

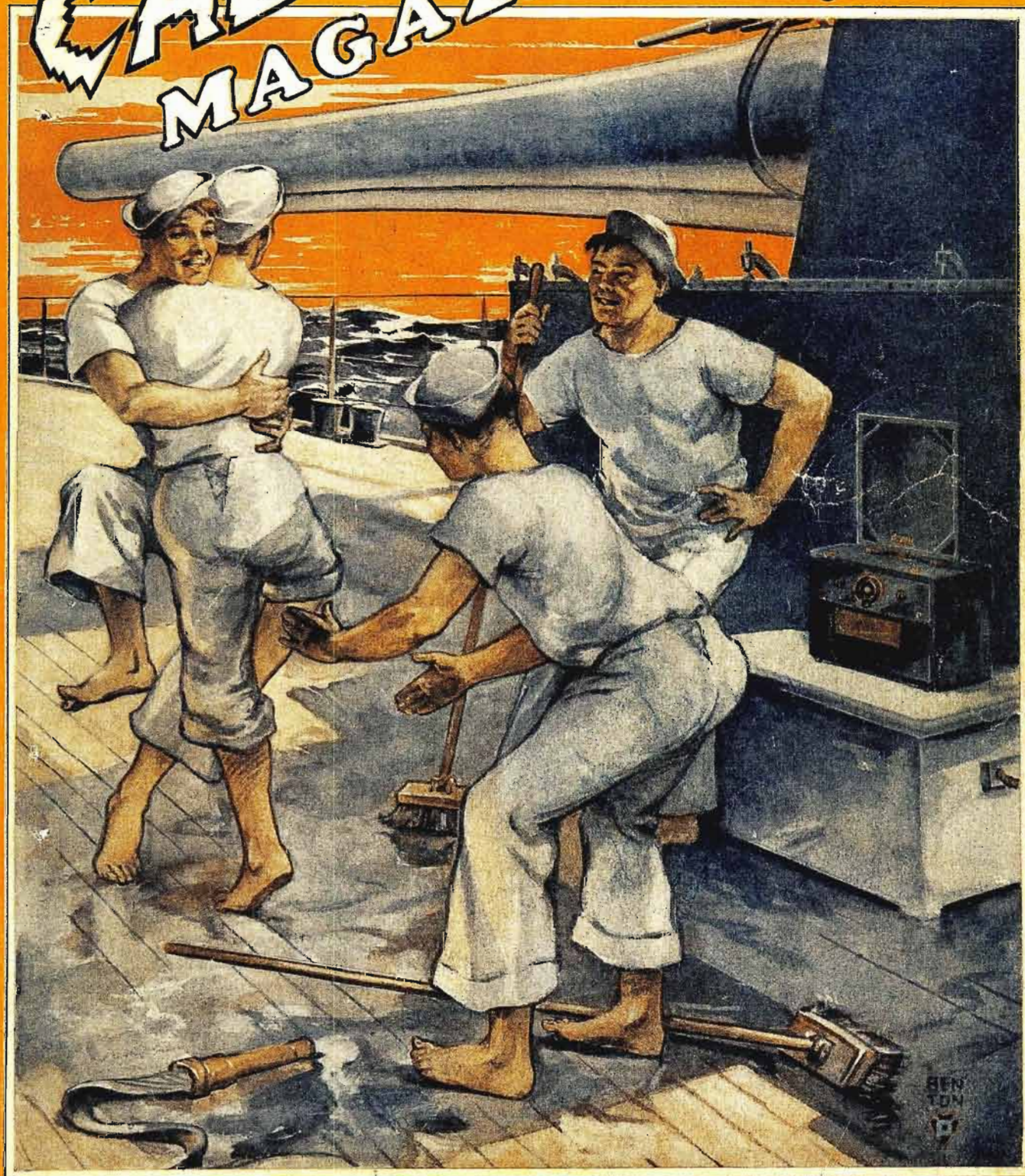
Citizen's

# RADIO CALL BOOK MAGAZINE

50¢

N. S. E.

A  
COMPLETE  
RADIO CYCLOPEDIA



“Used the World Over”

# THE RIGHT TUBE for the RIGHT SOCKET



Choose from

**Sonatron's  
33 Types**

—the World's Largest  
Tube Line

*Sonatron offers you exactly what you seek in radio tubes — standard quality, a remarkable guarantee, and the superior results of tubes carefully adapted to their particular work. In addition, Sonatron's progressive spirit brings you the newest tubes — in many cases months before any other manufacturer. Sold everywhere. Write for the newest tube information — our circular CB-9.*

*Among the newest Sonatrons are these advanced developments—the SH 85 No Filament Rectifying Tube—the sensational 225 AC . . . The complete line includes Power Detectors and Amplifiers, Dry Cell, Rectifying and Hi-Mu Tubes . . . and the standard X-201-A*



*Warning: Look for the Sonatron label on every tube — it identifies the genuine*

# SONATRON

SONATRON TUBE COMPANY

NEWARK, N. J.

108 West Lake St., CHICAGO

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# Tower

Presents

## New Startling

### 1927-28 SPEAKER VALUES



COMPLETELY revolutionizing present day standards, TOWER offers these five new, brilliantly conceived and executed cones. Select no speaker until you see them!



MODEL "28" \$17.50

Suggestive of the days of chivalry with elaborate heraldic grill and armature type unit. Superb volume and tone quality.

No matter what design meets your fancy—sailing ship or medieval castle, popular drum or octagonal cone — there's a TOWER Speaker of highest quality to delight both the eye and ear.

See your dealer or write us for illustrated circular.

TOWER MFG. CORP.  
124 Brookline Ave., Boston



Adventurer \$9.50

A genuine sailing ship model cast in bas-relief with bright natural colorings. Armature unit. WEST OF DES MOINES, IA., \$10.50



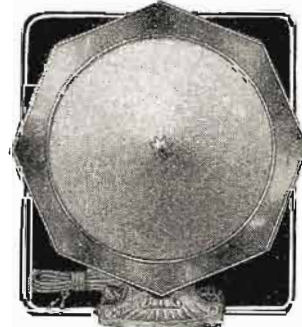
Castle Cone \$9.50

A creative work of art finished in two-toned bronze. Employs powerful new type armature unit for power tube amplification. WEST OF DES MOINES, IA., \$10.50



Pirate Ship \$7.95

The most amazing cone on the market! A fine old PIRATE SHIP with exceptional reproducing qualities. The utmost in eye and ear value. WEST OF DES MOINES, IA., \$8.75



NEW IMPROVED \$15-  
Meistersinger

America's most beautiful cone! Both a wall and table model with new armature type unit for power tubes. Mahogany finished frame. Art Metal Base.

Over Two Million Tower Products now in use!

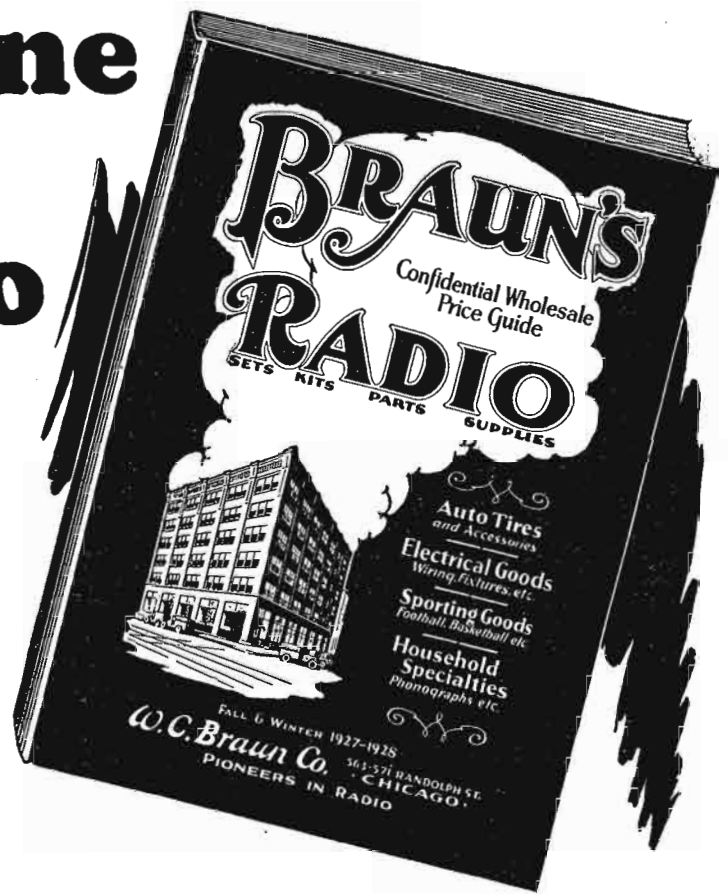
# The Keystone of Many a Retail Radio Store

—the Braun Confidential  
Wholesale Price Guide

Placing, at the Instant Call of Dealers  
Everywhere, the Greatest Radio  
Stock in All the World

From a very modest beginning, the W. C. Braun Company has shown a steady and rapid rise, until it now ranks as one of the largest distributors of radio products in the country. This Company was originally conceived with the thought in mind of furnishing a base of supplies for the average small retail radio dealer who could not hope to carry large stocks and, of necessity, must have a dependable source from which he could draw quickly for the servicing of his trade.

In the spirit of wishing to develop this idea to its fullest extent, we early inaugurated a policy of carrying all of the most popular manufactured lines of radio parts, kits, sets and supplies.



Coupled with our present large warehousing space, a trained, skilled organization and the best physical equipment possible that money can buy, we stand now in a position to give better service to our dealers than ever before.

## Distributors of These Nationally Known Radio Lines

|                 |                |                                |
|-----------------|----------------|--------------------------------|
| All-American    | Timmons        | Continental                    |
| Aero            | Cunningham     | Allen-Bradley                  |
| Jewel           | Marvelo        | Victoreen                      |
| Amsco           | R. C. A. Tubes | Signal                         |
| Pacent          | Spartan        | Ultradyn                       |
| Bremer-Tully    | Monroe Sets    | Stevens                        |
| Camfield        | Saal           | Madison-Moore                  |
| Silver-Marshall | Elkay          | Freshman                       |
| Raytheon        | Kurz-Kasch     | Precise                        |
| Browning-Drake  | Tray-Ler       | Eagle                          |
| Kingston        | Centralab      | National                       |
| Cookaday        | Kodel          | H. F. L.                       |
| Bolden          | Marco          | Eby                            |
| Lynch           | Baikite        | Tyrman                         |
| Bosch           | Micamold       | X-L                            |
| St. James       | Akradyne       | Hammarlund-                    |
| Gould           | Baldwin        | Roberts                        |
| Scott           | Thordarson     | Cutler-Hammer                  |
| Pioneer         | Trimm          | Frost                          |
| Hammarlund      | Excello        | Durham                         |
| Daven           | Samson         | Yaxley                         |
| Karas           | Thorola        | Walbert                        |
| Valley          | Carter         | Muter                          |
| Benjamin        | Polymet        | Apex                           |
| Jefferson       | Pilot          | Consrad                        |
| Hanscom         | Cardwell       | U. S. L.                       |
| Amertran        | Hazeltine      | Na-Aid                         |
| Workrite        | Mathieson      | Steinitz                       |
| General         | McCullough     | Q. R. S.                       |
| Musselman       | Chefton        | B. M. S.                       |
| Dubilier        | Concert Master | Maxlmitz                       |
| Van Horne       | Aalco          | Korach                         |
| Sangamo         | Burgess        | Exido                          |
| Eveready        | Thomas         | Graynie                        |
| Sterling        | Najestlo       | De Jur                         |
| Weston          | Bodine         | Jones                          |
| Bruno           | Hoyt           | Ferranti                       |
| Sonatron        | Acme           | Tobe                           |
| Magnaformer     | Remier         | And All Other<br>Popular Lines |

## Be First in Your Town to Get This Franchise

Last season our line of Monroe sets enjoyed a phenomenal popularity in every section of the country. Into their construction we placed the very finest materials obtainable, and only the most highly skilled workmanship. As a result, these sets became very popular with our dealers because of the lack of servicing and the trouble-free service which they gave in the hands of the users. This year these old dealers will push these sets to the very limit, and although our appointments have been very widespread there are many good districts yet open for the Monroe franchise.

## Braun Service Will "Make" Your Store

We are now so equipped in stock that practically all orders are shipped the same day of receipt. Telegraph orders are given very special attention and positively leave for destination on the same day the order is received. If you do not know about the Braun exceptionally speedy service you are counseled to write us immediately for your copy of the new Confidential Wholesale Price Guide which has just come from the press. This book has proven the foundation of many a successful retail radio store. In it you will find listed practically all the nationally-known radio lines in a completeness never heretofore reached by us or any other concern.

It will also point out to your the Braun plan of stabilizing radio retailing through carrying selected, limited allied lines during the season when the radio business is slack. It will also set out in detail the elaborate advertising and sales promotion help which our new Sales Promotion Department is equipped to furnish all Braun dealers.

In writing for this book please use your letterhead and give the names of two wholesale firms from which you have purchased in the past.

# W. C. BRAUN COMPANY

Pioneers in Radio

563-571 Randolph Street

Chicago, Ill.



**Magnaformer 9-8**  
*Commander-in-chief of the Air*

# FROST-RADIO DE LUXE

## Specified Exclusively for the Magnaformer

### FROST-RADIO DeLuxe Parts

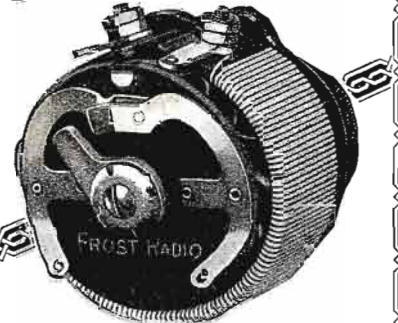
are exclusively specified for the Magnaformer 9-8 "Commander in Chief of the Air," described and illustrated in this publication. Go to your dealer and ask him for the following **FROST** parts for this great receiver: 1 No. 1810 De Luxe 10-ohm Rheostat; 1 No. S-1810 De Luxe 10-ohm Rheostat with switch; 1 No. 1830 De Luxe 30-ohm Rheostat; 1 No. 1824 De Luxe 400-ohm Potentiometer; 4 No. 253 Cord Tip Jacks.

**FROST-RADIO** Parts are also specified for the following popular circuits: Camfield Super-Selective 9; Bodine AC 6; Melo-Heald 14; S-M Unipac; Infradyne; Best's 45 Kilocycle 1928 Super, and many others.

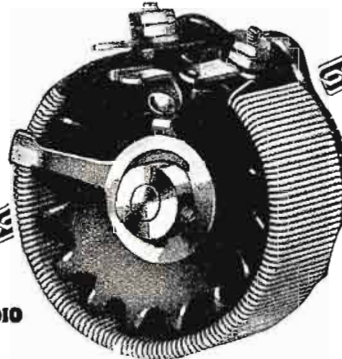
Fine quality and 100% performance won this national acceptance of **FROST-RADIO** for the country's leading circuits. **FROST** Quality always leads!



**FROST-RADIO**  
 No. 253 CORD TIP JACK  
 The handy cord tip jack with the spring clutch. 2 pairs used in the Magnaformer. Per pair . . . . . 30c

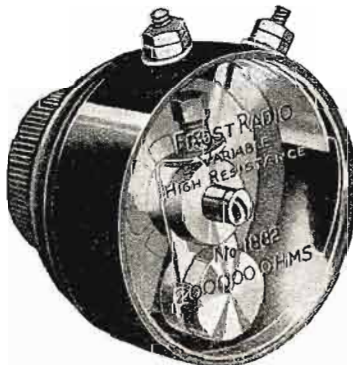


**DE LUXE BAKELITE RHEOSTATS**  
 Air cooled Bakelite frame; flexible Bakelite resistance mounting strip; hand-buffed nickel plated metal parts; Bakelite pointer knob. Series 1800, any resistance (shown at left) . . . . . \$1.00  
 Series S-1800, any resistance, with filament switch (shown above) . . . . . \$1.35



**FROST-RADIO**

**FROST-RADIO De Luxe Parts**  
 Are of Unbeatable Quality



**FROST-RADIO**  
 DE LUXE VARIABLE HIGH RESISTANCES

Have frictionless roller contact that reveals no wear or resistance strip changes after tests of over a million rotations. Perfect control of volume; entirely free from jerks or sudden changes. Bakelite pointer knob; polished Bakelite case and transparent Bakelite dust cover. 2,000 to 500,000 ohms. Series 1880, 2 terminals, \$1.75  
 Series 1890, 3 terminals, \$1.75

**DE LUXE METAL FRAME RHEOSTATS**  
 Series 1700, any resistance . . . . . \$ .75  
 Series S-1700, with filament switch, any resistance . . . . . \$1.10



**FROST-RADIO**  
 DE LUXE VARIABLE HIGH RESISTANCES WITH SWITCH

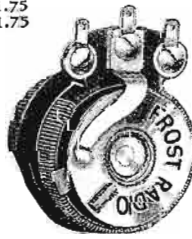
Construction is identical with Series 1880-1890 Resistances except that filament switch, mounted on Bakelite panel, operates when knob is turned to left, locking in "off" position. Nickel silver springs have sterling silver contacts. 2,000 to 500,000 ohms. Series S-1880, 2 terminals . . . \$2.10  
 Series S-1890, 3 terminals . . . \$2.10

### FROST-RADIO

Parts That Are Famous for Quality

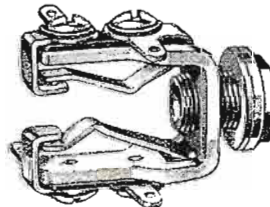


**FROST-FONES**  
 \$3.00  
 \$3.50  
 \$6.00



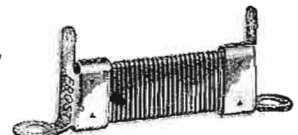
**FROST-RADIO**

**FROST-RADIO GEM DE LUXE RHEOSTAT**  
 Neat, compact and sturdy—a mighty good little rheostat. 6 to 30 ohms plain . . . . . 75c  
 With switch (illustrated) \$1.00  
 Also 200 and 400 ohm Gem Potentiometer . . . \$1.00



**FROST-RADIO**  
 Gem Jacks  
 40c  
 to  
 50c

Gem Jacks project only 1 inch back of panel. Brass frames are nickel plated and buffed. Springs are self-cleaning, with sterling silver contacts. Four popular types.



**FROST-RADIO DE LUXE FIXED RESISTANCES**  
 Wound on flexible Bakelite with staked terminals that cannot pull out. Wire of ample current carrying capacity. Supplied in 23 standard resistances from .4 to 1,000 ohms. .4 to 50 ohms 15c  
 100 to 1,000 ohms . . . . . 25c

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**FROST-RADIO**

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Pittsburgh  
 Washington

St. Paul  
 New Orleans

Los Angeles  
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Tell 'Em You Saw It in the Citizens Radio Call Book

# Citizens Radio Call Book Magazine

Established 1921

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SEPTEMBER, 1927

Vol. 8, No. 2

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## With the Editor

WITH this issue, the CITIZENS RADIO CALL BOOK enters into the seventh year of publication. The CITIZENS RADIO CALL BOOK of today is very much different from the modest loose-leaf Call Book of 1921. Originally conceived to supply the demand of the commercial and amateur operator for a Call Book containing all of the radio stations of the world, this magazine has slowly changed, both in physical appearance and type of content. We have endeavored, as year after year passed, to improve the magazine so that it would appeal to the radio public as a whole. Nor have we neglected our original readers. An amateur edition of the CITIZENS RADIO CALL BOOK appears tri-annually, supplying an up-to-date list of all commercial, broadcast and amateur stations in the world.

THERE has been considerable discussion during the past few years that the "parts business" is on the decline and that the custom-built receiver has lost favor with the radio public. A careful analysis of the situation has disclosed the falsity of such an assumption. The magazines catering to the radio experimenter and the home constructor all report that their circulation is increasing with each passing year. The constant introduction of new circuits and highly improved apparatus such as radio frequency transformers, audio frequency transformers, sockets, condensers, drum dials and other single control devices have so held the attention of the home constructor, that all indications point to an increased interest in that field instead of a decrease. There always will be an interest in the custom-built receiver. This interest will be largely governed by the quality of the receiver or power device described in the radio publications of today and tomorrow. We well realize the tremendous factor we constitute in this field in keeping the interest of the home constructor centered around custom-built receivers and power devices, and will exert every effort to bring before him apparatus, receivers and the like which are of such quality as to merit his continued interest.

F. C. BURLINGTON, Editor.

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Citizens Radio Call Book Magazine is for sale on all newsstands in the United States and Canada; also Department Stores and Book Stores; also can be purchased in most radio stores. Paris, France, Brentanos, Ave de L'Opera. England, R. A. Rothermel, Ltd., 24-26 Maddox St., Regent St., London, and W. H. Smith & Sons, London.

We also publish Citizens Radio Amateur Call Book, tri-annual, 75c per copy, listing all amateur transmitting stations in the world. Subscription price, \$2.00 yearly. Published September, December and March.

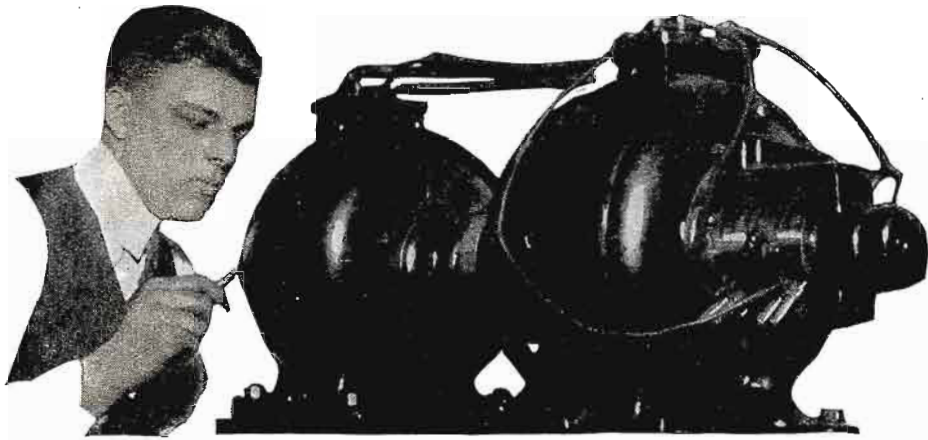
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# Amazingly Easy Way to get into ELECTRICITY

Don't spend your life waiting for \$5 raises in a dull, hopeless job. Now . . . and forever . . . say good-bye to 25 and 35 dollars a week. Let me show you how to qualify for jobs leading to salaries of \$50, \$60 and up, a week, in Electricity—NOT by correspondence, but by an amazing way to teach, that makes you an electrical expert in 90 days! Getting into Electricity is far easier than you imagine!

## Learn Without Lessons in 90 DAYS

**L**ACK of experience—age, or education bars no one. I don't care if you don't know an armature from an air brake—I don't expect you to! I don't care if you're 16 years old or 48—it makes no difference! Don't let lack of money stop you. Most of the men at Coyne have no more money than you have. That's why I have worked out my astonishing offers.

### Railroad Fare Allowed

I will allow your railroad fare to Chicago, and if you should need part-time work I'll assist you to it. Then, in 12 brief weeks, in the great roaring shops of Coyne, I train you as you never dreamed you could be trained . . . on the greatest outlay of electrical apparatus ever assembled . . . costing hundreds of thousands of dollars . . . real dynamos, engines, power plants, autos, switchboards, transmitting stations . . . everything from doorbells to farm power and lighting . . . full-sized . . . in full operation every day!

### No Books—No Printed Lessons

No dull books, no baffling charts

# COYNE ELECTRICAL SCHOOL

H. C. LEWIS, President, Dept. 67-08  
500 S. Paulina St., Chicago Established 1899



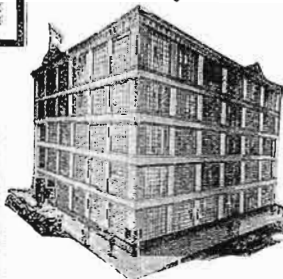
### Prepare For Jobs Like These

Here are a few of hundreds of positions open to Coyne-trained men. Our free employment bureau gives you lifetime employment service.

|                       |              |
|-----------------------|--------------|
| Armature Expert       | \$100 a Week |
| Substation Operator   | \$85 a Week  |
| Auto Electrician      | \$40 a Week  |
| Inventor              | Unlimited    |
| Maintenance Engineer  | \$130 a Week |
| Service Station Owner | \$200 a Week |
| Radio Expert          | \$100 a Week |

### Now In Our New Home

This is our new, fireproof, modern home wherein is installed thousands of dollars, worth of the newest and most modern Electrical Equipment of all kinds. We now have the largest amount of floor space devoted to the exclusive teaching of practical electricity in the world. Every comfort and convenience has been arranged to make you happy and contented during your training.



. . . all real actual work . . . building real batteries . . . winding real armatures, operating real motors, dynamos and generators, wiring houses, etc., etc. That's a glimpse of how we make you a master electrician in 90 days, teaching you far more than the average ordinary electrician ever knows and fitting you to step into jobs leading to big pay immediately after graduation. Here, in this world-famous *Parent school*—and nowhere else in the world—can you get such training!

### Jobs, Pay, Future

Don't worry about a job, Coyne training settles the job question for life. Demand for Coyne men often

exceeds the supply. Our employment bureau gives you lifetime service. Two weeks after graduation, Clyde F. Hart got a position as electrician with the Great Western Railroad at over \$100 a week. That's not unusual. We can point to many of Coyne men making up to \$600 a month. \$60 a week is only the beginning of your opportunity. You can go into radio, battery or automotive electrical business for yourself and make up to \$15,000 a year.

### Get the Facts

Coyne is your one great chance to get into electricity. Every obstacle is removed. This school is 28 years old—Coyne training is tested—proven beyond all doubt—endorsed by many large electrical concerns. You can find out everything absolutely free. Simply mail the coupon and let me send you the big, free Coyne book of 150 photographs . . . facts . . . jobs . . . salaries . . . opportunities. Tells you how many earn expenses while training and how we assist our graduates in the field. This does not obligate you. So act at once. Just mail coupon.

## Get this FREE Book



Mr. H. C. Lewis, Pres.  
COYNE ELECTRICAL SCHOOL, Dept. 67-08  
500 S. Paulina St., Chicago, Ill.

Dear Mr. Lewis:

Without obligation send me your big free catalog and all details of Railroad Fare to Chicago, Free Employment Service, Radio and Automotive Courses, and how I can "earn while learning." I understand I will not be bothered by any salesman.

Name . . . . .  
Address . . . . .  
City . . . . . State . . . . .

Tell 'Em You Saw It in the Citizens Radio Call Book

# FERRANTI A.F.4 TRANSFORMERS

*Exclusively specified*

for the

## MAGNAFORMER 9-8 CIRCUIT

**FERRANTI**

*The Quality  
Audio Frequency  
Transformer  
Used in  
High grade  
Radio Sets by  
Slagle Radio Company  
Indiana Manufacturing  
and Electric Co.  
Case Sets*



A.F.4 Price \$8.50  
Ratio:  $3\frac{1}{2}$  to 1  
Dimensions  $2\frac{1}{4}$ " x  $3$ " x  $3\frac{1}{4}$ "  
Weight 1 lb. 8 oz.

A.F.3 Price \$12  
Ratio:  $3\frac{1}{2}$  to 1  
Dimensions  $2\frac{1}{4}$ " x  $3$ " x  $3\frac{1}{4}$ "  
Weight 1 lb. 14 oz.

Output Price \$10  
Ratio: 1 to 1  
Dimensions  $2\frac{3}{4}$ " x  $3$ " x  $3\frac{3}{4}$ "  
Weight 2 lbs. 10 oz.

Ferranti known design,  
electrical characteristics and construction  
assure the highest degree of radio reception

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Toronto, Ontario, Canada

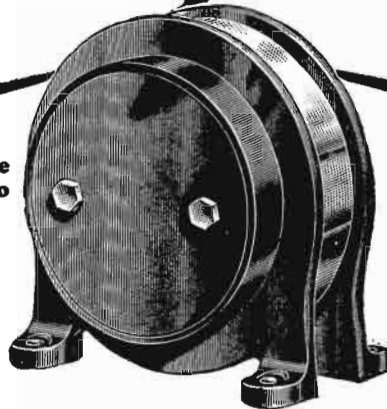
*Tell 'Em You Saw It in the Citizens Radio Call Book*



# Magnaformer

**Magna**—The dictionary definition of "magna" (Latin) is "great"; the definition of "former" is "creator". Thus, we have the "Great Creator, truly a name emblematic of the astonishing accomplishments of the Magnaformer.

**Price \$8.50**



### Two Years Ahead in Design

At the Radio Trade Show in Chicago, the announcement of the Magnaformer was one of the few startlingly new ideas in radio development. We know from actual observation that the Magnaformer is two years ahead in design, for it incorporates advanced and evolutionary ideas throughout. It is distinctly different, with its self-shielding, matched units, double amplification for each R. F. stage and excellent laboratory construction. It is a fresh idea—the very heart of the new and better receiver in which its remarkable qualities are given full range. Coming, as it does, when the air has been cleared by the new rulings of the Federal Radio Commission, it makes it possible to secure exceptional results, accomplishments heretofore unknown to radio fans.

**T**HE new Magnaformer 9-8 Receiver has won the instant approval of radio experts. It has created a new standard of all-around radio efficiency. It is the season's feature circuit in Radio, Citizens Radio Call Book, Popular Radio, and other well-known magazines. This widespread acceptance and enthusiasm is due to the inherent excellence of the circuit—its hair-splitting selectivity, perfected, superb tone, great volume and extremely long range. During the first test of the Magnaformer Receiver this Spring, 43 D-X stations were logged from Chicago, including three on the Pacific Coast. The engineers present during the test were astounded. Subsequent performances have shown that the Magnaformer does the amazing thing consistently. Winter reception will see many additional record performances, according to the experts. The enthusiastic reception accorded in Chicago is now being given the Magnaformer the country over. Its performance is sensational. It is the talked-about circuit in radio professional and amateur circles. One of the real thrills and joys in truly exceptional radio performances is in store for the man who "builds his own," and it is impossible to duplicate the work of the Magnaformer in any other way.

The secret of the Magnaformer circuit's efficiency lies in the new Magnaformer intermediate long-wave transformers with which it is equipped. These transformers are a distinct innovation in radio. They are refreshingly new in design, in workmanship and in performance. This new and superior construction meets the present-day demand for greater radio efficiency, a demand far more critical than ever before, due to radio's rapid advancement in factory-built receivers. The circuit throughout is new and modern. It has the latest lighted drum dials, controlled by knobs instead of the fingers; unique Ferranti transformers give equal amplification of all audio frequencies; output tone filter insures retention of tone quality.

Thus, in the Magnaformer you have a precision-built instrument that ranks foremost in laboratory circles and which is available to set builders in the perfection of a truly remarkable radio receiver, a receiver that is designed from the best available parts possible to produce, all matched perfectly into a compact, high-quality receiving set of the first order.

Truly, it has well earned its name, Magnaformer, the "Great Creator."

## Magnaformers are different, outstanding and unusual in four vital respects

**FIRST**—Magnaformers are precisely and unalterably tuned in the laboratory to exactly the same wave length in such a manner that they always positively pass the full and complete signal-wave with all of its harmonic carrying side-bands intact; result—surprisingly beautiful tone quality.

**SECOND**—The combined elements of technical engineering design of Magnaformer Intermediates are such that the incoming signal receives double the usual amplification in each R. F. stage; result—a very powerful output perfectly controlled from a whisper to volume enough to fill a large hall—every sound clear and distinct.

**THIRD**—Magnaformers are thoroughly and scientifically shielded—so that the tubes to which they are connected will not oscillate, no matter how closely together or in what position they are placed in the receiver—a very important factor of its superior design; result—no fuss, no fuming, no squeals, squawks, blurps nor hisses. Just beautiful, natural reception, clear, full-toned, quiet, powerful.

**FOURTH**—Mechanically, Magnaformers are as nearly perfect as engineering skill can make them. The three foregoing electrical factors are depend-

ent on perfection of Mechanical Design to insure their unvarying performance. The primary and secondary coils of each Magnaformer are wound on pure Bakelite and are permanently fixed so that their inductances cannot possibly change. The secondary inductances are exactly tuned in the laboratory by small variable condensers which are fixed and locked after the tuning is done. These small condensers are locked in entirely separate Bakelite compartments and are ENTIRELY outside the electrostatic fields of the coils. No jar or jolt can disturb or change the inductances or capacities of Magnaformers after they leave the laboratory. The coils also are locked in entirely separate Bakelite compartments. Both coils and condensers are specially treated before being locked in their separate compartments. They cannot possibly be affected by moisture, atmospheric or climatic changes; result—a permanency of vital tuning factors that insures a uniform and unalterable reception for the Receiver, year in and year out—a rare achievement.

### Permanent, Unalterable, Fixed Construction

The size, the shape, the built-in quality features—these three elements incorporated in the Mag-

naformer intermediate transformer, makes it surprisingly efficient and practical.

It is the best-balanced, most critically adjusted and fixed unit that can be had. It is the correct size for ease in handling and mounting side by side. It is the one unit in a radio set upon which the performance of everything else is dependent. Therefore, it is constructed with precision, exactness and fixed, adjusted and sealed in manufacturing to insure perfect operation continuously. It will never need adjustment, taking apart or tinkering. It is as fixed and final when it reaches you as anything can be.

It is fool-proof and trouble-free—features that will be appreciated by both the amateur and experienced set builder.

### An Appreciation to the Set Builder

We take off our hats to the set builder, the man who has really made radio what it is today. Without set builders—the makers of custom-built receivers, the science of radio would still be in the infant stages. The inspirations, the innovations, the continuous streams of new ideas, advancement and accomplishment in radio—these are all due to the set builder. It was the set builder who was the first to recognize radio's possibilities. It is to his untiring zeal that radio is what it is today.

The set builder deserves the respect of every professional radio engineer and manufacturer in the industry.

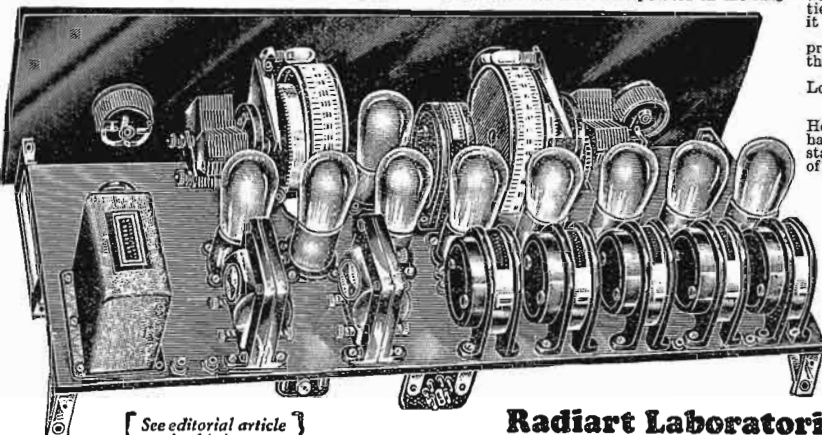
Here's to the Knight of the soldering iron! Long may he carry on!

### Enjoy This Thrill!

How many times have you wished that you could have a radio set that would bring in almost any station you desired, loudly and clearly, regardless of distance, and without squeals and howls? A set you could operate with perfect ease? A set that reproduces naturally, sweetly, delightfully, just as if you were listening to the program in the studio?

Now the opportunity to actually hear the supreme achievement in radio is afforded to you through the Magnaformer. It will be a new and pleasing experience for you and will furnish you with a new and novel radio thrill.

10c brings you full-size visualized circuit blue-prints, novel wiring diagram, complete wiring instructions and detailed story of development and accomplishments of Magnaformer. Be the first to get it.



[ See editorial article in this issue ]

**Radiart Laboratories Co.** 19 S. LaSalle St., Dept. 26 CHICAGO, ILLINOIS

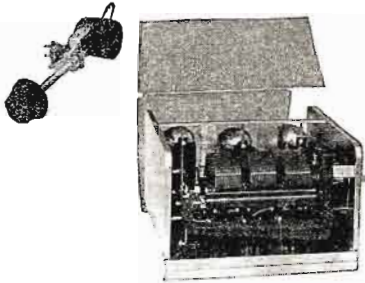
Tell 'Em You Saw It in the Citizens Radio Call Book

# REMLER

Now You Can Build the

## INFRA+DYNE

Easily - Quickly  
Safely



### Remler R. F. Amplifier and Antenna Compensator

The No. 710 R. F. Amplifier incorporates two stages of R. F. Amplification and a detector. Entirely enclosed in a sheet copper case which gives complete electro-magnetic shielding. It is designed for single-dial control, either with Remler Drum Dial or the ordinary 360° vernier dial. An Antenna Compensator, supplied with the amplifier, nullifies the de-tuning effect of the antenna, which interferes with efficient operation in the usual single-control R. F. amplifier. A Switch is provided for selective or non-selective tuning.

Included in the Remler No. 710 Amplifier are special solenoid-type, small diameter coils, the Remler 3-in-Line Condenser, Remler No. 50 Sockets, and special resistances.

No. 710...Price \$55.00



### Infra-dyne Amplifier

The Remler Infra-dyne Amplifier is a three-stage radio frequency unit which is adapted for use in connection with practically all standard sets of the tuned radio-frequency or neutrodyne types, and which also fully meets the requirements of the Infra-dyne Circuit.

The No. 700 Infra-dyne Amplifier offers a marked improvement in the selectivity and sensitivity of any set with which it is used.

This instrument is the result of the development of a simple and effective method for controlling energy transfer through tube capacities at high frequencies. It is unique in that amplification is accomplished at the fixed and very short wave length of 86 meters.

**\$27.50**



### Control Panel of Infra-dyne Kit

The Remler Infra-dyne Kit, No. 750, includes the following apparatus: Etched copper control panel (illustrated above); pressed steel instrument panel, two No. 110 Remler Drum Dials; one No. 659 Twin-Rotor Condenser; four No. 50 Remler Sockets, three No. 35 Remler Choke Coils; one special Coil; all necessary fixed condensers, rheostats, and fixed resistances; jacks; switches, binding posts; and wire and battery cable in colors to agree with wiring diagram.

The complete instructions include schematic wiring diagram; full-size cable harness template; schematic cable lay-out; diagram of parts and wiring under steel base; plan view of top of steel base.

No. 750—Infra-dyne Foundation Kit  
.....Price \$52.00



### REMLER INFRADYNE CABINET

This copper cabinet, embossed in two-tone brown crystalline enamel, together with a decorated wood base, supplies the highest standards of convenience and appearance for the new Infra-dyne. Size: 11x26 inches.

No. 760.....Price \$15.00

Two Hours Work—

Then Perfect Reception

The new Remler R. F. Amplifier and Infra-dyne Foundation Kit are designed to meet the growing demand for complete, tested and trouble-free construction units for the Infra-dyne Circuit.

Now, you can easily build the Infra-dyne in two hours with the simplest tools. Now, you can be sure of matched parts, scientifically correct design, and proper location of each piece of apparatus.

Remler leadership and reputation in the manufacture of quality parts is your guarantee of satisfaction.

*Write for special Infra-dyne folder and also a two-color catalog of Remler parts.*

**Remler Division of  
GRAY & DANIELSON MFG. CO.**

260 First Street, San Francisco

Eastern Warehouse: Elkhart, Ind.  
Chicago New York



By assembling Remler Units Nos. 700, 710, 750 and 760, together with two transformers and one voltmeter, you can build the complete Infra-dyne.

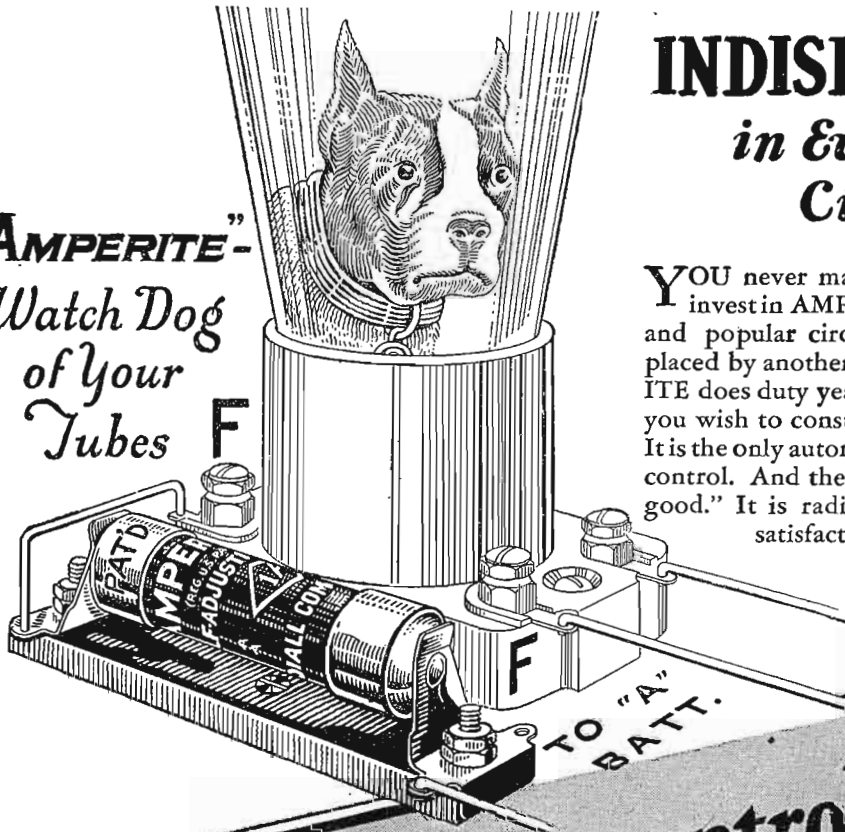
Now every part is checked and tested to give maximum results with every other part. The diagrams make it impossible to go wrong in either the wiring or the placement of parts.

While the ordinary factory set is designed to meet average conditions of reception, the Infra-dyne is so flexible in adjustment and control that it will meet the exact requirements of your particular locality.

And when you have built the Infra-dyne, you will have a set which for years to come will give you ideal reception at a minimum cost.

Tell 'Em You Saw It in the Citizens Radio Call Book

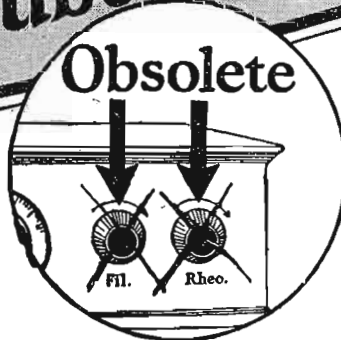
**"AMPERITE"**  
*Watch Dog*  
*of your*  
*Tubes*



# INDISPENSABLE! *in Every Radio* *Circuit*

**Y**OU never make a mistake when you invest in AMPERITES. The most clever and popular circuit of today may be replaced by another tomorrow. But AMPERITE does duty year after year in any circuit you wish to construct. It never wears out. It is the only automatic self-variable filament control. And there is nothing else "just as good." It is radio's most permanent and satisfactory investment.

**solves the tube control problem**



**Season's Best  
 Hook-ups FREE**

Write today for new "AMPERITE Book" just off press. A veritable jewel for last minute information on the season's most popular hook-ups and construction data. Address Dept. CCB-2.

*Specified  
 in the*

- Hi-Q
- Strobodyne
- Magnaformer
- Browning-Drake
- Equamatic
- Lincoln Quality
- Camfield Super
- Infradyne
- Ultra 5
- Citizens Super 9
- Bodine Twin 8
- Lodge N Circuit
- L C-27
- DX Special
- Super-Sensitive 5
- Planofier 7
- Find-All-5 and 6

*and all other  
 GOOD Circuits*

AMPERITE simplifies wiring and operation. Insures just the proper filament current for each and every tube. Does away with all hand rheostats on the panel. Precludes tube damage from under or excessive "A" current—resulting in both increased tube life and at all times maximum tube performance.

If you want AMPERITE performance you must insist upon AMPERITE. Nothing else will do. More essential than ever if you use a battery eliminator or trickle charger. Types for every tube. Sold everywhere. Price complete with mounting \$1.10 (in U. S. A.).

*Radiall Company*  
 50 FRANKLIN ST. NEW YORK

# AMPERITE

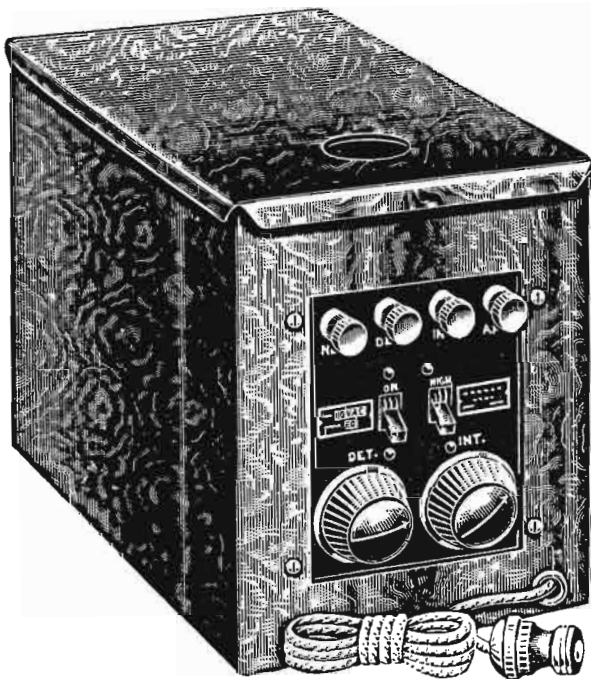
REG. U.S. PAT. OFF.

*The "SELF-ADJUSTING" Rheostat*

\$  
1.00  
DOWN

# No More "B" Batteries On Your Radio

## Brings You This Super "B" Eliminator COMPLETE WITH RAYTHEON TUBE



### DO AWAY WITH "B" BATTERIES

—their annoyance and trouble—the constant expense of changing them. The great Super "B" Eliminator offered in this ad is easily and instantly attached to any light socket. It delivers a steady flow of power. Hum, noise, distortion, pulses and all other disturbances are gone. You can use this power unit for any type or style of set. It gives immediate satisfaction—100% efficient. Built with heavy duty chokes, transformers and finest condensers in the filter circuits—the most modern, powerful and flexible "B" Eliminator on the market.

### Now Sold for \$1.00 Down

Radio retailers everywhere have asked the cash price of \$42.50 for this great "B" Eliminator. Now, because of our enormous buying power, we are able to offer it to you for only \$29.50 to be paid in easy installments. This is the most sensational offer ever made. Never before has a power unit of this class been available at such a price on easy payments.

### Try It for 30 Days

Only \$1.00 pinned to the coupon below brings you this great Super "B" Eliminator. Then we want you to try it and test it at our expense for one month. You don't pay us another penny until you are fully satisfied, as we know you will be. After you have experienced the difference this power unit makes in your set you will want to keep it. Then send us only \$5.00 a month until you have paid the total price of only \$29.50.

## Fully Guaranteed

The Super "B" Eliminator complete with famous Raytheon tube is guaranteed for one year against mechanical and electrical defects. Written guarantee goes with each unit. The strong construction assures its endurance—it lasts a life-time.

### What Users Say

"This is to advise that Super 'B' Eliminator ordered by me has arrived in very good condition and that I am very much pleased with the performance of this Eliminator."

JOHN L. KAMEEN, 535 Clinton St., Vandling, Pa.

"In all I have four eliminators from you and they all are excellent. No hum or noise whatsoever."

J. H. MILLER, 134 N. Carrollton Ave., New Orleans, La.

"I received my new Raytheon 'B' Eliminator about an hour ago. It is working fine."

HERBERT FERRIS, R. R. Box 681, Indianapolis, Ind.

### Description

The case is beautifully finished in burl walnut wood design. The panel is black etched in gold. Equipped with rubber covered cord and socket plug.

### Use the New Power Tubes

Equipped with high voltage taps and variable adjustments so that any of the new power tubes may be used. Operates from 110-120 A. C., 50-60 cycle current. Has tap for intermediate voltage on which 67½ to 90 volts may be obtained. The detector tap will supply 22½ to 67½ volts. Variable adjustment will deliver any desired detector voltage. On and off switch and high and low voltage switch are integral parts of the eliminator. No additional switches or cord switches are necessary.

The full wave rectifying Raytheon tube has made possible the delivery of great current at a high voltage with efficient apparatus. The Super Power Raytheon eliminator will deliver up to 180 volts. More than enough for any set from one to twelve tubes. This Raytheon Rectifying Tube has an indefinite life because it has no filament to burn out. Complete instructions with each unit for wiring to radio set.

## Mail This Coupon NOW!

ELLIOTT RADIO CORPORATION

709 West Lake Street, Dept. 18  
Chicago, Illinois

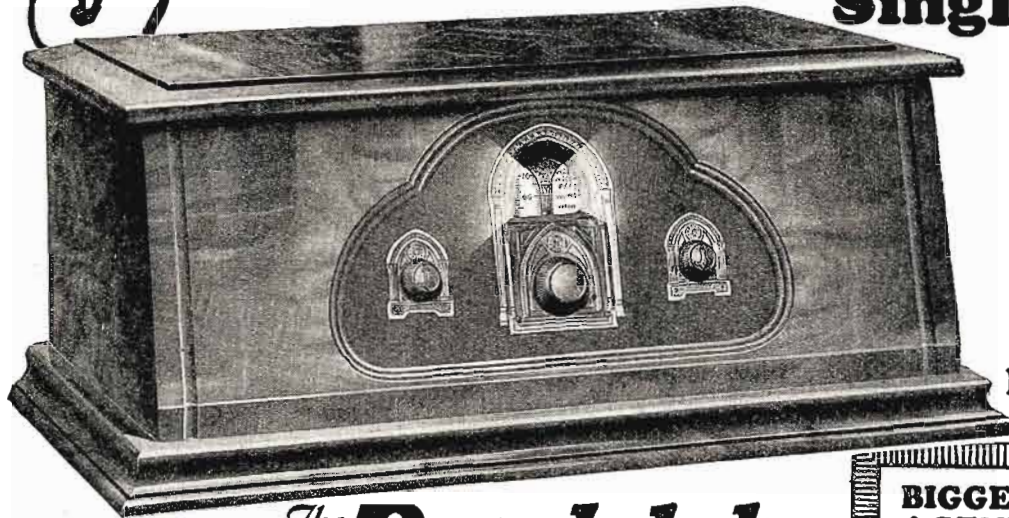
Attached find \$1.00 for which you agree to send me Super "B" Eliminator as described in your ad. Full particulars will be sent me by return mail and my money will be refunded if I do not accept your offer.

Name.....

Address.....

City..... State.....

# 30 Days FREE TRIAL



**Single Control**

**7-Tube**

**\$ 77**

**RETAIL PRICE**

Completely Assembled

## The **Randolph**

SINGLE CONTROL - ILLUMINATED DRUM

**POWERFUL** seven-tube radio at factory price. Test it without spending a cent. We claim the Randolph Seven will out-perform any radio and we want you to satisfy yourself that it will. To do this, we will send you this powerful radio to try for 30 days. Test it for distance, clearness, ease of operation, tone and every other way you can. Unless it more than satisfies you, return it to us. **Every Randolph set must make good before it is sold.**

### Battery **ALL ELECTRIC OPERATION**

The Randolph Seven is sold for use with batteries or connected for operation direct to electric light socket—absolutely batteryless—no chargers or batteries—just **plug in** socket and **tune in**. 100% efficient either way. Its construction and performance have been tested and approved by leading radio engineers and authorities and leading radio and scientific publications.

### Single Control—Illuminated Drum

One drum dial operated by one simple vernier control tunes in all stations with easy selectivity to tremendous volume. No overlapping of stations. Illuminated drum permits operation in the dark. Volume control for finer volume modulation. This is a 7-tube tuned radio frequency receiver with power transformers and power amplification. Space wound solenoid coils Full and completely shielded. A real receiver of the highest quality. Tremendous distance, wonderful tone quality, simple to operate.

The Randolph cabinets are in themselves beautiful pieces of furniture made of carefully selected solid burl walnut. Bas-relief bronze escutcheon plates are mounted on the dial panel. In design and appearance it is a cabinet worthy of the high-quality radio it contains. Solid walnut beautifully shaped surrounds the soft verdi-green panel. Nothing has been spared to make the Randolph Seven the leading radio receiver. We are so sure that it will surpass even your best hopes that we know how safe we are in making the **30 day free trial offer.**

### Read What Owners Say

I have logged more than 50 stations from coast to coast.—Lloyd Davenport, Littlefield, Texas.  
I have logged 52 stations from Cuba to Seattle—the set is a world beater.—J. Tampkinson, Detroit, Mich.  
Your set is a revelation—has all others tied to the post for distance and selectivity.—Waldo Powers, Vergennes, Vermont.  
On strength of its performance sold two more sets this week. T. Scanlow, Orlando, Florida.

### Beautiful Ampliphonic Console Set

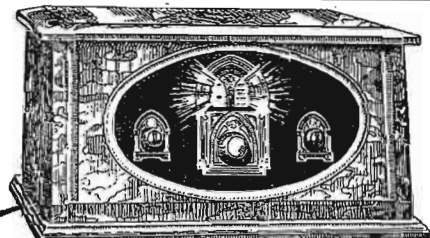
Made of the finest carefully selected solid walnut. Two-tone shaded finish. Has built-in cone loud-speaker that compares with any on the market and accurately reproduces high and low notes. Send for the folder today that shows this beautiful console in full colors and gives complete details. **Compares with most table sets in price.** For **battery or all-electric operation** ready to **plug in** and **tune in**. Write for complete descriptions.



**Randolph Radio Corporation**  
711 W. Lake St. Dept. 187, Chicago, Ill.

### BIGGEST DISCOUNTS to AGENTS and DEALERS

**WORK** either full or part time and make big money. Tremendous advertising campaign helps you sell. Regardless of whether you have ever sold before, be sure to get our proposition. The Randolph sells on first demonstration. Men and women both can make money this easy way. Get your demonstration set for thirty days **FREE TRIAL.**



**6-Tube**

**\$ 55**

**Retail Price**

**SINGLE CONTROL**

## The **Randolph**

Now you can have a new, modern, single-control, six-tube radio. Do not compare this set with old style 2-dial 6-tube sets selling for about the same price. The Randolph 1925 Senior Six has also been tested and approved by the leading radio engineers. Comes in a beautiful solid walnut cabinet of hand-rubbed finish. Single control, illuminated drum with space for logging. Absolutely dependable and very selective. Sent for 30 Days Free Trial. You test it before you buy.

### Mail Coupon Now

The Randolph Radio Corporation are pioneers in the manufacture of radios. All of its vast and unlimited resources have been used in making and perfecting of the Randolph Receivers. Because of our long and successful experience in the radio business, we are perfectly confident in sending out a Randolph Radio on trial. We know what it will do. Mail us the coupon now for the greatest radio offer ever made.

### USE THIS COUPON TODAY!

**Randolph Radio Corporation,**  
711 West Lake Street, Dept. 187,  
Chicago, Illinois.

Send me full particulars about the **RANDOLPH Six** and **Seven-Tube Table and Console Sets** with details of your **30 Day FREE Trial Offer.**

Name.....

Address.....

City..... State.....

Mark here ( ) if interested in Agent's proposition.

# American Broadcasting Stations

This list has been very carefully compiled from Federal Radio Commission bulletins and questionnaires sent to the broadcasting stations. If we have made any mistakes we want to know it. Address your corrections to the Citizens Radio Call Book, Caxton Building, Chicago, Ill., U. S. A.



**KDKA** Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa. 315.6 meters, 950 kilocycles, 30,000 watts. Week days, market and weather reports, 10, 12, 3, 5, 7:20. Time signals, 11:55 am; dinner concert, 6 pm. Evening program, 8 pm; Tues, 7:30. Studio talks, Mon, Tues, Wed, Fri, 7:45. Concert, Tues, 11:35 pm; Thur, 11 pm. Sun, church services, 10:45 am; organ recital, 4 pm; vespers, 4:45; orchestra, 6:30; church services, 7:45.

**KDLR** Radio Elec. Co., Devils Lake, N. Dak. 230.6 meters, 1300 kilocycles, 5 watts. Daily ex Sun, 12:15 pm, weather; 6:15 pm. markets. Mon, 9:30-11 pm, studio program; Sun, 11 am, church; 4:30-6 pm, studio program. Central standard time. Slogan: "North Dakota's Own Station."

**KDYL** Intermountain Broadcasting Corp., 1009-10-11 Ezra Thompson Building, Salt Lake City, Utah. 258.5 meters, 1160 kilocycles, 100 watts. Mon, Wed, Thur, Sat, 2-5 pm, 6-8 pm, studio program, baseball, etc.; 8-10:30 pm, studio; 10:30-11:30 pm, remote control dance music. Tues, 2-10 pm, studio; 10-12 pm, midnight, remote control dance. Fri. 2-5 pm, 6-8 pm, studio. Slogan: "On the Air—Goes Everywhere."

**KELW** Earl L. White, Broadcasting Station, Magnolia Park, Burbank, Calif. 228.9 meters, 1310 kilocycles, 250 watts. Daily ex Sun. 11:00 am, 1:00 pm, Press hour; 6-10 pm, Studio program. Western standard time. Slogan: "The White Spot of the San Fernando Valley."

**KEX** Western Broadcasting Co., Portland, Ore. 239.9 meters, 1250 kilocycles. 2500 watts. Sun, 8-10 pm, sacred music & organ concert. Daily ex Sun, 10 am, 12 noon, home economics; 6-10 pm, news, travciogues, music. Sat, 10-12 pm, midnight, dance music. Western standard time. Slogan: "A Public Service Necessity."

**KFAB** Nebraska Buick Auto Co., 13th and Ives sts., Lincoln, Nebr. 309.1 meters, 970 kilocycles, 2000 watts. Sun, 9-10 pm. Mon, Tues, Wed, 9:30-9:55 am, 10:30-11 am, 2:15-1:30 pm, 3-3:30 pm, 5:30-6:30 pm, 8-10:10:30 pm. Thurs, 3-4 pm. Fri same as Mon, Tues & Wed. Sat, 9:30-9:55 am, 3-3:30 pm, 5:30-6:30 pm, 8:30-10:30 pm. Slogan: "Home, Sweet Home."

**KFAD** Electrical Equipment Co., 312-16 N. Central av., Phoenix, Ariz. 272.6 meters, 1100 kilocycles, 500 watts. Daily, 12-15-1:15, 3-4, 6-7:30 pm. Tues, Fri & Sat, 8-9 pm. Wed & Thurs, 9-10 pm. Sun, 11 am to 12:30 pm, 8:30-9:30 pm. Mountain standard time. Slogan: "The Voice of Phoenix" and "The Gold Spot of America."

**KFAF** Alfred E. Fowler, 31st & San Antonio sts., San Jose, Calif. 217.3 meters, 1380 kilocycles, 50 watts. Pacific standard time.

**KFAU** High School, Boise, Idaho. 285.5 meters, 1050 kilocycles, 2000 watts. Sun, 7:30 to 8:30 or 9 pm, church services. Mon, Wed & Fri, 12:30 pm to 1 pm, market, weather, news. Tues, 12:30 to 1 pm, market, weather, news; 7:30-8 pm, 8 pm-10 pm Thurs; 12:30 pm to 1 pm, 8 pm, 10 pm, entertainment. No market or weather; 7:30 pm-8:30 pm, farm news by State Dept. of Agriculture.

**KFBB** F. A. Buttrey Co., Havre, Mont. 275.1 meters, 1090 kilocycles, 50 watts. Daily including Sun, 12 noon-1:45, noon-day program. Slogan: "Voice of the Treasure State."

**KFBC** Arthur W. Yale, M. D., and Union League Club of San Diego County, on roof of Balboa Theater Bldg., San Diego, Calif. 247.8 meters, 1210 kilocycles, 100 watts. Sun, 10 am-12 noon. Daily ex Sun, 5-10 pm, Pacific standard time.

**KFBK** Kimball Upson Co., 607 K st., Sacramento, Calif. 535.4 meters, 560 kilocycles, 100 watts. Mon, 7:30-9 pm, artist program & orchestra; 9-10 pm, dance program. Thur, 8-9 pm, artist program; 9-10:30 pm, dance program. Sat, 7:30-8 pm, dinner music; 8-9 pm, artist program; 9-10 pm, dance music. Western standard time. Slogan: "In the Heart of California."

**KFBL** Puget Sound Station, Leese Bros., 2814 Rucker ave., Everett, Wash. 223.7 meters, 1340 kilocycles, 50 watts. Daily, 7:30-8:30 pm. Sun, 11 am-12 noon. Mon, Wed, Fri, 6:30-8 pm. Tues, Thur, 7-8 pm, 9-10 pm. Sat, 9-11 pm. Pacific time. Slogan: "The Voice of Puget Sound."

**KFBS** School District No. 1, Trinidad, Colo. 238 meters, 1260 kilocycles, 15 watts.

**KFBU** St. Matthews Cathedral (Bishop N. S. Thomas), Laramie, Wyo. 428.3 meters, 700 kilocycles, 500 watts. Sun, 11 am, church. Daily ex Sun, 12 noon-1:30 pm, chapel services; 1:30 pm, studio programs. Mountain standard time. Slogan: "The Top of the World."

**KFCB** Nielsen Radio Supply Co., 311 N. Central av., Phoenix, Ariz. 243.8 meters, 1230 kilocycles, 125 watts. Sun, 9:30 to 10:30 am, Radio Community Bible Class. Mon, 7:30 to 8:30 pm, children's hour. Wed, 8 to 9 pm, musical. Thurs, 8 to 9 pm, educational program. Fri, 9 to 10 pm, dance music. Sat, 9 to 10 pm, dance music. Sun, 9:30-10:30 am, community Bible class. Mountain standard time. Slogan: "Kind Friends Come Back."

**KFCR** Santa Barbara Broadcasting Co., Daily News Bldg., Santa Barbara, Calif. 211.1 meters, 1420 kilocycles, 50 watts.

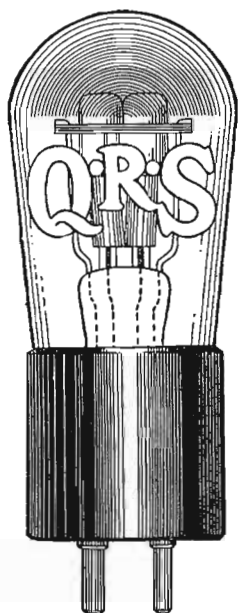
**KFDD** St. Michael's Episcopalian Church (Paul Roberts), Boise, Idaho. 275.1 meters, 1090 kilocycles, 50 watts. Sun, 11:15 am-12:30 pm, 7:30-9:15 pm, church services. Mountain standard time. Slogan: "The Voice of the Saint and of Paul."

**KFDM** Magnolia Petroleum Co., Box 798, Beaumont, Tex. 374.8 meters, 800 kilocycles, 500 watts. Sun, 11-12 n, 8-9 pm, church services. Tues & Fri, 12:30 n, band concert; 8 pm, band concert. Central standard time. Slogan: "Kall for Dependable Magnolene."

Your "B" Battery Eliminator  
will give you better service with

**Q · R · S**  
(Trade Mark Registered)

**Gaseous  
Rectifier Tubes  
ARE BETTER**



- 60 Milliamperes - \$4.50
- 85 Milliamperes - 4.50
- 400 Milliamperes - 7.00

Ask for Catalog of full line of Standard Tubes.

**Guaranteed**

The standing of the Q-R-S Company, manufacturers of quality merchandise for over a quarter of a century, establishes your safety.

Orders placed by the leading Eliminator Manufacturers for this season's delivery, approximating Four Million Dollars' worth of Q-R-S Rectifier Tubes, establishes the approval of Radio Engineers. Ask any good dealer.

**THE Q · R · S COMPANY**  
MUSIC

*Manufacturers*

**Executive Offices: 306 S. Wabash Ave., Chicago**

Factories: Chicago—New York—San Francisco—Toronto, Canada—Sydney, Australia—Utrecht, Holland

*Established 1900. References—Dun, Bradstreet, or any bank anywhere*

*Tell 'Em You Saw It in the Citizens Radio Call Book*

**KFDX** First Baptist Church, Shreveport, La. 236.1 meters, 1270 kilocycles, 250 watts. Sun, 10:45 am, 7:45 pm, church services. Central standard time.

**KFDY** South Dakota State College of Agriculture and Mechanic Arts, Brookings, So. Dak. 394.5 meters, 760 kilocycles, 500 watts. Mon, Wed & Fri, 12:15 pm, music, weather & market report; 12:30, farm news. Tues, Thurs & Sat, 12:15, music; 12:30, farm news; 7:30 pm. Central standard time.

**KFDZ** Harry O. Iverson, 2510 Thomas av., South Minneapolis, Minn. 215.7 meters, 1390 kilocycles, 10 watts. Central standard time.

**KFEC** Meier & Frank Co., Portland, Ore. 214.2 meters, 1400 kilocycles, 50 watts. Daily ex Sun, 12 n, weather reports; 4-5 pm, music; 6:30 pm, weather, crop, markets, reports. Sat, 11 am-12 n, children's hour. Pacific time. Slogan: "Known For Every Courtesy." Divides time with Station KFIF.

**KFEL** Eugene P. O'Fallon (Inc.), Argonaut Hotel, Denver, Colo. 247.8 meters, 1210 kilocycles, 250 watts. Sun, 9-10 am, church services. Mon, Tues, Wed, Thurs, Fri, Sat, 11-12 am, 2-3 pm, 4-5 pm, 5-6 pm, station programs. Tues, 9-10 pm, special programs. Thurs, 10-12 pm, Sleepwreckers' Program. Mountain standard time. Slogan: "The Argonaut Station."

**KFEQ** Scroggin & Co. Bank, Robidoux Hotel, Oak, Nebraska. 230.6 meters, 1300 kilocycles, 1000 watts. Sun, 4:30-6 pm, 8:30-10 pm. Mon, Tues, Wed, Thurs, Fri, Sat, 2-3 pm, 8:30-10 pm. Central standard time.

**KFEY** Bunker Hill & Sullivan Mining & Concentrating Co., Y. M. C. A. & Union High School, Kellogg, Idaho. 232.4 meters, 1290 kilocycles, 10 watts. Sun, 11 am-7:30 pm, church services. Wed, 7:30-8:30 pm, musical. Thurs, 7:30, health talks. Sat, 9-10 pm, dance music. Pacific standard time. Slogan: "The Voice of the Coeur d'Alenes."

**KFGL** N. L. Cotter, 219 W. Main St., Trinidad, Colo. 222.1 meters, 1350 kilocycles, 50 watts.

**KFGQ** Boone Biblical College, Boone, Iowa. 209.7 meters, 1430 kilocycles, 10 watts. Sun, 2:30 pm. Western standard time.

**KFH** Hotel Lassen (Rigby-Gray Hotel Co.), Wichita, Kan. 245.8 meters, 1220 kilocycles, 500 watts. Sun, 9:30-10:30 am, 7:30-9 pm, church services. Daily ex Sun, 8:30-9 am, 10-11 am, 1-2 pm, markets; 7:30-9 pm, studio program. Central standard time. Slogan: "Kansas' Finest Hotel—In the Very Heart of God's Country."

**KFHA** Western States College of Colorado, Gunnison, Colo. 254.1 meters, 1180 kilocycles, 50 watts. Tues, Fri, 7 pm, kiddies' hour; 7:30 pm, musical. Mountain time. Slogan: "Where the Sun Shines Every Day."

**KFHL** Penn College, Oskaloosa, Ia. 212.6 meters, 1410 kilocycles, 10 watts. Central standard time.

**KFI** Earle C. Anthony, Inc., 1000 S. Hope st., Los Angeles, Calif. 468.5 meters, 640 kilocycles, 5000 watts. Sun, 10 am, church; 6:30-11 pm, musical program. Mon, Wed, Fri, 10:20-11 am, household talk. Daily ex Sat, Sun, 5:30-11 pm, musical program. Sat, 5:30 pm-2 am, musical program. Pacific standard time. Slogan: "National Institution."

**KFIF** Benson Polytechnic Institute, Portland, Ore. 214.2 meters, 1400 kilocycles, 50 watts. Pacific standard time.

**KFIO** North Central High School, Snoke, Wash. 272.6 meters, 1100 kilocycles, 100 watts. Fri, 8-9:30 pm. Pacific standard time.

**KFIQ** Dr. I. M. Miller, 332 Miller Bldg., Yakima, Wash. 208.2 meters, 1440 kilocycles, 100 watts. Wed, Sat, 7:30 pm, musical programs. Sun, 11 am, 7:30 pm, church services. Pacific standard time.

**KFIU** Alaska Electric Light & Power Co., Juneau, Alaska. 225.4 meters, 1330 kilocycles, 10 watts. Mon, Wed & Fri, 6-7 pm, daily news items, steamer sailings, music, vocal and instrumental. Alaska time. (Note: 6-7 pm Alaska time is equivalent of 7-8 pm, Pacific standard time.) Slogan: "A Voice from the Far North."

**KFIZ** Fond du Lac Commonwealth Reporter, Fond du Lac, Wis. 267.7 meters, 1120 kilocycles, 100 watts. Daily, 5 to 5:30 pm, markets, weather and news. Occasional evening programs of music. Sun, 6-7 pm, dinner hour concert. Central standard time.

**KFJB** Marshall Electric Co., 1603 W. Main st., Marshalltown, Iowa. 247.8 meters, 1210 kilocycles, 15 watts. Daily ex Sun, 10 am, market reports. Tues & Fri, 7:30-11 pm, musical programs. Sun, 10 am-12 m; vespers, 3-6 pm. Central standard time. Slogan: "Marshalltown, the Heart of Iowa."

**KFJF** National Radio Mfg. Co., 406 N. Hudson st., Oklahomâ City, Okla. 272.6 meters, 1100 kilocycles, 750 watts. Daily ex Sun, 9 am, market service; 9:15 am, musical program; 10 am, market service; 12:30 pm, market service; 6:15 pm, market service; 6:30 pm, dinner musical; 7 pm, news bulletins; 9 pm, musical program. Sun, 10 am, 11 am, 7:30 pm, 9:30 pm, church services. Central standard time. Slogan: "Radio Headquarters of Oklahoma, The Tired Hand Announcing."

**KFJI** E. E. Marsh, Astoria, Ore. 249.9 meters, 1200 kilocycles, 15 watts. Wed, 9-10 pm, organ music. Sun, 12:30-1:30 pm, Sat, 10:30-11 pm. Pacific standard time.

**KFJM** University of North Dakota, Grand Forks, N. Dak. 333.1 meters, 900 kilocycles, 100 watts. Limited coml. Sun, 6-7 pm, orchestra. Daily ex Sun, 12 n-1 pm, music records; 6-7 pm, orchestra. Central standard time. Slogan: "The Educational Center of the State."

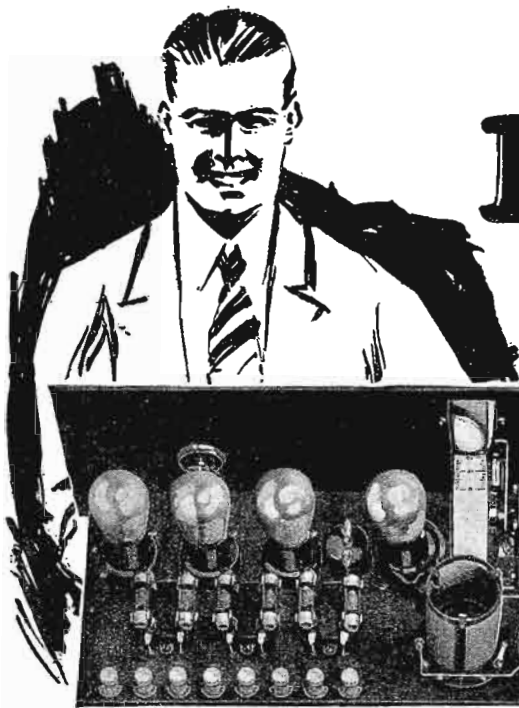
**KFJR** Ashley Dixon & Son, 1350 E. 36th st., Portland, Ore. 282.8 meters, 1060 kilocycles, 100 watts. Mon, 7:30-8:15 pm, story; 8:15-8:45, Listeners' Service. Tues, 7:30-8:15, junior program; 9:15-10:45, "Music of the Masters." Wed, 7:30-8:30 (1st & 3rd), Y. M. C. A. program (2nd & 4th). Thurs, 7:30-8:15 pm; 8:15-8:30, B. C. L. service; 9-10 pm, music. Fri, 12:30 (midnight), test program. Sat, 1:30-3 pm, music. Pacific standard time.

**KFJY** Tunwall Radio Co., 1004 Central av., Ft. Dodge, Iowa. 239.9 meters, 1250 kilocycles, 100 watts. Sun, 11 am, church services. Daily ex Sun, daily, 5:45 pm, market and weather reports. Mon, Wed, Fri, 10-11 am, musical. Mon, 11-12 pm, musical. Thurs, 7:30 pm, musical program. Central standard time.

**KFJZ** W. E. Branch, 3219 Avenue L, Fort Worth, Tex. 249.9 meters, 1200 kilocycles, 50 watts. Sun, 7-10 pm, 11-12:30 mornings. Daily ex Sun & Wed, 8:30-9:30 pm, 9 am to 6 pm. Central standard time.

**KFKA** Colorado State Teachers' College, Greeley, Colo. 399.8 meters, 750 kilocycles, 200 watts. Daily ex Sun, 12:05-12:15 pm, reports; 4-5 pm, studio programs; 8-10 pm, studio programs. Mountain time.





# AERO-SEVEN RECEIVER

## 10-Kilocycle Selectivity

### Utilizing New 340 Tubes

### Unique Features

The Aero-Seven Receiver, which is being featured in the prominent radio magazines and newspapers, is a new tried and tested tuned R. F. circuit, incorporating the most modern radio improvements at a popular price. It is a distinct innovation in a tuned R. F. receiver, utilizing three stages of R. F. and three stages of resistance-coupled audio. Circuit is built around the famous improved Aero Universal Coils, with improved Amsco S. L. tuning 3-gang condenser, S-M single-control drum dial and the tried and tested parts of other famous manufacturers. Such names as Carter, X-L, Westinghouse, Aero, Amsco and Silver-Marshall assure you of a circuit that is the final word in perfection.

Distinct features are: the new Hi-Mu tube at input and in R. F. stages, potentiometer control, higher amplification, 10-kilocycle selectivity and true single control.

The Aero-Seven has a broadcast range from below 200

meters to over 550 meters (1500-500 kc) and requires no shielding as with the small Aero coils, direct pick-up is negligible and coupling between coils is the very minimum. The coils are twice-matched at both high and low frequencies of the broadcast band, thus eliminating many difficulties in single dial control and overcoming one of the principle causes of disappointments.

The adjustable compensators on the Amsco condensers facilitate the equalization of circuits, solving the major problem of tandem tuning.

The extremely sharp selectivity of the Aero-Seven circuit is due to the low resistance of the coils. The high voltage gain per stage, due to the extremely low loss construction, assures extreme distant reception and greatest volume and sensitivity is assured through the high efficiency of the coil windings.

#### New and Unique Hookup 3 Stages of Radio Frequency 3 Stages of Audio Amplification

The Aero-Seven has a new and unique hookup that incorporates three stages of R. F. and three stages of Audio. There are two stages of tuned radio frequency and a special coupling stage, the secondary function of which is to prevent antenna detuning, thereby giving single control which is both theoretically and practically perfect. This independent antenna circuit is of a new and efficient design and employs a resistance connected between the antenna and ground inputting to the first grid circuit. Five CX340 tubes are used—3 in the R. F. circuit, one detector and one in the audio.

In the three audio stages, one 171 power tube is used, one 201A tube and the one CX340 tube in the input. The circuit, therefore, is different from the usual 7-tube R. F. circuits, which variations contribute to its optimum selectivity, perfect quality and thrilling volume. The combination of all the various parts, the matching of the Aero Universal Coils, together with the Amsco compensating 3-gang condenser, with true single control and potentiometer control, greatly simplifies operation and tuning, while adding efficiency to the circuit.

#### First Use of New CX340 Tubes— 1-6/10 Times Better

Utilizing the new CX340 Cunningham tubes in place of the usual 201A, gives the Aero-Seven the distinction of being the first circuit using this superior method. CX340 tubes are 1-6/10 times more effective than 201A tubes, having a 5-volt filament and .25 amperes; plate, 150 volts maximum. In this receiver 90 volts is used constantly on the plate for the R. F. circuit, something seldom attempted but efficiently worked out here. It is a High Mu tube, having a high amplification factor (Mu-30) and is used both as a detector and as a radio and audio amplifier. The Aero-Seven is specially designed to operate with this new and better CX340 tube and the results secured will be a pleasing revelation to you. It is surprising what tone and volume is secured with a minimum use of current.

#### Resistance Coupled Audio Amplification

Resistance coupled audio amplification in the Aero-7 attains a quality of reproduction unapproachable in other systems. It preserves the extraordinary quality consistently achieved by Aero-7's 10-kilocycle selectivity.

#### 10 Kilocycle Selectivity Now a Real Fact

Ten kilocycle selectivity is OPTIMUM Selectivity. It means a receiver that tunes sharply enough to eliminate interference and yet does not tune so sharply as to cause distortion. It is the ideal tuning characteristic. "Optimum tuning," says the engineer, when he means a perfect set.

Why bother with anything but the best? Why put up with anything but 10-kilocycle selectivity, as represented in the Aero-Seven circuit?

Due to the low-loss construction of the coils and condensers in the Aero-Seven and the great selectivity introduced into the circuit itself, you get selectivity so sharp that you cannot get two stations at one time under present broadcast regulations, at the same time providing adequate frequency margin to prevent high "cut off"—distortion.

Imagine what this means in perfect radio reception. Selectivity, the ability to tune in clearly, sharply, without fear of disturbance in getting the station you want whenever you want it—that's something every radio fan has long desired. It is an actuality in the Aero-Seven—a feature that is necessary in an up-to-date circuit—a feature that you get in the Aero-Seven when you build it.

#### New, Modern, Proved Features in Aero-Seven

- 10 Kilocycle selectivity.
- Resistance coupled amplification.
- Uses new CX340 tubes instead of 201A.
- 3 stages of R. F.
- 3 stages of audio amplification.
- Extreme D-X reception.
- Potentiometer control.
- Silver-Marshall single drum dial.
- True single control.
- Aero Coils are twice matched at both high and low frequencies.
- Amsco adjustable condensers.
- Carter resistances.
- Westinghouse Foundation Unit.
- X-L Posts.
- High quality parts throughout.
- Range below 200 to above 550 meters (1,500-500 KC).
- Low loss characteristics throughout.

Perfectly compensated—variation in antenna circuit doesn't affect it.  
Wiring underneath sub-panel.  
Simple construction.  
Easy to build in quick time.  
The most popular-priced 7-tube circuit.

The Aero-Seven-tube Receiver assures you of the very latest in radio. It has everything—beautiful tone, 10 kilocycle selectivity—extreme long range and a volume at your command that can be raised to music-hall proportion or lowered to slumbering whispers. The particularly meritorious application of resistance coupling creates a most remarkable tone. It gives you a receiver that is in a class all its own—a real conqueror of space—a companion that you can depend upon absolutely in any emergency. It delivers quality that is quality, and yet its construction is so low in cost as to be almost unbelievable.

#### An Opportunity for Set Builders

The set builder will find the Aero-Seven a most profitable receiver to build. It is an extremely simple circuit—efficient, high grade and having a record of exceptional performance. It could hardly be duplicated in a factory-built set at double the cost.

You can make big money building this set for your friends and get a real "kick" out of it yourself.

Complete parts, drilled and engraved panels and foundation units are being distributed through the Jobbing trade and are available at leading radio stores everywhere. If your dealer cannot supply you, order direct giving your dealer's name and we will see that you are supplied promptly.

A full-size working blueprint and booklet of assembly and operating instructions with complete data is furnished, which makes it both practical and easy to build this circuit quickly. Build yours early—get the jump on the other fellow.

Get the facts. Mail the coupon and 10c stamps for this valuable booklet. Send today—NOW!

See article  
in this issue

Aero Products, Inc.  
Dept. 309 1768 Wilson Ave., Chicago.

Dear Sirs: Enclosed find 10c for which please send me life-size blueprints, assembly diagrams, construction data and all the facts in building the new Aero-Seven Receiver.

Name .....

Address .....

## Get the Facts — MAIL NOW —>

### AERO PRODUCTS, INC.

1768 Wilson Ave., Dept. 309 Chicago, U. S. A.

ASSOCIATED MANUFACTURERS—AMSCO, AERO, CARTER, WESTINGHOUSE-MICARTA, SILVER-MARSHALL, X-L.

Tell 'Em You Saw It in the Citizens Radio Call Book

**KFKB** Dr. Brinkley's Hospital, Milford, Kan. 241.8 meters, 1240 kilocycles, 1000 watts. Sun, 8 am-10:30 pm, church services, lectures, popular programs. Daily ex Sun, 10:15 am, weather report; 6 pm, baseball scores, dinner hour program; 6:30 pm, health lecture; 10 pm, weather & market reports. Mon, 10:30 pm, orchestra, dance music. Central standard time. Slogan: "Kansas Folks Know Best."

**KFKU** University of Kansas, Lawrence, Kan. 254.1 meters, 1180 kilocycles, 500 watts. Mon & Thurs, 12:30-1:30. (Also special broadcasting.) Central standard time. Slogan: "Up at Lawrence on the Kaw."

**KFKX** Westinghouse Electric & Mfg. Co., Hastings, Nebr. 526 meters, 570 kilocycles, 2500 watts. Daily ex Sun & Sat, 9:30 & 10:30 am, 12:15-2 & 7 pm; musical program at 12:40 & 9 pm. Sat, 9:30 & 10:30 am, markets, also 12:15 pm. Slogans: "Empress of the Air" and "Pioneer Radio Repeating Station of the World."

**KFKZ** State Teachers College, 107 E. Harrison st., Kirksville, Mo. 225.4 meters, 1330 kilocycles, 15 watts. Sun, 3:30 to 4:30 pm. Mon, 8-9 pm, dance music; 9 pm, radio plays. Slogan: "Kirksville, the Home of Osteopathy."

**KFLR** University of New Mexico, Albuquerque, N. Mex. 416.4 meters, 720 kilocycles, 100 watts. Fri, 8:10 pm. Mountain standard time. Slogan: "Sunshine Center of America."

**KFLU** San Benito Radio Club, San Benito, Tex. 236.1 meters, 1270 kilocycles, 15 watts. Wed & Sat, 8-9 pm. Central standard time.

**KFLV** Swedish Evang. Miss. Church, Rockford, Ill. 267.7 meters, 1120 kilocycles, 100 watts. Fri, 8:30 pm. Sun, 12:30 pm (Swedish), 9:30 pm (English). Central standard time.

**KFLW** Earl L. White, 3702 Magnolia Ave., Burbank, Calif. 535.4 meters, 560 kilocycles, 250 watts.

**KFLX** George R. Clough, 3327 Avenue P, Houston, Tex. 270.1 meters, 1110 kilocycles, 100 watts. Central standard time.

**KFMR** Morningside College, Sioux City, Iowa. 440.9 meters, 680 kilocycles, 100 watts. Commercial. Daily ex Sat & Sun, 11:40 am-12:30 noon. Tues, Wed, Thur, Fri, 7:30-8:30 pm. Central standard time.

**KFMX** Carleton College, Northfield, Minn. 236.1 meters, 1270 kilocycles, 500 watts. Sun, 7 pm, college vesper service. Tues, 9:30 pm, lecture. Wed, 9 pm, concert. Fri, 10 pm, organ recital. Central standard time.

**KFNF** Henry Field Seed Co., Shenandoah, Iowa. 270.1 meters, 1110 kilocycles, 1000 watts. Sun, 10:45 am-12:15 pm, services; 2:30-4:30 pm, 6:30-9 pm, services. Daily ex Sun, 7-8:30 am, 10-11 am, 12:30-2 pm, 3-4 pm, 7-9 pm. Sat, 11 pm-12 midnight. Slogan: "Friendly Farmer Station." Divides time with KMA. Central standard time.

**KFOA** Rhodes Dept. Store, 1321 2nd av., Seattle, Wash. 447.5 meters, 670 kilocycles, 1000 watts. Mon, Tues & Sat, 12:30-10 pm. Wed, 12:30-7 pm. Thurs, 12:30-3 pm. Fri, 12:30 pm to midnight.

**KFOB** KFOB, Inc., Burlingame, Calif. 225.4 meters, 1330 kilocycles, 50 watts. Tues & Thurs, 10:11:30 am, 1-2:30 pm, 5:30-7 pm, 8-11 pm. Sat, 1-3 pm, 5:30-7 pm, 9 pm-1 am. Pacific standard time.

**KFON** Nichols & Warinner (Inc.), 212 Jergins Trust Bldg., Long Beach, Calif. 241.8 meters, 1240 kilocycles, 500 watts. Daily including Sun, 2:30 am-12 midnight. Pacific standard time. Slogan: "Where Your Ship Comes In."

**KFOO** Latter Day Saints University, Salt Lake City, Utah. 236.1 meters, 1270 kilocycles, 250 watts.

**KFOR** Lincoln Hatchery, Lincoln, Nebr. 217.3 meters, 1380 kilocycles, 100 watts. Sun, 9:30 am. Daily ex Sun, 9 am, 12:30-1 pm, 8-10 pm. Central standard time. Slogan: "The Poultry Station of the Middle West."

**KFOX** Technical High School, Omaha, Nebr. 258.5 meters, 1160 kilocycles, 100 watts. No regular schedule. Central standard time.

**KFOY** Maurice Gordon Goldberg, St. Paul, Minn. 285.5 meters, 1050 kilocycles, 250 watts. Sun, 2-4 pm, popular & classical. Mon, 7-9 pm, popular. Tues, Thur, Sat, 9-11 pm, dance program. Wed, Fri, 9 pm, reception report. Central standard time.

**KFPL** C. C. Baxter, 205 Grafton st., Dublin, Tex. 275.1 meters, 1090 kilocycles, 15 watts. Sun, 7 am. Mon, Thurs, 7-8 pm. Central standard time. Slogan: "Baxter's Place."

**KFPM** The New Furniture Co., Box 628, Greenville, Tex. 230.6 meters, 1300 kilocycles, 15 watts. Sun, 11 am, services. Mon, & Fri, 9 pm, music; Wed, 8 pm, music; 7:15, sports in season; 1 pm daily ex Sun, musical program. Central standard time. Slogan: "Biggest Little Ten Watts on the Air."

**KFPR** Los Angeles County Forestry, Los Angeles, Calif. 232.4 meters, 1290 kilocycles, 250 watts. Irregular schedule. Pacific standard time.

**KFPW** Lannie W. Stewart, Cartersville, Mo. 263 meters, 1140 kilocycles, 50 watts. Sun, 1-2 pm, chapel service. Fri, 8-10 pm, popular and classical. Central standard time. Slogan: "Keeping Pace with Christ Means Progress."

**KFPY** Symons Investment Co., Symons Block, Spokane, Wash. 245.8 meters, 1220 kilocycles, 250 watts. Sun, 3:30-5:30, 9 am-10 pm, 11 pm to midnight. Mon, Thurs, 7-8 pm, 8-9 pm. Wed, 6:30-7 pm, 7-8 pm, 9-10 pm. Fri, 7-7:30 pm, 7:30-8 pm. Sat, 7-8 pm. Pacific standard time.

**KFQA** The Principia, 5539 Page av., St. Louis, Mo. 322.4 meters, 930 kilocycles, 50 watts. Sun, 11 am, church services; 8 pm, church services. Central standard time.

**KFQB** Lone Star Broadcast Co., Ft. Worth, Tex. 260.7 meters, 1150 kilocycles, 1000 watts. Daily ex Sun & Wed, 8-12 midnight, musical. Sun, 10 am-12 pm, 3-10 pm, church services. Central standard time. Slogan: "Keep Folks Quoting the Bible—KFQB."

**KFQD** Anchorage Radio Club, Anchorage, Alaska. 244.6 meters, 870 kilocycles, 100 watts.

# Pioneering is important but performance is more so



**BALKITE "AB"** A complete unit, replacing both "A" and "B" batteries and supplying both "A" and "B" current from the light socket. Contains no battery in any form. Operates only while the set is in use. Turns on and off at the light switch. Two models. 135 volts "B" current, \$59.50. 180 volts, \$67.50.



**BALKITE "A"** Like Balkite "AB" above, but for the "A" circuit only. One of the most remarkable developments in radio. Price \$32.50.



**BALKITE "B"** Like Balkite "AB" above, but for the "B" circuit only. The accepted "B" power supply. Has probably the longest life of any device in radio. Three models at remarkably low prices. 90 volts, \$22.50. 135 volts, \$32.50. 180 volts, \$39.50.



**BALKITE CHARGER** The standard battery charger for radio "A" batteries. Noiseless. Can be used during reception. Three models, all trickle chargers. Prices, \$17.50, \$9.50, \$7.50.

Prices are slightly higher West of the Rockies and in Canada.

Most of the great improvements in radio power have been made by Balkite. First noiseless battery charging. Then successful light socket "B" power. Then trickle charging. And today, most important of all, Balkite "AB," a complete unit containing no battery in any form, supplying both "A" and "B" power directly from the light socket, and operating only while the set is in use.

Important as this pioneering has been, yet it has not been the most important factor in making Balkite the leader. The real factor has been Balkite performance in the hands of its owners. With 2,000,000 units in the field Balkite has a record of long life and freedom from trouble seldom equalled in any industry. The first Balkite "B," purchased 5 years ago is still in use and will be for years to come. To your radio dealer Balkite is a synonym for quality. The electrolytic rectification developed and used by Balkite is so reliable that today it is standard on the signal systems of most of the railroads of the country. These facts have made Balkite one of the best-known names in radio.

Today, whatever type of set you own, whatever type of power equipment you want, Balkite has it. And production is so enormous that prices are astonishingly low. Balkite today costs no more than ordinary equipment. Your dealer will recommend the particular equipment you need for your set.

FANSTEEL PRODUCTS COMPANY, Inc.  
North Chicago, Illinois

FANSTEEL  
**Balkite**  
*Radio Power Units*

Tell 'Em You Saw It in the Citizens Radio Call Book

**KFQP** George S. Carson, Jr., 906 College st., Iowa City, Iowa. 223.7 meters, 1340 kilocycles, 10 watts. Central standard time. Irregular schedules as announced.

**KFQU** W. E. Riker, Holy City (Alma P.O.), Calif. 249.9 meters, 1200 kilocycles, 100 watts. 8-9 pm every evening ex Mon. (silent). Sat, 11:30-12:30 midnight. Sun, 11 am-12 noon, 8-9 pm. Pacific standard time.

**KFQW** Carl F. Knierim, Continental Hotel, Seattle, Wash. 217.3 meters, 1380 kilocycles, 100 watts. Sun, 10 pm-12 midnight, popular program. Daily ex Sun, 12 noon-1 pm, luncheon musicale; 4:30-5:30 pm, tea hour program; 5:30-6 pm, amusements; 6-11 pm, musical program. Pacific time. Slogan: "Gateway to Alaska and the Orient."

**KFQX** Alfred M. Hubbard, 609 Washington blvd., Seattle, Wash. 210 meters, 1428 kilocycles, 15 watts.

**KFQZ** L. E. Taft, 5653 De Longpre ave., Hollywood, Calif. 232.4 meters, 1290 kilocycles, 100 watts. Tues, Fri, 9-11 pm, musical program. Pacific standard time.

**KFRB** Hall Bros. (Rialto Theatre), Beeville, Tex. 247.8 meters, 1210 kilocycles, 250 watts. Central standard time.

**KFRC** Don Lee (Inc.), San Francisco, Calif. 454.3 meters, 660 kilocycles, 50 watts. Daily ex Sun & Mon, 6:30-8 am, exercises. Daily ex Sun, 5:30-6:30 pm, children's hour; 6:30-10 pm, Mon & Thurs. Tues & Fri, 6:30-11 pm, concert. Wed, 6:30-12 pm. Sat, 6:30 pm-1 am, dance music. Sun, 6:30-10 pm, 10-12 pm. Pacific standard time.

**KFRU** Stephen's College, a Junior College for Women, Columbia, Mo., "The Athens of the West." 249.9 meters, 1200 kilocycles, 500 watts. Sun, 7:30 am, sunrise service; 9:20 am, Burrall class; 7:30 pm, church services. Daily ex Sun & Sat, 8:30 am, public school convocation; 4:30 pm, popular program; 6 pm, dinner hour. Wed, 9 pm, musical program. Thurs, 10 pm, musical program. Sat, 4:30 pm, popular program; 6:15 pm, weather news. Central standard time. Slogan: "Where Friendliness is Broadcast Daily."

**KFSD** Airfan Radio Corporation, U. S. Grant Hotel, San Diego, Calif. 440.9 meters, 680 kilocycles, 500 watts. Sun, 3-4 pm, musical program; 6:15-10 pm, musical program. Daily ex Sun, 6:15-11 pm, musical program. Pacific time.

**KFSG** Angelus Temple, 1100 Glendale blvd., Los Angeles, Calif. 275.1 meters, pm, 2:30-4:30 pm, 6:40-11 pm, church services. 1090 kilocycles, 500 watts. Sun, 10:30 am-12:30 pm, 2:30-4:30 pm, 6:30-9 pm, church services. Thurs & Fri, 10:30 am-12:30 pm, 2:30-4:30 pm, 6:30-11 pm, church services. Sat, 10:30 am-12:30 pm, 3:30-4:30 pm, 6:30-9:30 pm. Slogan: "The Church of the Air."

**KFUL** Thos. Goggan & Bro. Music Co., 2126 Markets, Galveston, Tex. 258.5 meters, 1160 kilocycles, 500 watts. Daily, 10:30 am. Fri, 8 pm. Central standard time. Slogan: "The City of Perpetual Sunshine."

**KFUM** W. D. Corley, Mining Exchange Bldg., Colorado Springs, Colo. 236.1 meters, 1270 kilocycles, 100 watts. Sun, 11 am-12:30 pm, 6:30-8:30 pm. Mon, 6:30-7:30 pm, 8-9 pm. Tues, 8-9 pm. Thur, 6:30-9 pm. Fri, 4-5 pm, 6:30-7:30 pm. Slogan: "Known For Unsurpassed Mountain Scenery."

**KFUO** Concordia Seminary (Lutheran), St. Louis, Mo. 545.1 meters, 550 kilocycles, 500 watts. Sun, 9:15 pm. Mon, 8 pm. Wed, 9:30 pm. Divides time with Station KSD. Central standard time. Slogan: "The Gospel Voice."

**KFUP** Fitzsimmons General Hospital, Denver, Colo. 227.1 meters, 1320 kilocycles, 100 watts. Mountain time.

**KFUR** Perry Building Co., 420 Twenty-fifth st. (H. W. Peery, Mgr.), Ogden, Utah. 225.4 meters, 1330 kilocycles, 50 watts. Tues, Thurs, Sat, 9:50-11:50 pm, dance music. Mountain time.

**KFUS** Louis L. Sherman, 1444 Havenscourt blvd., Oakland, Calif. 256.3 meters, 1170 kilocycles, 50 watts. Tues, 2:30-3:30 pm, educational; 8-9 pm, 6:30-7:30 pm, sacred studio program. Wed & Fri, 8-9 pm, sacred program. Thurs, 4:30-5 pm, educational; 5-5:30 pm, children's program. Sun, 9-9:30 am, S.S. lesson; 3:30-4:30 pm, sacred program. Pacific standard time.

**KFUT** University of Utah, Salt Lake City, Utah. 499.7 meters, 600 kilocycles, 50 watts. Tues, Wed, Thur, Fri, 7-8 pm. Mountain time.

**KFVD** W. J. & C. I. McWhinnie, Venice, Calif. 208.2 meters, 1440 kilocycles, 250 watts. Sun, 6-12 pm, dance program. Daily ex Sun, 9:30 am-12 noon, 4:30-6 pm, 9 pm-12 midnight, Pacific time. Slogan: "The Voice by the Sea." Divides time with Station KGFJ.

**KFVE** Greater St. Louis Broadcasting Corp., International Life Insurance Company's Station, Hotel Chase, St. Louis, Mo. 234.2 meters, 1280 kilocycles, 1000 watts. Sun, 11:15 am-12 noon, 2:30-5 pm, 6:45-9 pm. Daily ex Sun, 10 am-12 noon, 2:30-5 pm, 6:45-8:30 pm, 10-10:45 pm. Central standard time. Slogan: "K for Kansas; F for France; V for Venice; E for Egypt."

**KFVG** First Methodist Episcopal Church, 204 S. Penn. ave., Independence, Kan. 225.4 meters, 1330 kilocycles, 50 watts. Sun, 10:55 am-12:30 pm & 7:30-9:15 pm, church services. Central standard time. Slogan: "Kansas Folks Very Good."

**KFVI** Headquarters Troop, 56th Cavalry Brigade, 305 Sabine st., Houston, Tex. 238 meters, 1260 kilocycles, 50 watts. Central standard time.

**KFVN** Carl E. Bagley, Fairmont, Minn. 228.9 meters, 1310 kilocycles, 100 watts. Mon, Tues, Wed, 9-10:30 pm, musical programs. Fri, 8:30-8:50 pm, children's religious hour; 9-10:30 pm, musical program. Sun, 2:30-3:30 pm, Sunday School. Central standard time.

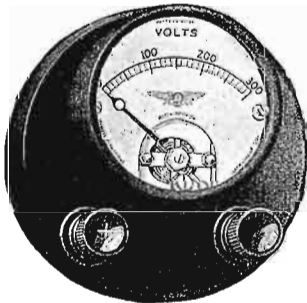
**KFVR** Olinger Corporation, Denver, Colo. (near), 1075 Pennsylvania st. 475.9 meters, 630 kilocycles, 250 watts. Mon, Tues, Wed, Fri & Sat, 7-9:30 pm, 12-2 am. Thurs nite silent. Wed, Thurs, 12-1 am. Mountain time.

**KFVS** Hirsch Battery & Radio Co., 312 S. Fredrick st., Cape Girardeau, Mo. 223.7 meters, 1340 kilocycles, 50 watts. Daily ex Sun, 12:15 noon, news and markets. Mon, 6:30-10:30 pm, musical. Wed, 7:30-10:30 pm, musical. Thurs, Fri, 7:30-9:30 pm, musical. Central standard time. Slogan: "The City of Opportunity."

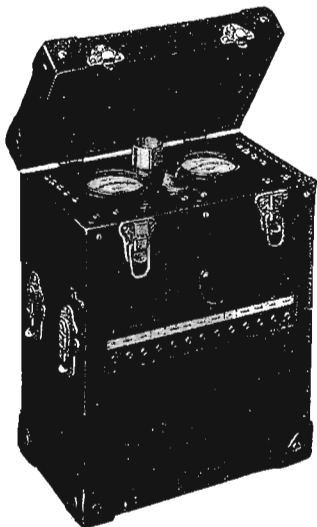


# JEWELL— better instruments for radio

When an instrument for radio use is desired by anyone—manufacturer, dealer, amateur, set-owner or set-builder—there is a great deal of pleasure in knowing that better instruments—Jewell instruments—are available, which are certain to give complete satisfaction in their use.



Pattern No. 139  
High resistance voltmeter for set owners use in testing "B" voltage



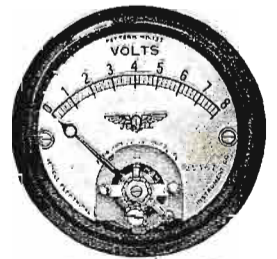
Pattern No. 111  
Radio service set. Helps solve dealer's service problems

There are Jewell instruments for every radio need. For the dealer we have tube testers, service test sets, special portable voltmeters, ammeters, galvanometers, etc. For the set builder and owner, a complete array of instruments for panel mounting and portable testing in keeping the set working at its very best. For the amateur we have transmitting instruments that will delight the most exacting. The famous Jewell trio—patterns 54, 64 and 74 have made amateur transmitting history and are the choice of most amateurs. For the manufacturer of radio receiving sets or accessories we can furnish any desired instrument for your testing laboratory. Our complete line of instruments gives an advantage of choice from many suitable designs. Our years of experience manufacturing instruments has furnished us with a fund of knowledge that is available to our many friends in the radio industry and we invite you to bring your instrument and testing problems to us.

New Jewell instruments for radio use are brought out as the need for any specific testing equipment demands. This year finds three new Jewell radio products—Pattern Nos. 115, 133 and 139—all illustrated herewith. Each has a decided value and all are of the well known Jewell quality.

Write for a copy of our 32-page radio instrument catalog No. 15-C

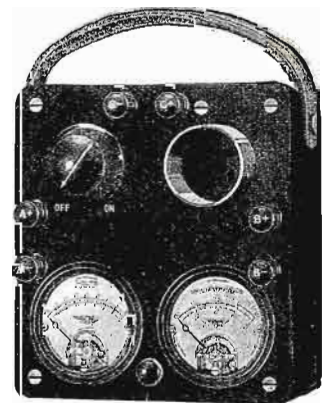
**Jewell Electrical Instrument Co.**  
1650 Walnut St. - - - Chicago



Pattern No. 135  
This style instrument as voltmeter or ammeter is the type used in most receiving sets



Pattern No. 133  
Radio set analyzer—for the service man



Pattern No. 115  
The newest and most up-to-date tube checker on the market

**"27 YEARS MAKING GOOD INSTRUMENTS"**

Tell 'Em You Saw It in the Citizens Radio Call Book

**KFVY** Radio Supply Co., 407 W. Central ave., Albuquerque, N. Mex. 249.9 meters, 1200 kilocycles, 10 watts. Daily ex Sun, 5:30-6:30 pm, news items & music. Tues & Fri, 8-9:30 pm, dance music. Mountain standard time.

**KFWB** Warner Bros. Motion Picture Studios, Inc., 5842 Sunset blvd., Hollywood, Calif. 361.2 meters, 830 kilocycles, 500 watts. Sun, 8:30-11 pm. Daily ex Sun, 10-10:30 am. Mon, Thur, Fri, 12 noon-3 pm, 5-11 pm. Tues, 11:30 am-2:30 pm, 5-11 pm. Wed, 12 noon-11 pm. Sat, 12 noon-11 pm.

**KFWC** L. E. Wall, San Bernardino, Calif. 222.1 meters, 1350 kilocycles, 100 watts. Sun, 9-12 am, church services; 9-12 pm, musical. Mon, 9 am-1 pm, 4-12 pm. Tues, 11:30 am-12:30 pm, 3-5 pm, 9-12 pm. Wed, 11:30 am-12:30 pm, 4-6 pm, 9-12 pm. Thurs, 12-1 pm, 4-6 pm, 9-12 pm. Fri, 11:30 am-12:30 pm, 3-5 pm, 9-3 pm. Pacific standard time. Slogan: "The Voice of the Orange Empire."

**KFWF** St. Louis Truth Center, 4030 Lindell st., St. Louis, Mo. 214.2 meters, 1400 kilocycles, 250 watts, non-commercial. Sun, 10:45 am, 7:45 pm, 9 pm, organ & chimes. Thurs, 10:45 am, sunshine hour; 7:45 pm, sermon; 9 pm, music. Central standard time. Slogan: "The Voice of Truth."

**KFWH** F. Wellington Morse, Jr., Eureka, Calif. 254.1 meters, 1180 kilocycles, 100 watts. Daily ex Sun, 6:15-6:30 pm, news and music. Daily, 6:30-7:15 pm, dinner concert. Mon, Wed, Fri, 8-10 pm. Pacific time. Slogan: "Kind Friends, We're Here."

**KFWI** Radio Entertainments, Inc., 205 Wiley B. Allen Bldg., San Francisco, Calif. 267.7 meters, 1120 kilocycles, 500 watts. Sun, 1-2 pm, 8-9 pm, 9-10 pm, 10-12 pm. Mon, 1-2 pm, 6:30-7 pm, 7-7:30 pm, 8-9 pm, 9-10 pm, 10-12 pm. Tues, 8-8:30 pm, 8:30-9 pm, 9-10 pm, 10-11 pm. Wed, 1-2 pm, 6:30-7:30 pm, 8-9 pm, 9:30-11 pm, 11 pm-1 am. Thurs, 10-12 pm. Fri, 1-2 pm, 6:30-7:30 pm, 8-10 pm, 10-12 pm. Sat, 10-12 pm, 12:30-3 pm.

**KFWM** Oakland Educational Society, 1126 Bella Vista av., Oakland, Calif. 236.1 meters, 1270 kilocycles, 500 watts. Sun, 9:30-11 am, 2-3 pm, 7:30-9 pm. Mon, Tues, Thur & Sat, 8-10 pm. Tues, Wed & Fri, 2-3 pm. Pacific standard time. Slogan: "Voice of Oakland."

**KFWO** Major Lawrence Mott, 346 Claressa av., Avalon, Catalina Island, Calif. 218.8 meters, 1370 kilocycles, 250 watts. Daily including Sun, 12:30-1:30 pm, 5-6 pm, 6-7:30 pm; 7:30-9 pm, band. Pacific standard time. Slogan: "Catalina for Wonderful Outings."

**KFWU** Louisiana College, Pineville, La. 238 meters, 1260 kilocycles, 100 watts. Central standard time.

**KFWV** Broadcast Studios, Inc., 385 58th st., South Portland, Ore. 228.9 meters, 1310 kilocycles, 50 watts. Sun, 6-7 pm, Benson Hotel dinner music. Mon, Fri & Sat, 10-11 am, housewife hour. Mon, 9-10 pm, 6-7 pm, Benson; 7-8 pm, organ; 8-9 pm, dinner music. Tues, 10-11 am, housewife hour; 6-7 pm, Benson; 7-8, 8-9, 9-10, 10:40-12 pm, musical program. Wed, 10-11 am, housewife hour; 5-6 pm, 6-7 pm, 7-8 pm, organ; 8-9, 9-10, 10-11 pm, music. Thurs, 10-11 am, housewife music hour; 5-6, 6-7 pm, Benson; 7-8 pm, organ, 8-9 pm. Sat, 10:40-12 pm.

**KFXB** Bertram O. Heller, Los Angeles, Calif. 252 meters, 1190 kilocycles, 500 watts. Daily ex Sun, 5:30 pm, news, road bulletins, lectures, music. Pacific standard time. Slogan: "The Rim of the World Station."

**KFXD** Service Radio Co., East Center st., Jerome, Utah. 204 meters, 1470 kilocycles, 15 watts. Mountain time.

**KFXE** Colorado Radio Corporation, Brown Palace Hotel, Denver, Colo. 282.8 meters, 1060 kilocycles, 500 watts. Mon, Tues, Wed, Fri & Sat, 6:30-12 pm. Slogan: "The Voice of Denver."

**KFXH** Bledsoe Radio Co., 115 S. El Paso st., El Paso, Tex. 241.8 meters, 1240 kilocycles, 100 watts. Mon, Wed, Fri, 8-10 pm, musical. Sat, 11-12 pm, frolic. Central standard time. Slogan: "The Voice of the Rio Grande."

**KFXJ** R. G. Howell Olinger Gardens, Edgewater, Colo. (Portable.) 215.7 meters, 1390 kilocycles, 15 watts input. Mon & Fri, 1-2 pm, matinee; 6-7 pm, dinner hour. Tues, Thurs & Sat, 6-7 pm. Wed, 1-2 pm, 6-7 pm. Sun, 5:30-6:30 pm, organ recital. Slogan: "America's Senic Center."

**KFXR** Classen Film Finishing Co., 1708 W. 35th st., Oklahoma City, Okla. 214.2 meters, 1400 kilocycles, 15 watts.

**KFXY** Mary M. Costigan, Flagstaff, Ariz. 205.4 meters, 1460 kilocycles, 25 watts. Mountain time.

**KFYF** Carl's Radio Den (Carl Newcomb), Oxnard, Calif. 238 meters, 1260 kilocycles, 25 watts. Mon, Tues, Wed, 5-6 pm, crop reports, news, music; 8-11 pm, music. Fri & Sat, 5-6 pm, crop reports, news, music. Slogan: "The Baby Super Station."

**KFYJ** Houston Chronicle Pub. Co. (Portable Station), Houston, Tex. 238 meters, 1260 kilocycles, 10 watts. Central standard time.

**KFYO** Buchanan-Vaughan Co., Texarkana, Tex. 209.7 meters, 1430 kilocycles, 10 watts. Sun, 11 am, church services. Daily ex Sun & Sat, 12 n-1 pm, musical program; 6-7 pm, dinner hour musical program. Sat, noonday program. Central standard time. Slogan: "Where Arkansas Ends and Texas Begins."

**KFYR** Hoskins-Meyer, Inc., 200 4th st., Bismarck, N. Dak. 239.9 meters, 1250 kilocycles, 250 watts. Sun, 10:30 am-12 noon, church; 3-5 pm, music. Daily ex Sun, 6:30-7:30 pm, music, baseball scores, weather forecast, etc. Central standard time.

**KGA** Northwest Radio Service, Spokane, Wash. 260.7 meters, 1150 kilocycles, 2000 watts. Sun, 11 am, church services; 5:40-6:15 pm, stock quotations, baseball scores; 9-10 pm, studio program. Daily ex Sun, 11 am-12 noon, morning musical hour; 12 noon-12:30 pm, stock quotations. Western standard time. Slogan: "The Voice of Spokane."

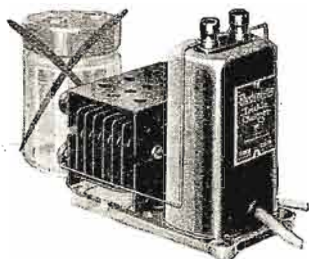
**KGAR** The Tucson Citizen, 80 S. Stone av., Tucson, Ariz. 234.2 meters, 1230 kilocycles, 100 watts. Sun, 11 am-12:30 pm, 7:30-9 pm, church services. Daily ex Sat & Sun, 6-9 pm, musical program. Sat, midnight frolic every 2nd week from 12 midnight-3 am. Slogan: "Way Out on the Desert."

**KGBS** Arthur C. Daily, Moore Hotel, Seattle, Wash. 202.6 meters, 1480 kilocycles, 100 watts. Daily ex Sat & Sun, 6:30-10 pm. Pacific time.

**KGBU** Alaska Radio & Service Co., Ketchikan, Alaska. 228.9 meters, 1310 kilocycles, 500 watts.

**KGBW** Martin Brotherson, 112 W. 6th st., Joplin, Mo. 262-3 meters, 1066 kilocycles.

# Revolutionizing Radio Socket Power!



**Modernize your Trickle Charger or Power Unit**



**KUPROX**

*No Bulbs · No Liquids · No Noise*

**Replacement Unit**

Eliminates, acids, liquids and charging bulbs.

Makes any electrolytic unit dry, noiseless. Requires no watering or other attention. Increases charging rate.

Throw away the acid jar on your present trickle charger or power unit. Install the new KUPROX all-metal Replacement Unit in its place. In less than two minutes banish all the bother of watering and other attention—the danger of ruined rugs and clothing. Very easy to attach. Requires but two very simple binding post connections. Makes your charger absolutely dry, and gives a higher charging rate. Fits all standard electrolytic chargers and power units. List Price, complete with full instructions.

**\$450**

from any radio dealer

**No acids, liquids, or charging bulbs.... Dry permanent power that requires no attention**

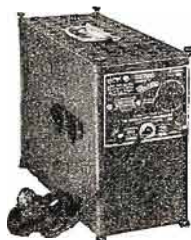
At last, radio power as dependable and permanent as your house current, that requires no more attention than the snap of a switch. KUPROX, the new, dry metallic rectifier supplies all radio power, A, B, and C, constantly, dependably—probably the greatest of all developments in light socket radio power.

With KUPROX Devices your set is truly electric. KUPROX is all-metal—dry—it needs no watching or watering—it cannot wear out. Various models, from Trickle Chargers to the Combinations which supply all radio power from a single compact unit.

[ FREE BOOKLET FOR YOU: "The Secret of Successful Battery Elimination," describing KUPROX Devices, will be mailed Free on request. Write for it. ]

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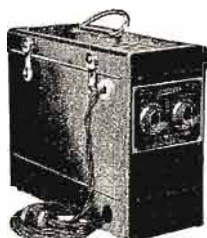
**KUPROX**  
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**KUPROX "A" TRANSIFIERS**—Batteryless, noiseless, electric "A" power. Dry, dependable, needs no attention. Operates any receiver. 4-volt or 6-volt, \$28.50 and up.



**KUPROX A & B TRANSIFIERS**—All radio power from a single unit. Controlled from set switch. Absolutely dry, requires no attention. \$57.50 and up.



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**Recharge Your Dry "B" Batteries**

Now you can make your dry cell B batteries last many times as long as before. One of the outstanding achievements of the past year in radio is this new system for rectifying ordinary dry cell B batteries.

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**Trickl-B-Recharger**

Makes a "B" Power Unit of any set of dry cell "B" batteries. Connected to the light socket it performs like the trickle charger on the "A" battery, supplying new life constantly into the dry cell "B" batteries. With this new system "B" batteries can be made to last indefinitely. Very simple to operate and very economical. Simply attach to your "B" batteries, turn on the light socket and forget it. Uses no acids or liquids of any kind. List price, complete with tube.

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Tell 'Em You Saw It in the Citizens Radio Call Book

**KGBX** Foster-Hall Tire Co., 1221 Fred av., St. Joseph, Mo. 288.3 meters, 1040 kilocycles, 100 watts.

**KGBY** Dunning & Taddiken, Shelby, Nebr. 202.6 meters, 1480 kilocycles, 50 watts. Sun, 3-5 pm, religious program. Tues, 8-10:30 pm, popular program. Fri, 6-7 pm, dinner program; 8-10:30 pm, popular program. Central standard time. Slogan: "The Voice of Shelby, in the Heart of the Corn Belt."

**KGBZ** Dr. George R. Miller, York, Nebr. 212.6 meters, 1410 kilocycles, 100 watts. Sun, 9 am, church services; 3:30 pm, orchestra. Daily ex Sun, Tues, 12:30 pm, market, livestock; 3 pm, musical. Thur, Sat, 9 pm, dance music. Central standard time. Slogan: "The Swine and Poultry Station."

**KGCA** Chas. W. Greeley, Decorah, Iowa. 202.6 meters, 1480 kilocycles, 10 watts. Sun, 2-4 pm. Daily ex Sun, 12:30-1:30 pm. Wed, 7:30-8:30 pm. Central standard time.

**KGCB** Wallace Radio Institute, 105 W. 13th st., Oklahoma City, Okla. 215.7 meters, 1390 kilocycles, 50 watts. On air daily, programs irregular. Divides times with Station KGFB.

**KGCC** Moore Motor Company, Newark, Ark. 223.7 meters, 1340 kilocycles, 100 watts. Sun, 2:30-3:30 pm, concert. Wed, 9-10 pm, popular concert. Sat, 10-11 pm, frolic. Central standard time.

**KGCH** Wayne Hospital, Wayne, Nebr. 293.9 meters, 1020 kilocycles, 250 watts. Sun, 2:30-4 pm. Tues, Wed, Thur, Fri, 6:30-8 pm. Central standard time. Slogan: "Remember Us When U R Ill."

**KGCI** Liberto Radio Sales, San Antonio, Tex. 202.6 meters, 1480 kilocycles, 15 watts. Sun, 1:30-2:30 pm. Daily ex Sun, 9:30-10:30 am, 11:30-12:15 am, 3-4 pm, 5:30-6:30 pm. Mon, Thur, Sat, 9:30-10:30 pm. Tues, 7:30-8:30 pm. Wed, 11-12 midnight. Central standard time. Slogan: "Radio Sam at San Antonio." Divides time with Station KGRC, the Gene Roth Co., San Antonio, Tex.

**KGCL** Louis Wasmer and Archie Taft, 609 Washington blvd., Seattle, Wash. 230.6 meters, 1300 kilocycles, 50 watts.

**KGCM** Concordia Broadcasting Co., Concordia, Kan. 208.2 meters, 1440 kilocycles, 50 watts. Daily ex Sat, 7:30-8:30 pm. Central standard time.

**KGCR** Cutlers Radio Broadcasting Service, 415 Main st., Brookings, S. Dak. 208.2 meters, 1440 kilocycles, 15 watts.

**KGCU** Mandan Radio Association (A. W. Nordholm), Mandan, N. Dak. 208.2 meters, 1440 kilocycles, 100 watts. Sun, 11 am-3 pm. Daily ex Sun, 12 noon-2 pm, 6:30-7:30 pm. Mountain standard time. Slogan: "Mandan, Where the West Begins."

**KGCCX** First State Bank of Vida, Vida, Mont. 243.8 meters, 1230 kilocycles, 10 watts.

**KGDA** Home Auto Co., Dell Rapids, S. D. 234.2 meters, 1280 kilocycles, 15 watts.

**KGDE** Jaren Drug Co., Barrett, Minn. 205.4 meters, 1460 kilocycles, 50 watts.

**KGDI** Northwest Radio Service Co., 614 Terminal Sales Bldg., Seattle, Wash. 416.4 meters, 720 kilocycles, 50 watts.

**KGDJ** R. Rathert, 316 Fifth av., Cresco, Iowa. 202.6 meters, 1480 kilocycles, 10 watts.

**KGDM** Victor G. Hopping, 332 E. Channel st., Stockton, Calif. 217.3 meters, 1380 kilocycles, 10 watts.

**KGDO** C. H. & Henry Garrett, 2012 Main st., Dallas, Tex. 285 meters, 1052 kilocycles, 100 watts.

**KGDP** Boy Scouts of America, Pueblo Council, Colorado (John D. Price). 223.7 meters, 1340 kilocycles, 10 watts.

**KGDR** Joe B. McShane, 206 Laurel Hgts. Place, San Antonio, Tex. 202.6 meters, 1480 kilocycles, 15 watts. Sun, 9-10 am, classical. Daily ex Sun, 4-5:30 pm, tea dancing program. Wed, 9:30-11:30 pm, frolic. Thur, 7:30-8:30 pm. Central standard time. Slogan: "The Little Station with the Big Programs."

**KGDW** Frank J. Rist, Humboldt, Nebr. 206.8 meters, 1450 kilocycles, 100 watts.

**KGDX** William E. Antony, 1513 Laurel st., Shreveport, La. 212.6 meters, 1410 kilocycles, 250 watts.

**KGDY** J. Albert Loesch (Hanson Hardware Co.), Oldham, S. Dak. 206.8 meters, 1450 kilocycles, 15 watts. Thur, 7:45 pm, 11:45 pm. Central standard time. Slogan: "The Little Brick Town on the Prairie."

**KGDZ** Norwegian Lutheran College, Decorah, Iowa. 431 meters, 695.6 kilocycles, 50 watts.

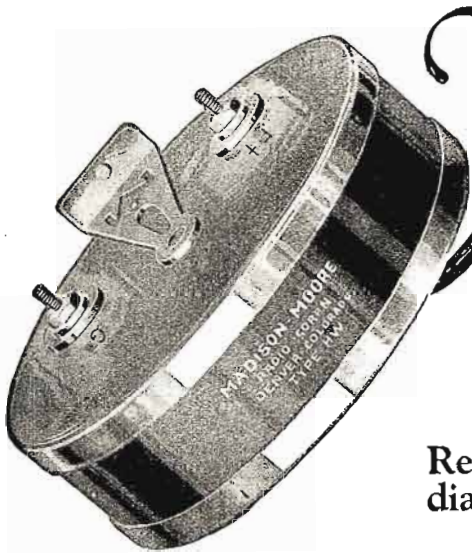
**KGEF** Trinity Methodist Church, Los Angeles, Calif. 263 meters, 1140 kilocycles, 500 watts.

**KGEG** Eugene Broadcast Station, Eugene Hotel, Eugene, Ore. 201.6 meters, 1490 kilocycles, 50 watts.

**KGEM** Beehler Electric Equipment Co., Yuma, Colo. 204 meters, 1470 kilocycles, 10 watts.

**KGEM** E. R., Irely & F. M. Bowles, El Centro, Calif. 225.4 meters, 1330 kilocycles, 15 watts.





Type HW Madison-Moore One-Spot Transformer

# The TWIN GIANTS of Radio

Reception at one and only one point on the dial came with the

## Madison-Moore One-Spot Transformer

The pinnacle of perfection for battery-operated receiving sets was reached.

Madison-Moore, thru a long period of exhaustive laboratory tests, have perfected the

## Madison-Moore ONE-SPOT Batt'ry-less Transformer

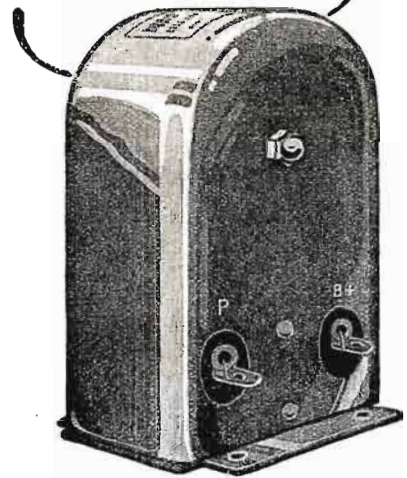
Now, for the first time, the set builder may successfully build a receiving set to operate on alternating current. All the desirable features of the celebrated One-Spot are included in this but the connection is made with the light socket, eliminating all A, B and C batteries.

This new member of the Madison-Moore line of Finest Radio Apparatus is made from the same high grade materials and sold under the same strict guarantee as the Famous One-Spot Transformer. A set made with these transformers not only covers the United States wave band, 200-600 meters, but may also be adapted to the shorter and longer wave lengths, making possible excellent reception from foreign stations.

The November issue of Citizens' Radio Call Book will contain a detailed description of this *batt'ry-less* set. Get them, build a set and enjoy complete, up-to-the minute radio efficiency.

Your radio dealer has both types ready for delivery NOW. If he can't supply your needs, send directly to us.

MADISON-MOORE RADIO CORPORATION  
2524 W Federal Boulevard  
Denver, Colorado - U. S. A.



Type AC Madison-Moore One-Spot Batt'ry-less Transformer

# MADISON-MOORE

*The Finest RADIO APPARATUS in the World!*

Tell 'Em You Saw It in the Citizens Radio Call Book

**KGEO** Hotel Yancey, Grand Island, Nebr. 205.4 meters, 1460 kilocycles, 100 watts.

**KGEQ** Glenwood Radio Station, 920 5th av., No. Minneapolis, Minn. 202.6 meters, 1480 kilocycles, 50 watts. Mon, 7-8 pm, miscellaneous. Tues, Thur, 8:30-11 pm, miscellaneous entertainment. Wed, 6:30-8:30 pm, 10-11 pm. Fri, 6:15-9 pm, music, entertainment. Central standard time.

**KGER** C. Merwin Bobyns, Long Beach, Calif. 215.7 meters, 1390 kilocycles, 100 watts.

**KGES** Central Radio Electric Co., Central City, Nebr. 204 meters, 1470 kilocycles, 10 watts.

**KGEU** L. W. Clement, Lower Lake, Calif. 227.1 meters, 1320 kilocycles, 50 watts.

**KGEW** City of Fort Morgan, Fort Morgan, Colo. 218.8 meters, 1370 kilocycles, 10 watts.

**KGEY** J. W. Dietz, Denver, Colo. 201.6 meters, 1490 kilocycles, 15 watts. Sun, 1-2 pm. Daily ex Sun, Thur, 7-8 pm. Western standard time.

**KGEZ** Flathead Broadcasting Association, Kallispell, Mont. 205.4 meters, 1460 kilocycles, 100 watts. Daily ex Sun, 6:30-7:30 pm. Thur, 9-10:30 pm. Mountain standard time. Slogan: "Located in the Switzerland of America—The Beautiful Flathead Valley."

**KGFB** Iowa City, Ia. 223.7 meters, 1340 kilocycles, 10 watts.

**KGFF** Earl E. Hampshire, 718 5th st., Alva, Okla. 205.4 meters, 1460 kilocycles, 25 watts. Programs irregular. Central standard time.

**KGFG** Oklahoma City, Oklahoma. 215.7 meters, 1390 kilocycles, 50 watts.

**KGFH** Crescenta, Calif. 223.7 meters, 1340 kilocycles, 100 watts.

**KGFI** Station KGFI, San Angelo, Tex. 220.4 meters, 1360 kilocycles, 15 watts. Sun, 11 am-8 pm. Daily ex Sun, 10 am-12 noon, 3:30 pm, markets & weather; 8-10 pm, music. Central standard time. Slogan: "The Voice of West Texas."

**KGfJ** Radio Station KGfJ, Los Angeles, Calif. 208.2 meters, 1440 kilocycles, 100 watts. Mon, 6:30-9:30 am, 12 noon, 4:30-6 pm, 9 pm. Pacific standard time. Slogan: "Keeping Good Folks Joyful."

**KGfK** Hallock, Minn. 223.7 meters, 1340 kilocycles, 50 watts.

**KGfL** Trinidad, Colo. 222.1 meters, 1350 kilocycles, 50 watts.

**KGfM** Geo. W. Johnson, Yuba City, Calif. 211.1 meters, 1420 kilocycles, 15 watts. Daily ex Sun, 9:30-10:30 am, advertising; 2-2:30 pm, musical. Mon, Wed, Fri, 8-10 pm, entertainment. Pacific standard time.

**KGfN** Aneta, N. Dak. 199.9 meters, 1500 kilocycles, 15 watts.

**KGfO** Terre Haute, Ind. 204 meters, 1470 kilocycles, 100 watts.

**KGfP** Mitchell, S. Dak. 212.6 meters, 1410 kilocycles, 10 watts.

**KGO** General Electric Co., Oakland, Calif. 384.4 meters, 780 kilocycles, 5000 watts. Sun, 11 am, 7:30 pm, church services; 6:30-7:30 pm, 9-10 pm, concert music. Daily ex Sun, 11:30 am, luncheon program; 1:30 pm, stock reports; 6 pm, dinner concert; 6:55 pm, evening reports. Mon, 5:30 pm, Kiddies' Club. Wed, 5:30 pm, Columnist. Thurs, 5 pm, Boys' hour. Tues, Thurs, Sat, 9:15 pm, studio program. Wed, 8 pm, farm program. Sat, 8 pm, sport review. Tues, Fri, Sat, dance program. Pacific standard time. Slogan: "Pacific Coast Station."

**KGRC** Gene Roth & Co., San Antonio, Tex. 220.4 meters, 1360 kilocycles, 50 watts.

**KGRS** Gish Radio Service, 108 E. 8th st., Amarillo, Tex. 243.8 meters, 1230 kilocycles, 150 watts. Daily ex Sun, 6:30 am-6:30 pm; 10 am, weather & markets. Mon, Wed, Fri, 9 pm. Sun, 11:30 am, 4:30 pm, 7:30 pm. Central standard time.

**KGTT** Glad Tidings Temple—Bible Institute, 1471 Ellis st., San Francisco, Calif. 206.8 meters, 1450 kilocycles, 50 watts. Sun, 2:30-5 pm, 8-10 pm. Mon, Tues, Thurs & Sat, 12:10-12:30, sacred. Wed, 12:10-12:30 pm, 2:30-3:33 pm, sacred. Fri, 12:10-12:30 pm, 3-4 pm, 8-10 pm, sacred. Pacific standard time. Slogan: "Knights of Glad Tidings."

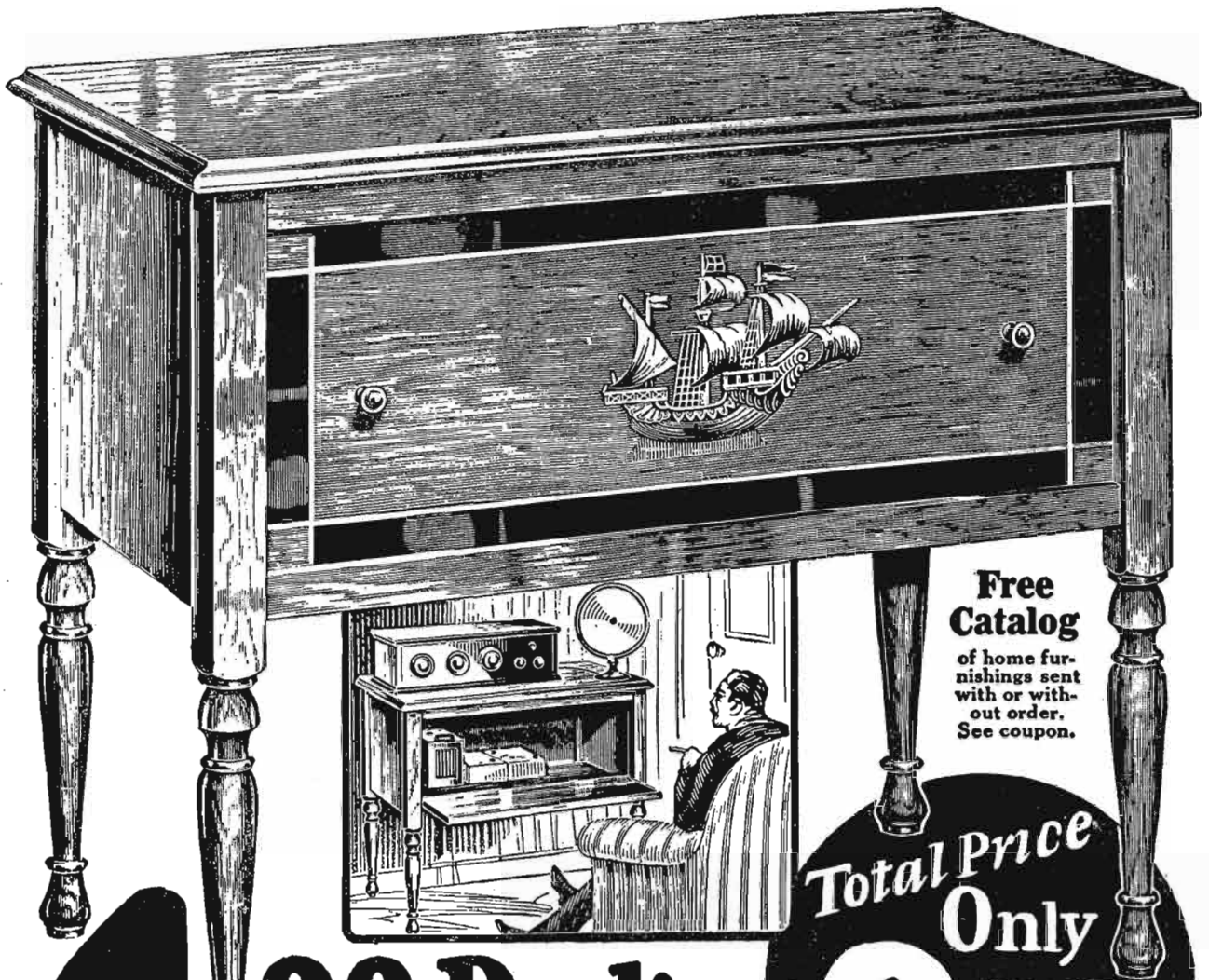
**KGU** The Advertiser Publishing Co., 217 King st., Honolulu, Hawaii. 270.1 meters, 1110 kilocycles, 600 watts. 2½ hours later than Pacific time. Sun, 6-9:30 pm, music, lectures, church, news. Daily, 12 noon-1 pm, stock & weather reports. Daily ex Sat & Sun, 7:30-9:30 pm, Hawaiian program, news, sports, music, etc. Slogan: "In the Land of Sunshine, the Future Playground of America."

**KGW** Oregonian Publishing Co., Portland, Ore. 491.5 meters, 1000 watts, 610 kilocycles. Sun, 10 am-12 noon, church; 7:30-9 pm, church; 9-10, symphony. Mon, 10-11:30 am, Town Crier; 12:30-1:30 pm, concert; 6-7, concert; 7-12, musical entertainment. Tues, 10-11:30 am, Town Crier; 12:30-1:30 pm, concert; 2-3:30 pm, women's matinee; 6-12, music and educational program. Wed, 10-11:30 am, Town Crier; 12:30-1:30 pm, 6-7, concerts; 7:30-10, diversified entertainment. Thurs, 10-11:30 am, Town Crier; 12:30-1:30 pm, entertainment and dance music. Fri, 10-11:30 am, 6-7, concerts; 7:30-12, utility service, vaudeville, Town Crier; 12:30-1:30 pm, concert; 2-3:30 pm, women's matinee; 6-7, concert; 7:30-9, utility and musical entertainment; 10:30-12, Hoot Owl frolic. Sat, 10-11:30 am, Town Crier; 12:30-1:30 pm, 6-7, concert; 10-12 pm, dance music. Pacific standard time. Slogan: "Keep Growing Wiser."

**KGy** St. Martins College, Lacey, Wash. 243.8 meters, 1230 kilocycles, 50 watts. Tues, Thurs, Sun, 8:30-9:30, PST concert. Pacific standard time. Slogan: "Out Where the Cedars Meet the Sea."

**KHJ** Times-Mirror Co., Los Angeles, Calif. 405.2 meters, 740 kilocycles, 500 watts. Sun, 10-12 am, 7-10 pm. Daily ex Sun, Mon, 6-10 pm. Pacific time. Slogan: "Kindness, Happiness, Joy."

**KHQ** Louis Wasmer, Inc., Peyton Building, Spokane, Wash. 370.2 meters, 810 kilocycles, 1000 watts. Sun, 11-12:30, 6-7:30, 7:30-10 pm, church services. Mon, Tues, Thurs, Fri, Sat, 2:30-4:30 pm, matinee; 5-6 pm, service hour. Thurs, Fri, Sat, 6-7 pm, concert. Mon, Tues, 7:30-12 pm, varied. Wed, 9-10 pm, dance music. Thurs, Fri, 8-10 pm, popular; 10:30-12 pm, KGW. Pacific time. Slogan: "In the Friendly City."



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**KICK** Atlantic Automobile Co., Anita, Ia. 461.3 meters, 650 kilocycles, 100 watts.

**KJBS** Julius Brunton & Sons Co., 1380 Bush st., San Francisco, Calif. 220.4 meters, 1360 kilocycles, 50 watts. Sun. (summer schedule—silent). Daily ex Sun. 9-11:30 am, 2-4 pm. Slogan: "San Francisco's Baby Station."

**KJR** Northwest Radio Service Co., 611 Terminal Sales Bldg., Seattle, Wash. 348.6 meters, 860 kilocycles, 2500 watts. Sun. 11 am. church services; 7:30 pm, church services; 9-10 pm, concert. Daily ex Sun. 10-10:30 am, cooking talks; 10:30-11:30 am, musical program; 11:30-12 noon, popular program; 5 pm, stocks; 6-8 pm, concert; 8-10 pm, studio; 10-12 midnight, dance. Pacific standard time.

**KKP** City of Seattle, Harbor Department, Seattle, Wash. 265.3 meters, 1130 kilocycles, 15 watts.

**KLDS** Reorganized Church of Jesus Christ of Latter Day Saints, Independence, Mo. 238 meters, 1260 kilocycles, 1500 watts. Sun, 8:30-11 am, 3-6:30 pm, 9 pm. Mon. silent. Tues, 6:30 am, 2:30 pm, 7 pm, 8 pm. Wed, silent. Thurs, 2:30 pm, 7 pm, 8 pm. Fri. 6:30 pm. Sat, 7 pm, 8 pm. Morning devotional. Tues & Fri, 6:30 am. Slogan: "The Station Dedicated to Knowledge, Liberty, Divinity and Service."

**KLIT** Portland, Ore. 206.8 meters, 1450 kilocycles, 10 watts.

**KLS** Warner Bros. Radio Supplies Co., 2201 Telegraph av., Oakland, Calif. 245.8 meters, 1220 kilocycles, 250 watts. Sun. 10-11 am. church services. Pacific standard time. Slogan: "The City of Golden Opportunity."

**KLX** The Oakland Tribune, Oakland, Calif. 508.2 meters, 590 kilocycles, 500 watts. Daily ex Sun, 10:30 am, women's hour; 5:30 pm. children's hour; 7 pm, news; 8-9 pm. studio program; 9-10 pm, dance music, studio program. Pacific standard time. Slogan: "Where Rail and Water Meet."

**KLZ** Pioneer Station of the West, Shirley Savoy Hotel, Denver, Colo. 267.7 meters, 1120 kilocycles, 250 watts. Sun. 9:30-10:30 am, 11-12:30 noon, 3-4 pm, 7-10 pm. Daily ex Sun, 9-11 am, 3-4:30 pm, 6:30-10 pm. Mountain time. Slogan: "The Pioneer Station of the West."

**KMA** Earl E. May Seed & Nursery Co., Shenandoah, Iowa. 270.1 meters, 1110 kilocycles, 500 watts. Sun, 8:30-9:30 am, sacred; 12:15-1:30 pm, talk & music; 4-5 pm, sacred service. Daily ex Sun, 5:30-7 am, 9-10 am, 11-12:30 noon, 2-3 pm, 5-7 pm, 9-11 pm. Central standard time. Slogan: "Keeps Millions Advised."

**KMED** W. J. Virgin, Sparta Bldg., Medford, Ore. 267.7 meters, 1120 kilocycles, 50 watts. Sun, 11 am-12:15 pm, 3:30-4:30 pm, 8-9:15 pm. Daily ex Sat & Sun, 12:15-1:15 pm, 5:45-10 pm. Wed, 10-11 pm. Sat, 6:15-6:30 pm, 10-11:30 pm. Pacific standard time. Slogan: "See Crater Lake."

**KMIC** J. R. Fouch, Inglewood, Calif. 223.7 meters, 1340 kilocycles, 250 watts.

**KMJ** Fresno Bee, Fresno, Calif. 365.6 meters, 820 kilocycles, 50 watts. Mon, Wed, Fri. 7:15-9 pm. Pacific time.

**KMJP** Journal-Post, Kansas City, Mo. 440.9 meters, 680 kilocycles, 1000 watts.

**KMMJ** M. M. Johnson Co., Clay Centre, Neb. 228.9 meters, 1310 kilocycles, 500 watts. Sun, 9:15 pm. Mon, Tues, 10 am, 1:30 pm, 8 pm. Thurs, Fri, Sat, 10 am, 1:30 pm, 8 pm. Slogan: "The Old Trusty Station."

**KMO** Hotel Winthrop (Love Electric Co.), Tacoma, Wash. 254.1 meters, 1180 kilocycles, 250 watts. Sun, 11-12 am, 6:15-7 pm, 8-9 pm. Mon, 10-11 am, 2-4 pm, 7-8 pm. Tues, 10-11 am, 2-4 pm, 7:30-11 pm. Wed, 10-11 am, 2-4 pm, 8-9 pm. Thurs, 10-11 am, 2-4 pm, 8-10 pm. Fri, 10-11 am, 2-4 pm, 7-8, 10-11 pm. Sat, 10-11 am, 2-4 pm, 6:15-7 pm, 10-11 pm. Pacific time.

**KMOX** KMOX, Voice of St. Louis (Inc.), St. Louis, Mo. 299.8 meters, 1000 kilocycles, 5000 watts. 9 pm. Skouras Brothers Sunday night club; 6:30 pm, Jacquinet Jules, organist; 7 pm, KMOX Radio orchestra; 8 pm, KMOX Radio orchestra; 9 pm, "By the Banks of Bonny Doon." KMOX Radio, orchestra; 10 pm, KMOX Radio orchestra.

**KMTR** KMTR Radio Corp., 1025 N. Highland av., Hollywood, Calif. 526.0 meters, 570 kilocycles, 500 watts. Sun, 6:30-7, 7-9 pm, church services. Daily ex Sun, 9:30 am, 12 midnight, programs vary. Pacific time. Slogan: "Echoes of Hollywood."

**KNRC** Clarence B. Juneau, Municipal Auditorium Bldg., Santa Monica, Calif. 374.8 meters, 800 kilocycles, 500 watts. Sun, 10:45-11 pm. Daily ex Sat & Sun, 2-11 pm. Sat, 2 pm-2 am. Pacific standard time. Slogan: "The Station With a Smile."

**KNX** The Los Angeles Evening Express Broadcasting Station, 6116 Hollywood Blvd., Los Angeles, Calif. 336.9 meters, 890 kilocycles, 500 watts. Sun, 10 am-10:30 pm, classical program. Mon, 7:30 am-12 midnight, semi and classical. Tues, 7:30 am-1 am, semi and classical. Wed, 7:30 am-12 midnight, semi and classical. Thurs, 7:30 am-12 midnight, semi and classical. Fri, 7:30 am-12 midnight, semi and popular. Sat, 7:30 am-2 am, semi, popular and classical. Slogan: "The Voice of Hollywood."

**KOA** Rocky Mountain Broadcasting Station, General Electric Co., 1370 Krameria st., Denver, Colo. 325.9 meters, 920 kilocycles, 5000 watts. Sun, 10:30 am, 4:30 pm, 7:30 pm. church services. Daily ex Sun, 11:45 am, weather, news; 12 noon, time signals; 12:45 pm, organ recital. Tues, Thurs, Fri, 3:30 pm, matinee; 4 pm, culinary hints; 4:15 pm, fashion review. Daily ex Sat & Sun, 6 pm, stocks, markets, news bulletins, etc.; 6:30 pm, dinner concert; 8:15 pm, studio program. Tues, 8:30 pm, wit & humor. Mountain standard time.

**KOAC** Oregon Agricultural College, Corvallis, Ore. 270.1 meters, 1110 kilocycles, 500 watts. Revising schedules, programs announced later. Pacific standard time. Slogan: "Science for Service."

**KOB** New Mexico College of Agriculture & Merchants Arts, State College, N. M. 394.5 meters, 760 kilocycles, 5000 watts. Mon. 11:55 am-12 pm, time signals; 9:55-10 pm, time signals; 12:12:02 n, weather reports; 12:02-12:10 pm, New Mexico road reports; 12:10-12:30 pm, news briefs. Wed, 9:55-10 pm, standard mountain time signals; 10-10:02 pm. U. S. W. B. reports; 10:02-10:10 pm, New Mexico road reports. Mountain standard time. Slogan: "The Sunshine State of America."

**KOCH** Central High School, Omaha, Neb. 258.5 meters, 1160 kilocycles, 250 watts. Sun, 3-5 pm, classical. Mon, Tues, Thurs, & Sat, 9-10:30 pm, musical. Central standard time. Slogan: "The Voice of 2,000 Students."

**KOCW** Oklahoma College for Women, Chickasaw, Okla. 252 meters, 1190 kilocycles, 250 watts. Mon, Tues, Thur & Fri, 12-1 pm, educational talk and music. Tues, Fri & Sat, 8-9 pm, musical program. Wed, 10-10:40 am, chapel services; 12-1 pm, musical. Sun, 11 am-12 n, church services; 2:30-3:30 pm, musical. Central standard time.



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**KOIL** Mona Motor Oil Co., Council Bluffs, Iowa. 277.6 meters, 1080 kilocycles, 1500 watts. Sun, 11 am-12 noon, church services; 1-2:30 pm, 6-9 pm, 11-12 midnight. Daily ex Sun, 11:45 am-2:30 pm, 6-9 pm, 11 pm-12 midnight. Central standard time. Slogan: "The Hilltop Studio."

**KOIN** KOIN (Inc.), Sylvan, Ore. 319 meters, 940 kilocycles, 1000 watts. Daily ex Sun, 3-4 pm, news bulletin and musical program from The Portland News. Nightly ex Sat & Sun, studio diversified musical program from 8-10 pm. Sat night silent. Sun, 6-7 pm, 7:50-9 pm, broadcast of church services from First Church of Christ, Scientist, Portland, Ore. Slogan: "The Station of the Hour."

**KOLO** Durango, Colo. 199.9 meters, 1500 kilocycles, 5 watts.

**KOMO** Fisher's Blend Station (Inc.), Seattle, Wash. 305.9 meters, 980 kilocycles, 1000 watts. Mon, Tues, Wed, Thurs, Fri & Sat, 10 am-12:30 midnight. Tues, 7-8 pm, 8-9 pm, 10 am-9:30 pm, church service. Pacific time.

**KOW** The Associated Industries, Inc., 1429 Champa st., Denver, Colo. 475.9 meters, 250 watts. Sun, 11 am-12 noon, church program; 7:30-9 pm. Daily ex Sun, 11 am-12 noon, 1:30-3:30 pm, 6:30-10 pm. Mountain standard time. Slogan: "Kow Station of the West."

**KOWW** Frank A. Moore (Inc.), Elks Bldg., Walla Walla, Wash. 299.8 meters. 1000 kilocycles, 500 watts. Daily ex Sat-Sun. 4:15 pm, news, markets & weather, 7-8 daily ex Sun; 8-12 pm, studio & orchestra. Sun, church service, 11-12 am.

**KPCB** Snowflake Station, Central Bldg., Seattle, Wash. 230.6 meters, 1300 kilocycles, 50 watts. Sun, 8-9 pm. Daily ex Sun, 11 am-1 pm. Mon, Wed, Thur, 7:30-8:30 pm. Tues, Fri, Sat, 7:30-11 pm; 11-1, household talks, evening programs, musical. Pacific standard time.

**KPJM** Wilburn Radio Service, Journal Miner Bldg., Prescott, Ariz. 214.2 meters, 1400 kilocycles, 15 watts. Indefinite schedule, broadcasting only sports & feature news. Mountain time.

**KPNP** Muscatine, Iowa. 211.1 meters, 1420 kilocycles, 100 watts.

**KPO** Hale Brothers & The Chronicle, San Francisco, Calif. 422.3 meters, 710 kilocycles, 1000 watts. Sun, 2:45-4:30 pm, baseball games; 6-6:30 pm, restaurant orchestra; 6:30 pm, "Ya Towne Cryer"; 6-10 pm, concert, orchestra. Daily ex Sun, 6:45-7:45 am, health exercises; 8-9 am, happy hour; 10:30-1 pm, time signals, market reports, etc.; 1-5:30 pm, orchestra; 6-12 midnight, concerts, orchestra, studio programs. Pacific standard time. Slogan: "The City by the Golden Gate."

**KPPC** Pasadena Presbyterian Church, Colorado & Madison sts., Pasadena, Calif. 228.9 meters, 1310 kilocycles, 50 watts. Wed, 6:45-9 pm, mid-week service. Pacific standard time.

**KPRC** Houston Post-Dispatch, Houston, Texas. 293.9 meters, 1020 kilocycles, 500 watts. Sun am & pm, church services. Mon, Tues, Wed, Thurs, Fri, Sat, 11 am-12 noon; 5:30 pm, 7:30-10 pm. Wed, Sat & Sun, 11-12 midnight. Central standard time. Slogan: "Kotton Port Rail Center."

**KPSN** The Pasadena Star-News, 525 E. Colorado st., Pasadena, Calif. 315.6 meters, 950 kilocycles, 1000 watts. Tues, Thurs, Sat, 8-9 pm, studio concert. Sat, 11 am, dance orchestra. Sun, 10:30 am, church services; ex Sun daily, 6-6:15 pm, news. Pacific standard time. Slogan: "Pasadena, California, Station KPSN."

**KQV** Doubleday Hill Elec. Co., 719 Liberty av., Pittsburgh, Pa. 270.1 meters 1110 kilocycles, 500 watts. Daily ex Sat & Sun, 10:30-11:15 am, music; 3-4 pm, music and baseball scores. Eastern standard time. Slogan: "The Smoky City Station." Divides time with Station "WJAS."

**KQW** California Farm Bureau Station, San Jose, Calif. 296.9 meters, 1010 kilocycles, 500 watts. Daily ex Sun, 9:30-10:30 am, shoppers guide; 5:30-6:30 pm, dinner concert; 6:30-6:50 pm, market reports; 7-8 pm, Calif. Farm news, including weather, editorials, farm topics; 7:55-8:00 pm, Riddles & Sign Off. Sun, 8-9:30 pm, church services. Pacific standard time. Slogan: "For God and Country."

**KRAC** Caddo Radio Club, State Fair Grounds, Shreveport, La. 220.4 meters, 1360 kilocycles, 50 watts.

**KRE** Berkeley Daily Gazette, Berkeley, Calif. 256.3 meters, 1170 kilocycles, 100 watts. Daily ex Sun, 7:30 am, Good Thought service; 11:15 am, physical exercise for women; 7 pm., current news. Mon, 8-10 pm. Tues, 9-11 pm, musical. Wed, 5-6 pm, children's hour; 9-12 pm, musical. Thurs, 8-11 pm. Fri, 9-12 pm. Sat, 8 pm-1 am, dance programs. Sun, 10-11 am, church; 6:30-7:30 pm, concert; 8:15-10 pm, sacred music concert. Pacific standard time. Slogan: "Looking Thru the Golden Gate."

**KRLD** Dallas Radio Laboratories (Inc.), 208 N. St. Paul st., Dallas, Texas. 461.3 meters, 650 kilocycles, 500 watts. Sun, 9:30-10:30 am, Sunday school; 11:00 am, church; 6:45-7:30 concert; 8:00 pm, church. Daily ex Sun, & Wed, 12:30-1:30 pm, music; 7 pm, baseball & sports; 7:30-8:30 pm, music; 9:30-10:30 pm, concert hour. Wed, 7 pm, Baseball. Central standard time. Slogan: "Down Where the Blue-bonnets Grow."

**KRLO** Los Angeles, California, 215.7 meters, 1390 kilocycles, 250 watts.

**KROW** Oregon Broadcast Co., Sovereign Hotel, Portland, Ore. 231 meters, 1298 kilocycles, 50 watts.

**KROX** N. D. Brown & W. J. Casamalia, 4728 Bennett St., Seattle, Washington. 211.1 meters, 1420 kilocycles, 50 watts.

**KRSC** Radio Sales Corp., 1202 Fifth av., Seattle, Wash. 211.1 meters 1420 kilocycles, 50 watts.

**KSAC** Kansas State Agricultural College, Manhattan, Kan. 333.1 meters, 900 kilocycles, 500 watts. Daily ex Sat & Sun, 9-9:25 am, 9:55-10:25 am, 12:35-1:05 pm, 4:30-5 pm, 6:30-7:30 pm. Sat, 12:35-1:05 pm. Central standard time.

**KSBA** Shreveport Broadcasting Association, Shreveport, La. 267.7 meters, 1120 kilocycles, 1000 watts. Sun, 11-12 am, church services; 5-6 pm, musical; 7:30-9 pm, church services. Mon, 8-9 pm, musical. Tues, 9-11, hotel dance. Wed, 8-9, musical. Thurs, Fri, 8-9 pm, musical. Sat, 9-11, hotel dance. Central standard time. Slogan: "Keep Shreveport Before America."

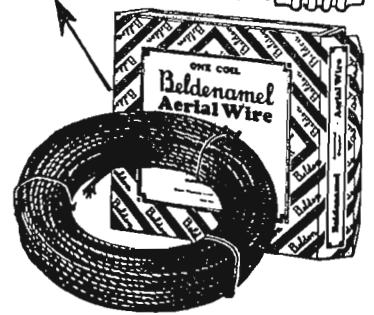
**KSCJ** The Sioux City Journal, Sioux City, Iowa. 243.8 meters, 1230 kilocycles, 500 watts. Sun, 11-12 am, 2-4 pm, 7-9 pm, Daily ex Sun, 9:45-10:45 am, markets; 11:30 am-12:30 pm, noon program; 6-7 pm, dinner program; 8:30-midnight, studio program; Central standard time. Divides time with Station "KWUC," 12:30-1:30 pm, 4-5 pm, 7-8 pm.

**KSD** St. Louis Post-Dispatch, 12 & Olive sts., St. Louis, Mo. 545.1 meters, 550 kilocycles, 500 watts. Sun, 5:20 pm, Capitol Family; 7:15 Arwater Kent hour. Mon, 5:30-Roxy's Gang. Daily ex Sun, & Mon, 6:30 pm, studio program; 7 pm, Eveready hour; 8 pm, Coca Cola hour; 8:30 pm, orchestra. Central standard time.

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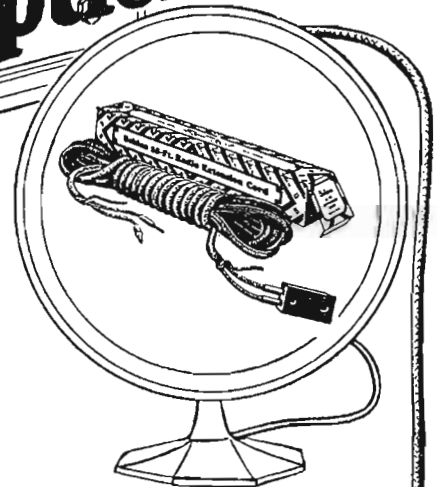
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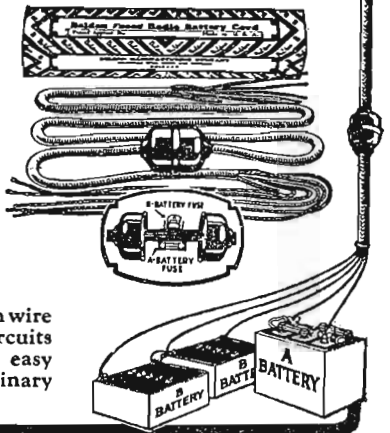
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3. A color code on each wire for identifying circuits which makes it as easy to install as an ordinary battery cord.



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**KSEI** KSEI Broadcasting Association, Pocatello, Idaho. 333.1 meters, 900 kilocycles, 250 watts. Sun, Wed, & Fri, 9-11 pm, Daily ex Sun, 3-4 pm. Sat, 10-12 pm. Western time. Slogan: "Kummuunity Southeast Idaho."

**KSL** Utah Radio Service Corp., South Temple St., Salt Lake City, Utah. 302.8 meters, 990 kilocycles, 1000 watts. Sun, 10 am, 12 noon, 1:55 pm, 4-5 pm. 7:30-8:30 pm. 9-10 pm. Daily ex Sun, 10 am-12 noon. 4-5 pm. 6:30-8 pm, 9-10 pm, 11 pm, 12 midnight. Slogan: "The voice of the Inter-Mountain Empire."

**KSMR** Santa Maria Valley R. R., Santa Maria, Calif. 272.6 meters, 1100 kilocycles, 100 watts. Daily ex Sun, 6:30-10 pm, music, children's hour, home & farm, music. Sat, 7:30-8:15 pm, markets, reports, etc. Pacific time. Slogan: "Santa Maria, Calif., The Valley of Gardens."

**KSO** Berry Seed Co., Clarinda, Iowa. 227.1 meters, 1320 kilocycles, 500 watts, Sun, 11 am, church services. Mon, Tues, Wed, Thurs, Fri, 12 noon, 6:30-8:30 pm, musical. Sat, 12 noon, Sunday school. Sat, silent night. Central standard time. Slogan: "Keep Serving Others."

**KSOO** Sioux Falls Broadcast Association, 609 Minnehaha Bldg., Sioux Falls, S. D. 209.7 meters, 1430 kilocycles, 250 watts.

**KTAB** The Associated Broadcasters (Inc.), 1410 10th av., Oakland, Calif. 280.2 meters, 1070 kilocycles, 500 watts. Sun, 9:45-12:30 pm, 7:45-9:30 pm, church services. Daily ex Sun, 8:45-10 am, 5-6 pm, 7-7:30 pm. Daily ex Sat, Sun, 8-10 pm. Pacific standard time. Slogan: "Knowledge, Truth and Beauty."

**KTAP** Robert B. Bridge, Radio Service Shop, 2412 Main av., San Antonio, Texas. 223.9 meters, 1310 kilocycles, 10 watts. Sun, 4-6 pm, varied musical program. Daily ex Sun, 6:30-7:30, calisthenics; 10:15-11:30, weather bulletins, music; 12:30-2 pm, road bulletins, music; 6:30-7:45 pm, music; 9:30-10:30 pm (ex Mon), music. Central standard time. Slogan: "The Alamo—Texas Shrine of Liberty."

**KTBI** Bible Institute of Los Angeles, 536 S. Hope st., Los Angeles, Calif. 283.3 meters, 1040 kilocycles, 500 watts. Mon, Tues, Wed, Thurs, 8 pm, musical studio program. Fri, 7 pm, Sunday school lessons. Sun, 10:45 am, 7:15 pm, church services; 6 pm, vespers. Pacific standard time.

**KTBR** Brown's Radio Shop, 393 1/2 Yamhill st., Portland, Ore. 282.8 meters, 1060 kilocycles, 50 watts. Mon & Wed, 11 am-12 noon, 1:30-2:30 pm, 6-7:30 pm, 8:30-9:30 pm. Tues, 11 am-12 noon, 1:30-2:30 pm, 7-7:30 pm. Thurs, 11 am-12 noon, 1:30-2:30 pm, 6-9 pm. Sat, 11 am-12 noon, 3-4 pm, 7-9:30 pm.

**KTCL** American Radio Telephone Co., Seattle, Wash. 277.6 meters, 1080 kilocycles, 500 watts. Sun, 7:15-8:15 pm. Mon, Wed, Fri, 5:45-11 pm. Tues, Thur, 6-8:30 pm. Pacific standard time. Slogan: "Know The Charmed Land."

**KTHS** The Arlington Hotel, Hot Springs, Ark. 340.7 meters, 830 kilocycles, 750 watts. Sun, 11 am-12:15 pm, 9-12 pm, music. Daily ex Sun, 12:30-1:30 pm, markets; 9 pm-12 midnight, music. Central standard time. Slogan: "Kum to Hot Springs."

**KTNT** Norman Baker, Muscatine, Iowa. 256.3 meters, 1170 kilocycles, 3500 watts. Daily ex Sat & Sun, 12-12:30 noon, 8-9 pm; home folks program, 12-12:30 pm. Sun, 2:30-3 pm, 9-10 pm. Central standard time. Slogan: "Calliphone Studio KTNT First New Tone in 40 Years."

**KTRL** Technical Radio Laboratory, (H. C. Hogenkamp), 28 Sicomac av., Midland Park, New Jersey. 280.2 meters, 1070 kilocycles, 15 watts.

**KTSA** San Antonio, Tex. 265.3 meters, 1130 kilocycles, 2000 watts.

**KTUE** Uhalt Electric Co., 614 Fannin St., Houston, Tex. 212.6 meters, 1410 kilocycles, 5 watts. Daily, 5:30-6:30 pm. Central standard time.

**KTW** First Presbyterian Church 7th av. and Spring st., Seattle, Wash. 394.5 meters, 760 kilocycles, 1000 watts. Sun, 11 am to 1 pm, 3-4 pm, 7:30-9:30 pm. Pacific time.

**KUOA** University of Arkansas, Fayetteville, Ark. 296.9 meters, 1010 kilocycles, 500 watts. Sunday services, 7:30 pm. Mon, 7:30 pm, farmers' program; Tues, 8 pm, musical program; Thurs, 8 pm, University Extension lectures.

**KUOM** State University of Montana, Missoula, Mont. 374.8 meters, 800 kilocycles, 500 watts. Mon & Thurs, 8 pm, music & popular educational talks. Sun, 9:15 pm, sacred concert & sermon. Mountain standard time.

**KUSD** University of South Dakota, Vermillion, S. D. 483.6 meters, 620 kilocycles, 250 watts. Program during summer entirely irregular. Central standard time.

**KUT** University of Texas, Austin, Tex. 232.4 meters, 1290 kilocycles, 500 watts. Sun, 11 am, St. David's Episcopal Church. Mon & Wed, 8 pm, studio program. Slogan: "Come to University of Texas."

**KVI** Puget Sound Radio Broadcasting Co., 9th & A sts., Tacoma, Wash. 234.2 meters, 1280 kilocycles, 50 watts. Sun, 11:30-12:45 pm, 1:30-5:30 pm, 7:30-9:30 pm. Daily ex Sun, 8-10 am, 6:15-10 pm. Pacific standard time. Slogan: "Puget Sound Station."

**KVOO** South Western Sales Corp., Bristow, Okla. 348.6 meters, 860 kilocycles, 1000 watts. Sun, 8-12 am, church services; 6-8 pm, musical entertainment. Daily ex Sun, 8:15 am, prayer; 8:30-9 am, music; 10 am, markets; 12 noon-1 pm, Farmers' hour; 1:45 pm, markets; 3-4 pm, music; 6-10:30 pm, varied musical program. Central standard time. Slogan: "The Voice of Oklahoma."

**KVOS** L. L. Jackson & L. Kessler, 1208 10th av., Seattle, Wash. 209.7 meters, 1430 kilocycles, 50 watts.

**KWBS** Schaeffer Radio Co., 226 E. 41st st., Portland, Ore. 199.9 meters, 1500 kilocycles, 15 watts.

**KWCR** H. F. Paar, 1444 2nd av. E., Cedar Rapids, Iowa, 384.4 meters, 780 kilocycles, 250 watts. Sun, 11 am, church service; 5:15 pm, special service. Mon, Wed, Fri, 4:15-9 pm. Wed, 4:15-9 pm. Sat, 12 midnight. Central standard time. Slogan: "Voice of Cedar Rapids."

**KWG** Portable Wireless Telephone Co., 530 E. Market st., Port Stockton, Calif. 344.6 meters, 870 kilocycles, 50 watts. Sun, 11-1 pm, 7:30-9:30 pm, church service; 4:30-5:30 pm, concert. Daily ex Sun, 4-5 pm, news; 5-6 pm, news; 6-7 pm, children's hour; 8-9 pm, studio; 9-10 pm, studio; 10-11 pm, studio.



# There are many fluxes for soldering but only one— is safe for Radio!

**F**LUX for soldering is a general term; it embraces, as a class, all types of soldering fluxes. To designate a flux as safe for radio construction is specific; *it means rosin*. Chloride pastes, acids and fluid solutions are soldering fluxes, and are well adapted for certain work, but *conductive and corrosive properties forbade their use for radio assembly*. Their active elements, zinc and ammonium chlorides, display spreading, creeping tendencies that promote leakage and will eventually cause increased resistance in the wiring.

Rosin, an organic mixture, *is a non-conductor and non-corrosive*. The glass-like surface of this material does not readily lend itself to the collection of dust (carbon particles) as will the sticky organic greases of paste. Nor will rosin attract moisture from the atmosphere; the chlorides of pastes and fluids will. *Moisture plus carbon particles defeat the best insulations produced. Moisture plus chlo-*

*rides direct a slow but determined corrosive attack upon supporting metals*. Such slow corrosion in wiring causes a steadily increasing resistance to the flow of electrical energy.

Kester Rosin Core Radio Solder scientifically combines radio's premier flux, Rosin, with a solder alloy of unvarying quality. The use of Kester Radio Solder furnishes the user with a means of accomplishing *Safer, Faster, and Cleaner* set wiring. Constructors who solder-protect wiring with Kester Radio Solder enjoy increased receptive range, improved tonal quality and the satisfying assurance that their receivers will never be forced into the discard through the corrosive and conductive action of a chloride flux.



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| Dealer.....   |           |

*Tell 'Em You Saw It in the Citizens Radio Call Book*

**KWJJ** Wilbur Jerman Station, at Route No. 1, Box 481, Portland, Ore. Studio at Broadway Theater, 220 Broadway st. Sun, 12-1 pm, organ music; 9-10 pm, studio program. Daily ex Sun, 6-10:30 pm, studio program; 10:30-11:30 pm, dance program. Pacific standard time.

**KWKC** Wilson Duncan Studios, 39th & Main sts., Kansas City, Mo. 222.1 meters, 1350 kilocycles, 100 watts. Tues, Wed, Thurs, Fri, 7-9:15 pm. Central standard time. Slogan: "Keep Watching Kansas City."

**KWKH** W. K. Henderson Iron Works & Supply Co., Spring & Fanning sts., Shreveport, La. 394.5 meters, 760 kilocycles, 1000 watts.

**KWLC** Decorah, Iowa. 247.8 meters, 1210 kilocycles, 50 watts.

**KWSC** The State College of Washington, Pullman, Wash. 394.5 meters, 760 kilocycles, 500 watts. Mon, Wed, Fri, 7:30-9 pm. Pacific standard time. Slogan: "The Voice of the Cougars." Divides time with Stations KTW, KOB, and KFNF.

**KWTC** Dr. John Wesley Hancock, 1101 N. Ross st., Santa Ana, Calif. 340.7 meters, 880 kilocycles, 5 watts. Daily ex Sun, 6:30-7:15, dinner hour; Mon, Thur & Sat, 8-9, studio program. Tues, 8-10, studio program. Sat, 10:30-12, irolic & radio revue. Pacific standard time. Slogan: "The Garden of Eden Station."

**KWUC** Western Union College, Le Mars, Iowa. 243.8 meters, 1230 kilocycles, 1500 watts. Sun, 4-5 pm, vesper service. Daily ex Sun, 9:30-11:15 am, markets, etc.; 12:30 pm, Who's Who from "Sioux City" studio; 7 pm, musical, organ. Sat, 10 pm, college irolic. Central standard time. Slogan: "Voice of Western Union College." Divides time with Station KSCJ.

**KWWG** City of Brownsville, Board of City Development, Brownsville, Texas. 277.6 meters, 1080 kilocycles, 500 watts. Sun, church services at 11 am. Mon, weather and river reports, music 12-12:30; music, 6-6:30, 8:30-9:45, 12 midnight-1 am. Tues, weather & river reports, 12-12:30 pm; music, 6-6:30. Wed, Thurs, Fri, Sat, same as Tues. Slogan: "Kum to the World's Winter Garden."

**KXL** KNL Broadcasters (Love Electric Co.), 501 Pantages Bldg., Portland, Ore. 220.4 meters, 1360 kilocycles, 500 watts.

**KXRO** Brott Laboratories, 609 Washington blvd., Seattle, Wash. 240 meters, 1249 kilocycles, 85 watts.

**KYA** Pacific Broadcasting Corp., Clift Hotel, San Francisco, Calif. 309.1 meters, 970 kilocycles, 500 watts. Sun, 11 am-12:30 pm, 7:30-9 pm, church. Daily ex Sun, 7-8 am, 12:30-2 pm, 5:30-7:30 pm, 8-10 pm. Pacific standard time. Slogan: "At the Golden Gate."

**KYW** Westinghouse Elec. & Mfg. Co., roof of Congress Hotel, Chicago, Illinois. 526.0 meters, 570 kilocycles, 2500 watts. Sun, 10:55-11:05 am, time signals; 1-2 pm, 5:30-5:50 pm, 6 pm, 8:30-10:30 pm. Daily ex Sun, 10:55-11:05 am, time signals; 6 pm, baseball scores; 6:30-12 midnight. Central standard time. Slogan: "Pioneer of the West."

**KZM** Preston D. Allen, 13th & Harrison sts., Hotel Oakland, Oakland, Calif. 243.8 meters, 1220 kilocycles, 100 watts. Daily ex Sun, 6:30-8 pm. Hotel Oakland dinner orchestra. Sun, 8-10 pm, orchestra. Pacific standard time.

**NAA** United States Navy, Arlington, Va. 434.5 meters, 690 kilocycles, 1000 watts. Daily 10:05 am, 3:45 pm, 10:05 pm. Tues, 7:30 pm. Eastern standard time. Slogan: "Where the Time Signals Originate."

**WAAD** Ohio Mechanics Institute, Cincinnati, Ohio. 267.7 meters, 1120 kilocycles, 25 watts. Central standard time.

**WAAF** Chicago Daily Drivers Journal, 836 Exchange av., Chicago, Ill. 389.4 meters, 770 kilocycles, 500 watts. Daily ex Sun, & holidays, 8:45 am, markets; 10:30 am, weather; 10:50 am, markets; 11 am, estimated receipts of following day; 12:30 pm, weather; 12:50 pm, markets; 3 pm, markets; 4:30 pm, eastern meat trade conditions. Sat, 12:30 pm, final weather & market reports. Central standard time.

**WAAM** I. R. Nelson Co., 1 Bond st., Newark, N. J. 348.6 meters, 860 kilocycles, 500 watts. Daily ex Sat, Sun, 11 am-12 pm, religious. Daily ex Thurs & Sun, 6-11 pm. Thurs, 6-7:30 pm. Eastern standard time. Slogan: "Sunshine Station."

**WAAT** Bremer Broadcasting Corp., Hotel Plaza, Jersey City, N. J. 245.8 meters, 1220 kilocycles, 300 watts. Sun, 5:30 pm-12 midnight, mixed program. Daily ex Sun, 10 am-12 noon, 6-7 pm, 8-11 pm, mixed programs. Eastern standard time. Divides time with Stations WSOM and WGBB. Slogan: "The Voice At the Gate of the Garden State."

**WAAW** Omaha Grain Exchange, Grain Exchange Bldg., Omaha, Neb. 374.8 meters, 800 kilocycles, 500 watts. Daily ex Sun, Wed, 8 pm, classical, orchestra, etc. Central standard time. Slogan: "Pioneer Market Station of the West."

**WABB** Harrisburg Radio Co., 424 Market st., Harrisburg, Pa. 204 meters, 1470 kilocycles, 10 watts.

**WABC** Atlantic Broadcasting Corp., Richmond Hill, N. Y. 325.9 meters, 920 kilocycles, 2500 watts. Sun, 11 am-12:30 pm, 7:30-9 pm. Central standard time.

**WABF** Markle Broadcasting Corp., 292 Wyoming av., Kingston, Pa. 205.4 meters, 1460 kilocycles, 250 watts. Sun, 9:30 am, children's hour; 12 noon, sermon; 2:30-4 pm, gospel; 7:30-9 pm, sermon. Wed, 8-10 pm. Eastern standard time. Slogan: "The Voice of Wyoming Valley."

**WABI** First Universalist Church, Park st., Bangor, Me. 389.4 meters, 770 kilocycles, 100 watts. Sun, 10:30 am-12 pm, morning services; 7:30-9 pm, evening services. Eastern standard time. Slogan: "The Pinetree Wave."

**WABO** Lake Av. Baptist Church, Rochester, N. Y. 232.4 meters, 1290 kilocycles, 100 watts. Sun, 10:25 am-12 noon, 7:15-9 pm, church services. Eastern standard time.

**WABQ** Keystone Broadcasting Co., Philadelphia, Pa. 212.6 meters, 1410 kilocycles, 500 watts. Sun, 8-11:30 pm. Mon, Tues, 6:15-10:30 pm. Wed, Thur, Fri, Sat, 8 pm-12:30 am. Varied musical programs. Eastern standard time. Slogan: "Designed, Built and Operated by Engineering Students at Haverford College."

**WABR** Scott High School, Toledo, Ohio. 280.2 meters, 1070 kilocycles, 50 watts. No regular schedule. Eastern standard time.

**WABW** College of Wooster, Wooster, Ohio. 247.8 meters, 1210 kilocycles, 50 watts. No regular schedule. Eastern standard time.



## The Outstanding Radio Power Units

What does it mean to you that over fifty leading manufacturers of light socket power units submitted their designs to the Raytheon research laboratories for approval and right to use Raytheon long life rectifying tubes? Just this—that Raytheon's technical personnel and unusual scientific facilities in conjunction with the use of the Raytheon rectifier are invaluable aids in the making of a *reliable* radio power unit.

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# Raytheon

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Tell 'Em You Saw It in the Citizens Radio Call Book

**WABX** Henry B. Joy, 1830 Pendbscot Bldg., Detroit, Mich., near Mt. Clemens, Mich. 245.8 meters, 1220 kilocycles, 500 watts. Central standard time.

**WABY** John Magaldi, Jr., 930 S. 8th st., Philadelphia, Pa. 247.8 meters, 1210 kilocycles, 50 watts. Eastern standard time.

**WABZ** Coliseum Pl. Baptist Church, 1376 Camp st., New Orleans, La. 247.8 meters, 1210 kilocycles, 50 watts. Sun, 10:55 am to 12:30-7:25 to 9:15 pm. Central standard time. Slogan: "The Station with a Message."

**WADC** (Allen T. Simmons) Allen Theater, Cadillac Bldg., W. Market st., Akron Ohio. 239.9 meters, 1250 kilocycles, 1000 watts. Sun, 10:30-11:45 am, 12:30-2:30 pm. Daily ex Sun, 11 am-12 noon, 8-11 pm. Eastern standard time. Slogan: "Watch Akron Deliver Cars."

**WAFD** Radio Station WAFD, Addison Hotel, Charlotte & Woodward av., Detroit, Mich. 218.8 meters, 1370 kilocycles, 250 watts. Sun, 8-10 pm, studio concert. Mon, Wed, Fri, 7-8 pm, commercial; 9-10 pm, studio program. Tues, Thur, 6-7 pm, commercial; 8-9 pm, studio. Eastern standard time. Slogan: "We Are For Detroit." Divides time with Station WTHO, Hotel Whittier, Detroit.

**WAGM** R. L. Miller, Royal Oak, Mich. 225.4 meters, 1330 kilocycles, 50 watts. Sun, Mon, Wed & Fri, 8-10:30 pm. Slogan: "The Little Station With the Big Reputation."

**WAGS** Willow Garages (Inc.), 131 Willow av., Somerville, Mass. 217.3 meters, 1390 kilocycles, 5 watts.

**WAIT** A. H. Waite & Co. (Inc.), 32 Weir st., Taunton, Mass. 214.2 meters, 1400 kilocycles, 10 watts. No regular schedule. Eastern standard time.

**WAIU** American Insurance Union, Columbus, Ohio. 282.8 meters, 1060 kilocycles, 5000 watts. Daily ex Sun, 10:30-11 am, 11:55 am-1 pm. Mon, Fri, 6-11:30 pm. Tues, Wed, 6-7 pm. Eastern standard time. Slogan: "The Radio Voice of the American Insurance Union."

**WALK** Bethayres, Pa. 201.6 meters, 1490 kilocycles, 50 watts.

**WAMD** Radisson Radio Corp. & Stanley E. Hubbard, Minneapolis, Minn. 225.4 meters, 1330 kilocycles, 500 watts. Sun, 10:30 am, church; 12:30, funnies; 3 pm, popular program; 5:30 pm, concert; 9:30 pm, popular. Daily ex Sun, 10:30 am, musical; 11 am, Aunt Sammy; 12 noon, studio organ; 5:30 pm, organ; 5:45 pm, ncws, scores; 6 pm, time signals; 7 pm, classical hour; 8 pm, popular; 10:45 pm, dance frolic. Sun, 10:30 am, 9:15 pm, church services. Central standard time. Slogan: "The Call of the North."

**WAOK** A. H. Andreason, 10317-116 st., Richmond Hill, N. Y. 247.8 meters, 1210 kilocycles, 100 watts.

**WAPI** Alabama Polytechnic Institute, Auburn, Ala. 491.5 meters, 610 kilocycles, 1000 watts. Daily ex Sun, 12:30-1 pm, 8-9 pm. All programs include musical numbers and educational lectures. Central standard time.

**WARC** The Amrad Corp., 1 Radio av., Medford Hillside, Mass. 261 meters, 1150 kilocycles, 100 watts. Eastern standard time.

**WARS** Amateur Radio Specialty Co., Brooklyn, N. Y. 227.1 meters, 1320 kilocycles, 500 watts. Sun, 7-9:30 am, 12:30-3 pm. Daily ex Sun. Tues, Thur, Sat, 7-8 am, 9-10 am, 3-7 pm, 8-10 pm. Tues, 7-9:30 am, 12 noon-2 pm. Thur, 7-8 am, 9-10 am, 12 noon-2 pm, 6-7 pm, 10 pm-12 midnight. Sat, 7-9 am, 12:45-3:30 pm, 9-12 pm. Eastern standard time. Slogan: "The Voice of the Atlantic."

**WASH** Baxter Launderers & Cleaners, 747 Fountain st., N. E., Grand Rapids, Mich. 256.3 meters, 1170 kilocycles, 250 watts. Sun, 11 am-12:15 pm. Daily ex Sun, 12:30-1:30, 5:30-6, 7-8 pm. Sat, 2:15 pm (football season only). Central standard time.

**WASN** Boston, Mass. 230.6 meters, 1300 kilocycles, 100 watts.

**WATT** Edison Elec. Illuminating Co., 39 Boylston, Boston, Mass. (portable). 201.6 meters, 1490 kilocycles, 100 watts.

**WBAA** Purdue University, West Lafayette, Ind. 272.6 meters, 1100 kilocycles, 500 watts. Daily 9:50 am. Mon & Fri, 7:15 pm, special programs as athletic contests, football, basketball, banquet talks, etc. Mon, Fri, 9:50 am, markets & WX; 7:15 pm, lecture, entertainment. Tues, Wed, Thurs, 9:50 am, markets & WX. Sat, 9:50 am, markets & WX. Central standard time. Slogan: "School of E. E."

**WBAK** Pennsylvania State Police, 18th & Herr sts., Harrisburg, Pa. 299.8 meters, 1000 kilocycles, 500 watts. Daily ex Sun, 2 pm, weather, police information, etc.; 11:30 am, agricultural bulletins. Eastern standard time.

**WBAL** Baltimore, Md. 285.5 meters, 1050 kilocycles, 3000 watts. Sun, 6:30-7:30 pm, concert orchestra. Daily ex Sun, Wed, Sat, 3:30-12 pm, all musical ex 3:45-4 pm, when talk is on air. Eastern standard time. Slogan: "The Station of Good Music."

**WBAO** James Milliken, University, Decatur, Ill. 267.7 meters, 1120 kilocycles, 100 watts. Mon, Wed, 7-8 pm, music & lectures. Thur, Fri, Sat, basketball & football games whenever scheduled. Central standard time. Slogan: "Millikin at Decatur."

**WBAP** Carter Publications (Inc.), 400 W. 7th st., Fort Worth, Tex. 499.7 meters, 600 kilocycles, 1500 watts. Sun, 11 am, church; 12:30 pm, kiddies' hour; 5 pm, sacred music; 9:30 pm, orchestra. Daily ex Sun, Wed, 7:30-8:30 pm, 9:30-11 pm, 11 pm-midnight, music. Central standard time. Slogan: "Daytime on the Hour, Nighttime on the Half." Divides time with Station WFAA, Dallas, Tex.

**WBAW** Waldrum Drug Co. & Braid Electric Co., 7th av., South & Broad sts., Nashville, Tenn. 247.8 meters, 1210 kilocycles, 100 watts.

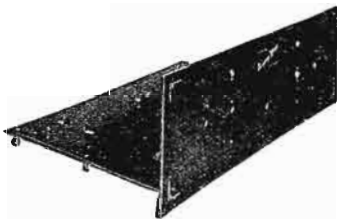
**WBAX** John H. Stenger, Jr., 66 Gildersleeve, Box 104, Wilkes-Barre, Pa. 249.9 meters, 1200 kilocycles, 100 watts. 6:30 pm, studio. Mon, 7-8 dance music. Tues, 7-9 pm, main studio; 10:30 pm, classical. Thurs, 9-10:30 pm, recital; 3:15-5 pm, lectures; 11:15-2 am, witching hour. Sat, 10-12 pm, dance. Eastern standard time. Slogan: "In Wyoming Valley, Home of the Anthracite."

**WBBC** Peter J. Testan, 2123 Troy av., New York, N. Y. 227.1 meters, 1300 kilocycles, 500 watts. Tues, Thurs, Sat, 8-12 pm, musical. Eastern time.



**BROWNING-DRAKE KIT**

Antenna system—One Browning-Drake space wound antenna coil, mounted on .0005 condenser, with velvet vernier illuminated dial. Regenaformer system—One Browning-Drake transformer; slot wound primary, space wound secondary, mounted on one .00025 condenser with velvet vernier illuminated dial. Complete with instructions. List price \$25.00.



**FOUNDATION UNIT**

Consists of front and base panels, drilled and engraved; with sockets, resistor clips, soldering lugs, machine screws and wire. List price \$15.00.



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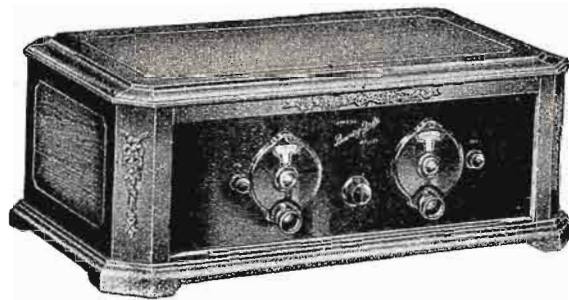
The Browning-Drake balancing or neutralizing device lists for \$1.00. This system of neutralizing is recommended by Browning and Drake.



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The cartridge resistance—another Browning-Drake Corporation product. Lists for 75c.

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**B**ROWNING-DRAKE, in the summer of 1924, gained an unprecedented popularity that has never waned despite the fact that countless designs for home construction have come and gone since that time.

Browning-Drake sells twice as many parts as their nearest competitor. Such popularity is explained by the fact that Browning-Drake has been founded on the sound, scientific research work of Prof. Glenn H. Browning and Dr. Frederick H. Drake, at Cruft Laboratory of Harvard University.

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**DEALERS:** The Official Browning-Drake Kit and the other genuine specified parts of associate manufacturers can be had from your distributor. If he cannot supply you with kits or sets, write or wire us. Your needs will be met at once.

**BROWNING-DRAKE CORPORATION**  
CAMBRIDGE MASS.

# BROWNING-DRAKE RADIO

**WBBL** Grace Covenant Presbyterian Church, Richmond, Va. 247.8 meters, 1210 kilocycles, 100 watts. Sun, 11 am-7:45 pm. Tues, 8 pm. Eastern standard time. Slogan: "Richmond, the Gateway North and South."

**WBBM** The WBBM Air Theater, Chicago, Ill. 389.4 meters, 770 kilocycles, 1000 watts. Sun, 4-6 pm, 7-11 pm, 12 mid-2 am. Mon, 12:30-2 pm, 6-7 pm. Daily ex Sun & Mon, 12:45-2 pm, 7-11 pm. Sat, 12 midnight-2 am. Central standard time. Divides time with Station WJBT, Chicago, 5-7 pm, daily ex Sun, Mon, 11 pm-12 midnight, daily ex Thur. Divides time with Station WAAF, Chicago, 8:30 am-12:45 noon, 2-5:30 pm.

**WBBP** Petoskey High School, Petoskey, Mich. 239.9 meters, 1250 kilocycles, 100 watts. Program irregular. Central standard time. Slogan: "There's Only One Petoskey."

**WBBR** People's Pulpit Association, 124 Columbia Heights, Secaucus, N. J. 256.3 meters, 1170 kilocycles, 1000 watts. Sun, 10-12 am, orchestra, lectures, lessons; 2:4:30 pm, concert; 7-9 pm, Bible questions, music. Tues, Thurs, Fri, 7:30-9:30 pm, organ recital, health items, vocal & violin, Bible lecture. Eastern standard time. Slogan: "Watchtower."

**WBBW** Ruffner Junior High School, Norfolk, Va. 236.1 meters, 1270 kilocycles, 50 watts. Programs vary. Eastern standard time.

**WBBY** Washington Light Infantry, 240 King st., Charleston, S. C. 499.7 meters, 600 kilocycles, 75 watts. Irregular through week. Sat, 7-12 pm, orchestra, vocal, instrumental and talks. Eastern time. Slogan: "The Seaport of the Southeast."

**WBBZ** C. L. Carrell, 36 S. State st., Chicago, Ill. (Portable). 204.0 meters, 1470 kilocycles, 50 watts. Central standard time.

**WBCN** Commonwealth Edison Company, Chicago, Ill. 288.3 meters, 1040 kilocycles, 250 watts. Sun, 2-6 pm, church services; 7:30-9:30 pm, church. Mon, 1-2 pm, semi-classical program; 5-6 pm, organ, classical hour. Daily ex Sun, Mon, 1-2 pm, organ, semi-classical; 5-6 pm, popular request program; 7-8 pm, popular hour; 9:30-12 midnight, popular request program. Central standard time. Slogan: "World's Best Community Newspaper."

**WBES** Bliss Electrical School, Takoma Park, Md. 296.9 meters, 1010 kilocycles, 100 watts. Eastern standard time.

**WBET** Boston Transcript Co., 324 Washington st., Boston, Mass. 241.8 meters, 1240 kilocycles, 500 watts.

**WBKN** Municipal Bank Bldg., 350 Stone av., Brooklyn, N. Y. 267.7 meters, 1120 kilocycles, 100 watts. Daily ex Sun, 12 noon-1 pm, 3-5 pm. Mon, Fri, 8-10 pm. Tues, 10 pm-12 midnight. Wed, 12 midnight-2 am. Thur, 6-8 pm. Sat, 6-8 pm. Eastern standard time. Slogan: "The Voice of Community Service." Divides time with Stations WWRL, WBMS, WIBI.

**WBMC** Malbrook Co., 4128 Betts av., Woodside, N. Y. 293.9 meters, 1020 kilocycles, 500 watts.

**WBMH** Braun's Music House, Detroit, Mich. 211.1 meters, 1420 kilocycles, 100 watts.

**WBMS** The Union City Municipal Broadcasting Station, State-Capital Theater Bldg., Union City, N. J. 267.7 meters, 1120 kilocycles, 100 watts. Sun, 10 am-1 pm. Popular program. Daily ex Sun, 10-11 am, dance program; 5-6 pm, dinner music. Mon & Fri, 12 midnight-2 am, nut club. Tues, Thur, 8-10 pm, popular program. Wed, 6-8 pm, popular program. Sat, 10 pm-12 midnight, popular program. Eastern standard time. Slogan: "The Voice of Union City, New Jersey." Divides time with Stations WWRL, WBKN, WIBI.

**WBNY** Baruchrome Corp., 145 W. 45 Tilmor Bldg., New York, N. Y. 218.8 meters, 1370 kilocycles, 500 watts. Daily ex Sun, 7-11 pm. Sun, 2:30-6 pm. Eastern standard time. Slogan: "The Voice of the Heart of New York."

**WBOQ** New York City, N. Y. 325.9 meters, 920 kilocycles, 500 watts.

**WBRC** Birmingham Broadcasting Corp., 1913 5th av. N., Birmingham, Ala. 243.8 meters, 1230 kilocycles, 250 watts. Sun, 11 am-12:30 pm, 7:30-9 pm, church services. Mon, Wed, Thurs, Fri, 8:10 pm, musical. Tues, 7:30-8 pm, musical. Central standard time. Slogan: "The Biggest Little Station in the World."

**WBRE** Baltimore Radio Exchange, 17 W. Northampton, Wilkes-Barre, Pa. 249.9 meters, 1200 kilocycles, 100 watts. Sun, 9-12 pm. Wed, 6-7 pm, dinner music. Fri, 8:30-10:30 pm. Eastern standard time.

**WBRL** Booth Radio Laboratories, 23 Summer st., Tilton, N. H. 232.4 meters, 1290 kilocycles, 500 watts. Sun, 10:30-11:30 am, 7-8 pm, church services. Tues, Fri, 10-11:30 pm, dance program. Mon, Wed, Thurs, Sat, program varied. Eastern time. Slogan: "The Voice of the Granite State."

**WBRS** North American Broadcasting Corp., 1062 Broadway, Brooklyn, N. Y. 211.1 meters, 1420 kilocycles, 100 watts.

**WBSO** Babson's Statistical Organization, Wellesley Hills, Mass. 284.4 meters, 780 kilocycles, 100 watts. Sun, 12 midnight-1 am, religious service. Daily ex Sat, Sun, 6-6:20 pm, business talks. Daily including Sun, 12 midnight-1 am. Eastern standard time.

**WBT** C. C. Coddington, 500 W. Trade st., Charlotte, N. C. 258.5 meters, 1160 kilocycles, 500 watts. Sun, 10:55 am, church; 8 pm, church services. Daily ex Sun, 12:30 pm, Atwater Kent hour; 3:50 pm, baseball; 8 pm, studio program. Eastern standard time. Slogan: "The Queen City of the South."

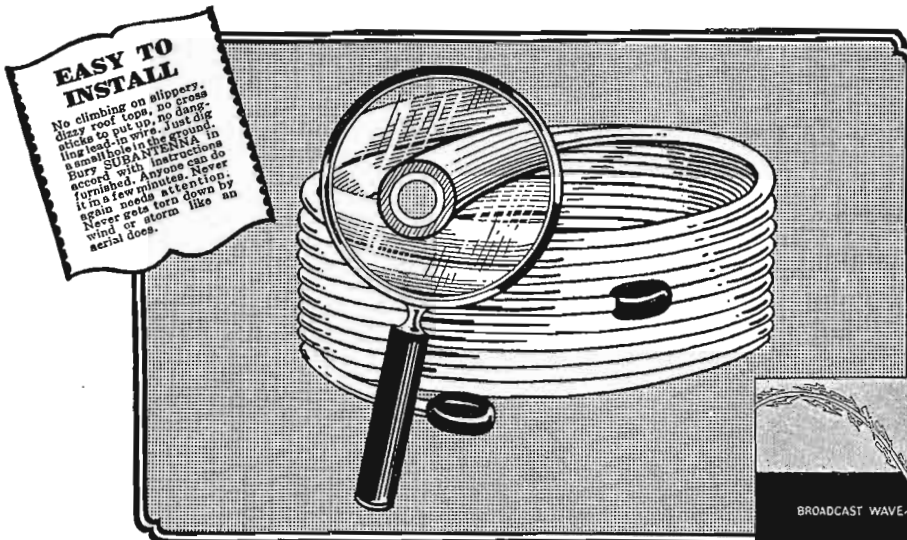
**WBZ** Westinghouse Electric & Mfg. Co., 625 Page blvd., East Springfield, Mass. 333.1 meters, 900 kilocycles, 15,000 watts. Broadcasts on a 24-hour schedule daily. Eastern standard time. Slogan: "The Broadcasting Station of New England."

**WBZA** Westinghouse Electric & Mfg. Co., Hotel Statler, Boston, Mass. 333.1 meters, 900 kilocycles, 500 watts. Broadcasts on a 24-hour schedule daily. Eastern standard time.

**WCAC** Connecticut Agricultural College, Mansfield, Conn. 275.1 meters, 1090 kilocycles, 500 watts. Mon, Wed, Fri, 7:30-9 pm, farm lectures & music. Eastern standard time. Slogan: "Voice from the Nutmeg State."

**WCAD** St. Lawrence University, Canton, N. Y. 365.6 meters, 820 kilocycles, 500 watts. Sun, 4-5 pm, organ recital. Daily ex Sun, 12:30 pm-1 pm. Wed, 8-10 pm. Eastern standard time. Slogan: "The Voice of the North Country."

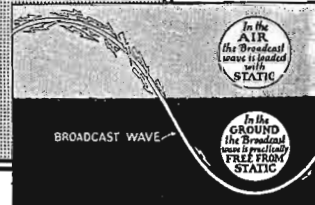
**WCAE** The Pittsburgh Press and Kaufman & Baer Co., Pittsburgh, Pa. 516.9 meters, 580 kilocycles, 500 watts. Sun, 9:30 am-10 pm. Daily ex Sun, 6:45 am-11 pm, inclusive. Programs include exercises, educational talks, musical programs, children's periods, news & recitals. Eastern standard time. Slogan: "Where Prosperity Begins."



**EASY TO INSTALL**

No climbing on slippery, dizzy roof tops, no cross sticks to put up, no dangerous lead-in wires. Just dig a small hole in the ground in a SUBANTENNA in a hurry with instructions furnished. Anyone can do it in a few minutes. Never gets torn down by wind or storm like an aerial does.

This graph-picture tells the greatest radio story ever told. Send coupon for the complete explanation of the difference between noisy air waves and static-free ground waves.



# Oh—the joy of Radio! with a SUBANTENNA

“I get plenty of stations with my Subantenna, on the loud speaker, that I have never been able to reach with my outside aerial. It absolutely cuts down interference to the minimum, **cuts static out, too — not just partly out—but ALL out!**”  
H. S. M., North Carolina

And besides that he gets stations with his Subantenna that he never could coax out of the air with an aerial! Read what Mr. H. S. M. of North Carolina thinks of Subantenna, in his letter which we have reprinted in brackets at the top of this column. He is just one of many thousands of fans who are enjoying clearer, louder, better long distance radio reception since discarding the unsightly, static-collecting, up-in-the-air type of aerial, and using in its stead, Subantenna, the new *underground* antenna.

**Every Night a Good Radio Night —Now an Actuality**

Gone is the time when the first warm day is the signal for pushing the radio back in the corner until cold weather comes again. A thing of the past is the disappointment of having an evening's radio fun spoiled by an unexpected storm or attack of static. Install a Subantenna and your radio will be as dependable as the sunrise. On any night, in any season, in any weather you can get real “distance,” enjoyable clarity and bigger usable volume than you ever could before—all you need is a Subantenna.

**What Scientists Found Out**

For years the heads of great laboratories have been trying to perfect a means of tun-

ing static out of radio impulses received from the air. And all this time they knew not only that the same radio wave which travelled thru the air also travelled thru the ground, but that the ground is practically free from static! Knowing this, a group of inventors set out to develop a device by which the radio wave could be satisfactorily picked up from the ground. Result! Subantenna—already tested and proved by thousands of users—and offered to YOU to test on an unconditional, unqualified guarantee basis. Read herewith, a few more of the voluntary letters of praise which Subantenna users have sent in. Then get the whole explanation of Subantenna—why the ground is almost static-free—why Subantenna increases the distance-getting capabilities of practically any set—why it increases volume and improves selectivity. Get this information from your dealer, or mail the coupon from this announcement for booklet and our *free trial* offer. Now, read:

**Says its WONDERFUL!**

“After 4 years of testing aeriels I at last found the master in the Subantenna. The first night I used it was a very hot summer night. Static was very bad on my outdoor aerial. I connected my Subantenna and one could hardly believe the results. It was wonderful.”—F. L. C., Mass.

**Works Fine with “B” Eliminator**

“We have the Subantenna installed and it is all you claim it to be. It works fine and

we enjoy it very much. We also have a B Battery Eliminator and the two together work fine. We would not want to go back on the high-in-the-air aerial again as we get so much better reception on Subantenna.”—A. J. L., Maine.

**SURPRISED!**

“I received the Subantenna and installed it the same night and believe me I was surprised with the result for I was quite suspicious about it. I am well satisfied.”—R. E. G., Canada.

## FREE TRIAL

**Make This Convincing Test**

Install SUBANTENNA. Leave your old aerial up. Select a bad night when DX is almost impossible with the ordinary aerial. Make a comparison station for station connecting first your aerial, then SUBANTENNA. If, from stations that are just a mess of jumbled noise with the old aerial, you don't get reception that rivals local in sweetness and clarity the instant you switch to SUBANTENNA, this test won't cost you even a single penny. Obtain a SUBANTENNA from your dealer or send coupon at once for scientific explanation of SUBANTENNA and for particulars of GUARANTEE and FREE TRIAL OFFER. SEND COUPON NOW!

# SUBANTENNA

## The New Underground Antenna

Made by CLOVERLEAF MANUFACTURING CO.  
2713-A CANAL STREET CHICAGO, ILLINOIS

**CLIP AND MAIL AT ONCE**

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2713-A Canal Street, Chicago, Illinois  
Tell me all about SUBANTENNA, your unqualified, unconditional guarantee and your FREE TRIAL OFFER.

Name.....  
Address.....

Tell 'Em You Saw It in the Citizens Radio Call Book

**WCAH** C. Aentrekin, 321 W. 10th av., Columbus, O. 535.4 meters, 560 kilocycles, 250 watts. Sun, 10:30-12, church services. Daily, 11:30 am-12:30 pm, 7:30-9:30 pm.

**WCAJ** Nebraska Wesleyan University, University Place, Nebr. 348.6 meters, 860 kilocycles, 500 watts. Mon, Tues & Thurs, 4:30 pm, radio forecasts, weather & news. Wed, 4:30 pm, news, weather; 8 pm, music, lectures. Fri, 4:30 pm, news, weather. Mon, 7 pm, Bible study hour. Sun, 11 am, church; 7:30 pm, service. Central standard time.

**WCAL** St. Olaf College, Northfield, Minn. 236.1 meters, 1270 kilocycles, 500 watts. Daily ex Sun & Thurs, 9:45 am, chapel service. Sunday, 8:30 am, Norwegian Church service. Central standard time. Slogan: "The College on the Hill."

**WCAM** City of Camden, Camden, N. J. 223.7 meters, 1340 kilocycles, 500 watts. Mon, Wed, Fri, 8-12 pm, mixed program. Eastern time.

**WCAO** Monumental Radio, Incorporated, 842 N. Howard st., Baltimore, Md. 384.4 meters, 780 kilocycles, 250 watts. Mon, Wed & Fri, 8-11, varied. Sun, 11-12 am, church. Eastern standard time. Slogan: "The Gateway of the South." Divides time with Station WCBM.

**WCAR** Alamo Broadcasting Co., Plaza Hotel, San Antonio, Tex. 263 meters, 1140 kilocycles, 2000 watts. Daily ex Sun, 11 am, stock reports; 3 pm, late stock reports and news item; 8-10 pm, musical program. Central standard time. Slogan: "Down in Sunny Antonio."

**WCAT** South Dakota State School of Mines, Rapid City, S. Dak. 247.8 meters, 1210 kilocycles, 100 watts. Daily ex Sun, 9:30-9:45 am, weather; 12:30-1 pm, weather & agrigrams. Mountain time. Slogan: "WCAT, Station of the South Dakota State School of Mines at Rapid City."

**WCAU** Universal Broadcasting Co., Hotel Pennsylvania, 39th & Chestnut sts., Philadelphia, Pa. 260.7 meters, 1150 kilocycles, 500 watts. Sun, 11 am-5 pm, 6:45-11 pm. Mon, 7:30-12 pm, musical. Tues, 7:30-12 pm, musical. Wed, 7:30-12 pm. Thurs, 6:30-12 pm. Fri, 7:30-12 pm. Eastern standard time. Slogan: "Where Cheer Awaits U."

**WCAX** University of Vermont, Burlington, Vt. 254.1 meters, 1180 kilocycles, 100 watts. Fri, 7:30-8:30 pm, education & entertainment. Eastern standard time. Slogan: "The Voice of the Green Mountains."

**WCAZ** Carthage College, Carthage, Ill. 340.7 meters, 880 kilocycles, 50 watts. Daily ex Sat & Sun, 11:40 am, church services. Sat, 8:30 pm, athletic contests.

**WCBA** Charles W. Heimbach (Queen City Radiophone Station WCBA), 1350 Allen st., Allentown, Pa. 222.1 meters, 1180 kilocycles, 100 watts. Wed & Fri, 8:15-11 pm, musical programs. Sat, 9:30-11 pm, dance program. Sun, 10 am, 5:30 pm, 7 pm, church services. Eastern standard time.

**WCBD** Wilbur Glenn Voliva, Shiloh Park, Zion, Ill. 344.6 meters, 870 kilocycles, 5000 watts. Sun, 9-10:45 am, 2:30-6 pm, 9-11:30 pm. Tues, 9-11:30 pm. Wed, 1:30-2 pm. Thur, 2:30-3:45 pm, 9-11:30 pm. Divides time with WLS, Sears Roebuck Station, Chicago.

**WCBE** Uhalt Bros. Radio Co., 1219 N. Rampart st., New Orleans, La. 227.1 meters, 1320 kilocycles, 5 watts. Daily ex Sun, 11:30-12:30 pm. Sun, 12:30-2:30 pm, 7:30-8:30 pm. Central standard time. Slogan: "Second Post, U. S. A."

**WCBH** University of Mississippi (near Oxford, Miss.), University, P. O. 241.8 meters, 1240 kilocycles, 100 watts. Tues, 7 pm. On air irregular times, broadcasting athletic events. Central standard time. Slogan: "The Voice of Ole Miss."

**WCBM** Hotel Chateau, Baltimore, Md. 384.4 meters, 780 kilocycles, 100 watts. Sun, 9:45-11:30 pm, vocal & instrumental. Mon, midnight-1:15 am, dance program. Wed, 10-11:45 pm, dance selections. Sat, 9:30-10 pm, religious service; 10-11:30 pm, dance program. Eastern standard time. Slogan: "At Dixie's Door." Divides time with Station WCAO.

**WCBR** C. H. Messter (Portable), 42 Doyle av., Providence, R. I. 201.6 meters, 1490 kilocycles, 100 watts. Daily ex Sun, 6:30 pm, 7:30 pm, 9-10 pm. Eastern time.

**WCBS** St. Nicholas Hotel, Springfield, Ill. 209.7 meters, 1430 kilocycles, 250 watts. Sun, 10:45 am-12 noon, church services; 12:30-2 pm, 6-7 pm. Mon, Tues, Fri, 8:30-10:30 pm, 11-12 pm. Wed, Thur, 8-11 pm. Central standard time.

**WCCO** Cold Medal Station, Nicollet Hotel, Minneapolis, and Union Depot, St. Paul, Minn. 405.2 meters, 740 kilocycles, 5000 watts. Daily, 9:30 am, 9:35 am, 9:45 am, 10:30 am, 11:30 am, 12 noon, 1:30 pm & 2 pm, news, markets, weather, noon concert & women's hour. Mon, 2:30-10 pm. Tues, 3-10 pm. Wed, 2:30-11:30 pm. Thurs, 3-10:05 pm. Fri & Sat, 6:15-10:05. Sun, 10:50 am, 2:30-11 pm. Central standard time. Slogan: "Service to the Northwest."

**WCDA** New York City, N. Y. 211.1 meters, 1420 kilocycles, 250 watts.

**WCFL** Chicago Federation of Labor, 623 So. Wabash av., Chicago, Ill. 483.6 meters, 620 kilocycles, 1500 watts. Sun, 11-12:30 noon, church; 2:30-3:30 pm, organ concert; 3:30-5:30 pm, Municipal Pier Band concert; 7:45-9:15 pm, Baptist church. Mon, 10 am-2 pm, 4-6 pm, musical. Daily ex Sun, Mon, 10 am-2 pm, 4 pm-12 midnight, musical & speakers. Central standard time. Slogan: "The Voice of Labor." Divides time with Station WLTS.

**WCFT** Knights of Pythias Home (Knights of Pythias Orphanage), Tullahoma, Tenn. (Ovoca). 252 meters, 1190 kilocycles, 10 watts.

**WCGU** Chas. G. Unger, New Perl House, Coney Island, New York. 211.1 meters, 1420 kilocycles, 500 watts.

**WCLO** C. E. Whitmore, Camp Lake, Wis. 227.1 meters, 1320 kilocycles, 100 watts. Sun, 9-12 noon, church services; 2-5 pm, popular; 6-7 pm, supper bell program. Mon, Wed, Fri, Sat, 7 pm-midnight, Popular program. Central standard time. "The Playground of the Lake Region."

**WCLS** WCLS, Inc., 301 E. Jefferson st., Joliet, Ill. 215.7 meters, 1390 kilocycles, 150 watts. Sun, 9:30 am, services. 11 am, services; 8-11 pm, studio program. Tues, 8-11 pm, studio features. Wed, 7-8 pm, organ concert. Fri, 7-8 pm, organ & vocal; 8-11 pm, studio program. Sat, 8-11 pm, studio features, orchestra. Central standard time. Slogan: "Will County's Largest Store."

**WCMA** Culver Military Academy, Culver, Ind. 258.5 meters, 1160 kilocycles, 250 watts. Daily, 12:15 pm, public service hour, highway reports, etc. Sun, 11 am, chapel service. Mon, 8 pm, band concert & studio. Wed, 8 pm, dance music & studio. Slogan: "The Voice of Culver."

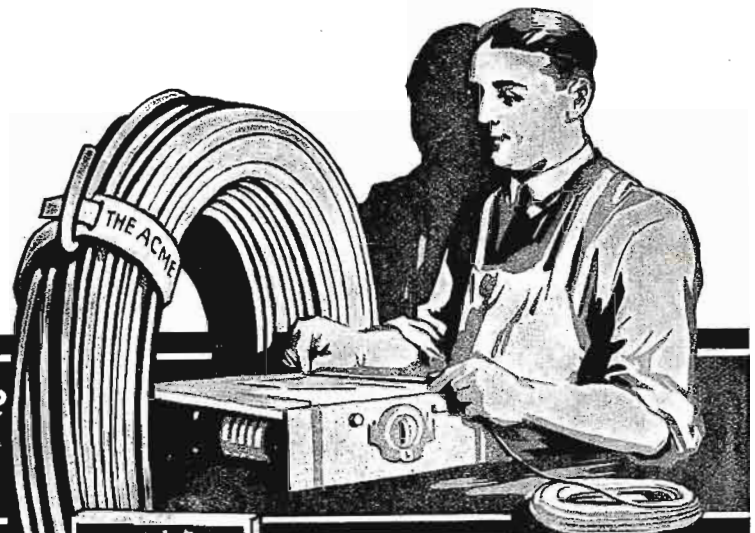
**WCOA** Municipal Broadcasting Station, City Hall, Pensacola, Fla. 249.9 meters, 1200 kilocycles, 500 watts. Sun, 11 am, 12:30-7:45 pm. Mon, Wed, Fri, 10:30 am, 12:30-8 pm. Tues, Thur, Sat, 10:30 am-12:30 pm. Central standard time. Slogan: "Wonderful City of Advantages."

**WCOC** Crystal Oil Co., Columbus, Miss. 230.6 meters, 1300 kilocycles, 100 watts. Mon, 8-10 pm, vocal & instrumental. Wed, Fri, 8-10 pm, vocal & instrumental. Fri, 9-10 pm, dance program. Central standard time.



# ACME CELATSITE Solid or Stranded Circuit Wire

*Recommended in the  
hook-ups of leading  
radio magazines*



### Flexible Celatsite For Sub-Panel Wiring

**F**INE tinned copper wires twisted into a cable, then covered with improved, non-inflammable Celatsite compound. Soft and yielding, therefore, excellent for point-to-point and sub-panel wiring of radio sets. The insulation strips easily and the wires, being tinned, solder readily. Colors, red, yellow, green, maroon, brown, slate, blue, white and black. *Sold only in 25-foot coils, in cartons colored to match the contents.*

### Acme Solid Celatsite For Above-Panel Wiring

This is Nos. 14, 16, 18 and 19 tinned copper wire covered with improved, non-inflammable Celatsite compound. The insulation strips easily and will not crack at the bends. Acme Solid Celatsite in the small sizes is adaptable for sub-panel wiring; in the larger sizes it is ideal for visible wiring; the bright colors of varying shade make a splendid appearance. Made in red, yellow, green, maroon, brown, slate, blue, white and black; 30-inch lengths, single or assorted colors.



### Acme Spaghetti

Acme Spaghetti is oil, moisture and acid proof, and highly dielectric; the choice of manufacturers of the most delicate electrical instruments. In 30-inch lengths, for wire sizes from 12 to 18. Nine bright colors; red, yellow, green, maroon, brown, slate, blue, white and black. (We also make tinned bus bar, round and square, in 2 and 2½-ft. lengths.)

### Stranded, Enameled Antenna

Made of seven strands of copper wire thoroughly enameled, then twisted into a firm cable. This type of antenna resists corrosion and presents maximum surface to the incoming wave,

thus greatly improving the signals. Made in size to equal Nos. 14 and 16 solid enameled antenna wire. (We also make solid and stranded bare, and stranded tinned antenna.)

### Acme Loop Antenna

No wire but the best should be sold for loops. Acme Loop Antenna Wire is composed of sixty strands of No. 38 bare copper wire, to give it flexibility, and five strands of No. 36 phosphor bronze wire, to prevent stretching. Green or brown cotton next to the wire, and an outer covering of green or brown silk, result in splendid insulation and a very pleasing appearance. In convenient spools.

### Acme Celatsite Battery Cable

A thoroughly insulated cable composed of five, six, seven, eight or nine Flexible Celatsite wires all enclosed in brown Rayon braid. Each wire is of a different color. The workmanship and material are of the best. One to a box, with or without terminals.



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Dealers--Write Dept. C for catalog inserts showing the full line

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# ACME WIRE

*For greater certainty in radio circuits*

**WCOM** New Hampshire National Guard, 172nd Field Artillery, Headquarters Battery, Manchester, N. H. 238.0 meters, 1260 kilocycles, 100 watts.

**WCOT** Jacob Conn, Olneyville, R. I. 225.4 meters, 1330 kilocycles, 50 watts.

**WCRW** Clinton R. White, 817 Grace st., Chicago, Ill. 223.7 meters, 1340 kilocycles, 500 watts. Sun, 7:30-11 pm. Daily ex Sun & Mon, 11-12 am, orchestra request hour; 7:30-11 pm. Mon, 11-12 am. Slogan: "For Your Entertainment."

**WCSH** Henry P. Rines, Congress Square Hotel, Portland, Maine. 361.2 meters, 830 kilocycles, 500 watts. Sun, 10:30-12 noon, 1:30-2:30 pm, 4-5:30 pm, 7:30-10 pm. Mon, 10-12 am, 12-1:30 pm, 3-4 pm, 6-11 pm. Daily ex Sun, same as Mon. Slogan: "The Voice from Sunrise Land."

**WCSO** Wittenberg College, Springfield, O. 256.3 meters, 1170 kilocycles, 500 watts. Mon, Wed, Fri, 8-10 pm. Tues, Thurs, 6-7 pm. Eastern standard time.

**WCWK** Chester W. Keen, Fort Wayne, Ind. 228.9 meters, 1310 kilocycles, 500 watts. Sun, 10:30 am, 6:30-7:30 pm, church services. Mon, Tues, Wed, Thurs, Fri, Sat, 11 am-12 noon, musical program. Mon, 4-5:30 pm, children's hour. Tues, Fri, 8-11 pm, musical program. Central standard time. Slogan: "The Hoosier Station."

**WCWS** The Connecticut Portable Broadcasting Station, Bridgeport, Conn. 201.6 meters, 1490 kilocycles, 100 watts.

**WCX** & WJR. Detroit Free Press & Jewett Radio & Phone Co., Pontiac, Mich. 517 meters, 580 kilocycles, 5000 watts. Sun, 3:30 pm, 7:15 pm, church services, Central Methodist Episcopal. Mon, Wed, Thurs, Fri, 4 pm, news bulletin; 6 pm, dinner concert, 8 pm, studio program. Mon, 8:15, code lesson. Wed, 8 pm, 9 pm. Fri, 8:30, Al and Pete; 9, classical program, dance music. Tues, 4 pm, news bulletin; 6 pm, dinner concert; 10 pm, Red Apple Club. Sat, 4 pm, news bulletin; 6 pm, dinner concert.

**WDAD** & WLAC, Dad's Auto Accessories (Inc.) & Life & Casualty Insurance Co., 171-173 8th av. N., Nashville, Tenn. 225.4 meters, 1330 kilocycles, 500 watts. Daily ex Sat, 3-4 pm, musical (Sun, sacred program). Daily ex Sun, 7-10 pm, musical. Central standard time. Slogan: "Where Dollars Are Doubled."

**WDAE** Tampa Daily Times, Tampa, Fla. 267.7 meters, 1120 kilocycles, 500 watts. On air every afternoon and evening. Eastern standard time. Slogan: "The Land of Wonderful Days and Evenings."

**WDAF** The Kansas City Star, Kansas City, Mo. 370.2 meters, 810 kilocycles, 1000 watts. Sun, 3-4:45 pm, church concert and services. Daily ex Sun, 8-8:15 am, Bible lesson; 10-10:15 am, 12-1 pm, 3-4 pm, 5:30-10 pm, 11:45 pm-1 am, musical. Central standard time. Slogan: "Enemies of Sleep."

**WDAG** J. L. Martis, 605 E. 4th st., Amarillo, Texas. 263 meters, 1140 kilocycles, 250 watts. Week days, 12:45 pm, chats, markets & weather; 9-10 pm, entertainment. Fri, 8-10 pm, entertainment. Sun, 9:45 am, Bible class. Central standard time. Slogan: "Where Dollars Always Grow."

**WDAH** Trinity Methodist Church, El Paso, Tex. 234.2 meters, 1280 kilocycles, 100 watts. Sun, 10:45 am, 7:30 pm, church services. Wed, 7:30-8:30 pm, prayer meeting service; 8:30-10 pm, classical & semi-classical music. Standard mountain time.

**WDAY** Radio Equipment Corp., 119 Broadway, Fargo, N. Dak. 361.2 meters, 830 kilocycles, 250 watts. Sun, 10:30 am, church; 1 pm, church; 2 pm, lecture; 3-6 pm, entertainment. Daily ex Sun, 7-9 am, music, news, time signals; 9 am, markets; 10 am, 11 am, 11:55 am, 12 noon, markets; 12:30 pm, music; 1 pm, markets; 5 pm, music; 5:30 pm, story lady; 5:45 pm, news; 6-7:30 pm, music, other entertainment. Central standard time. Slogan: "At the Sign of the Bug."

**WDBE** Gilham Electric Co., Inc., 35 Cone st., Atlanta, Ga. 270.1 meters, 1100 kilocycles, 50 watts. Tues, 7-8 pm, 9C. S. T. Central standard time.

**WDBJ** Richardson Wayland Electric Corp., 106 Church st., S.W., Roanoke, Va. 230.6 meters, 1300 kilocycles, 250 watts. Sun, 7:30-8:30 pm, church services. Daily ex Sun, 12 noon-1 pm, 5:30-6 pm, 8-9 pm, musical. Wed, 9-11 pm. Fri, Sat, 9-10 pm, dance, sports, music. Eastern standard time. Slogan: "The Magic City."

**WDBK** The WDBK Broadcasting Station Co., Inc., 82 Carnegie av., Bolton Square Hotel, Cleveland, Ohio. 227.1 meters, 1320 kilocycles, 250 watts. Tues & Fri, 8-10 pm. Eastern standard time. Slogan: "Broadcasting from Cleveland."

**WDBO** Orlando Broadcasting Co., for Rollins College, Inc., Fort Gatlin Hotel, Orlando, Fla. 239.9 meters, 1250 kilocycles, 500 watts. Sun, 10:45 am, church; 4 pm, musicale; 7:30 pm, church. Mon, Tues, Wed, 8:40-10 pm. Thur, 9:15-10:30 pm, studio. Fri, 8:50-10:30 pm, studio. Eastern standard time. Slogan: "The Voice of Central Florida."

**WDBZ** Kingston Radio Club, Kingston, N.Y. 215.7 meters, 1390 kilocycles, 50 watts.

**WDEL** Wilmington Electric Specialty Co., 405 Delaware av., Wilmington, Del. 265.3 meters, 1130 kilocycles, 100 watts. Sun, 8-10 pm. Tues, Thur, 7:30-9:30 pm. Sat, 9:30-12 midnight. Eastern standard time. Slogan: "First City of the First State."

**WDGY** Dr. George Young's School of Optometry, Minneapolis, Minn. 260.7 meters, 1150 kilocycles, 500 watts. Mon, 7-8 pm, 10-12 pm. Tues, 7-12 pm. Wed, Fri, 7-8 pm, 10-12 pm. Thur, 7-10 pm. Sat, 11-12 pm. Sun, 2-6 pm. Central standard time. Divides time with Station WRHM.

**WDOD** Chattanooga Radio Co., Inc., 615 Market st., Chattanooga, Tenn. 260.7 meters, 1150 kilocycles, 500 watts. Sun, 11 am, church; 1 pm, orchestra; 7:30 pm, church services. Daily ex Sun, 12 noon, WDOD trio. Mon, 7 pm, studio program; 10 pm, Arrowhead hour. Tues, 7 pm, dinner hour program. Wed, 8 pm, studio program. Fri, 8 pm, studio program. Sat, 9 pm, dance program. Central standard time. Slogan: "Wonderful Dynamo of Dixie."

**WDRC** Doolittle Radio Corp., 70 College st., New Haven, Conn. 275.1 meters, 1090 kilocycles, 250 watts. Sun, 11 am-12 pm. Daily ex Sat, Sun, 6:45-10 pm, classical & popular programs. Eastern standard time. Divides time with Station WCAC.

**WDWF** Dutee Wilcox Flint, Inc., Cranston, R. I. 384.4 meters, 780 kilocycles, 500 watts. Eastern standard time.

**Follow the Example of Thousands—Join the Radio Association—Learn Radio—Take Advantage of Its Big-Pay Opportunities**

THE RADIO ASSOCIATION OF AMERICA (composed of radio manufacturers, engineers, designers, dealers, enthusiastic amateurs) will help you make money in Radio, full or part-time. It will teach you how to build and repair sets; start you in business, if you wish; give you the training you need to pass a licensed operator's examination and to become a Radio Engineer.

**Earned \$500 in Spare Hours**

Hundreds of members earn \$3 an hour serving their communities as "radio doctors." Member Lyle Follick, Lansing, Mich., has already made \$500 in his spare time. Member Werner Eichler, Rochester, N. Y., is earning \$50 a week. Member F. J. Buckley, Sedalia, Mo., is earning as much money in his spare time as he receives from his employer. The Association will train you to be a "radio doctor" and to build sets "tailored" to your neighborhood needs, that you can sell for less than the "ready-made" sets offered by your local dealers.

**We Will Start You in Business**

If you prefer a business of your own to becoming a Radio Engineer, our co-operative plan will start you in a business of your own without capital.

This plan gives the ambitious man his opportunity to establish himself in his community.

Many have followed this plan and established radio stores.

**Doubled His Income in Two Months**  
Member W. E. Thon, Chicago, was a clerk in a hardware store when he joined the Association. The training we gave him enabled him to secure the management of the Radio Department of a large store at a 220% increased salary.

"I attribute my success entirely to the Radio Association," he writes. "Your method of instruction is wonderful."

Membership in the Association has increased the salaries of innumerable men. Some turned their extra hours into cash being "radio doctors" for their neighbors; others by accepting employment with neighborhood radio dealers. Scores of our members are now connected with big radio organizations in different capacities. Others are proprietors of prosperous stores.

**From Clerk to Owner**

"In 1922 I was a clerk," writes Member K. O. Benzing, McGregor, Ia., "when I enrolled. Since then I have built hundreds of sets—from 1-tube Regenerative to Superhetrodynes.

"I am now operating my own store and my income is 400% greater than when I joined the Association. My entire success is due to the splendid help you have given me."

**Membership Privileges**

If interested in Radio as a profession or a profitable hobby, join the Association. You will receive a comprehensive and

practical training in Radio that will fit you for Radio's big-pay opportunities. You will have the benefit of proven business-building plans. Our Employment Service will be at your disposal. You will have the privilege of buying radio parts at wholesale. You will have the Association behind you in carrying out your ambitions.

**ACT NOW—If You Want the No-Cost Membership Plan**

Now is the time for you to join. The success of the Association was so tremendous during 1926 that we are still able to offer a limited number of Memberships that may not—need not—cost you a cent. To secure one of them, write today without fail. We will send you details and also our book, "Your Opportunity in the Radio Industry," that will open your eyes to the possibilities in Radio for you. Let us hear from you at once.

RADIO ASSOCIATION OF AMERICA  
4513 Ravenswood Avenue  
Chicago, Ill. Dept. R.C.B.-9

Gentlemen:  
Please send me by return mail full details of your Special Membership Plan and also a copy of your book, "Your Opportunity in the Radio Industry."

Name.....  
Address.....  
City.....State.....

*Tell 'Em You Saw It in the Citizens Radio Call Book*

**WDWM** Radio Industries Broadcast Co., 20 Central av., New York City. 236.1 meters, 1070 kilocycles, 500 watts. Eastern standard time.

**WDZ** James L. Bush, Star Store Bldg., Tuscola, Ill. 277.6 meters, 1080 kilocycles, 100 watts. Daily ex Sat & Sun, grain markets, 9 am-2:15 pm each half hour. Sat, 9 am-1:15 pm, each half hour. Slogan: "The Buckle of the Corn Belt." Central standard time.

**WEAF** National Broadcasting Company, Inc., Rm. 412, 195 Broadway, New York City. 491.5 meters, 610 kilocycles, 5000 watts. Sun, 2-10:15 pm. Daily ex Sun, 6:45-8 am, 4-6 pm, 6-12 midnight. Daily ex Sun, Sat, 11 am-1:15 pm. Sat, 12:45-1:45 pm. Eastern time.

**WEAI** Cornell University, Ithaca, N. Y. 483.6 meters, 620 kilocycles, 250 watts. Eastern standard time.

**WEAM** Borough of North Plainfield, North Plainfield, N. J. 239.9 meters, 1250 kilocycles, 250 watts. Eastern standard time.

**WEAN** The Shepard Co., Westminster st., Providence, R. I. 319.0 meters, 940 kilocycles, 500 watts. Sun, 10:45 am, 7-8:30 pm. Daily ex Sun, 11:55 am-1 pm, 4-5 pm, 6:30-10:30 pm. Eastern standard time. Slogan: "We Entertain a Nation."

**WEAO** Ohio State University, Columbus, Ohio. 282.8 meters, 1060 kilocycles, 750 watts. Daily ex Sun & holidays, 9:45 am, weather, market reports, agricultural bulletin; 11 am, market reports and music; 1 pm, market, music; 4 pm, markets. Tues, 7-9 pm, lectures, music. Wed, 8-10 pm, lectures, music. Thurs, 8-10 pm, lectures, music. Eastern standard time. Divides time with Station WAIU.

**WEAR** The Willard Storage Battery Co., 2026 Union Trust Bldg., Cleveland, Ohio. 399.8 meters, 750 kilocycles, 1000 watts. Daily ex Sun, 11:30 am-12:05 pm, weather, markets. Daily ex Sat & Sun, 3:30-4:10 pm, weather, markets. Eastern standard time. Slogan: "Goodyear Tires—WEAR."

**WEAU** Davidson Bros. Co., Sioux City, Ia. 275.1 meters, 1090 kilocycles, 100 watts. Daily ex Mon, 8:35-9:35, 10:35-11:35 am, 12 noon-12:35 pm, 3:30-5 pm. Tues also, 6:30 pm. Sun, 2-4 pm, musical program. Central standard time.

**WEBC** Head of the Lakes, Walter C. Bridges, 1225 Tower st., Superior, Wis. 241.8 meters, 1240 kilocycles, 250 watts. Sun, 10:40 am, 7:45 pm, church services. Mon, 12:15 noon, musical; 5:30 pm, organ; 6 pm, musical; 6:45 pm, news & baseball, weather; 7:15 pm, childrens hour; 8 pm, feature music. Tues, Thur, Fri, Sat, 12:15 noon, musical; 6 pm, music; 6:45 pm, news; 7 pm, childrens hour; 7 pm, weather. Fri, Sat, 9 pm, organ, dance music. Wed, 10:30 am, cookery corner; 12:15 pm, music; 1:15 pm, weather; 6 pm, music; 6:45 pm, news; 8 pm, music. Slogan: "Where Sail Meets Rail."

**WEBE** Cambridge, Ohio, 247.8 meters, 1210 kilocycles, 10 watts.

**WEBH** Edgewater Beach Hotel, Chicago Evening Post, 5349 Sheridan Road, Chicago, Ill. 365.6 meters, 820 kilocycles, 2000 watts. Daily ex Sun, Mon, 7-8 pm, 9-10 pm, 11 pm-1 am (Sat, 11 pm-2 am). Sun, 10:40 am-12 noon, church service; 5-6 pm, 7-9 pm, musical program. Central standard time. Slogan: "Where Everybody's Happy."

**WEBJ** Third Avenue Railway, 2396 Third st., New York, N. Y. 370.2 meters, 810 kilocycles, 500 watts. Tues, & Fri, 7-9 pm, popular and educational. Wed, 8-10 pm, popular and educational. Eastern standard time.

**WEBL** Radio Corp. of America, Woolworth Bldg., New York, N. Y. (portable). 225.4 meters, 1330 kilocycles, 100 watts. Eastern standard time.

**WEBQ** Raley's School of Beauty Culture, Harrisburg, Ill. 223.7 meters 1340 kilocycles, 15 watts. Daily ex Sun, 7:15-7:30 pm, local news, markets. Sun, 7-8:30 church services. Central standard time. Slogan: "The Voice from Egypt."

**WEBR** H. H. Howell, 54 Niagara st., Buffalo, N. Y. 241.8 meters, 1240 kilocycles, 200 watts. Mon, Wed, Fri, 8:30-11 pm. Sun, church services. Thur, 10:15 pm-12:15 am. Slogan: "We extend Buffalo's Regards."

**WEBW** Beloit College, Beloit, Wis. 258.5 meters, 1160 kilocycles, 500 watts. Sun, 4:25-5:30 pm, vesper services. Wed, 8-9:30 pm. Central standard time.

**WEDC** Emil Denemark Broadcasting Station, 3860 Ogden av., Chicago, Ill. 241.8 meters, 1240 kilocycles, 500 watts.

**WEEL** The Edison Electric Illuminating Co. of Boston, 39 Boylston st., Boston, Mass. 447.5 meters, 670 kilocycles, 500 watts. Sun, 10:50 am-12 noon. Daily ex Sat, Sun, 6:45-10:45 am, 2-5 pm, 5:45-11 pm. Sat, 2-5 pm, 8-10:30 pm. Eastern time. Slogan: "The Friendly Voice."

**WEHS** A. T. Becker, Evanston, Ill. 215.7 meters, 1390 kilocycles, 100 watts.

**WEMC** Emmanuel Missionary College, Berrien Springs, Mich. 238.0 meters, 1260 kilocycles, 1000 watts. Sun, 11 am-8:15 pm, chapel services. Daily ex Sun, 8:05 am, Beacon Light Sacred Hour. Mon, Wed, 8:15 pm, miscellaneous, orchestra, etc. Fri, 8:15 pm, old-time hymns, sacred songs, etc. Central standard time. Slogan: "The Radio Lighthouse."

**WENR** Commonwealth Edison Company, Chicago, Ill. 288.3 meters, 1040 kilocycles, 500 watts. Sun, 2-4 pm, 9:30-10:30 pm, classical music. Daily ex Sun & Mon, 1-3 pm, All-American popular program; 6-7 pm, dinner concert; 8-10 pm, popular program; 12-3 am, Midnight Frolic. Central standard time. Slogan: "Radio Built for Years to Come."

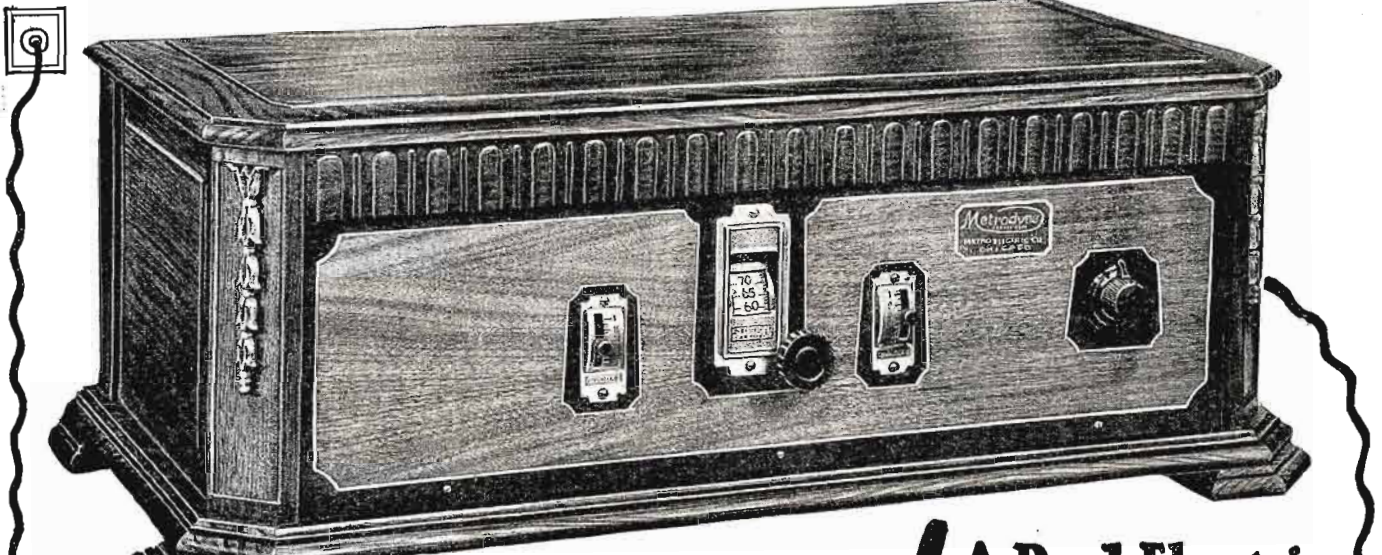
**WEPS** Ralph Glendon Mathewson, Gloucester, Mass. 296.9 meters, 1010 kilocycles, 100 watts.

**WEW** St. Louis University, University Station, St. Louis, Mo. 352.7 meters, 850 kilocycles, 1000 watts. Daily ex Sun, 9-10 am, 2-5 pm, government report. Tues, 7 pm, literary reading. Thurs, 7 pm, music, lectures. Sun, 2 pm, difficulties in religion answered; 7:15 pm, lecture. Central standard time.

**WFAA** Dallas News & Journal, Dallas, Tex. 499.7 meters, 600 kilocycles, 500 watts. Sun, 2:30-3:30, 6-8:30, 11-12 pm. Daily ex Sun, each half hour from 6:30 am to 6 pm, 6:30-7:30 pm, 8:30-9:30 pm. Sun, Tues, Sat, 11-12 pm. Central standard time. Slogan: "Working for All Alike."

**WFAM** St. Cloud Daily Times, St. Cloud, Minn. 252.0 meters, 1190 kilocycles, 10 watts. Daily, 5:30-6 pm, markets, news, weather. Standard time.

**WFBC** First Baptist Church, Knoxville, Tenn. 234.2 meters, 1280 kilocycles, 50 watts. Sun, 10:30 am, 7:30 pm, church services; 4 pm, concert sacred music. Central standard time.



**30 Days Free Trial**

**Now! A Real Electric Radio Set**

**Three Year Guarantee**  
 Shipped direct from our factory at rock bottom prices—cost less than most battery sets

**No Batteries, Chargers or Eliminators**  
 No Acids; No Liquids—Plug In—Press Button—“Tune In”

**AGENTS! DEALERS! BIG PROFITS!**  
 Make big money taking orders for Metrodynes. All or part time. Metrodyne All Electric Radios are in a class by themselves. Unequalled for quality, performance and price. Demonstrate at home and take orders. Lowest wholesale prices. Your demonstrating set on 30 days' free trial. Mail coupon below for details.

**Metrodyne**  
**ALL ELECTRIC RADIO**

**7 Tubes—Single Dial Set**

**100% Electric Radio**

**BEAUTY—EFFICIENCY**  
**DEPENDABILITY**

At last! The radio you've dreamed about! If you have electricity in your home you can now really enjoy coast to coast radio reception without the care, bother and muss of batteries, chargers, eliminators, etc. The Metrodyne All Electric is a real, genuine batteryless radio set. Simply insert the plug in the socket, press the switch button and “tune in.” You could not possibly buy a better radio set than the Metrodyne All Electric, no matter what price you paid.

The Metrodyne All Electric Radio is a 7 tube, single dial set. Only the highest quality low loss parts are used throughout. Solid walnut cabinet, beautiful two-tone effect, with handsome gilt metal trimmings. Size of cabinet, 28 inches long, 13 inches deep, 10 inches high. Has electrically lighted dial so that you can log stations in the dark. Only one dial to tune in all stations. Excellent tone qualities—wonderful volume—very selective.

**Costs Less Than Most Battery Sets**

Do not confuse the Metrodyne electric radio with ordinary light socket sets, because the Metrodyne is truly an all electric radio—consumes less than 2c worth of power a day. Comes to you direct from the factory. Its low cost brings it down to the price of an ordinary battery set. We are so confident that you will be delighted with this wonderful, easy-to-operate batteryless radio that we offer to ship it to your home for thirty days' free trial—you to be the judge.



**Gorgeous Console Electric Radio**

Here is the Metrodyne All Electric Console Radio—a gorgeous, genuine walnut cabinet, in a beautiful two-tone finish. Has a built-in genuine Metro-Cone large size speaker. Brings in programs with great volume, reproducing the entire range from the lowest to the highest notes with remarkable clearness and distinction. All metal parts are finished in old gold. Wonderful electric radio, in a cabinet that will beautify the appearance of any home.

**Mail This Coupon**

We are one of the pioneers of radio. The success of Metrodyne sets is due to our liberal 30 days' free trial offer, which gives you the opportunity of trying before buying. Thousands of Metrodynes have been bought on our liberal free trial basis—**WRITE TODAY!**

**METRO ELECTRIC COMPANY**  
 2165 N. California Ave., Dept. 631  
 Chicago, Illinois

Gentlemen:  
 Send me full particulars about Metrodyne All Electric Radio and your **thirty days' free trial offer.**

Name \_\_\_\_\_  
 Address \_\_\_\_\_  
 If you are interested in AGENT'S proposition place an "X" in the square

**METRO ELECTRIC COMPANY**  
 2165 N. California Ave. Dept. 631 Chicago, Illinois

**MAIL COUPON NOW!**

Tell 'Em You Saw It in the Citizens Radio Call Book

**WFBE** The Garfield Place Hotel Co., Cincinnati, Ohio. 245.8 meters, 1220 kilocycles, 250 watts.

**WFBG** Wm. F. Gable Co., Altoona, Pa. 280.2 meters, 1070 kilocycles, 100 watts. Sun, 10:45 am, church; 7:30 pm, church. Tues, 12:15 pm, organ; 3:30-8:30 pm. Wed, 12:15-3:30-8:30 pm. Fri, 12 noon, 3:30-8:30-11:15-9:30. Sat, 3:30-7:30-8:30-9:30. Eastern standard time. Slogan: "The original Gateway to the West and we wish you all the best way."

**WFBJ** St. Johns University, Collegeville, Minn. 272.6 meters, 1100 kilocycles, 100 watts. Sun, 7-7:30 pm. Central standard time. Slogan: "In the Heart of the Landscape Paradise."

**WFBL** The Onandaga Hotel, Syracuse, N. Y. 258.5 meters, 1160 kilocycles, 750 watts. Sun, 6:30-7:30 pm. Daily ex Sun, 6:30-10 pm. Eastern standard time. Slogan: "When Feeling Blue, Listen."

**WFBM** Merchants Heat & Light Co., 2 W. Washington st., Indianapolis, Ind. 225.4 meters, 1330 kilocycles, 250 watts. Sun, 9:30-10:45, 2 pm, 4:45 pm, 7:30 pm, church services. Daily ex Sat, Sun, 5:30 pm, sports, stock market reports; 10 pm, orchestra. Fri, 11 pm, request organ program. Central standard time. Slogan: "The Crossroads of America."

**WFBR** Fifth Infantry Maryland National Guards, Fifth Regiment Armory, Baltimore, Md. 225.4 meters, 1330 kilocycles, 100 watts. Daily ex Sun, 12 noon, dance music; 7-10 pm, sporting results and news. Tues, Thurs & Sat, 12 noon, 10 pm, 7 pm, general programs. Sun, 11 am. Central standard time. Slogan: "Home of the Star-Spangled Banner."

**WFBZ** Knox College, Galesburg, Ill. 247.8 meters, 1210 kilocycles, 50 watts.

**WFCI** Frank Crook, Inc., 103 Exchange st., Pawtucket, R. I. 225.4 meters, 1330 kilocycles, 50 watts. Mon, 8-9 pm, orchestra. Wed & Fri, 8-10 pm, entertainment. Slogan: "The City of Diversified Industries."

**WFDF** Frank D. Fallain, Police Building, Flint, Mich. 348.6 meters, 860 kilocycles, 100 watts.

**WFHH** Clearwater, Florida. 365.6 meters, 820 kilocycles, 500 watts.

**WFI** Strawbridge & Clothier, Market, 8th & Filbert sts., Philadelphia, Pa. 403.2 meters, 740 kilocycles, 500 watts. Mon, Wed & Fri, 10:15 am-1 pm, markets and reports, recital and Betty Crocker; 3 pm, S & C tearoom ensemble, market reports & recital; 5:45-7:15, dance music. Tues, Thurs & Sat, 10:15 am, market reports; 1-3 pm, S & C tearoom ensemble, markets, reports & studio recital; 6:45-7:15 pm, concert & dance orchestra; 8-11:30 pm, musical program. Morning & evening Sunday services alternating & 9:15 Atwater-Kent radio hour (every Sunday). Eastern standard time. Divides time with Station WLIT

**WFIW** Hopkinsville, Kentucky. 245.8 meters, 1220 kilocycles, 500 watts.

**WFKB** Francis K. Bridgman, 4536 Woodlawn av., Chicago, Ill. 223.7 meters, 1340 kilocycles, 500 watts. Daily ex Sun, 2:30-4 pm. Mon, silent night. Tues, Wed, Thurs, Fri & Sat, 7-8 pm, classical; 9-11 pm, popular. Central standard time. Slogan: "Station of Vesta Battery Corporation."

**WFKD** Foulkrod Radio Engineering Co., 1510 Oxford st., Philadelphia, Pa. 205.4 meters, 1460 kilocycles, 10 watts.

**WFLA** Boca Raton, Florida. 212.6 meters, 1410 kilocycles, 1000 watts.

**WGAL** Lancaster Elec. Sup. & Const. Co., 23 E. Orange st., Lancaster, Pa. 252.0 meters, 1190 kilocycles, 15 watts. On Wed, Fri, 5:45-6:15 pm, dinner concert. Wed, 11:15-1 am, organ concert. Eastern standard time. Slogan: "World's Gardens at Lancaster."

**WGBB** Harry H. Carman, 217 Bedell st., Freeport, N. Y. 245.8 meters, 1220 kilocycles, 400 watts. Sun, 10:40 am-12:30 pm, 4-5:30 pm. Mon, Wed, Fri, 7-11 pm. Slogan: "The Voice of the Sunrise Trail." Divides time with Station WAAT—WSOM.

**WGBC** First Baptist Church, Memphis, Tenn. 277.6 meters, 1080 kilocycles, 15 watts. Sun, 9:55-10:55 am, 7:45-9 pm. Central standard time.

**WGBF** The Finke Furniture Co., 307 Upper Seventh st., Evansville, Ind. 236.1 meters, 1270 kilocycles, 250 watts. Daily ex Sun, 7:15 am, morning worship service; 12:10 pm, news, markets, weather, etc. Mon, 7-12 pm, musical program. Tues, 8-11 pm, music. Fri, 7-11 pm, musical program. Sun, irregular schedule. Central standard time. Slogan: "Gateway to the South."

**WGBI** Scranton Broadcasters, Inc., 608 Linden st., Scranton, Pa. 230.6 meters, 1300 kilocycles, 100 watts.

**WGBR** Geo. S. Ives, 407 S. Central av., Marshfield, Wis., builders of Ives radio apparatus. 228.9 meters, 1310 kilocycles, 50 watts. Sun, 2-4 pm, musical. Central standard time. Slogan: "Wisconsin's Greatest and Best Radios."

**WGBS** Gimbel Brothers, Inc., 33rd st. and Broadway, New York, N. Y. 348.6 meters, 860 kilocycles, 500 watts. Sun, 8:30-10 pm, Vocal & instrumental music. Daily ex Sun, 1:30-6:30 pm, Talks, vocal, instrumental programs. Tues, Thur, Sat, 7:30-11:30 pm, vocal, instrumental programs. Eastern standard time. Divides time with Station WAAM, Mon, Wed, Fri.

**WGBU** Florida Cities Finance Co., Fulford-by-the-Sea, Fla. 277.6 meters, 1030 kilocycles, 500 watts. Mon, Tues, Thurs, Fri, 12-1 pm, 6:30-7:30 pm, 11 pm-2 am. Wed. & Sat, 12-1 pm, 6:30-7:30 pm, 10 pm-1 am. Sun, 9:30-11 pm. Eastern standard time.

**WGBX** University of Maine, Orono, Maine. 389.4 meters, 770 kilocycles, 500 watts. Sun, 2 pm, musical. Wed, 7:30 pm, musical & educational. Eastern standard time.

**WGCP** May Radio Broadcast Corp., 319 Central av., Newark, N. J. 280.2 meters, 1070 kilocycles, 500 watts. Daily ex Sun, 3:5-30 pm. Mon, Thurs & Sat, 6-12 pm. Tues, Wed, Fri, 7-8:30 pm. Sun, 7-9:30 pm. Eastern standard time. Slogan: "The Four Leaf Clover Station."

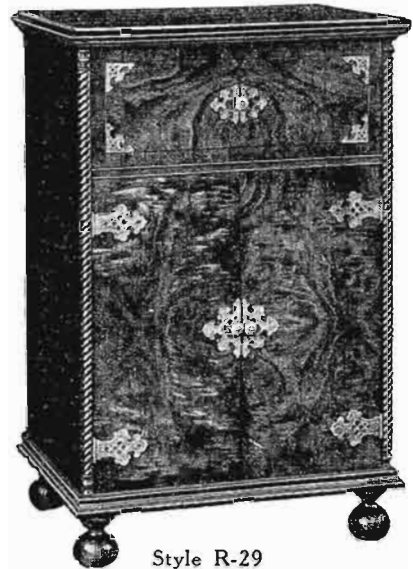
**WGES** Oak Leaves Broadcasting Corp., 128 N. Crawford av., Chicago, Ill. 241.3 meters, 1240 kilocycles, 500 watts. Mon, 5-7 pm, pipe organ, musical. Tues, Wed, Thurs, Fri & Sat, 5-7 pm, semi-classical; 8-9 pm, 11-1 am, musical. Sun, 10:15-12 am, 5-7:40 pm, 11-12 pm, religious pipe organ music. Central standard time. Slogan: "World's Greatest Electrical School."

# New and Distinctive Radio Consoles from the "EXCELLO" Line



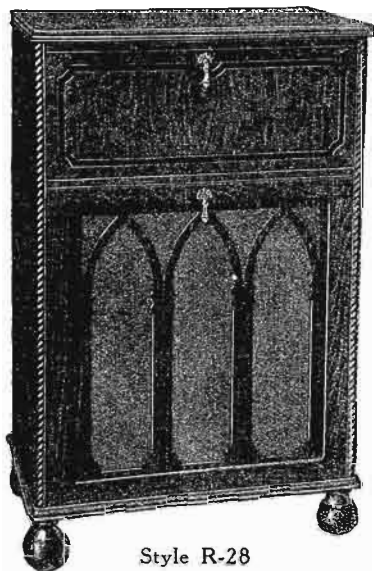
Style R-31

The creation of these smart designs so closely in keeping with the present trend is an achievement to delight all radio fans. These Consoles come with or without horn speaker of long air travel type. Accommodates 22 inch cone type speaker as well as batteries, charger or eliminator.



Style R-29

The sound chamber is so designed that confusing vibrations arising when a cone is enclosed in a cabinet are entirely eliminated. This is accomplished by open grill in front and back. All parts of set and accessories instantly accessible.



Style R-28

Quality cabinet work of true Excello type. Doors of 5-ply butt walnut. Special filler panels are furnished without extra charge for any Excello Console to accommodate Atwater-Kent, Fada, Freed-Eisemann, Grebe, Stromberg - Carlson, Kellogg, as well as all other standard receivers.

**DEALERS AND DISTRIBUTORS** write for interesting proposition in open territory.

## EXCELLO Radio Consoles

See the new Excello Consoles at your dealer or write to us for descriptive catalog.

### EXCELLO PRODUCTS CORPORATION

4820-28 West 16th Street, Cicero, Illinois  
(Suburb of Chicago)

Tell 'Em You Saw It in the Citizens Radio Call Book

**WGHB** Fort Harrison Hotel, Clearwater, Fla. 266 meters, 1130 kilocycles, 500 watts. Daily ex Sun, 7 pm, dinner music; 8 pm, orchestra program; 8:30 pm, studio program; 9 pm, band; 10:30 pm, orchestra. Eastern standard time. Slogan: "WGHB Inviting the World to the Springtime City."

**WGHP** George Harrison Phelps, Inc., Radio Division, Moccobee Temple, Woodward & Putnon av., Detroit, Mich. 243.8 meters, 1230 kilocycles, 1500 watts. Sun, 7:22-9:10 pm. Daily ex Sat & Sun, 1:15-3-6-10 pm. Eastern standard time.

**WGL** International Broadcasting Corp., 2 West 72nd st. & Central Park, New York, N. Y. 256.3 meters, 1170 kilocycles, 500 watts.

**WGM** Verne & Elton Spencer, 501 Cowan av., Jeannette, Pa. 208.2 meters, 1440 kilocycles, 50 watts, Sun, 1:30-3 pm, music. Daily ex Sun, Wed, Sat, 7:30-9 pm, dance music. Popular program. Eastern time. Slogan: "Voice from the Glass City, Voice from the Hilltop."

**WGMU** Atlantic Broadcasting Corp., New York City. 201.6 meters, 1490 kilocycles, 100 watts. Unlimited schedule. Eastern standard time.

**WGN** The Chicago Tribune Station on the Drake Hotel, Chicago, Ill. 305.9 meters, 980 kilocycles, 15,000 watts. Sun, 12-noon-5 pm, 6-10-11:25 pm. Daily ex Sun, 9-10 am, 11 am-7 pm. Daily ex Sun & Mon, 8-11 pm. Central standard time. Divides time with Station WLIB, 10-11 am, 7-8 pm, and after 11 pm.

**WGR** Federal Radio Corp., Hotel Statler, Buffalo, N. Y. 302.8 meters, 990 kilocycles, 750 watts. Sun, 10:45 am, church; 7:45 pm, church; 9:15 pm, concert; 10:15-11:15, concert. Mon, 12 noon, reports; 1-1:30 pm, ensemble; 2:30 pm, program; 6:30, music; 7:30, reports; 1-1:30, ensemble; 2:30 pm, program; 6:30, music; 7:30, reports; 8-11 pm, program. Wed, 12 noon, reports; 1-1:30, ensemble; 2:30 pm, concert; 6:30 pm, music; 7:30, reports; 8-11 pm, program. Thurs, 12 noon, reports; 1-1:30, ensemble; 2:30 pm, program; 6:30 pm, music; 7:30 pm, reports; 8-11 pm, program. Fri, 12 noon, reports; 1-1:30, ensemble; 2:30, concert; 6:30, music; 8 pm-1 am, program. Eastern standard time. Slogan: "Key City of Industry."

**WGST** Georgia School of Technology, Atlanta, Ga. 270.1 meters, 1110 kilocycles, 500 watts. Mon, 9:30-10:30 pm, "Tech Nite" program. Thurs, 7-8 pm, "Artist Series" program. Central standard time. Slogan: "The Southern School with the National Reputation."

**WGWB** Radiocast Corp. of Wisconsin, 144 Broadway, Milwaukee, Wis. 218.8 meters, 1370 kilocycles, 500 watts. Daily ex Sun, 6:30-7:30 pm, dinner music. Mon, 7:30-9 pm, studio artists. Wed & Sat, 9-12 pm, dance music.

**WGY** General Electric Co., 1 River Road, Schenectady, N. Y. 379.5 meters, 790 kilocycles, 30,000 watts. Daily ex Sun, 11:55 am, 12:30 pm, 12:45 pm, 6 pm, 6:10 pm. Mon, Tues, Thurs, Fri, 2 pm. Tues & Thurs, 2:30 pm. Mon, Tues, Thurs, 6:30-7 pm. Thurs, 11:30 pm. Fri, 7 pm. Wed, 6:30 pm. Fri, 6:30 pm, 10:30 pm. Mon, 7:15 pm. Wed, Fri, 7 pm. Sat, 9:30 pm. Sun, 10:30-12 am, 5 pm, 7 pm, 7:30-8:45 pm, 8:15 pm. Eastern standard time.

**WHA** University of Wisconsin, Madison, Wis. 319.0 meters, 940 kilocycles, 750 watts. Mon, 7-9:30 pm. Programs on these evenings consist of educational talks, music, athletic events, etc. Central standard time.

**WHAD** Marquette University - Milwaukee Journal Bldg., 4th and State sts., Milwaukee, Wis., 293.9 meters, 1020 kilocycles, 500 watts. Sun, 3:15 pm, symphony concert. Mon, Tues, Wed, Thurs, Fri, Sat, 12 noon, news, musical program; 4 pm, studio program; 4:55 pm, stock quotations; 6 pm, market and financial news; 6:15 pm, dinner orchestra; 8:30 pm, popular program. Wed, 11:30 pm, midnight recital. Central standard time. Slogan: "The Voice of Wisconsin."

**WHAM** Eastman School of Music, Rochester, N. Y. 277.6 meters, 1080 kilocycles, 500 watts. Daily ex Sun, 3:30-4 pm, 5-5:45 pm, 7-7:40 pm. Sun, 3:15 pm, chapel services. Eastern time.

**WHAP** WHAP, 9 West 96th st., New York City, N. Y. 236.1 meters, 1270 kilocycles, 1000 watts. Sun, 7:30-9:30 pm, Mon, Thurs, 6-9 pm, Wed, 9-12 pm, Sat, 7-11:30 pm. Eastern standard time. Divides time with stations WBNY, WMSG.

**WHAR** Pioneer Broadcasting Station of Atlantic City, the Hotel Seaside, Atlantic City, N. J. 272.6 meters, 1100 kilocycles, 750 watts. Sun, 10:45-1 pm, 2:15-3:10 pm, 7:45-10 pm. Daily ex Sun & Wed, 2-3 pm, 7:45-9 pm. Eastern standard time. Slogan: "Pioneer Broadcasting Station of Atlantic City."

**WHAS** The Courier-Journal Co. and The Louisville Times Co., Louisville, Ky. 461.3 meters, 650 kilocycles, 500 watts. Sun, 3:30-7:15 pm, 10-11 am, church services. Daily ex Sun, 2:15-2:30 pm, 3:30-5 pm, 7-9 pm. Central standard time. Slogan: "Old Kentucky Home."

**WHAZ** Rensselaer Polytechnic Institute, Troy, N. Y. 379.5 meters, 790 kilocycles, 500 watts. Mon, 9 pm. Eastern standard time. Slogan: "Transcontinental and International Radiophone Broadcasting from the Oldest College of Engineering and Science in America, Rensselaer Polytechnic Institute, Troy, N. Y."

**WHB** Sweeney Automotive and Electrical School, Kansas City, Mo. 336.9 meters, 890 kilocycles, 500 watts. Sun, 9:40-10:45 am, church service; 7-7:45 pm, church; 11:15 pm-12:15 am, organ. Daily ex Sun, 8:25-9:25 am, 10:25-11:25 am, 12-1:25 pm, 3 pm, markets; 2-3 pm, Ladies hour; 7-10 pm, concert. Divides time with Station WOQ, Kansas City, Mo.

**WHBA** Shaffer Music House, Oil City, Pa. 260.7 meters, 1150 kilocycles, 10 watts. Limited commercial broadcast. Mon, 8 pm until 11 pm, musical. Fri, 9 pm until 12 pm, musical. Eastern standard time.

**WHBC** Rev. E. P. Graham, 627 McKinley av., Canton, Ohio. 236.1 meters, 1270 kilocycles, 10 watts. Mon, 8-8:30 pm, lecture, sermon. Eastern time. Slogan: "Dispel Ignorance."

**WHBD** Chamber of Commerce, 118 1/2 N. Main st., Bellefontaine, Ohio. 222.1 meters, 1350 kilocycles, 100 watts. Sun, 10:45 am, 7:30 pm. Daily ex Sun & Sat, 7:30-9 pm. Eastern standard time. Slogan: "Ohio's Highest Point."

**WHBF** Beardsley Spec. Co., Inc., 217 18th st., Rock Island, Ill. 222.1 meters, 1350 kilocycles, 100 watts. Mon, Wed, 9-11 pm. Sat, 2-4, 7-9 pm. Central standard time. Slogan: "Where Historic Blackhawk Fought."

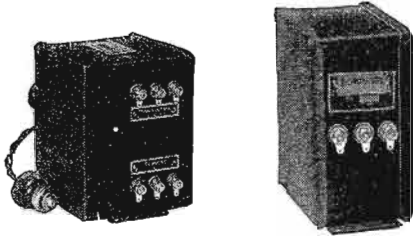
**WHBL** C. L. Carrell, 36 S. State st., Chicago, Ill. 204.0 meters, 1470 kilocycles, 100 watts. Central standard time.

**WHBM** C. L. Carrell (portable), 1506 No. American Bldg., 36 S. State st., Chicago, Ill. 201.6 meters, 1490 kilocycles, 100 watts, class A. Central standard time.

**WHBN** First Avenue Methodist Church, 1st av. & 5th st., Petersburg, Fla. 296.9 meters, 1010 kilocycles, 10 watts. Eastern standard time.



*New*



**130 M. A. FULL WAVE RECTIFIER**

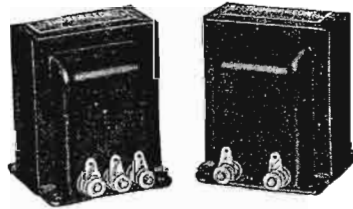
Here is a power unit that will satisfy the ever increasing demand for improved quality of reception. A split secondary 550 volts either side of center, makes possible full wave rectification, using two 216-B or two 281 tubes. Current capacity, 130 milli-amperes. The low voltage secondary, 7½ volts, will supply two UX-210 power tubes, enabling the use of push-pull amplification in last audio stage. The Double Choke Unit 2099 is designed for this power unit. Contains two individual chokes of 30 henries, 130 milli-amperes capacity each.

T-2098 Transformer, 4½" x 5¼" x 5¾"  
List Price, \$20.00

T-2099, Choke Unit  
3¼" x 4⅞" x 5⅞"  
high

List Price \$14.00

*Realistic tone quality, that elusive but much talked of characteristic of radio reception— can be obtained only through the use of apparatus of the finest materials and workmanship. For years Thordarson transformers have been the choice of many discriminating manufacturers of quality receiving sets. Follow the lead of the leaders. If you enjoy good music specify Thordarson transformers*



**POWER PUSH-PULL TRANSFORMER and CHOKE**

Quality reproduction that cannot be obtained with straight audio amplification, is made possible through the Thordarson power push-pull combination. This arrangement is designed for use with power tubes only and has sufficient capacity for all tubes up to and including the UX-210. Makes an ideal power amplifier when used with power supply unit T-2098.

Input transformer couples stage of straight audio to stage of push-pull. Output choke is center-tapped with 30 henries on either side of center tap. Dimensions of both transformer and choke, 2½" x 2½" x 3" high.

Input Transformer T-2408  
List Price, \$8.00

Output Choke T-2420  
List Price \$8.00



**A. C. TUBE FILAMENT SUPPLY**

The new R. C. A. and Cunningham A. C. filament tubes will be very popular with the home constructor this season. The Thordarson Transformer T-2445 is designed especially for these tubes. Three separate filament windings are provided.

Sec. No. 1, 1½ volts, will supply six UX-226 amplifier tubes.

Sec. No. 2, 2½ volts, will supply two UX-227 detector tubes.

Sec. No. 3, 5 volts, will supply two 5 volt power tubes.

In addition to the above, this transformer is equipped with a receptacle for the B-supply input plug. Supplied with six-foot cord and separable plug for attachment to the light circuit. Transformer in compound filled, crackle-finished case. Dimensions — 2¾" x 5¾" x 4¾".

A. C. Tube Supply, T-2445  
List Price, \$10.00

**THORDARSON ELECTRIC MANUFACTURING CO.**  
*Transformer Specialists Since 1895*  
**WORLD'S OLDEST AND LARGEST EXCLUSIVE TRANSFORMER MAKERS**  
*Huron and Kingsbury Streets — Chicago, Ill. U.S.A.*

THORDARSON ELECTRIC MFG. CO.  
500 W. Huron St., Chicago, Ill.  
Gentlemen:  
Please send me your booklets describing your new power supply transformers. No. A  
Name.....  
Address.....  
City..... State.....  
(3562)

Tell 'Em You Saw It in the Citizens Radio Call Book

**WHBP** The Johnstown Automobile Co., 101 Main st., Johnstown, Pa. 228.9 meters, 1310 kilocycles, 250 watts. Daily ex Sun, 4-5 pm, 2:30-3 pm, 10 pm. Eastern standard time. Slogan: "The voice of the Friendly City."

**WHBQ** Men's Fellowship Class of St. John's M. E. Church, South Bellevue and Peabody avs., Memphis, Tenn. 232.4 meters, 1290 kilocycles, 100 watts. Limited commercial. Sun, Church services. Daily ex Sun, 7-8 pm, orchestra. Central standard time. Slogan: "We Have Best Quartet."

**WHBU** Riviera Theater & Bing's Clothing, 1002 Meridian st., Anderson, Ind. 220.4 meters, 1360 kilocycles, 15 watts. Daily ex Sun, 9-9:30 am, 12-12:30 pm. Wed, Fri, Sun, 7-9 pm. Central standard time. Slogan: "The Home of Chief Anderson."

**WHBW** D. R. Kienzle, 4916 Chestnut st., Philadelphia, Pa. 220.4 meters, 1360 kilocycles, 50 watts. Wed, pm. Eastern standard time.

**WHBY** St. Norbert's College, West De Pere, Wis. Green Bay-De Pere Broadcasting Station. 249.9 meters, 1200 kilocycles, 50 watts. Sun, 5-6 pm, Religious program. Daily ex Sun, 6 pm, weather & markets; 8-10 pm, musical entertainment. Wed, Thur, Fri, Sat, 5-6 pm, dinner hour. Slogan: "Prepared for all good Works."

**WHDI** Dunwoody Industrial Institute, 818 Superior Blvd., Minneapolis, Minn. 245.8 meters, 1220 kilocycles, 500 watts. Daily ex Sun, 6:57-9:30 am. Mon, Wed, Fri, 8-10 pm. Divides time with Station WLB, Minneapolis, Minn.

**WHEC** Hickson Electric Co., Inc., 36 South av., Rochester, N. Y. 232.4 meters, 1290 kilocycles, 100 watts. Sun, 10:30-12 noon, 8-10 pm. Daily ex Sun, 12 noon-3 pm, 6:30-9 pm. Fri, Sat, 10-11 pm.

**WHFC** Triangle Broadcasters, 4145 Broadway, Chicago, Ill. 215.7 meters, 1390 kilocycles, 200 watts. Sun midnight to 4 am, Low Twelve Club. Mon, Wed & Fri, 4-7 pm. Wed & Fri, 1:10 pm-3 am. Tues, Thurs & Sat, 4-6 pm, 7 pm-3 am. Slogan: "Where Happiness First Commences."

**WHK** The Radio Air Service Corporation, Inc., 1220 Huron road, Cleveland, Ohio. 265.3 meters, 1130 kilocycles, 500 watts. Sun, 10 am-12 noon, 5-10 pm. Mon, Tue, 12 noon-10 pm. Wed, Thu, 12 noon-11 pm. Fri, Sat, 12 noon-12 midnight. Eastern standard time. Slogan: "Cleveland's Pioneer Broadcasting Station."

**WHN** Marcus Loew Booking Co., 1540 Broadway, New York, N. Y. 394.5 meters, 760 kilocycles, 500 watts. Sun, 12:30 noon-12 midnight. Daily ex Sun, 9 am-12 midnight. Eastern standard time. Slogan: "Voice of the Great White Way."

**WHO** Banker's Life Company, Des Moines, Iowa. 535.4 meters, 560 kilocycles, 5000 watts. Sun, 11 am, 4-5 pm, 6:30-7:30 pm. Daily ex Sun, 10 am, 12 noon, 2 pm, market reports, weather. Daily ex Sat & Sun, 3-4 pm, 6:30-7:30 pm, 8:30-12 midnight. Central standard time. Slogan: "Who, Who? Bankers Life, Des Moines."

**WHOG** Huntington Broadcasters Assn., 409 N. Jefferson st., Huntington, Ind. 241.8 meters, 1240 kilocycles, 15 watts.

**WHPP** Bronx, New York. 206.8 meters, 1450 kilocycles, 10 watts.

**WHT** Radiophone Broadcasting Corp., Wrigley Bldg., 410 N. Michigan Blvd., Chicago, Ill. 416.4 meters, 720 kilocycles, 5000 watts. Sun, 11 am-2:30 pm, 7-10 pm. Daily ex Sun, 10 am-2:30 pm, 7-10 pm. Tues, Thur, 11 pm-1 am. Central standard time. Slogan: "Write Home Tonight."

**WIAD** Howard R. Miller, 6318 N. Park av., Philadelphia, Pa. 220.4 meters, 1360 kilocycles, 50 watts. Tues, Fri, 9 pm. Eastern standard time.

**WIAS** Home Elec. Co., 315 N. Third st., Burlington, Iowa. 475.9 meters, 630 kilocycles, 100 watts. Tues, 8-9 pm, Thurs, 7-8 pm. Sat, 10:30-11 pm. Sun, 10:30 am, church. Central standard time. Slogan: "Burlington on the Mississippi."

**WIBA** The Capital Times-Strand Theatre Station, 16 E. Mifflin st., Madison, Wis. 239.9 meters, 1250 kilocycles, 100 watts. Mon & Wed, 8:30-10 pm. Mon, 11-12 pm, Fri, 6:15-7 pm. Sat, 11 pm to midnight, Cuckoo Club Music. Central standard time. Slogan: "The Four Lakes City."

**WIBG** St. Paul's Protestant Episcopal Church, Elkins Park, Philadelphia, Pa. 440.9 meters, 680 kilocycles, 50 watts. Sun, 10:45 am, 3:45 pm. Eastern standard time.

**WIBI** Frederick B. Zittrell, Jr., 49 Boerum av., Flushing, L. I., N. Y. 267.7 meters, 1120 kilocycles, 100 watts. Eastern standard time.

**WIBJ** C. L. Carrell, 36 S. State st., Chicago, Ill. (portable). 201.6 meters, 1490 kilocycles, 100 watts. Central standard time.

**WIBM** C. L. Carrell, 36 S. State st., Chicago, Ill. 201.6 meters, 1490 kilocycles, 100 watts. Daily ex Sun, 8:45-9:45 pm. Central standard time. Slogan: "The Gypsy Station."

**WIBO** WIBO Broadcasters, Inc., 6310 Broadway, Chicago, Ill. 416.4 meters, 720 kilocycles, 1000 watts. Sun, 8:45-10 am, 2:30-4:30 pm, 5-7 pm, 10 pm-1 am. Mon, 2:30-4:30 pm, 5:30-7 pm. Daily ex Sun, Mon, 2:30-4:30 pm, 5:30-7 pm, 10-11 pm. Divides time with WHT. Central standard time. Slogan: "Chicago's Uptown Radio Station."

**WIBR** Tri-State Service Co. (Thurman A. Owings, Mgr.), Steubenville, Ohio. 249.9 meters, 1200 kilocycles, 50 watts. Fri, 8-11 pm. Eastern standard time.

**WIBS** Lieut. Thomas F. Hunter (portable), 921 Edgewood road, Elizabeth, N. J. 204.0 meters, 1470 kilocycles, 150 watts, class A. Eastern standard time.

**WIBU** The Electric Farm, R. F. D. No. 3, Poynette, Wis. 217.3 meters, 1380 kilocycles, 20 watts. Central standard time.

**WIBW** Jayhawk Capital Station, Hotel Jayhawk, Topeka, Kansas. 204.0 meters, 1470 kilocycles, 100 watts. Sun, 12:15-1:45 pm, dinner music; 1:45-3 pm, studio program; 6:15-7:45 pm, string ensemble. Daily ex Sun, 12:15-1:15 pm, organ music, studio program; 5-7:30 pm, organ, weather, news, bed time story, dinner music; 9:45-11:30 pm, studio program. Central standard time. Slogan: "Topeka—Where Investment Brings Wealth."

**WIBX** WIBX, Inc., Hotel Utica, Utica New York. 238.0 meters, 1260 kilocycles, 150 watts. Sun, 10:30-12 noon, 8-10 pm, church services. Daily ex Sun, 11:45-12 noon, stock quotations, news; 6:30-10 pm, musical program. Eastern standard time.

# What I would do if I wanted more money

By J. MATHESON BELL

**FIRST** of all I'd make up my mind definitely that I was going to get it.

I don't believe any man living can get things worth while without **firmly believing** that he can. Determination will conquer failure anytime, anywhere.

I'll work harder on my present job to make the boss feel that he owes me more.

But I won't stop there.

I'll put my spare time to work. I'll quit losing money by making my evenings pay.

I wouldn't give up my present job but I'd make more money by working longer hours.

I'd find something that could be sold evenings, either in my home or some one else's home.

That something would have to be a little out of the ordinary because it would have to be of special interest in the evening.

That would be the time of day when both the man and his wife are at home so I'd find something that would be of interest to both of them.

I feel sure that such an article would have to be something for the home, something they would both use and enjoy.

So far so good, but what will that something be.

Piano? Fine, but come to think of it I can't even play one myself so that's out.

Automobile—

Sounds better, guess I could learn how, but seems to me that everybody I know has one. At any rate the auto sounds good—let's see if there is anything better.

Phonograph—

Doesn't sound near so good as the auto.

Vacuum Sweeper—

Not so much interest to the man and I don't see just how I'd show up dust at night.

Radio— Why, the Sam Hill didn't I think of that before, but let's see if it will do—let's see what its good points are as well as its bad ones.

True—I don't know anything about radio, but I have lots of friends who have learned something about it, so I think I could. What sounds good to me is, that I can demonstrate in the home in the evening, the very time of the day for me, and that's just when all the music is being broadcasted.

I'll have competition. I expect it. I'll have to know just what my demonstration will do that the other fellow's won't, so lets see what would make the biggest appeal.

Of course, they would be impressed with music from our nearby stations but I feel sure that if I bring in great distances they will be more impressed. It will have to bring in music loud enough so they can sit away back in the room and enjoy it. It must have volume.

They may be satisfied with music from nearby stations, but they'll ask me for distance, so I must be able to get "by" our powerful nearby station. The radio I want must be selective so I can tune out our nearby station if I desire.

I can picture myself in some prospect's home with a radio that will do that, but I wonder if that is enough—maybe my competitor will be there also—maybe he can do all those things as well as I can.

Then where am I? I've got it—I'll tell you what my radio must do—I want one that my prospect can do all the tuning, so that he will get the thrill of bringing in the music from a distance **clear and loud** and with a tone that will please.

After all he is the one who is going to operate it, so why wouldn't it be better and best if all he had to do was sell himself. I'll admit I'm not much of a salesman, so if I find a radio that will sell itself then I'll not only whip competition but I'll do it easily.

Best of all, I'll make that extra money I want.

Who knows, I may be so successful at it that I can give up my present job and give it all my time—Geetha sounds too good to be true, but other men have done it so why can't I—I can and I will.

But what radio can I sell that will do what I want and yet sell at a reasonable price—I don't want one so high that my people can't buy—but it must be a good one.

Then when I do sell it, they will want me to fix anything that goes wrong so somebody must teach me how to service radio—that's something I can't afford to overlook.

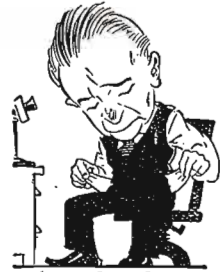
Where is such a radio?

Where is a manufacturer who will teach me how to sell and how to demonstrate—where I can learn this business, both selling and servicing radio—there must be someone.

There is—Ozarka Incorporated of Chicago—the sign of the long distance goose—they have

Writes to Mr. Bell a 64-page book "The Ozarka Plan" which they will send me if I tell them about myself and mention the name of my county. Where is my pen and some paper? I'm going to make **more money** and I'm going to start **right now** by writing for this book.

I am greatly interested in the FREE Book, Ozarka Plan No. 100, telling how I can establish myself in the radio business and increase my present income.



"Busted" and Blue



How Can I Make More?



Thinks Hard!



Decides to Work Harder



Gets An Idea—



**OZARKA**



**INCORPORATED**

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Chicago, Illinois

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Chicago, Illinois

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Address.....City.....  
County..... State.....

Tell 'Em You Saw It in the Citizens Radio Call Book

**WIBZ** A. D. Trum, 217 Catoma st., Montgomery, Ala. 230.6 meters, 1300 kilocycles, 15 watts. Fri, 9-10 pm. Sun, 12-1 pm. Central standard time. Slogan: "We Interest Business Zeal."

**WICC** The Bridgeport Broadcast Station, 1188 Main st., Bridgeport, Conn. 214.2 meters, 1400 kilocycles, 250 watts. Sun, 10:50 am-2 pm, church services. Tues, Fri, 11 am, home management; 8 pm, studio program. Mon, 7-9 pm, studio program. Wed, 5:45-10:30 pm, concert, musical, etc. Thurs, 8 pm, Fri, 6:30-8:30 pm, orchestra, studio program. Eastern standard time. Slogan: "The Industrial Capital of Connecticut."

**WIL** Benson Broadcasting Corp., Missouri Hotel, 11th & Locust st., St. Louis, Mo. 258.5 meters, 1160 kilocycles, 250 watts. Sun, 5-7 pm. Daily ex Sun, 9:30-11:30 am, 2:45-5 pm, 8-11 pm. Central standard time. Slogan: "A Wave Length Ahead."

**WIOD** Carl G. Fisher, Miami Beach, Fla. 247.8 meters, 1210 kilocycles, 1000 watts. Slogan: "Wonderful Isle of Dreams."

**WIP** Gimbel Bros., Philadelphia, Pa. 508.2 meters, 590 kilocycles, 500 watts. Daily ex Sun, Mon & Fri, 6:45-7:30 am, 10-11 am, 1-2 pm, 3-4 pm, 6-7:30 pm. Tues, Thurs & Sat, 8 pm-12 midnight. Mon, Wed & Fri, 6:45-8 am, 10-11 am, 1-2 pm, 3-4:30 pm, 6-7:30 pm. Sun, 10:30 am-12:30 pm, 4-6 pm, 7-9:15 pm, 9:15 pm-12 midnight. Eastern standard time. Slogan: "Watch Its Progress."

**WJAD** Frank P. Jackson, 801 Austin av., Waco, Tex. 447.5 meters, 670 kilocycles, 500 watts. Mon, Tues, Thur, Fri, 8:30-10:30 pm, musical. Wed, 8:30-9:30 pm, musical. Central standard time. Slogan: "Waco, Texas, All Around It."

**WJAG** Norfolk Daily News, Norfolk, Neb. 222.1 meters, 1350 kilocycles, 250 watts. Daily, 12:15 pm, features, sports, word pictures, ball games and athletic events; 6:30 pm, dinner hour orchestra. Central standard time. Slogan: "Home of Printers' Devil."

**WJAK** The Kokomo Tribune, Kokomo, Ind. 234.2 meters, 1280 kilocycles, 50 watts. Mon, 11:45 am, weather, markets, etc.; 7:30 pm, hour of music. Daily ex Sun, 11:45 am, Radio Chapel; 1 pm, Thurs & Sat, organ request program.

**WJAM** D. M. Perham, 322 3rd av. W., Cedar Rapids, Iowa. 384.4 meters, 780 kilocycles, 100 watts. Daily 9:15 am, 1:15 pm, Chicago grain & livestock markets. Daily ex Sun, 8:30 am-12:40 pm, music & talks. Mon, Wed, Fri, 7-9 pm, music. Tues, Thur, 8-11 pm, music. Divides time with Station KWCR alternate evening hours.

**WJAR** The Outlet Company, 174 Weybosset st., Providence, R. I. 483.6 meters, 620 kilocycles, 500 watts. Daily ex Sun, 1:05 pm, musical; 1:30, weather reports. Mon, 8 pm, 9 pm & 10 pm, musical programs & grand opera. Tues, 7 pm, 8 pm, 9 pm, musical; 10 pm, bridge. Wed, 7:30 pm, music. Thurs, 8, 9 & 10 pm, music & entertainment. Fri, 8:20, 8:30, 9 & 11 pm, music & entertainment. Sun, 7:20 pm & 9:15 pm. Eastern standard time. Slogan: "The Southern Gateway of New England."

**WJAS** Pittsburgh Radio Supply House, Tenth st. & Penna av. Pittsburgh, Pa. 270.1 meters, 1110 kilocycles, 500 watts. Sun, 11 am, church services, St. Patrick's Church; 2 pm, studio services. Daily ex Sun, 12 noon, church services, St. Patrick's Church; 7:30 pm, dance; 8 pm, studio concert; 10:30, dance program. Eastern standard time. Slogan: "World's Jolliest Aerial Station."

**WJAX** Jacksonville Municipal Radio Broadcasting Station, Waterworks Park, Jacksonville, Florida. 336.9 meters, 890 kilocycles, 1000 watts. Sun, 11 am, church; 6:30 pm, dinner hour concert; 7:30 pm, church. Daily ex Sun, 11:55 am, Time signals; 12 noon, weather; 4 pm, baseball. Mon, 7:45 pm-12 midnight, musical. Tues, 8-10 pm, musical. Wed, 7:15-11 pm, musical. Fri, 7-10 pm, musical. Sat, 8-10 pm, musical. Eastern standard time. Slogan: "WJAX-W for Wonderful, JAX for Jacksonville."

**WJAY** Cleveland, Ohio. 265.3 meters, 1130 kilocycles, 500 watts.

**WJAZ** Zenith Radio Corp., 3620 Iron st., Chicago, Ill. 263.0 meters, 1140 kilocycles, 5000 watts. Sun, 8-10 pm. Tues, Wed, Fri, Sat, 7-8 pm, 9-11 pm, Shoreland Studio program. Thur, 9-12 pm, Chez Pierre Program. Divides time with Station WMBL, 8-9 pm, except Thur, 7-9 pm. Sun, 3:30-7 pm. Central standard time.

**WJBA** D. H. Lentz, Jr., 301 Whitley av., Joliet, Ill. 322.4 meters, 930 kilocycles, 50 watts. Tues, 8-11 pm. Central standard time.

**WJBB** The Financial Journal, Inc., 126 13th st., N., St. Petersburg, Fla. 344.6 meters, 870 kilocycles, 250 watts. Eastern standard time. Slogan: "Land of Perpetual Sunshine."

**WJBC** Hummer Furniture Co., Second and Joliet, La Salle, Ill. 227.1 meters, 1320 kilocycles, 100 watts. Sun, 10-11 am, Catholic church services; 7:30-9:30 pm, Baptist church services. Mon, 8-10 pm, studio program. Tues, Thurs, Sat, 12:30-1 pm, organ concert. Sat, 1-2 pm, children's program. Central standard time. Slogan: "Better Homes Station."

**WJBI** Robert S. Johnson, 63 Broad st., Red Bank, N. J. 267.7 meters, 1120 kilocycles, 150 watts. Wed, 8 pm-12 midnight, entertainment. Eastern standard time.

**WJBK** Ernest F. Goodwin, 803 Congress st., Ypsilanti, Mich. 220.4 meters, 1360 kilocycles, 15 watts. Central standard time.

**WJBL** Wm. Gushard Dry Goods Co., 301 N. Water st., Decatur, Ill. 212.6 meters, 1410 kilocycles, 250 watts. Mon, Wed & Sat, 9 pm. Sun, 3 pm. Central standard time.

**WJBO** Valdemar Jensen, 119 South st., New Orleans, La. 263.0 meters, 1140 kilocycles, 100 watts.

**WJBR** Gensch and Stearns, Omro, Wis. 227.1 meters, 1320 kilocycles, 100 watts.

**WJBU** Bucknell University, Lewisburg, Pa. 214.2 meters, 1400 kilocycles, 100 watts. Slogan: "In the Heart of the Keystone State."

**WJBW** Serve-U-Radio Co., 2743 Dumaine st., New Orleans, La. 238.0 meters, 1260 kilocycles, 30 watts. Tues, Fri, 7-8 pm, Central standard time. Slogan: "The Serve You Broadcasting Station at New Orleans."

**WJBY** Electric Construction Co., 517 Broad st., Gadsden, Ala. 234.2 meters, 1280 kilocycles, 50 watts.

**WJBZ** Roland G. Palmer and A. Coppotelli, 144 East 16th st., Chicago Heights, Ill. 208.2 meters, 1440 kilocycles, 100 watts. Mon & Tues, 7-10 pm. Slogan, "Crossroads of the Nation."

# Announcing New and Improved

## AERO COIL Super-Sensitive INDUCTANCE UNITS



### The Improved AERO Universal Coil

At last—a true universal coil. This improved coil is suitable for any straight tuned radio frequency circuit, both bridge and loss balance. It is easily and ideally adaptable to 3, 4, 5, 6 or 7 tube sets and can be used with all types of tubes—201-A, 199, 112, and the new 240 tubes and A. C. tubes.

Sharp selectivity, true tone quality, distance and volume, to a heretofore unknown degree, are assured where these coils are used. For that reason the improved Aero 6, Aero 7, Aero 4, and other circuits built around these coils will be more popular than ever during the coming season.

## NEW AERO KITS Employing the Improved AERO Universal Coil



Code No. U-16

### The AERO Universal Tuned Radio Frequency Kit Kit of 4 Coils (For Improved Aero-Dyne 6)

Kit consists of 4 twice matched units—adaptable to all standard tubes. Tuning range below 200 to above 550 meters. This kit will make any set better in selectivity, tone and range. Will eliminate losses and give the greatest receiving efficiency. Each kit is carefully matched at both ends of the broadcast range.

For .0005 Condenser, Code No. U-16.....Price \$15.00 For .00035 Condenser, Code No. U-163..... Price \$15.00

### The AERO Universal Tuned Radio Frequency Kit Kit of 3 Coils (For Aero-Seven)

Consists of 3 twice matched units. Coils are wound on Bakelite skeleton forms, assuring a 95% air dielectric. Range from below 200 to above 550 meters. Each kit carefully matched at both ends of the broadcast range.

For .0005 Condenser, Code No. U-12.....Price \$12.00 For .00035 Condenser, Code No. U-123.....Price \$12.00



Code No. U-12

### AERO Universal 3-Circuit Tuner



In the form of a 3 circuit tuner with a fixed tickler, this Aero Coil will improve any circuit. Adaptable only to 201-A, 199, 112, or the new A. C. Tubes. Has variable primary for governing selectivity.

Code U-55 (for .0005 Condenser) or Code U-553 (for .00035 Condenser).....Price \$4.00

### AERO Radio Frequency Regenerative Kit



The supersensitive kit used in the new Aero 4 and The Chicago Daily News Receiver will improve the efficiency of any circuit for use with 201-A, 112, 199, and the new A. C. Tubes. Used as .0005 variable condenser to tune fixed tickler.

Code U-95 (for .0005 Condenser) or Code U-953 (for .00035 Condenser).....Price \$8.00

### AERO Universal Antenna Coupler



A highly efficient low-loss and antenna coupler with variable primary, adaptable to 201-A, 199, 112, 240 and the new A. C. Tubes.

Code No. U-96 (for .0005 Condenser) or Code No. U-963 (for .00035 Condenser). Price .....\$4.00

### AERO Universal Wave Trap Unit

Makes an excellent wave trap due to low distributive capacity and low high frequency resistance. Helps greatly in eliminating interference. Can also be used to improve efficiency of Crystal Sets.

Code No. U-4 (for .0005 Condensers) or Code No. U-43 (for .00035 Condenser).....Price \$4.00

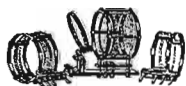
### AERO Choke 60

Has uniform choking action over a wide range of wave lengths. Eliminates customary "holes" in the tuning range—so common with ordinary chokes. You will find the Aero Choke 60 perfect in every respect.

Price each.....\$1.50



### AERO Short Wave Kit



The most efficient and satisfactory short wave kit ever offered. Completely interchangeable, and covers U. S. Bands range 15 to 130 meters.

Kit consists of 3 coils and base mountings. Code No. L. W. T. 125.....Price \$12.50

### AERO Transmitter Kits



An interchangeable Transmitter Kit at last. Kit 2040-K has range of 16.5 to 52 meters. Kit 4080-K has range of 36 to 90 meters. Kit includes two mounting bases and two choke coils that are interchangeable.

Price (each kit).....\$12.00

### AERO Choke 248

Designed for use with Aero Transmitter Kits and other circuits. Prevents a high impedance over usual amateur wave lengths.

Price each.....\$1.50



### IMPORTANT NOTICE

We furnish foundation units, drilled and engraved by Westinghouse Micarta for the Aero Short Wave, Aero 6, Aero 7, Aero 4, Aero Transmitter, and The Chicago Daily News 4 tube circuits. This is a special service for the home set builder. Full working blue prints with each unit. Dealers may secure samples of blue prints to show their trade for 25c each.

Any of these Aero Kits, Coils and Chokes should be available at your dealer's. If he cannot supply you, order direct from the factory. Be sure to specify code or key numbers when ordering.

**AERO PRODUCTS, Inc., Dept. 113**  
1772 Wilson Avenue  
Chicago, Ill.

**WJJD** Loyal Order of Moose, Mooseheart, Ill. Chicago programs from the Palmer House, Chicago, in co-operation with the Chicago Evening Post, 365.6 meters, 820 kilocycles, 1000 watts. Sun, 1 hr, 15 minutes. Mon, 5 hrs. Tues, Fri, 7 hrs, 30 minutes. Wed, Thur, 6 hrs, 30 minutes. Sat, 10 hrs. Central standard time. Slogan: "Every Child Is Entitled to a High School Education and a Trade."

**WJPW** J. P. Wilson, Ashtabula, Ohio. 208.2 meters, 1440 kilocycles, 30 watts.

**WJR** Jewett Radio & Phonograph Co., Pontiac, Mich. 440.9 meters, 680 kilocycles, 5000 watts. Daily ex Sun, 7-8 pm, 9-10 pm. Mon, Wed, Sat, 11:30 pm-1 am. Thurs, Sat, 10-11 pm. Eastern standard time. Slogan: "Where Joy Reigns."

**WJUG** Uda B. Ross, 30 Park pl., New York City, N. Y. 516.9 meters, 580 kilocycles, 500 watts. Daily on air. Unlimited time. Eastern standard time. Slogan: "The Jug."

**WJY** Radio Corporation of America, 33 W. 42nd st., New York, N. Y. 405.2 meters, 740 kilocycles, 1000 watts, class B. Tues, Thurs, Fri, 7:30-11:30 pm. Sun, 8:15-10:30 pm. Eastern standard time.

**WJZ** Radio Corporation of America, 33 W. 42nd st., New York, N. Y. 454.3 meters, 660 kilocycles, 30,000 watts, Sun, 9-12:30 pm, 3:55-5:30 pm, 7-11:30 pm. Mon, 1-2:40 pm, 4:30-6 pm, 7-10:30 pm. Tues, 1-2:40 pm, 4:30-6 pm, 7-11:45 pm. Wed, 1-2:40 pm, 4:30-6 pm, 7-11:30 pm. Thurs, 1-2:40 pm, 4:30-6 pm, 7-11:30 pm. Fri, 1-2:40 pm, 4:30-6 pm, 7 pm-12:15 am. Sat, 1-4 pm, 4:30-6 pm, 7 pm-11:30 pm. Eastern standard time.

**WKAQ** Radio Corp. of Porto Rico, Telephone Bldg., San Juan, Porto Rico. 340.7 meters, 880 kilocycles, 500 watts. Sun, 7-9 pm, Municipal Band of San Juan. Wed, 7-9 pm, Municipal Band of San Juan. Fri, 7-10 pm, Studio Program. Slogan: "Porto Rico, The Island of Enchantment in the Caribbean Sea." Eastern standard time.

**WKAR** The Michigan State College, East Lansing, Mich. 230.6 meters, 1300 kilocycles, 1000 watts. Daily ex Sun, 12-12:30, markets, weather, educational program.

**WKAV** Laconia Radio Club, 480 Main st., Laconia, N. H. 223.7 meters, 1340 kilocycles, 50 watts. Fri, pm. Sun, 10:30 am, 6:30 pm. Fri, 7:30 pm. Eastern standard time. Slogan: "The Voice of the Winnepesaukee Lake Region."

**WKBB** Sanders Bros., 607 Jefferson st., Joliet, Ill. 215.7 meters, 1390 kilocycles, 150 watts. Wed, 6-8:30 pm, dinner program. Thurs, 8:30-12 pm, good time program. Sun, 3-5 pm, classical; 8:30-12 pm, frolics. Central standard time.

**WKBC** H. L. Ansley, 1428 N. 12th av., Birmingham, Ala. 218.8 meters, 1370 kilocycles, 10 watts. Tues, Thurs, Sat, 7:30-8 pm, music. Sat, Sunday school talks on lessons for Sunday. Central standard time.

**WKBE** K. & B. Electric Co., 59 Emerald av., Webster, Mass. 228.9 meters, 1310 kilocycles, 100 watts. Mon, 8-11:30 pm. Eastern standard time.

**WKBF** Hoosier Athletic Club, 902 N. Meridian st., Indianapolis, Ind. 252.0 meters, 1190 kilocycles, 250 watts. Slogan: "We Keep Building Friendships."

**WKBG** C. L. Carrell, 36 S. State st., Chicago, Ill. (Portable). 201.6 meters, 1490 kilocycles, 100 watts.

**WKBH** Callaway Music Co., 221 Main st., LaCrosse, Wis. 220.4 meters, 1360 kilocycles, 500 watts. Mon & Fri, 6-7 pm, organ; 7:15-8 pm, bedtime stories, 8-10 pm. Wed, 6-7 pm, organ; 7:15-8 pm, bedtime stories; 9-11 pm, dance program. Daily 12:10 noon, weather and stock reports.

**WKBI** Fred L. Shoenwolf, 1917 Warner av., Chicago, Ill. 322.4 meters, 930 kilocycles, 50 watts.

**WKBJ** Gospel Tabernacle (Inc.), 5th av. & 10th st. S., St. Petersburg, Fla. 280 meters, 1071 kilocycles, 250 watts.

**WKBL** Monrona Radio Mfg. Co., 16 S. Monroe, st., Monroe, Mich. 205.4 meters, 1460 kilocycles, 15 watts. Mon, 8-9 pm. Wed, 9-10:30 pm. Thurs, 8-10 pm. Fri, 8-11 pm. Sat, 9-12 pm. Slogan: "The Most Powerful 15-Watt Station in the World."

**WKBM** John W. Jones, 130 Broadway, Newburgh, N. Y. 208.2 meters, 1440 kilocycles, 100 watts. Sun evening, church services. Mon, dinner musical program. Tues, Thurs, 6-12 pm, studio program. Fri, 7-11 pm, studio program. Sat, 10:30 am, morning program; 9 pm, dance music. Eastern time.

**WKBN** Radio Electric Service Co., 26 Auburndale av., Youngstown, Ohio. 214.2 meters, 1400 kilocycles, 50 watts.

**WKBO** Camith Corp., Jersey Observer Bldg., New York City, N. Y. 218.8 meters, 1370 kilocycles, 500 watts.

**WKBP** Battle Creek Enquirer & News, Battle Creek, Mich. 212.6 meters, 1410 kilocycles, 50 watts.

**WKBQ** Starlight Amusement Park, 1100 E. 177th st., New York City, N. Y. 218.8 meters, 1370 kilocycles, 500 watts. Daily ex Sun. Irregular hours. Eastern standard time.

**WKBR** Kenosha, Wis. 322.4 meters, 930 kilocycles, 15 watts output. Sun, 2-3 pm, religious services. Sat, 11-12:30 pm.

**WKBS** Weinberg Arcade, Galesburg, Ill. 217.3 meters, 1380 kilocycles, 100 watts. Sun, religious, 3-4 pm. Daily ex Sun, 8-10 pm. Wed & Sat, 10-11 pm, frolic. Slogan: "Where Knowledge Becomes Sure."

**WKBT** First Baptist Church, 3436 St. Charles av., New Orleans, La. 252 meters, 1190 kilocycles, 50 watts. Sun, 11 am & 7:30 pm, church services & special music.

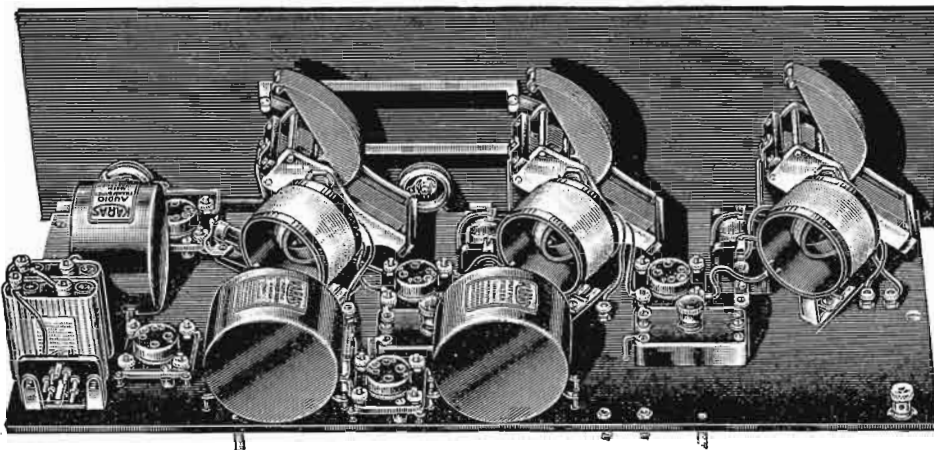
**WKBU** H. K. Armstrong, 1037 Maryland av., New Castle, Pa. (Portable). 204 meters, 1470 kilocycles, 50 watts.

**WKBV** Knox Battery & Electric Co., 658 Main st., Brookville, Ind. 217.3 meters, 1380 kilocycles, 100 watts.

**WKBW** Churchill Tabernacle, 1420-28 Main, Buffalo, N. Y. 217.3 meters, 1380 kilocycles, 500 watts. Sun, 10:30 am-3 pm, 7, 10:15 pm until midnight, religious; 12:15 noon to 2:15 pm, dinner music. Mon & Tues, 6:15-7:30, dinner music. Wed, Thurs & Fri, 8 pm, concert. Slogan: "Well Known Bible Witness."

# KARAS Scores Again for 1927-28

## With the NEW 2-Dial EQUAMATIC Sensation



### The 5-Tube Receiver that Leads the World in Performance!

**O**UTSTANDING among all of the season's radio receivers is the NEW Karas 2-Dial Equamatic—the 1927-28 Sensation that leads them all in performance. This marvelous new Equamatic has 2-Dial Control, insuring simplified, easy tuning, with maximum and equal efficiency over the entire broadcast waveband.

The Karas 2-Dial Equamatic is completely balanced and perfectly neutralized. It offers set builders who want utmost volume and superb tone quality the very pinnacle of perfection in these two all-important requisites. In addition, the Karas 2-Dial Equamatic makes use of a 24-inch panel and baseboard, thus shortening the set and simplifying its assembly.

The three Karas Type 17 S. F. L. Removable Shaft Condensers are of the latest design. Two of these condensers are operated together by means of the Karas 2-Dial Control System, giving wonderfully accurate tuning in conjunction with the Karas Micrometric Vernier Dials.

For a tremendous volume of round, clear, pure, undistorted, full, mellow tones you will not find a rival to equal the Karas 2-Dial Equamatic. To build this great receiver you will need the Karas parts listed and illustrated here, plus certain other standard parts easily obtainable anywhere. Mail the coupon for complete information about this receiver and about the NEW Karas parts now at your dealer's.



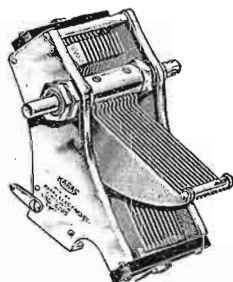
The NEW Karas Type 28 Audio Transformer. Price, \$8.00.



The NEW Karas Output Filter. Price, \$8.00.

#### Karas Parts for the 2-Dial Equamatic

|   |  |         |
|---|--|---------|
| 3 Karas Equamatic R. F. Transformers, each \$4.00                                   | 2 Karas Type 28 Impregnated Audio Transformers, each \$8.00  | 16.00   |
| 3 Karas Equamatic Type 17 Removable Shaft S. F. L. Variable Condensers, each \$5.25 | 1 Karas Output Filter  | 8.00    |
| 2 Karas Micrometric Vernier Dials, each \$3.50                                      | 3 Karas Subpanel Brackets, set of 3  | .70     |
|   | 1 Karas 2-Dial Control System, complete with three extra shafts and all necessary assembly hardware for entire set | 3.00    |
|   |  | \$12.00 |
|   |  | 15.75   |
|   |  | 7.00    |



The NEW Karas S.F.L. Condenser with Removable Shaft. Price, .00025 mfd., \$5; .00037 mfd., \$5.25; .0005 mfd., \$5.50.



Karas Micrometric Vernier Dials. Price, \$3.50.

## The New KARAS Products for 1927-28 are Superlatively Better

For the 1927-28 season Karas offers several new products of superlative quality and distinction. Among these is the NEW Karas Type 28 Audio Transformer. This new transformer is scientifically impregnated and is housed in a lifetime steel clad, spun-sealed case which effectively guards its marvelous amplifying qualities. The Type 28 gives full, clear, undistorted amplification of all low notes as well as perfect reproduction of high notes, and has tremendous volume. Two of these transformers are used in the Karas 2-Dial Equamatic.

The new Karas S. F. L. Variable Condensers, Types 11, 17 and 23, have removable shafts, allowing for sub-panel, baseboard or single hole mounting from either side, and permitting the use of 0-100 or 100-0 dials. This right or left hand single hole method of mounting is an exclusive Karas achievement. These condensers are true straight frequency line type, separating all adjoining wave-lengths by equal distances on the dial. In the Karas 2-Dial

Equamatic 3 Type 17 S.F.L. Condensers are used. The new Karas Output Filter sweetens and clarifies tone qualities and prevents demagnetization and eliminates chattering of the loud speaker. This new Karas Filter exactly matches our new Type 28 Transformer in size, and because of their compact design two transformers and a filter occupy no more space in the set than is needed for two ordinary large size transformers. The Karas Output Filter is equipped with choke of 100 henrys and a large capacity paper condenser.

You can see and order this new Karas apparatus NOW at your dealer's. Get in touch with him today for these and other Karas parts you will need in building your Karas 2-Dial Equamatic.

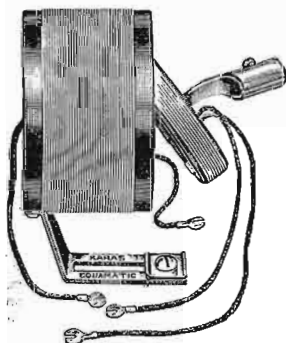
Fill out and mail the coupon below for complete information about the NEW Karas products for 1927-28, and complete data on the Karas 2-Dial Equamatic Receiver described in other pages of this magazine.

### Mail This Coupon for Literature

**KARAS ELECTRIC CO.,**  
4026-I North Rockwell Street, Chicago

Send me complete particulars about your new Radio Products, including data on the new Karas 2-Dial Equamatic.

Name.....  
Address.....  
City.....State.....



Karas Equamatic Inductance Coils. Set of 3, \$12.00.

## KARAS ELECTRIC CO.

4026-I North Rockwell Street Chicago

Tell 'Em You Saw It in the Citizens Radio Call Book

**WKBZ** Karl L. Ashbacher, First National Bank Bldg., Ludington, Mich. 199.9 meters, 1500 kilocycles, 15 watts.

**WKDR** Edward A. Dato, 936 N. Michigan av., Chicago, Ill. 491.5 meters, 670 kilocycles, 15 watts.

**WKEN** Radio Station WKEN, Kenmore, Buffalo, N. Y. 205.4 meters, 1460 kilocycles, 50 watts. Sun, 11 am-12 noon; 7:30-8:30 pm. Daily ex Sun, 6-6:45 pm. Mon, Tues, Thur, 8-11 pm. Eastern standard time. Divides time with Station WSVS, Wed, Fri evenings, 7:30-9:30 pm.

**WKJC** Kirk Johnson & Co., 16-18 W. King st., Lancaster, Pa. 252.0 meters, 50 watts, 1190 kilocycles. Sun, 9:30-12 noon, 7:30-9:30 pm. Mon, Wed, Fri, 7:30-9:30 pm. Sat, 2:30-4:30 pm. Eastern standard time.

**WKRC** The Kodel Radio Corp., 507 E. Pearl st., Cincinnati, Ohio 329.5, 333.1 meters, 900 kilocycles, 500 watts. Sun, 11 am, church; 10 pm, classical; 11:15 pm, popular. Mon, Wed, 6 pm, dinner music; 8 pm, instrumental. Mon, 12 midnight, dance music. Wed, 8:30 pm, classical. Tues, 10 pm, vocal, instrumental; 11 pm, popular. Sat, 10 pm, dance program. Eastern standard time. Slogan; "WKRC—K, Kodel—R, Radio—C, Corporation."

**WKY** E. C. Hull, H. S. Richards, 1911 W. Ash st., Oklahoma City, Okla. 288.3 meters, 1040 kilocycles, 150 watts. Daily ex Sun, 9 am, 2:30 pm, markets, weather; 7-8:30, music. Sun, 11 am, 7:30 pm, services. Central time.

**WLAC** Life and Casualty Insurance Co., Nashville, Tenn. 225.4 meters, 1330 kilocycles, 1000 watts. Sun, 8:30-9:30 pm, band concert; 9:30-10 pm, studio. Mon, Sat, 7-9 pm. Tues, 9 pm-12 midnight. Wed, 1:30-2:30 pm, 7-9 pm. Thur, 6-7 pm, 9-12 midnight. Central standard time. Slogan: "The Thrift Station."

**WLAL** First Christian Church, 9th & Boulder sts., Tulsa, Okla. 249.9 meters, 1200 kilocycles, 100 watts, class A. Wed, 9:30 pm. Sat, 7:30 pm. Sun, 7:30 pm, church. Central standard time.

**WLAP** Virginia Av. Baptist Church, 2600 Virginia av., Louisville, Ky. 267.7 meters, 1120 kilocycles, 30 watts. Thurs, Fri, 9:20-10 pm. Central standard time.

**WLB** University of Minnesota, Minneapolis, Minn. 245.8 meters, 1220 kilocycles, 500 watts.

**WLBC** D. A. Burton, 2224 S. Jefferson st., Muncie, Ind. 209.7 meters, 1430 kilocycles, 50 watts.

**WLBE** J. H. Fruitman, 2029-65th st., Brooklyn, N. Y. 230.6 meters, 1300 kilocycles, 15 watts.

**WLBF** Everett L. Dillard, 300-A E. 33rd st., Kansas City, Mo. 209.7 meters, 1430 kilocycles, 50 watts. Daily ex Sun, 10 am-11 pm, popular & classical; 7:30-10:30 pm, popular & classical. Central standard time. Slogan: "Where Listeners Become Friends."

**WLBG** R. A. Gamble, 126 N. Sycamore st., Petersburg, Va. 214.2 meters, 1400 kilocycles, 100 watts. Irregular programs daily.

**WLBH** Joseph J. Lombardi, Farmingdale, N. Y. (Portable). 227.1 meters, 1320 kilocycles, 10 watts.

**WLBI** Aloysius Yarc, 314 Elm st., East Wenona, Ill. 238.0 meters, 1260 kilocycles, 250 watts.

**WLBL** Wisconsin Department of Markets, Stevens Point, Wis. 319.0 meters, 940 kilocycles, 1000 watts. Mon, Tues, Wed, Thurs, Fri, Sat, 8-9-10-11 am, 12 noon, 1 pm, markets. Mon, 8 pm, musical program. Central standard time. Slogan: "Wisconsin, Land of Beautiful Lake." Divides time with Station WHA, University of Wisconsin, Madison, Wis.

**WLBM** Boston, Mass. 211.1 meters, 1420 kilocycles, 50 watts.

**WLBN** William E. Hiler, 339 S. Homan av., Chicago, Ill. (Portable). 204.0 meters, 1470 kilocycles, 50 watts.

**WLBO** Frederick A. Trebbe, Jr., 526 Monmouth blvd., Galesburg, Ill. 217.3 meters, 1380 kilocycles, 100 watts.

**WLBP** Ashland County Radio Club Station, Robert A. Fox, 25 College av., Ashland, Ohio. 202.6 meters, 1480 kilocycles, 15 watts. Sun, 10:30 am-12 noon; 2-4 pm, church services. Mon, 8-10:30 pm, musical program. Wed, Fri, 7:30-10 pm, musical program. Eastern standard time.

**WLBQ** E. Dale Trout, Atwood, Ill. 202.6 meters, 1480 kilocycles, 25 watts.

**WLBK** Alford Radio Co., Belvidere, Ill. 312.4 meters, 930 kilocycles, 15 watts.

**WLBT** Harold Wendell, 317 E. North st., Crown Point, Ind. 322.4 meters, 930 kilocycles, 50 watts.

**WLBW** Kelsey Block, Canastota, N. Y. 220 N. Y. 220 meters, 1363 kilocycles, 5 watts. Sun, 9:30 am, church services. Tues, Fri, 8 pm, musical program. Sat, 9 pm, musical program. Eastern standard time. Slogan: "The Heart of Canastota."

**WLBV** Mansfield Broadcasting Association, Chamber of Commerce Bldg., East Mansfield, Ohio. 206.8 meters, 1450 kilocycles, 50 watts. Sun, 10:30-12 noon. Mon, Wed, 9 am-10 pm. Mon, 6-7 pm, dinner hour. Sat, 9:30-12 pm. Eastern standard time.

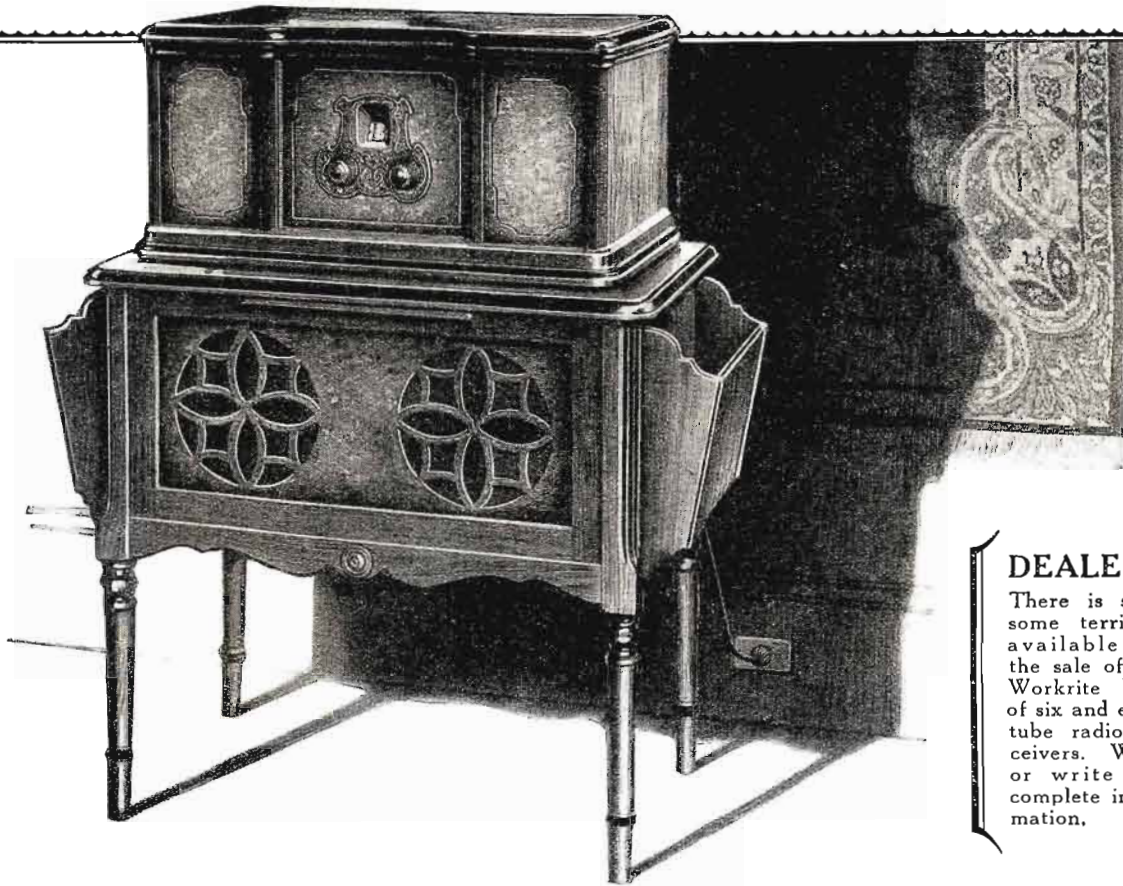
**WLBW** Northwestern Pennsylvania Broadcast Station, P. O. Box No. 163, Oil City, Pa. 293.9 meters, 1020 kilocycles, 500 watts. Sun, 3:30 pm, sacred. Mon, 9:30 pm, miscellaneous program; 10 pm, dance music. Wed, Fri, 10 pm, dance music. Thur, 10 pm, miscellaneous program. Eastern standard time.

**WLBX** John N. Brahy, 283 Crescent st., Long Island City, N. Y. 204.0 meters, 1470 kilocycles, 250 watts.

**WLBZ** Aimone Electric, 1236 Carpenter st., Iron Mountain, Mich. 209.7 meters, 1430 kilocycles, 50 watts.



Workrite 8-tube—Luxuriously Rich in Appearance  
Unusual in Performance



**DEALERS**  
There is still some territory available for the sale of the Workrite line of six and eight tube radio receivers. Wire or write for complete information.

To see it is to want to hear it—  
To hear it is to want to own it—

Let us tell you more about this Workrite Model 37, so that you will appreciate the remarkable value which it represents.

An 8-tube circuit with all metal chassis, complete copper shielding, ball bearing friction drive and illuminated single dial control—these features make it as easy to tune as pointing your finger.

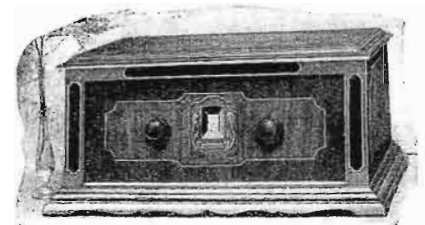
The cabinet in which this set is housed and also the table on which it rests are craftsman-built, in har-

*It sells for only \$205.00 with table*

mony with the latest furniture designs. The cabinet is of walnut with burl maple panels.

Inside and outside, this Workrite represents the best in radio—mechanically and musically. The extreme power of this set will amaze you, using either short aerial or loop. You will find it a pleasing and beautiful addition to your home.

Workrite Model 37, without table, \$160.00. If there isn't a Workrite dealer in your neighborhood, write us for illustrated literature.



**Workrite Model 17**  
A single illuminated dial control 6-tube radio receiver housed in a beautiful walnut cabinet.  
Price .....\$95.00

**Workrite Model 26**  
A 6-tube radio receiver housed in a pleasing walnut console having built-in cone speaker and ample space for batteries or power units.  
Price .....\$160.00

**WORKRITE CONE SPEAKER**  
*Something new!*

*Send for Folder*



Manufactured by  
**THE WORKRITE MFG. CO.**  
1812 E. 30th Street  
Cleveland, Ohio

In Canada: Workrite Radio, Ltd.  
Brantford, Ontario

Sales Department  
**THE ZINKE COMPANY**  
1323 S. Michigan Blvd.  
Chicago, Ill.

*Tell 'Em You Saw It in the Citizens Radio Call Book*

**WLBZ** Thompson L. Guernsey, Dover, Me. (Foxcroft). 208.2 meters, 1440 kilocycles, 250 watts.

**WLCI** Lutheran Association of Ithaca, Ithaca, N. Y. 247.8 meters, 1210 kilocycles, 50 watts.

**WLIB** Liberty Magazine, Chicago, Ill. 305.9 meters, 980 kilocycles, 500 watts. Daily ex Sun & Mon, 7-8 pm, 11-12 pm. Sun, 5-6 pm. Central standard time. Slogan: "Liberty—A Weekly for Everybody."

**WLIT** Lit Bros., Philadelphia, Pa. 405.2 meters, 740 kilocycles, 500 watts, class B. Daily ex Sun, 12-1 pm, 2-3 pm, 4:30-5 pm. Mon, 12 noon to 11 pm. Tues, 11 am to 8 pm. Wed, 12 noon to 11 pm. Thurs & Sat, 12 noon to 8 pm. Fri, 12 noon to 12 midnight. Eastern standard time. Slogan: "The Quaker City Siren."

**WLS** Sears, Roebuck & Co., Chicago, Ill. 344.6 meters, 870 kilocycles, 5000 watts. Sun, 10:45-12:20, U. of C. church; 12:20-1, organ; 1-1:30, trio concert; 6-8, Little Brown church. Mon, markets; 9-9:10-10:10-30-11-11:30-11:45, markets every day ex Sun; R. F. D. program & markets, 12-1 pm; closing markets every day, 1:25-1:35; home makers' hour, Mon, Tues, Wed, Fri, 2:30-3:30 pm; organ every day ex Sat & Sun, 5:30. Birthday time, ex Sat & Sun, 5:45 pm. Supper bell program ex Sun, 6 pm. Sports time ex Sun, 6:30 pm. Silent after 7 pm Mon. Tues, 5:30-8, 10:30-12:30 pm. Wed, 5:30-12 pm. Thurs, 5:30-8, 10:30-12:30 pm. Fri, 5:30-12 pm. Sat, 6-1 am. Central standard time. Slogans: "World's Largest Store," "Work Better, Live Better, Sell Better."

**WLSI** Lincoln Studios (Inc.), 335 Westminster st., Providence, R. I. 440.9 meters, 680 kilocycles, 500 watts.

**WLTH** Leverick Hotel Operating Co., Inc., Leverick Towers Hotel, Brooklyn Heights, New York. 218.8 meters, 1370 kilocycles, 250 watts. Eastern standard time.

**WLTS** Lane Technical High School, 1225 Sedgwick st., Chicago, Ill. 483.6 meters, 620 kilocycles, 100 watts. Daily ex Sat & Sun, 2-4 pm, musical & educational. Mon, 6-7 pm, musical. Central standard time. Slogan: "World's Largest Technical School." Divides time with WCFL, Chicago Federation of Labor Station.

**WLW** The Crosley Radio Corp., Harrison, Ohio. 428.3 meters, 700 kilocycles, 5000 watts. Sun, 9:30 am-8:50 pm, church services. Mon, Tues & Sat, 3 am-9 pm, concerts, orchestra, etc. Wed, 8 am-11 pm. Thurs, 8 am-12:15 am, novelties, etc. Fri, 8 am-4 pm, weather, etc. Central standard time. Slogan: "What Listeners Want."

**WMAC** Clive B. Meredith, Cazenovia, N. Y. 225.4 meters, 1330 kilocycles, 500 watts. Sun, 3:30 pm, choral singing; 9:30 pm, popular program. Mon, 8:30, semi-classical program; 7:30, Weekly Letter to Dad. Daily ex Sun & Mon, 7:30 pm. Tues, Autobiography of Infamous Bugs. Wed, Chats with Weatherman; 8:30, popular program. Thurs, Primer for Town Farmers. Fri, 7:30 pm, Agricultural Interview; 8:30 pm, classical program. Sat, Farm News Digest. Eastern time. Slogan: "Voice of Central New York."

**WMAF** Round Hills Radio Corp., South Dartmouth, Mass. 428.3 meters, 700 kilocycles, 500 watts. Eastern standard time.

**WMAK** Norton Laboratories, Inc., Mill st., Lockport, N. Y. 545.1 meters, 550 kilocycles, 750 watts. Sun, 10 am-12 noon, 2-5 pm, 7-11 pm. Daily ex Sun, 11 am-12 noon, 1:30-6 pm, 6-12 midnight. Eastern standard time.

**WMAL** Washington Radio Forum, owned & operated by the M. A. Leese Radio Co., 720 11th st., N. W., Washington, D. C. 228.9 meters, 1310 kilocycles, 100 watts. Tues, Thur & Sat, 6:45-11 pm, varied. Eastern standard time.

**WMAN** First Baptist Church, Columbus, Ohio. 234.2 meters, 1280 kilocycles, 50 watts. Sun, 10:30-12 noon, 7:30-9 pm, church services. Eastern standard time.

**WMAQ** The Chicago Daily News, 15 N. Wells st., Hotel La Salle, Chicago, Ill. 447.5 meters, 670 kilocycles, 1000 watts. Daily ex Sun & Mon, 6:30-8 to 11 am, 12 noon to 3 pm, 4 to 7 pm, 8 to 10 pm. Mon, 9 am to 11 am, 12 noon to 4 pm. 4 to 7 pm. Central standard time.

**WMAZ** Kingshighway Presbyterian Church, St. Louis, Mo. 247.8 meters, 1210 kilocycles, 100 watts. Sun, 11 am-12 pm, 8-9 pm, church services. Central standard time.

**WMAZ** Mercer University, Macon, Ga. 270.1 meters, 1110 kilocycles, 500 watts. Mon, Thurs, 10-11 pm, musical. Tues & Fri, 8-9 pm, sacred music. Wed, 11-12 pm, musical program. Fri, 9-11 pm, musical. Central standard time. Slogan: "Watch Mercer Attain Zenith."

**WMBA** Leroy J. Beebe, 13 Robinson st., Newport, R. I. (Portable). 204.0 meters, 1470 kilocycles, 100 watts.

**WMBB** American Bond & Mortgage Co., 6201 Cottage Grove av., Chicago, Ill. 252.0 meters, 1190 kilocycles, 500 watts. Sun, 3-6 pm, popular concert program; 7:40-9 pm, Christian Science services; 9-11 pm, popular program. Daily ex Sun, Mon, 7-8:30 pm, semi-classical program; 9-10 pm, popular program. Central standard time. Slogan: "World's Most Beautiful Ballroom."

**WMBC** Michigan Broadcasting Co. (F. G. Siegel), Hotel Savoy, Detroit, Mich. 211.1 meters, 1420 kilocycles, 100 watts. Sun, 6:30-10 pm, dinner hour, studio program. Daily ex Sun, 6:30-8:30 pm, dinner hour. Mon, Tues, Wed, 10-12 pm, studio; 12-1 am, midnight frolic. Thurs, Fri, Sat, 8-10 pm, studio; 12-1 am, midnight frolic. Eastern standard time. Slogan: "The Singing Announcer."

**WMBD** Peoria Heights Radio Laboratory, Peoria Heights, Ill. 205.4 meters, 1460 kilocycles, 250 watts. Sun, 11 am-12 noon, church. Daily ex Sun, 6:55-7:30 pm, markets; 8-10 pm, studio program. Central standard time. Slogan: "World's Most Beautiful Drive."

**WMBE** Dr. C. S. Stevens, St. Paul, Minn. 208.2 meters, 1440 kilocycles, 10 watts.

**WMBF** Fleetwood Hotel Corp., Miami Beach, Fla. 384.4 meters, 780 kilocycles, 500 watts. Daily, 7-8 pm, concert orchestra; 8-9 pm, popular program; 10-11 am, dance music. Eastern time. Slogan: "Wonderful Miami Beach Fleetwood."

**WMBG** Havens & Martin, 914 W. Broad st., Richmond, Va. 206.8 meters, 1450 kilocycles, 15 watts. Mon, Tues, Thur, Fri, & Sat, 1-3 pm. Slogan: "The Daytime Station."

**WMBH** Edwin Dudley Aber (Portable), Chicago, Ill. 204.0 meters, 1470 kilocycles, 100 watts.

**WMBI** The Moody Bible Institute of Chicago, 153 Institute pl., Chicago, Ill. 263.0 meters, 1140 kilocycles, 500 watts. Sun, 3:30-5 pm, 7-9 pm, Bible classes. Daily ex Sun, 7-7:40 am, morning worship; 12:30-1:30 pm, organ program; 10:30-11:30 am, missionary hour, Bible study; evening, 8-9 pm, Bible study. Central standard time. Slogan: "The West Point of Christian Service."

# Clear, Smooth Reception ALWAYS!

That is why the *Majestic* is popular everywhere  
"B" CURRENT SUPPLY

Dependable! When you hook up a Majestic unit you know you are going to have continuously clear reception. Thousands of fans—all over the country—have proven the superiority of Majestic units. That's why you play safe when you buy Majestic.

## Majestic Super "B"

Recognized as the leader in popularity, sales, and efficiency. For sets 1 to 12 tubes. List price of unit complete with the Majestic Super Power Tube,

**\$29<sup>50</sup>**



## Majestic Master-B

The precision B Power Unit offering complete control of all output voltage taps. List price complete with Majestic super power tube

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## Majestic Special Master-B

Similar in appearance and design to Master-B but equipped with four B+ taps for sets requiring same. List price complete with Majestic super power tube

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*ACE Models for Sets using the new A-C Tubes—Ask for Specifications*

The 1927-28 season will see a tremendous demand for Power Units—Majestic has established a solid reputation with the trade and the public. All Majestic Units are DRY. Public opinion is opposed to the use in the home of devices containing liquids.

## Majestic

### Super-Power B-Rectifier

Most powerful B-Rectifier made, sturdily built for long life and heavy duty.

1000 hr. guarantee (glass breakage only excepted). Gives a year or more of service.

Retail price

**\$4<sup>50</sup>**



Manufactured by

# GRIGSBY-GRUNOW-HINDS CO.

4560 Armitage Ave., Chicago, Ill.

*Tell 'Em You Saw It in the Citizens Radio Call Book*

**WMBJ** Wm. Roy McShaffrey, Monessen, Pa. 232.4 meters, 1290 kilocycles, 50 watts.

**WMBK** John C. Slade, Hamilton, Ohio. 360 meters, 832.8 kilocycles, 10 watts. Sun, 2:30 pm, 8:30-10:30 pm, 12-2 am.

**WMBL** Benford Radio Studios, Lakeland, Fla. 228.9 meters, 1310 kilocycles, 50 watts. Sun, church services, morning & evening. Daily ex Sun, 10:30 am-1:30 pm, varied program; 2:30-3:30 pm, varied; 8-9:30 pm, classical; 9:30-10:30 pm, popular; 10:30-11:30 pm, dance program. Eastern standard time. Slogan: "Lakeland—The City of Heart's Desire."

**WMBM** Memphis, Tenn. 209.7 meters, 1430 kilocycles, 10 watts.

**WMBO** Auburn, N. Y. 220.4 meters, 1360 kilocycles, 100 watts.

**WMBQ** Brooklyn, N. Y. 204.0 meters, 1470 kilocycles, 100 watts.

**WMBR** F. J. Reynolds, 109 Franklin st., Tampa, Fla. 252.0 meters, 1190 kilocycles, 100 watts. Daily ex Sun, 1-2 pm, weather reports, organ; 7-8 pm, baseball returns, orchestra. Tues, 7-8 pm, orchestra. Wed, 9-10 pm, musical. Fri, 10 pm, fight returns. Sat, 8-10 pm, musical. Eastern standard time. Slogan: "WMBR, Everything for Radio at Tampa, Florida."

**WMBB** Macks Battery Service, 210 Locust st., Harrisburg, Pa. 234.2 meters, 1280 kilocycles, 250 watts. Sun, 9 am-9 pm. Daily ex Sat & Sun, 7-10 pm. Sat, 9 pm-2 am. Eastern standard time.

**WMBU** Pittsburgh, Pa. 217.3 meters, 1380 kilocycles, 50 watts.

**WMBW** Youngstown, Ohio. 214.2 meters, 1400 kilocycles, 50 watts.

**WMBY** Bloomington, Ill. 199.9 meters, 1500 kilocycles, 15 watts.

**WMC** Commercial Publishing Co., The Commercial Appeal, 30 N. 2nd st., Memphis, Tenn. 516.9 meters, 580 kilocycles, 500 watts. Sun, 11 am, church services. Daily ex Sun, 9:45 am, markets. Mon, Wed, Fri, 12 noon, music. Tues, Thurs, 12 noon, markets. Mon, 8 pm, farm talks. Tues, 7:45 pm, bridge game. Thurs, 8 pm, music. Mon, Tues, Fri, Sat, 8:30-11 pm, music, frolic. Central standard time. Slogan: "WMC, Memphis, Down in Dixie."

**WMCA** Hotel McAlpin (Creeley Square Hotel Co.), Hoboken, N. J. 370.2 meters, 810 kilocycles, 500 watts. Sun, 11 am-1 am. Daily ex Sun, 10:30 am-1 am. Eastern standard time. Slogan: "Where the White Way Begins."

**WMHA** Young Men's Hebrew Association of Washington Heights, 975 St. Nicholas av., New York, N. Y. 230 meters, 1304 kilocycles, 30 watts.

**WMPC** First Methodist Protestant Church, Lapeer, Mich. 234.2 meters, 1230 kilocycles, 30 watts. Sun, 10:30 am-12:30 pm, 4-5:30 pm, 7:30-10 pm. Daily ex Sat & Sun, 12-1 noon. Mon, Wed, Fri, 7:30-10 pm. Programs include sermons, vocal, instrumental music, missionary, patriotic, educational & church services. Eastern standard time. Slogan: "Where Many Preach Christ."

**WMRJ** Peter J. Prinz, 10-12 New York av., Jamaica, N. Y. 206.8 meters, 1450 kilocycles, 10 watts. Sun, 9:30 pm-12 midnight, dance music & popular program. Tues, 8:30 pm-11:30 pm, dance music, popular program. Thurs, 8:30 pm-11:30 pm, semi-classical, popular program. Eastern time. Slogan: "The Gateway to the Sunrise Trail."

**WMSG** Madison Square Garden, 319 W. 49th st., New York, N. Y. 236.1 meters, 1270 kilocycles, 500 watts.

**WMVM** Edward J. Malome, Jr., 126 1st st., Newark, N. J. 475.9 meters, 630 kilocycles, 500 watts.

**WNAB** The Shepard Stores, Winter st., Boston, Mass. 280.2 meters, 1070 kilocycles, 100 watts. Daily ex Sun, 3-4 pm, daily phonograph record hour. Eastern standard time.

**WNAC** The Shepard Store, Winter st., Boston, Mass. 265.3 meters, 1130 kilocycles, 500 watts. Sun, 10:45 am, church services; 7:30-9 pm, church services. Daily ex Sun, 10:30-11:30 am, women's club; 12:15-1 pm, church services; 1-2 pm, luncheon concert; 4-5 pm, music; 6-6:30 pm, children's club; 6:30-7:30 pm, dinner dance; 7:30-8 pm, news & talks; 8-10 pm, concert; 10:05-11 pm, dance program. Eastern time.

**WNAD** University of Oklahoma, Norman, Okla. 239.9 meters, 1250 kilocycles, 500 watts. Mon, 7:15-8 pm. Tues, 12:15-1 pm, 2:30-3:30 pm. Wed, 7:15-8 pm. Thurs, 7:15-8 pm. Fri, 12:15-1 pm, 2:30-3:30 pm. Sat, broadcast of athletic events. Central standard time. Slogan: "The Voice of Soonerland."

**WNAL** R. J. Rockwell, 5019 Capitol av., Omaha, Neb. 258.5 meters, 1160 kilocycles, 250 watts. Tues, Fri, 7:30-9 pm. Central standard time. Slogan: "Pioneer Station of Omaha."

**WNAT** Lennig Bros. Co., Spring Garden & 9th st., Philadelphia, Pa. 288.3 meters, 1040 kilocycles, 100 watts. Wed, 6:50 pm until midnight, musical. Sat, 8 pm until midnight. Eastern standard time. Slogan: "We Never Are Tired." Divides time with Station WRAX.

**WNAX** Dakota Radio Apparatus Co., Yankton, S. Dak. 302.8 meters, 990 kilocycles, 250 watts. Daily ex Sun, 11:30 am, markets & weather. Tues, Thur, Sat, 5 pm, musical. Central standard time.

**WNBA** Forest Park, Ill. 208.2 meters, 1440 kilocycles, 200 watts.

**WNBF** Howitt-Wood Radio Co., Inc., Endicott, N. Y. 208.6 meters, 1450 kilocycles, 50 watts. Sun, 12:30-2 pm, 7:30-9:30 pm. Thur, 7:30-10 pm. Eastern standard time. Slogan: "The Voice of the Triple Cities."

**WNBH** New Bedford Hotel, Pleasant st., New Bedford, Mass. 260.7 meters, 1150 kilocycles, 250 watts. Mon, Wed, Fri, 6-10:30 pm, musical program. Tues, Thur, Sat, 7-7:30 pm, news reports, baseball. Eastern standard time. Slogan: "The Gateway to Cape Cod."

**WNBL** Bloomington, Ill. 199.9 meters, 1500 kilocycles, 15 watts.

**WNBO** Symplex Electrical & Radio Research Laboratories, George Washington Hotel, Washington, Pa. 211.1 meters, 1420 kilocycles, 15 watts. Sun, 11-12 noon, 10-11 pm, church services. Mon, Tues, Thur, Fri, 3:30-4:30 pm, 9-11:30 pm, orchestra, baseball, weather. Sat, 3:30-4:30 pm, 9:30-12 pm, orchestra, studio programs. Eastern standard time. Slogan: "The Voice of Washington, Pa."

**WNBQ** Rochester, N. Y. 202.6 meters, 1480 kilocycles, 15 watts.

**WNBW** Memphis, Tenn. 228.9 meters, 1310 kilocycles, 20 watts.

**WNBX** Lonsdale Baptist Church, 122 W. Connecticut av., Knoxville, Tenn. 206.8 meters, 1450 kilocycles, 50 watts.

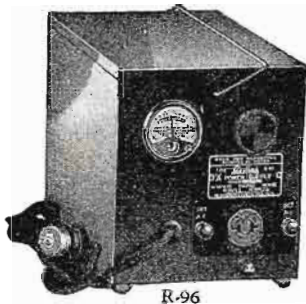
**WNJ** Herman Lubinsky, 89 Lehigh av., Newark, N. J. 280.2 meters, 1070 kilocycles, 500 watts. Daily ex Mon & Thur, 6-6:30 pm, 8:30-12 pm, dance music. Eastern standard time. Slogan: "The Voice of Newark."

# Complete "A" and "B" Light Socket Power that works

## - and Keeps on Working

STERLING Socket Power Units, both "A" and "B", have made good on performance. In the homes of hundreds of radio owners they have shown themselves to be as thoroughly reliable as good designing, honest workmanship, fine materials can make them.

"Light Socket" your set the Sterling way and say good-bye to batteries once and forever. Know for the first time the pleasure of continuous full powered light socket operation . . . without batteries, without chargers . . . with nothing more to do than turn on your set switch.



R-96

R-94, 4-volt "A" Power unit for Radiolas, \$32.00 complete.

Sterling  
"A" Power R-96

This unit entirely takes the place of the storage "A" battery. It uses the famous Raytheon A—the little unbreakable copper cylinder that displaces the rectifying tube. Has a steady output of 6 honest volts. Is meter equipped and fully automatic. Price \$47.00 complete.

RT-41, especially designed "B" unit for Radiolas. Price \$27.00 complete.

Sterling  
"B" Power R-81

For 3 to 8 tube sets including power tube. Output at 35 mils. is 150 volts. All three voltages Detector, Medium and High are adjustable within wide limits. On and Off switch. List Price: including Raytheon B-H tube, \$28.50.

R-98, a universal "B-C" power supply. Price \$38.00 complete.



R-81

R-97, "Heavy Duty" "B-C" Model for very largest sets. Price \$53.50 complete.

# Radio Sterling Products



R-415

Test Your  
"B" Power Voltage

To get full value from your "B" Power Unit you should know that your Power Unit is delivering the correct voltage to the detector, amplifier and power tubes. Low resistance battery testing voltmeters are worthless for testing socket power units. This specially designed Voltmeter is accurate for both. Tests all D. C. circuits up to 300 volts.  
R-415 DC Model, 0-300 volts . . . . . \$8.50  
R-417 AC Model, 0-150 volts . . . . . \$7.50

Test Your Radio  
Tubes

The Sterling Tube Tester shows at a glance whether your tubes are performing at their best or whether they are "all shot". No calculations. Simple to use. For large tubes.

R-411 . . . . . \$7.50



R-411

THE STERLING MANUFACTURING COMPANY, 2831 PROSPECT AVENUE, CLEVELAND, OHIO

Tell 'Em You Saw It in the Citizens Radio Call Book

**WNOX** Peoples Tel. & Tel. Co., 313 Commerce st., Knoxville, Tenn. 265.3 meters, 1130 kilocycles, 1000 watts. Mon, Wed, Fri, 8-10 pm. Central standard time. Slogan: "Smoky Mountain Station."

**WNRC** Wayne M. Nelson, 7 W. 4th St., Greensboro, N. C. 223.7 meters, 1340 kilocycles, 250 watts.

**WNYC** City of New York, New York City, N. Y. 535.4 meters, 560 kilocycles, 500 watts, class B. Daily ex Sun, 6-11 pm. Mon, Wed, Fri, 11 am-12:30 pm. Sun, irregular. Eastern standard time. Slogan: "Municipal Broadcasting Station of the City of New York."

**WOAI** Southern Equip. Co., San Antonio, Tex. 302.8 meters, 990 kilocycles, 2000 watts. Sun, 11 am-7:45 pm, church services. Daily ex Sat, Sun, Mon, 8:30-9:30 pm, varied program. Central standard time. Slogan: "The Winter Playground of America."

**WOAN** The Vaughan School of Music, Lawrenceburg, Tenn. 285.5 meters, 1050 kilocycles, 250 watts. Daily ex Sun, 9-10 pm, musical. Central standard time. Slogan: "Watch Our Annual Normal."

**WOAX** Franklin J. Wolf, the Monument Pottery Co., Trenton, N. J. 239.9 meters, 1250 kilocycles, 500 watts. Daily ex Sun, 12:15-12:30 pm, music, weather forecast, police reports, crop reports for New Jersey. Wed, 7:30-9:30 pm, popular program. Sun, 7:30-8:30 pm, dance orchestra. Eastern standard time. Slogan: "The Voice from Trenton."

**WOBB** Longacre Engineering & Construction Co., 127 N. Dearborn st., Chicago, Ill. 555.2 meters, 540 kilocycles, 5 watts.

**WOC** The Palmer School of Chiropractic, 1002 Brady st., Davenport, Iowa. 352.7 meters, 850 kilocycles, 5000 watts. Sun, 1-2 pm, orchestra; 6:30 pm, church; 8:15-9:15 pm, 10-11 pm, orchestra. Daily ex Sun, 1:57-6 pm, time signals, markets. Mon, 3-3:30 pm, home management; 5:45-6 pm, chimes & sports. Tues, 7:30-9:30 pm, WEAF; 9:30 pm, musical or lecture. Wed, 4-4:45 pm, musical; 9-9:30 pm, WEAF; 9:30-10:30 pm, organ. Thurs, 7-7:30 pm, WEAF; 7:30-8, Quartet Plowboys; 8-10 pm, WEAF. Fri, 7-7:30 pm, Ivory Twins; 7:30-8:30 pm, Melody Mexicos; 8:30-9:30 pm, musical from WEAF. Sat, 8-9 pm, WEAF. Central standard time. Slogan: "Where the West Begins and in the State Where the Tall Corn Crows."

**WOCB** Orlando Broadcasting Co., P. O. Box 451, 19 S. Main st., Orlando, Fla. 293.7 meters, 1021 kilocycles, 50 watts. Daily ex Sun, 3-4 pm, 7:30-8 pm. Sat, 6:7 pm. Eastern time. Slogan: "Orlando, City Beautiful."

**WOCL** A. E. Newton, Jamestown, N. Y. 223.7 meters, 1340 kilocycles, 25 watts. Sun, 10:30 am & 7:30 pm, church service. Mon, 9-9:15 pm, 9:15-12 midnight, educational feature popular program. Eastern standard time.

**WODA** The O'Dea Temple of Music, 115 Ellison st., Paterson, N. J. 293.9 meters, 1020 kilocycles, 1000 watts. Sun, 10:30 am, 7:30 am, church services. Daily ex Sun, 12-1 noon; 5-7 pm, studio; 8-11 pm, studio. Tues, 11:30-12:30 am, Nite Club. Thurs, 11-12 midnight, Nite Club. Fri, 10:30-11:30 pm, dance; 11:30-12:30 am, Nite Club. Eastern standard time. Slogan: "The Voice of the Silk City."

**WOI** Iowa State College, Ames, Iowa. 265.3 meters, 1130 kilocycles, 2500 watts. Daily ex Sun, 9:30 am, weather, markets; 10:15 am, weather & markets; 12:30 pm, chimes, weather, markets & educational talks; 9:30 pm, weather. Central standard time.

**WOK** Neutrowound Radio Mfg. Co., Homewood, Ill. 252.0 meters, 1190 kilocycles, 5000 watts. Sun, 6-12 pm, organ concert, orchestra. Daily ex Sun & Mon, 6-7:45 pm, 8-9 pm, 9:20-12 pm. Central standard time.

**WOKO** Harold E. Smith, Peekskill, N. Y. 215.7 meters, 1390 kilocycles, 250 watts. Mon, Thur, Sat, 7-12 pm. Tues & Fri, 7-12 pm, non-regular. Eastern standard time.

**WOKT** Titus-Ets Corp., 608 Terminal Bldg., Rochester, N. Y. 209.7 meters, 1430 kilocycles, 500 watts. Sun, 11 am-12:30 pm, religious. Daily ex Sun, 11:30 am-12 midnight, musical and educational programs. Eastern standard time. Slogan: "Where the Better Programs Are Broadcast From."

**WOMT** The Mikadow Theater, Manitowoc, Wis. 222.1 meters, 1350 kilocycles, 50 watts.

**WOO** John Wanamaker, Philadelphia, Pa. 508.2 meters, 590 kilocycles, 500 watts. Daily ex Sun, 11 am, music; 11:30, weather; 11:55 am, time signals; 12 noon, music; 4:40 pm, news reports; 4:45 pm, musical; 9:55 pm, time signals; 10:02 pm, weather report. Mon, Wed, Fri, 7:30-11 pm, concerts. Sun, 10:45 am or 7:45 pm, 2:15 pm, Sunday school musical program; 6 pm, organ recital. Eastern standard time.

**WOOD** Walter B. Stiles, Inc., 211 Diamond av., S. E., Grand Rapids, Mich. 260.7 meters, 1150 kilocycles, 500 watts. Daily ex Sun, 9-11 pm, popular request programs, and vocal and dance programs. Central standard time. Slogan: "The Voice of the Whispering Pines."

**WOQ** Unity School of Christianity, 917 Tracy av., Kansas City, Mo. 336.9 meters, 890 kilocycles, 250 watts. Tues, 8-9:30 pm, devotional musical program. Thurs, 7-8 pm, educational; 8-10 pm, musical. Sat, 6:15-7:15 pm, orchestra music; 10-11 pm, special radio healing service. Sun, 11 am-12:30 pm, morning service; 7-9:15 pm, evening services; 11 am, daily prayer service. Central standard time.

**WOR** L. Bamberger & Co., 46 Bank st., Newark, N. J. 422.3 meters, 710 kilocycles, 500 watts. Mon, 3:45 pm, 5:15-12 pm. Tues & Thurs, 5:15-7:30 pm. Wed, 5:15-11 pm. Fri, 5:15-6:30 pm. Sat, 3 pm, 6:30-12 pm. Eastern standard time.

**WORD** Webster Hotel Studios, 2150 Lincoln Park West, Chicago, Ill. 275.1 meters, 1090 kilocycles, 5000 watts. Sun, 10-12 am, 2:30-5 pm, 7-10 pm. Daily ex Sun, Mon, 7-10 pm. Central standard time. Slogan: "The Watch Tower, Radio WORD." Divides time with Station WTAS.

**WOS** Missouri State Marketing Bureau, Board of Agriculture, Jefferson City, Mo. 394.5 meters, 760 kilocycles, 500 watts. Daily ex Sun, 9 am, markets, weather; 10 am, markets, stocks, weather; 11 am, markets, stocks & bonds, weather; 12 noon, grain market, stocks, weather; 1 pm, 2 pm, markets, weather; 3:30 pm, baseball scores; 4 pm, women's & children's hour; 5 pm, baseball scores; 7 pm, market review; 7:15 pm, news items. Central standard time. Slogan: "Watch Our State."

**WOW** The Voice of the Woodmen of the World Life Insurance Association, Headquarters Bldg., Omaha, Neb. 508.2 meters, 590 kilocycles, 1000 watts. Sun, 9-10:45 am, 2-4 pm, 6-7 pm, religious services; 9-11 pm, religious. Mon, Tues, Thurs & Fri, 8-9 am, stock report; 10-11:30 am, 12:30-2 pm, stock reports & musical; 4-6 pm, miscellaneous; 6-7:30 pm, dinner concert; 9-11, concert. Sat, regular programs till 7:30 pm. Additional programs under the Omaha Chamber of Commerce. Central standard time. Slogan: "The Omaha Station."

**WOWO** The Main Auto Supply Co., 215 W. Main st., Fort Wayne, Ind. 228.9 meters, 1310 kilocycles, 1000 watts. Mon, Wed, noon & night, Tues, Fri, Sat, noon. Central standard time. Slogan: "Wayne Offers Wonderful Opportunities."

**WPAB** Radio Corp. of Virginia, 305 Plume st., Norfolk, Va. 209.7 meters, 1430 kilocycles, 100 watts.

**WPAP** Palisade Amusement Park, Cliffside, N. J. 361.2 meters, 830 kilocycles, 500 watts.

**WPCC** North Shore Congregational Church, Chicago, Ill. 223.7 meters, 1340 kilocycles, 500 watts.

**WPCH** Peoples Broadcasting Corp., Park Central Hotel, 55th, 56 st. & 7th av., New York City, N. Y. 309.1 meters, 970 kilocycles, 500 watts. Mon, 1 pm-12 midnight. Tues, 12 noon-7 pm, 9 pm-midnight. Wed, 1 pm, 8 pm, 10 pm-midnight. Thurs, 12 noon to midnight. Fri, 1-7 pm, 9 pm-midnight. Sat, 12 noon-3 Sun am. Sun, 11 am-12 noon, 4:30 pm-midnight. Eastern standard time. Slogan: "Voice of Central Park."

# NEW FORMICA KIT PANELS!

Drilled and decorated front and sub-panels for the leading kits of the new season can be had in Formica. Dealers and jobbers can supply you with Magnaformer Front Panels 7x26x3/16 in., Black, decorated in Gold, drilled and Magnaformer Sub-Panels 9x25x3/16 in. Black, drilled.

Tyrman Superheterodyne front panel, 7x24x3/16 in. Walnut, decorated and drilled and sub-panel 9x23x3/16 in. Ivory, drilled.

World's Record Super 10, front panel 7x26x3/16 in., decorated and drilled and sub-panel 10x25x3/16 in. Black Polished, drilled.

Camfield Nine, front panel 7x30x3/16 in. Black, decorated and drilled, \$7.60; sub-panel 10x29x3/16 in. Black Polished, drilled.

In addition there are panels for the Melo-Heald Superheterodyne; Madison-Moore One Spot; World's Record Super Nine; Victoreen one and two dials; H. F. L. Nine-In-Line; Infradyne and others.

*These panels are sold by jobbers and dealers everywhere*

## THE FORMICA INSULATION COMPANY

4666 Spring Grove Avenue  
CINCINNATI, OHIO

**FORMICA**  
Made from Anhydrous Bakelite Resins  
**SHEETS TUBES RODS**

*Tell 'Em You Saw It in the Citizens Radio Call Book*

**WPEP** Waukegan Pep Station; 140 Hazel Court, Waukegan, Ill. 215.7 meters, 1390 kilocycles, 250 watts. Sun, 3-5 pm, 7:30-9:30 pm, 10-12 pm. Daily ex Sun, Mon, 7:30-9:30 pm, 10-12 pm. All programs popular and semi-popular. Central standard time. Slogan: "Where Pep Entertains Public."

**WPG** Municipality of Atlantic City, Atlantic City, N. J. 272.6 meters, 1100 kilocycles, 2500 watts. Sun, 3:15 pm until 12 midnight. Mon, Tues, Thur, Fri & Sat, 1:30 pm-midnight. Eastern standard time.

**WPRC** Wilson Printing & Radio Co., 1740 5th st., Harrisburg, Pa. 209.7 meters, 1430 kilocycles, 100 watts. Sun, 9-11 pm. 1st & 3rd Mon, 9-11 pm. Eastern standard time. Slogan: "The Capital City of the Keystone State."

**WPSC** Pennsylvania State College Dept. of Elec. Engineering, State College, Pa. 299.8 meters, 1000 kilocycles, 500 watts. Mon, Wed & Fri, 7-11 pm. Eastern standard time. Slogan: "The Voice of the Titany Lion."

**WPSW** Philadelphia School of Wireless Telegraph, Philadelphia, Pa. 202.6 meters, 1480 kilocycles, 50 watts. Wed, 7 pm, radio questions & answers. Fri, 7 pm, talks on radio, care & operation. Eastern standard time. Slogan: "First Wireless School in America."

**WQAA** Horace A. Beale, Jr., Parkersburg, Pa. 215.7 meters, 1390 kilocycles, 500 watts. Eastern standard time.

**WQAE** Moore Radio News Station, 41 Main st., Springfield, Vt. 249.9 meters, 1200 kilocycles, 50 watts. Sun, 10:30 am, church services. Eastern standard time.

**WQAM** Electrical Equipment Co., 42 N. W. 4th st., Miami, Fla. 322.4 meters, 930 kilocycles, 750 watts. Sun, 10:45 am-12 noon, 8-9:15 pm, church. Daily ex Sun, 11:45 am-12:15 pm, organ, time signals, weather, stock reports; 7-8:15 pm, organ, dance orchestra, weather, baseball results & studio programs.

**WQAN** Scranton Times, 222 Spruce st., Scranton, Pa. 230.6 meters, 1300 kilocycles, 100 watts. Daily ex Sun, 12:30-1 pm, 4:30-5 pm. Tues & Fri, 8-10:30 pm. Sat, 10:30-12 pm. Eastern standard time. Slogan: "The Voice of the Anthracite." Divides time with WGBI, Scranton, Pa., Mon, Wed, Thur, nights, & Tues, Fri, 6:45-7:55 pm.

**WQAO** Calvary Baptist Church, Cliffside, N. J. 394.5 meters, 760 kilocycles, 500 watts. Wed, 8-9 pm, mid-week evening services. Sun, 11 am-12:30 pm, church services; 3-4:30 pm, Bible study class; 7:45-9:30 pm, evening services. Eastern standard time. Slogan: "The Bible, the Whole Bible and Nothing but the Bible."

**WQJ** Calumet Broadcasting Co., operated by Chicago Daily News, Hotel La Salle, Chicago, Ill. 447.5 meters, 670 kilocycles, 500 watts. Sun, 10:45 am-12:30 pm, 1:30-4:30 pm. Mon, 11 am-12 noon, 3-4 pm. Tues, 11-12 noon, 3-4 pm, 7-8 pm, 10-12 midnight. Wed, Thur, Fri, Sat, 11 am-12 noon, 3-4 pm, 7-8 pm, 10-12 pm, 12 midnight-2 am. Central standard time.

**WRAF** The Radio Club (Inc.), 719 Michigan av., LaPorte, Ind. 208.2 meters, 1440 kilocycles, 100 watts. Sun, 10:15 am, church services; 8 pm, music. Mon & Thurs, 8:30 pm. Central standard time. Slogan: "The City of Maples."

**WRAH** Stanley N. Read, 191 Alabama av., Providence, R. I. 199.9 meters, 1500 kilocycles, 250 watts.

**WRAK** Economy Light Co., 1105 Ludington st., Escanaba, Mich. 282.8 meters, 1060 kilocycles, 50 watts. Sun, 6:30-8 pm, classical. Mon and Fri, 10:30-11 am, household hints and weather forecast; 6:30-7:00 pm, late news and weather forecast followed by musical program. Tues & Thurs, same as Mon & Fri. Wed, 10:30-11:30 am, household hints & weather forecast. Sat, 10:30-11 am, household hints & weather forecast; 6-6:30 pm, late news & weather forecast, followed with dance program. Eastern standard time. Slogan: "The Gateway to Cleveland."

**WRAM** Lombard College, Galesburg, Ill. 247.8 meters, 1210 kilocycles, 50 watts. Mon, 7 pm, bedtime stories; 8 pm, educational; 9-11 pm, musical. Central standard time.

**WRAV** Antioch College, Yellow Springs, Ohio. 340.7 meters, 880 kilocycles, 100 watts. Wed, 8 pm, 9 pm, music & educational. Thurs, 9-10 pm. Sun, 7 pm. Central standard time.

**WRAW** Avenue Radio & Electric Shop, 460 Schuylkill av., Reading, Pa. 238 meters, 1260 kilocycles, 50 watts. Sun, 1:30-3 pm. Tues, 8 pm. Thur, 8-10 pm. Eastern standard time. Slogan: "The Schuylkill Valley Echo."

**WRAX** Berachan Church (Inc.), 1608 Alleghany av., Philadelphia, Pa. 288.3 meters, 1040 kilocycles, 250 watts. Eastern standard time.

**WRBC** Immanuel Lutheran Church, Valparaiso, Ind. 238.0 meters, 1260 kilocycles, 250 watts. Sun, 10:30-12:00 noon, 7:30-9 pm, church service. Mon, 7:30-9 pm, diversified program. Central standard time. Slogan: "World Redeemed by Christ."

**WRBL** Farmington, N. Y. 201.6 meters, 1490 kilocycles, 30 watts.

**WRC** Radio Corporation of America, 3308 14th st., N. W., Washington, D. C. 468.5 meters, 640 kilocycles, 500 watts. Sun, 11 am-12:30 pm, church services; 4-5:30 pm, church; 6:20-10:15, musical. Mon, Tues, Wed, Thur, Fri & Sat, 6:45 am to 11 pm, varied. Eastern standard time. Slogan: "The Voice of the Capital."

**WRCO** Wynne Radio Co., 8 W. Hargett st., Raleigh, N. C. 217.3 meters, 1380 kilocycles, 250 watts. Sun, 10:45 am. Irregular programs at present. Eastern standard time.

**WREC** Wooten's Radio & Elec. Co., White Haven, Tenn. 254.1 meters, 1180 kilocycles, 50 watts. Daily 7-8 pm. Sun, 4-5 pm. Central standard time. Slogan: "The Most Powerful 10-Watt Station in the World."

**WREN** Lawrence, Kan. 254.1 meters, 1180 kilocycles, 750 watts.

**WREO** The Reo Motor Car Co., Lansing, Mich. 230.6 meters, 1300 kilocycles, 500 watts. Daily ex Sun, 6-7 pm. Tues, Thurs, 8:15-10 pm. Sat, 10-12 midnight. Sun, 10 am, chimes; 10:30 am & 7:30 pm, church services. Eastern standard time. Slogan: "Home Port of the Flying Cloud."

**WRES** Harry Leonard Sawyer, Quinev, Mass. 217.3 meters, 1380 kilocycles, 50 watts. Mon & Thurs, 8 pm, entertainment.

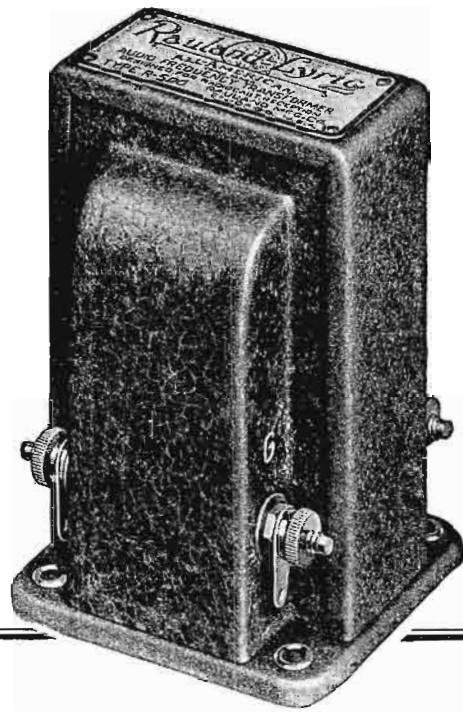
**WRHF** Washington Radio Hospital Fund, Colorado Bldg., Washington, D. C. 319.0 meters, 940 kilocycles, 50 watts. Daily ex Sun, 11 am-12 noon, news & current events. Eastern standard time.

**WRHM** Rosedale Hospital (Inc.), Nicollet & 44th st., Minneapolis, Minn. 260.7 meters, 1150 kilocycles, 1000 watts. Sun, 9:15 am, Bible students; 10 am, children's Bible stories; 11 am, church services; 6:30 pm, dramatic hour; 7:45 pm, church; 9:30 pm, lectures. Mon, We, Fri, 9 am, housewife's hour. Daily ex Sun, 5:50 pm, news, weather, sports; 6 pm, dinner concert; 8 pm, popular; 9 pm, dance program. Central standard time. Slogan: "Welcome Rosedale Hospital, Minneapolis." Divides time with WDGY, Minneapolis.



# Still the undisputed leader

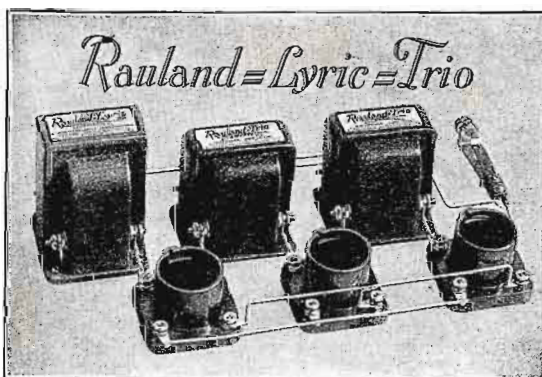
**Rauland-Lyric**  
AUDIO TRANSFORMER



If you love music, and want your radio set to reproduce tones *faultlessly*, there is one audio transformer you can absolutely depend on—the famous Rauland-Lyric.

Voices and instruments alike are amplified with amazing realism by the Rauland-Lyric; with faithful amplification of those “overtones” essential to full, natural reproduction. The amplification curve of the Rauland-Lyric illustrates its outstanding superiority in tone purity.

The Rauland-Lyric is the undisputed leader in its field. It is invariably chosen by set builders who want the utmost in perfect tone quality.



## A new high mark in three-stage audio amplifiers

Your receiver's tone quality depends in large measure on correct audio amplification. The famous Rauland-Lyric Transformer may now be combined with two Rauland-Trios (impedance units) to form the Rauland-Lyric-Trio—the highest known perfection in three-stage audio amplification. Rauland-Trio is a compact, well-made unit—containing in one shell—inductance, resistance, and capacity in correctly balanced relation.

Write for “Modern Audio Amplification”, a free book, describing this fine unit.

## New 1927 Radio Key Book

You'll enjoy reading it—48 pages of interesting, up-to-the-minute facts about radio, simply told. Also full construction details of all leading types of circuits. Send 10 cents (coin or stamps) to cover postage and mailing cost.



**ALL-AMERICAN RADIO CORPORATION**

4221 Belmont Avenue, Chicago, Illinois

OWNING AND OPERATING STATION WENR 266 METERS

Tell 'Em You Saw It in the Citizens Radio Call Book

**WRK** John C. Slade, R. R. No. 3, Hamilton, Ohio. 270.1 meters, 1110 kilocycles, 100 watts. Sun, 2:30-3:30 pm. Daily ex Sun, 1-2 pm. Mon, Wed, 8-10 pm. Tues, Thur, 7-9 pm. Fri, 6-12 pm. Sat, 6-7 pm, 8-11 pm. Eastern standard time. Slogan: "The Voice of the Miami Valley."

**WRM** University of Illinois, Urbana, Ill. 272.6 meters, 1100 kilocycles, 500 watts. No definite schedule. Musical concert broadcasted once a week or oftener, no definite time selected, also basketball games and other athletic contests. Central standard time.

**WRMU** Atlantic Broadcasting Corp., New York City, N. Y. (Portable). 201.6 meters, 1490 kilocycles, 100 watts. Unlimited schedule. Eastern standard time.

**WRNY** Radio News, Hotel Roosevelt, 45th st. & Madison av., New York City, N. Y. 309.1 meters, 970 kilocycles, 500 watts. Sun, 10:30-1 pm, 1-7 pm. Mon, Wed, 10:30 am-7 pm. Wed, 9-12 midnight. Tues, 10:30-12. Thus, 10:30-1. Sat. 11 am-1, 7-9 pm. Eastern standard time. Divides time with Station WPCB.

**WRPI** Rose Polytechnic Institute, Hotel Deming, Terre Haute, Indiana. 208.2 meters, 1440 kilocycles, 100 watts. Sun, 9:30 am-12 noon, church. Daily ex Sun, 7 pm, markets. Mon, Wed, Fri, 8 pm. Popular programs. Central standard time. Slogan: "On the Banks of the Wabash."

**WRR** Municipal Station, Jefferson Hotel, Dallas, Tex. 352.7 meters, 850 kilocycles, 500 watts. Daily ex Sun, Wed, 12-1 pm, 6-7 8-9. Mon, 9:30-10:30 pm. Fri, 8-10 pm. Sun, 10:45-12 am, 7:30-9 pm, 9:30-10:50 pm. Thurs, 9:30-10:30 pm. Central standard time. Slogan: "City of Achievements."

**WRRS** Racine Radio Station, Arcade Bldg., Racine, Wis. 322.4 meters, 930 kilocycles, 50 watts.

**WRSC** The Radio Shop (William S. Pote), 56 Washington av., Chelsea, Mass. 205.7 meters, 1460 kilocycles, 15 watts.

**WRST** Radiotel Mfg. Co., Inc., 76 Main st., Bay Shore, N. Y. 211.1 meters, 1420 kilocycles, 250 watts. Daily ex Sun, 12 noon-1 pm. Mon, Wed & Fri, 7-11:30 pm, concerts. Tues & Thurs, 8-11:30 pm. Sat, 7-11:30 pm. Sun, 11 am-12:45 pm, church services; 7-11 pm, musical concert. Eastern standard time. Slogan: "Bay Shore, Garden Spot of Long Island."

**WRVA** Edgeworth Tobacco Station, Richmond, Va. 254.1 meters, 1180 kilocycles, 1000 watts. Mon, Wed, Fri, 12 noon-2 pm, 8 pm-12 midnight. Tues, Thur, 12 noon-1 pm. Thur, 8-12 midnight. Eastern standard time. Slogan: "Carry Me Back to Old Virginny."

**WSAI** United States Playing Card Co., Cincinnati, Ohio. 361.2 meters, 830 kilocycles, 5000 watts. Sun, 11 am, church services; 4 pm, Dr. Cadman; 7:45 pm, chimes; 8 pm, sermon; 9:15 pm, Atwater-Kent Hour. Mon, 7-10 pm, musical, grand opera. Daily ex Sun, Mon, Fri, Sat, 7-10:30 pm. Sat, 7:45-12 midnight. Central standard time. Slogan: "The Gateway to Dixie."

**WSAJ** Grove City College, Grove City, Pa. 223.7 meters, 1340 kilocycles, 250 watts. Irregular schedule. Eastern standard time.

**WSAN** Allentown Call Publishing Co., Inc., Allentown, Pa. 222.1 meters, 1350 kilocycles, 100 watts. Tues, Thurs & Sats, 8:15 pm, musical. Eastern standard time. Slogan: "We Serve Allentown Nationally."

**WSAR** Doughty & Welch Elec. Co., 46 N. Main st., Fall River, Mass. 252.0 meters, 1190 kilocycles, 100 watts. Daily ex Sun, 12-1 pm. Sun, 10:30-12 m. Eastern standard time.

**WSAX** Zenith Radio Corp., 3620 Iron st., Chicago, Ill. 204.0 meters, 1470 kilocycles, 100 watts. (Portable.) Central standard time.

**WSAZ** McKellar Electric Co., 1143 4th av., Huntington, W. Va. 241.8 meters, 1240 kilocycles, 100 watts. Sun, 9 am-1 pm, 3-4 pm, 7:30-9 pm, 10-11 pm. Daily ex Sun, 12 noon-1 pm, 5:30-6:30 pm, 9:30-12: midnight. Eastern standard time.

**WSB** The Atlanta Journal, care Biltmore Hotel, Atlanta, Ga. 475.9 meters, 630 kilocycles, 1000 watts. Sun, 9:30 am-5 pm, church services. Daily ex Sun, 10 am, homemakers' half hour, market reports, etc.; 10:30 am, public school program; 12 noon, organ recital, songs, etc.; 1 pm, Radio Farm Service; 2:30 pm, market reports, etc.; 6 pm, public school program; 6:20 pm, garden message. Mon, 8 pm, Sears-Roebuck Agricultural Foundation program; 10:45 pm, concert, organ, skylark, etc. Tues, 8 pm, church choir. Thurs, Fri, Sat, 8 pm, club, orchestra, etc. Central standard time. Slogan: "The Voice of the South."

**WSBC** The World Battery Company Station, 1219 S. Wabash av., broadcasting from New Southern Hotel, Chicago, Ill. 232.4 meters, 1290 kilocycles, 500 watts. Sun, 5-7 pm, classical; 9:30 pm-1 am, popular. Mon, 5-7 pm, popular program. Tues, Wed, Thur, Sat, 5-7 pm, 9:30 pm-1 am, popular program. Fri, 6-1 pm, 9 pm-1 am, popular program. Central standard time. "World Storage Battery Company."

**WSBF** Stix, Baer & Fuller, 6th & Washington av., St. Louis, Mo. 272.6 meters, 1100 kilocycles, 250 watts. Sun, 9-10 pm, theater. Mon, 1 pm, 3-4 pm, 7:30-8, 8-9, 9 pm, musical talks. Tues, 1 pm, 3-4 pm, popular. Wed & Fri, 12 noon-1 pm, 3-4 pm, 7:30-8 pm, 8-9 pm, music. Thurs, 12 noon-1 pm, 3-4 pm, popular. Sat, 12 noon-1 pm, 3-4 pm. Central standard time.

**WSBT** South Bend Tribune, South Bend, Ind. 222.1 meters, 1350 kilocycles. 250 watts. Mon, 7:15-10 pm, C. S. Wed, 7:15-9:15 pm. Fri, 7:15-9:30 pm. Slogan: "Voice of the Hoosier State."

**WSDA** The City Temple, 122 W. 76th st., New York City, N. Y. 227.1 meters, 1320 kilocycles, 250 watts. Thurs, 7:45-9:30 pm. Sat, 10:45 am-1 pm. Sun, 7:30-9:30 pm. Eastern standard time.

**WSEA** Radio Corporation of Virginia, Norfolk, Va. 218.8 meters, 1370 kilocycles, 250 watts. Sun, 7-9 pm, concert, orchestras. Daily ex Sun, 6:15 pm, news, scores; 7 pm, dinner concert; 8-10 pm, studio, 10 pm-12 pm, dance program. Eastern standard time. Slogan: "The Voice of Tidewater, Virginia."

**WSIX** Springfield, Tennessee. 212.6 meters, 1410 kilocycles, 150 watts.

**WSKC** World's Star Knitting Company, Bay City, Mich. 491.5 meters, 610 kilocycles, 250 watts. Sun, 11 am. Daily, 12-1 pm, dinner hour; 4 pm, news events, features. Mon, 9-11 pm, 12 midnight-2 am. Wed, 9-11 pm, request program. Sat, 10-11 pm. Sun, 11 am, church service. Eastern standard time. Slogan: "Where the Summer Trails Begin."

**WSM** The National Life and Accident Ins. Co., Inc., Seventh av. N. & Union st., Nashville, Tenn. 319.0 meters, 940 kilocycles, 2000 watts. Sun, 5:20-6:20 pm, 11-12 am, 7:45-9 pm. Daily ex Sat, Sun, 11:45-12:30 noon, 1-1:30 pm, 5:30-11 pm. Sat, 7-11 pm. Eastern standard time. Slogan: "We Shield Millions."

**WSMB** Saenger Theatres, Inc., 1401 Tulane av., New Orleans, La. 322.4 meters, 930 kilocycles, 500 watts. Daily ex Sun, 12:30 1-30 pm, 6:30-7:30 pm, 8:30-10:30 pm, entertainment. Central standard time. Slogan: "America's Most Interesting City."

**WSMK** The WSMK Radio Corp., 812 Gibbons Hotel, Dayton, Ohio. 296.9 meters, 1010 kilocycles, 200 watts. Daily ex Sun, & Thurs, 12 noon-1 pm, dinner, music. Daily ex Sun, 4-4:30 pm, news reports. Daily ex Sun & Wed, 6-7 pm, dinner concert; 8-10:30 pm, studio concert. Sat, "Dum Dora Club," midnight frolic. Central standard time. Slogan: "The Home of Aviation."

**WSOE** School of Engineering of Milwaukee, Oneida & Jackson sts., Milwaukee, Wis. 270.1 meters, 1110 kilocycles, 500 watts. Daily (inc Sun), program as announced. Central standard time. Slogan: "In the Land of the Sky Blue Waters."



**The Bradleyleak**  
is a variable grid leak providing stepless adjustment over a wide range.



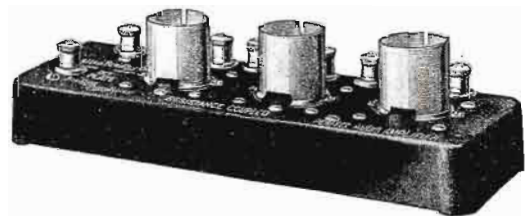
**The Bradleystat**  
is a compression resistance rheostat that provides stepless control of the filament current.



**The Bradleyohm**  
is a variable resistor made in a great variety of sizes providing widely varying resistance values. Extensively used in B-eliminators.



**The Bradleyunit**  
is a fixed resistor that does not vary with age or atmospheric changes. It is guaranteed to be accurately within 5% of its rating. Used on many B-eliminators, and ideal for resistance coupled amplifiers. Made in a wide range of resistance values.



**The Bradley-Amplifier**  
is a resistance coupled amplifier which uses Bradleyunit Resistors. It does not deteriorate in service and is not affected by atmospheric changes. It is so compact that it can readily be used to replace transformer coupled amplifiers with a decided improvement in tone quality.

# Radio Parts

## that improve the performance of every radio hook-up

ALLEN-BRADLEY radio parts are designed for the convenience of set and power-unit builders. They are easily installed and provide the refinement of adjustment demanded by all radio enthusiasts. With Allen-Bradley parts it is easy to secure the outstanding results that make the building of sets and power-supply units well worth while.

These superior parts are equally advantageous for use on sets in service. Because of their small size and one-hole mounting features they can be used to replace inferior parts on sets in service.

### Allen-Bradley Co.

488 Clinton St.

Milwaukee, Wis.

# Allen-Bradley

## PERFECT RADIO DEVICES

**WSOM** Union Course Laboratories, 9024 78th st., Woodhaven, N. Y. 245.8 meters, 1220 kilocycles, 500 watts. Sun, 12:30-4 pm. Mon, Wed, Fri, 1-6 pm, 11-12 pm. Tu, 1-6 pm, 9-12 pm. Thur, 1-6 pm. Eastern standard time. Divides time with WAAT & WGBB.

**WSRO** Radio Company (Harry W. Fahrlander), Central & Canal sts., Middleton, Ohio. 384.4 meters, 780 kilocycles, 100 watts. Tues & Fri, 8-10 pm. Sun, 2-4 pm. Central standard time. Slogan: "We Sell Radio Only."

**WSSH** Tremont Temple Baptist Church, Boston, Mass. 230.6 meters, 1300 kilocycles, 100 watts. Sun, 10:15-12 noon, 6:30-9 pm. Fri, 7:30-9 pm. Eastern standard time. Slogan: "Stranger's Sabbath Home."

**WSUI** State University of Iowa, Capitol & Washington sts., Iowa City, Iowa. 265.3 meters, 1130 kilocycles, 500 watts. Sun, 4 pm, vespers; 9:30 pm, hymns. Daily ex Sun, 10:30 am, news, music; 12:25 pm, news, music. Wed, 9 am, high school program; 10:30 am, music, news. Mon, 4 pm, Women's Club hour; 7:30 pm, radio correspondence courses; 9 pm, music; 11:15 pm, organ. Sat, 7:30 pm, athletic contests. Central standard time. Slogan: "The Old Gold Studio."

**WSVS** Seneca Vocational School, 666 East Delavan av., Buffalo, N. Y. 205.4 meters, 1460 kilocycles, 50 watts. Wed, 7:40-8 pm, code lessons; 8-9:30 pm, musical program. Fri, 8-9:30 pm, musical program. Eastern standard time. Slogan: "Watch Seneca Vocational School."

**WSYR** Voice of Central New York, Hotel Syracuse, N. Y. 225.4 meters, 1330 kilocycles, 500 watts. Sun, 10:45 am, church services; 6:30-7:30 pm, dinner concert. Daily ex Sun, 6:20 pm-10:30 pm, Varied programs. Eastern standard time.

**WTAD** Illinois Stock Medicine Broadcasting Corp., Quincy, Ill. 236.1 meters, 1270 kilocycles, 250 watts. Sun, 11-12 am, 2:30-3:30 pm, 10-12 pm. Daily ex Sun, 11:30 am-12:45 pm, 6:30-8:30 pm. Central standard time.

**WTAG** Worcester Telegram-Gazette Broadcasting Station, 18 Franklin st., Worcester, Mass. 288.3 meters, 1040 kilocycles, 500 watts. Sun, 7:20-9:25 pm. Daily ex Sat, Sun, 10:30-11 am, 12:30-1:05 pm, 7:30-10:10 pm. Sat, 12:30-1:05 pm, 8-11:10 pm. Eastern standard time. Slogan: "The Voice from the Heart of the Commonwealth."

**WTAL** Toledo Broadcasting Co., Waldorf Hotel, Toledo, Ohio. 280.2 meters, 1070 kilocycles, 100 watts. Sun, 10:45 am-9:30 pm. Daily ex Sat & Sun, 6-11 pm. Sat, 8-12 pm. Divides time with Station WABR. Eastern standard time. Slogan: "The Gateway of the Sea."

**WTAM** Willard Storage Battery Co., 2026 Union Trust Bldg., Cleveland, Ohio. 399.8 meters, 750 kilocycles, 3500 watts. Sun, 11 am-12:30 pm, 3-4:30 pm, 6-11:15 pm. Mon, Tues, Wed, Thurs, Fri, Sat, 10:45-11:30 am, 12:30-1:30 pm, 2:30-3:30 pm, 6 pm-12 midnight. Eastern standard time. Slogan: "The Voice from the Storage Battery."

**WTAQ** Gillette Rubber Co., Eau Claire, Wis. 254.1 meters, 1180 kilocycles, 500 watts. Sun, 11 am, church service; 6 pm, concert. Daily ex Sun, 12:15 pm, weather, markets, news; 6:30 pm, Balloon Cords Program; 9 pm, State Theatre program; 11 pm, courtesy program. Central standard time. Slogan: "Where Tires are Quality."

**WTAR** Reliance Elec. Co., Inc., 519 W. 21st ave., Norfolk, Va. 275.1 meters, 1090 kilocycles, 500 watts. Daily ex Sun, 6 pm, weather, markets & news. Eastern standard time. Slogan: "Down in Old Virginia."

**WTAS** Illinois Broadcasting Corp., Villa Road, Illinois. 275.1 meters, 1090 kilocycles, 3500 watts. Sun, 10 am-1 pm. Daily ex Sun, 12 noon-2:30 pm, 6-7 pm, 10 pm-1 am. Central standard time. Slogan: "Willie, Tommy, Annie, and Sammy."

**WTAW** Agricultural & Mechanical College of Texas, College Station, Texas. 309.1 meters, 970 kilocycles, 500 watts. Mon, Tues, Wed, Thurs & Fri, 12:15 pm. Central standard time.

**WTAX** Williams Hardware Co., 115 S. Vermillion st., Streator, Ill. 322.4 meters, 930 kilocycles, 50 watts. Mon, 8-10 pm, Studio program. Wed, Fri, 8-10:30 pm, studio program. Thur, 9-11 pm, dance program. Central standard time. Slogan: "Tappa Kugga Nails."

**WTAZ** Thomas J. McGuire, 48 N. Main st., Lambertville, N. J. 220.4 meters, 1360 kilocycles, 15 watts. Mon, 8-10 pm, musical. Eastern standard time.

**WTHO** W. J. Thomas Radio, Hotel Whittier, Burns Drive & East Jefferson st., Detroit, Mich. 218.8 meters, 1370 kilocycles, 250 watts. Mon, Wed, Fri, 6-7 pm, dinner music; 8-9 pm, studio; 10-12 pm, studio & dance music. Tues, Thurs, Sat, 7-8 pm, dinner music; 9-19 pm, dance music. Eastern standard time. Alternate hours not scheduled above used by WAFD, Hotel Addison, Detroit, Michigan.

**WTIC** The Travelers Insurance Co., 700 Main st., Hartford, Conn. 461.3 meters, 650 kilocycles, 500 watts. Daily ex Sun, 11:45 am-12:15 pm, 6-11 pm. Mon, Tues, Thurs, Fri, 11:45 am-1 pm. Mon, 6-11:30 pm. Sun, 6-7 pm. Eastern time. Slogan: "The Insurance City."

**WTMJ** The Milwaukee Journal Station, Milwaukee, Wis. 293.9 meters, 1020 kilocycles, 1000 watts. Sun, 11-12, organ; 12-12:30 pm, comics; 12:30-1:45 pm, music; 1:45-2:30 pm, music; 2:30-5:15 pm, baseball; 8-9 pm, organ; 9-10 pm, Popular program. Daily ex Sun, 10-10:30 am, organ; 10:30-10:45, new, talks; 10:45-11, organ; 2-2:30 pm, news, talks; 2:30-5:15 pm, baseball; 6:15-7:30 pm, music; 8:15-9:45 pm, concert; 10:30-11:30 pm, dance music. Central standard time.

**WTRC** 20th Assembly District Regular Republican Club, 62 Woodbine st., Brooklyn, N. Y. 204.0 meters, 1470 kilocycles, 50 watts. Sun, 2-6 pm, general entertainment. Mon, 8-11 pm, musical program, sports, news items. Tues, Wed, Fri, 7-11 pm, general program. Eastern time.

**WTRL** Technical Radio Laboratory, 28 Si-comae av., Midland Park, N. J. 206.8 meters, 1450 kilocycles, 15 watts. Sun, 2-4 pm, religious program. Tues, Fri, 7-8 pm, Sports & dance music. Eastern standard time.

**WWAE** L. J. Crowley, Chicago, Ill. 232.4 meters, 1290 kilocycles, 500 watts class A. Daily ex Sun, 12:30-1:30 pm, 9-12 midnight. Sun, 10:50-12:15 pm, church; 3:30-4:30 pm, musical. Central standard time.

**WWJ** Detroit News, Detroit, Mich. 374.8 meters, 800 kilocycles, 1000 watts. Sat, 9 pm, same as WEAJ. Sun, 7:20 pm, same as WEAJ. Daily ex Sat & Sun, 6 pm, dinner concert; 8 pm, entire program from WEAJ. Eastern standard time.

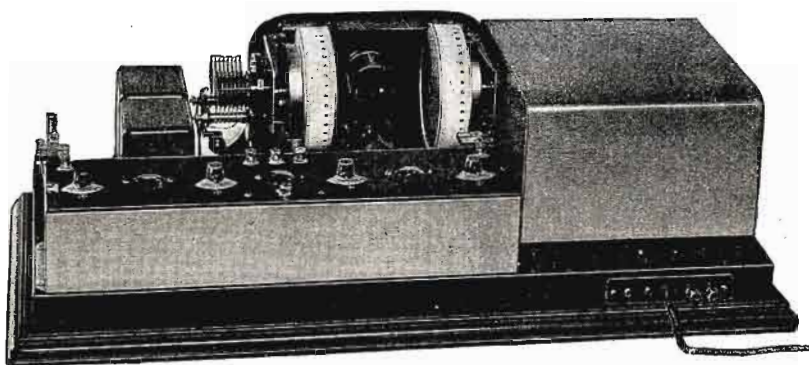
**WWL** Loyola University, New Orleans, La. 275.1 meters, 1090 kilocycles, 100 watts. Sat, 7:30-8:30 pm. Central standard time.

**WWNC** Chamber of Commerce, Asheville, N. C. 296.9 meters, 1010 kilocycles, 100 watts. Sun, 11 am, church services; 4-8 pm, orchestra concert & church services. Daily ex Sun, 1-2 pm, luncheon music; 4-6 pm, baseball scores; 7-8 pm, dinner music; 8-11 pm, studio program. Eastern standard time.

**WWPR** Detroit Police Department, Detroit, Mich. 300 meters, 999.4 kilocycles, 500 watts.

**WWRL** W. H. Reuman, 4130 58th st., Woodside, L. I., N. Y. 267.7 meters, 1120 kilocycles, 100 watts. Sun, 1-6 pm, 8:30-10 pm, popular program. Daily ex Sun, 11 am-12 noon, 1-2 pm. Mon, Fri, 10-12 pm, mixed program. Tues, Sat, 12 midnight-2 am. Thur, 8-10 pm, mixed program. Eastern standard time. Slogan: "Long Island Broadcast Laboratories." Divides time with Stations WMBS, WKBN, WIBI.

**WWVA** John C. Strobel, Jr., National Road, Wheeling, W. Va. 389.4 meters 770 kilocycles, 100 watts. Sun, 12 midnight-1:15 am, Mountain club. Daily ex Sun, 6:45-7:45 am, 2 pm, exercises; 7 pm, GrayGoose; 8-11 pm, Regular program. Sat, 11 pm-1:15 am, Mountain Club. Eastern standard time.



**5 or 10 tubes  
Local or Distance**

**Model "DX" 1928  
INFRADYNE**

**You Can Wire This Set In One Hour  
—and tune in on stations you never heard before**



**COPPER SHIELDED CABINET**

*The Cabinet problem solved. A pure copper die-punched embossed cabinet in lacquered crystalline. The 1928 idea.*

**8 Distinctive Features —**

- 1—5 or 10 tune reception by the throw of a switch. Local or DX. The Universal Receiver.
- 2—Illuminated drum controls. The new Remler system. Logging space on dials.
- 3—Tuned r.f. unit comes completely wired and each compartment shielded. A copper shielded case then again re-shields the entire amplifier. Automatic coupling coils.
- 4—Chassis wired and the set completely assembled for you. 90% of the wiring is in place. Hours of time saved.
- 5—No soldering. Screw terminals used throughout. Positive contact. Entirely foolproof.
- 6—No cabinet to buy. The copper cabinet goes with the assembly. If no cabinet is wanted deduct \$15.00 from the price of the assembly.
- 7—Antenna Compensator for bringing the r.f. amplifier into resonance. Switch for broad or sharp tuning.
- 8—Jewell voltmeter on control panel. Tube protective devices. Silver Marshall Audio Amplifier.

**\$179<sup>50</sup>**

is the price for the complete assembly with 90% of the wiring in place. Deduct \$7.00 if unassembled kit is desired. Wiring chart and wires go with each kit.

Telegraph your order if you are in a hurry. C. O. D. shipments accepted when half cash accompanies order. DEALERS and PROFESSIONAL SET BUILDERS are invited to write for attractive proposition.

**N**OW you can build radio's greatest receiver in an hour—or less. You take a screwdriver—hook on a few wires and your distance breaking set is ready for operation. A new 1928 idea of assembly brings you this INFRADYNE with 90% of the work completed. The chassis is wired for you. The sockets are in place and you simply follow a few instructions to finish the job of building the ultimate in radio—the INFRADYNE. No receiver can excel it for long distance range. It is the most beautiful receiver on the market. The latest vogue in shielding, assembly and chassis construction. You can also buy the parts separately—or in complete kit form. A large booklet on the new Infradyne is ready for you. It contains a wealth of common-sense data of great value to any radio man. It is yours for the asking.

**Intelligent Circulars Free  
Mail Coupon Now For Full Data**

Radio Constructors Corporation,  
Dept. CB, 357 12th Street,  
Oakland, California.

Send me complete booklets on the Model DX 1928 Infradyne as described in the CITIZENS RADIO CALL BOOK.

I am a Dealer.....  
Set Builder.....  
(Please state which)  
Name.....  
Address.....  
City and State.....

**Radio Constructors Corporation**  
**357 Twelfth Street                      Dept. CB.                      Oakland, California**

*Tell 'Em You Saw It in the Citizens Radio Call Book*

# U. S. Broadcasting Stations Listed by States

## ALABAMA

Auburn, WAPI  
Birmingham, WBRC, WKBC  
Gadsden, WJBY  
Montgomery, WIBZ

## ARIZONA

Flagstaff, KFNX  
Phoenix, KFAD, KFCB  
Prescott, KPJM  
Tucson, KGAR

## ARKANSAS

Fayetteville, KUOA  
Hot Springs, KTHS  
Newark, KGCG

## CALIFORNIA

Alma, KPQU  
Avalon, KFVQ  
Berkeley, KRE  
Burbank, KELW, KFLW  
Burlingame, KFQB, KFPR  
El Centro, KGEN  
Crescenta, KGFH  
Eureka, KFVH  
Fresno, KMJ  
Hollywood, KFQZ, KFVW  
KMYR  
Long Beach, KFON, KGER  
Los Angeles, KFI, KFPR,  
KFR, KFSG, KFXB,  
KGEF, KGEJ, KHJ,  
KNX, KRLO, KTBI  
Lower Lake, KGEU  
Oakland, KFUS, KFVW,  
KGO, KLS, KXK, KTAB,  
KZM  
Ocean Park, KNRC  
Oxnard, KPYE  
Pasadena, KPCC, KPSN  
Inglewood, KMFC  
Sacramento, KFBK  
San Bernardino, KFVC  
San Diego, KFBC, KFSD  
San Francisco, KFRC, KFVI,  
KGGT, KJBS, KPO, KYA  
San Jose, KFAE, KQW  
Santa Ana, KWTG  
Santa Barbara, KFRC  
Santa Maria, KSMR  
Stockton, KGDH, KWG  
Venice, KFVW  
Yuba, KGFH

## COLORADO

Colorado Springs, KFUM  
Denver, KFEL, KFUP, KFVR,  
KFV, KGEY, KLZ, KOA,  
KOW  
Durango, KOLO  
Edgewater, KFVJ  
Fort Morgan, KGEW  
Greely, KFKA  
Gunnison, KFHA  
Pueblo, KGDP  
Trinidad, KPBS, KFGL,  
KGFL  
Yuma, KGEK

## CONNECTICUT

Bridgport, WCWS, WICC  
Hartford, WTIC  
Mansfield, WCAC  
New Haven, WDRC

## DELAWARE

Wilmington, WDEL

## DISTRICT OF COLUMBIA

Washington, WMAL, WRC,  
WRHF

## FLORIDA

Boca Raton, WFLA  
Clearwater, WFHH, WGH  
Fulford-by-the-Sea, WGBU  
Jacksonville, WJAX  
Lakeland, WMLB  
Miami, WQAM  
Miami Beach, WIOD, WMBF  
Orlando, WDBO, WOCB  
Pensacola, WCOA  
St. Petersburg, WHBN, WJBB  
St. Petersburg, WKBF  
Tampa, WDAE, WMBR  
Winter Park, WDBO

## ALASKA

Anchorage, KFQD  
Juneau, KFIU  
Ketchikan, KGBU

## PORTO RICO

San Juan, WKAQ

## GEORGIA

Atlanta, WDBE, WGST,  
WSB  
Macon, WMAZ

## HAWAII

Honolulu, KGU

## IDAHO

Boise, KFAU, KFDD  
Kellogg, KFEY  
Pocatello, KSEI

## ILLINOIS

Atwood, WLBO  
Belvidere, WLBR

Bloomington, WMBY, WNBL  
Carthage, WCAZ  
Chicago, KYV, WAAF,  
WBEM, WBBZ, WBCN,  
WCFL, WCRV, WEBH  
WEDC, WENR, WFKB,  
WGES, WGN, WHBL,  
WHBM, WHFC, WHT,  
WHY, WIBM, WBO,  
WIBW, WJAZ, WKBG,  
WKBI, WLBH, WLJB,  
WLS, WLTS, WMAQ,  
WVBB, WMBH, WMBI,  
WOB, WPCC, WQJ,  
WZLX, WZBC, WVAE,  
WKDR, WDRB

Chicago Heights, WJHZ  
Decatur, WBAO, WJBL  
East Wenona, WLBI  
Evanston, WEHS  
Galesburg, WFBZ, WKBS,  
WLBQ, WRAM  
Forest Park, WNBH  
Harrisburg, WEBQ  
Homewood, WOK  
Joliet, WCLS, WJBA, WKBB  
La Salle, WJBC  
Mooseheart, WJJD  
Peoria Heights, WMBD  
Quincy, WPAF  
Rockford, KFLV  
Rock Island, WHBF  
Springfield, WCBS  
Streator, WTAX,  
Tuscola, WJZ  
Urbana, WRM  
Vandalia, WTAS  
Waukegan, WPEP  
Zion, WCBD

## INDIANA

Anderson, WHBU  
Brookville, WKBY  
Crown Point, WLBT  
Culver, WGMH  
Evansville, WGBF  
Fort Wayne, WCWK, WOWO  
Huntington, WHOG  
Indianapolis, WFBM, WKBF  
Kokomo, WJAK  
La Porte, WPAF  
Muncie, WLBC  
South Bend, WSBT  
Terre Haute, KGFO, WRPI,  
Valparaiso, WRBC  
West Lafayette, WBAH

## IOWA

Ames, VOI  
Anita, KICK  
Burlington, WIAS  
Cedar Rapids, KWCR, WJAM  
Clarinda, KSO  
Council Bluffs, KOIL  
Cresco, KGBI  
Davenport, WOC  
Decorah, KCCA, KGDZ,  
KWLC  
Des Moines, WHO,  
Ft. Dodge, KFVJ  
Iowa City, KFQP, KGFB,  
WSU  
Le Mars, KWUC  
Marshalltown, KFJB  
Muscatine, KGEN, KPMP,  
KTNT  
Oskaloosa, KFHI,  
Shenandoah, KPNF, KMA  
Sioux City, KFMR, KSCJ,  
WEAU

## KANSAS

Concordia, KGCN  
Independence, KFVS  
Lawrence, KFVJ, WREN  
Manhattan, KSAC  
Milford, KFVJ  
Topeka, WIRW  
Wichita, KFH, KFOT

## KENTUCKY

Hopkinsville, WFVW  
Louisville, WHAS, WLAP

## LOUISIANA

New Orleans, WABZ, WCBE,  
WJBO, WJWB, WKBT,  
WSMB, WWL  
Pineville, KFVW  
Shreveport, KFDX, KGDX,  
KRAC, KSBA, KWKH

## MAINE

Bangor, WARI  
Dover, WLBB  
Orono, WGBX  
Portland, WCSH

## MARYLAND

Baltimore, WBAL, WCAO,  
WCBM, WFBR  
Tacoma Park, WBES

## MASSACHUSETTS

Boston, WASH, WATT,  
WBET, WBZA, WEEL,  
WBZ, WLAB, WNAE,  
WVBR  
Chelsea, WRSR  
Dartmouth, WMAF  
East Springfield, WZB  
Fall River, WSAF  
Gloucester, WEPS  
Medford Hillside, WARC  
New Bedford, WNBH

Quincy, WRES  
Somerville, WAGS,  
Taunton, WAIT  
Webster, WKBE  
Wellesley Hills, WBSO  
Worcester, WTAG

## MICHIGAN

Battle Creek, WKBP  
Bay City, WSKC  
Berrien Springs, WEMC  
Detroit, WABX, WAFD,  
WBHM, WDXI, WDXL,  
WGHF, WMBL, WTHO,  
WTVR  
Escanaba, WVRK  
Flint, WDFD  
Grand Rapids, WASH, WOOD  
Iron Mountain, WLBY  
Lapeer, WMPG  
Lansing, WKAR, WREO  
Ludington, WEBZ  
Menominee, WDM  
Monroe, WKBL  
Royal Oak, WAGM  
Owosso, WSMH  
Petoskey, WBBP  
Pontiac, WCN, WJVR  
Ypsilanti, WJBK

## MINNESOTA

Barrett, KGDE  
Collegeville, WFBJ  
Fairmont, KFPV  
Hallock, KGRK  
Minneapolis, KPDZ, KGFO,  
WAMD, WCCO, WDTG,  
WDDI, WLB, WRHI  
Northfield, KFMX, WCAL  
St. Cloud, WFM  
St. Paul, KFOY, WMBE

## MISSISSIPPI

Columbus, WCOE  
Oxford, WCBH

## MISSOURI

Cape Girardeau, KFVS  
Cartersville, KFPW  
Columbia, KFVW  
Independence, KLDS  
Jeffersonville City, WOS  
Joplin, KGBW  
Kansas City, KMP, KWKC,  
WDAF, WBB, WLBF,  
WQO  
Kirksville, KFKZ  
St. Joseph, KGBX  
St. Louis, KFOA, KFIO,  
KFVE, KFVW, KSD,  
KMOX, KWEW, WIL,  
WMAX, WDBF

## MONTANA

Havre, KFBB  
Kalispell, KGEZ  
Missoula, KUOM  
Vida, KGCK

## NEBRASKA

Central City, KGES  
Clay Center, KMMJ  
Grand Island, KGEQ  
Hastings, KFKX  
Humboldt, KGDV  
Lincoln, KFAB, KFOR  
Norfolk, WJAG  
Oak, KFEQ  
Omaha, KFQX, KOCH,  
WAAW, WNAL, WOW,  
Shelby, KGBY  
University Place, WCAJ  
Wayne, KGCH  
York, KGBZ

## NEW HAMPSHIRE

Laconia, WKAN  
Manchester, WCOM  
Tilton, WBRL

## NEW JERSEY

Atlantic City, WHAR, WPG  
Camden, WCAM  
Cliffside, WPAP, WQAO  
Elizabeth, WJBS  
Hoboken, WJCA  
Jersey City, WJAT  
Lambertville, WPAZ  
Midland Park, KTRL, WTRI,  
Newark, WAAM, WDWV,  
WGCP, WJVM, WJNJ,  
WOR  
North Plainfield, WVEAM  
Paterson, WODA  
Red Bank, WBI  
Secaucus, WBBR  
Trenton, WOAX

## NEW MEXICO

Albuquerque, KFLL, KFVY  
State College, KOB

## NEW YORK

Auburn, WKBR, WMBO  
Bay Shore, WRST  
Bronx, WHPP  
Brooklyn, WARS, WBKN,  
WABC, WLBE, WMBQ,  
WTRC  
Buffalo, WEBR, WGR,  
WKBW, WKEN, WSVS  
Canastota, WLBU  
Canton, WCAD  
Cazenovia, WJAC

Endicott, WNBK  
Farmingdale, WLPH  
Farmington, WRBL  
Flushing, WIBI  
Freeport, WGBE  
Ithaca, WEAL, WLCI  
Jamaica, WMRJ  
Jamestown, WOCL  
Kingsport, WDBZ  
Lockport, WMAK  
Long Island City, WLBS  
Newburgh, WKBM  
New York, WBBC, WBMS,  
SYRBY, WBOQ, WCDL,  
WGLT, WJWM, WJAF,  
WJBT, WJBL, WJEL,  
WGBS, WGMU, WGL,  
WHAP, WHN, WJUG,  
WJY, WJZ, WKRQ,  
WMHA, WMSG, WNYC,  
WPCU, WPNY, WSDA,  
WRMU, WRBO  
Peekskill, WOKC  
Richmond Hill, WABC, WAOK  
Rochester, WABO, WTAM,  
WHEC, WNBQ, WOKT  
Shenectady, WGY  
Syracuse, WFLB, WSYR  
Troy, WHAZ  
Utica, WJRK  
Woodhaven, WSOM  
Woodside, WBMJ, WWRJL

## NORTH CAROLINA

Asheville, WYNC  
Charlotte, WBTB  
Greensboro, WNCN  
Haleight, WRCO

## NORTH DAKOTA

Aneta, KGFN  
Bismarck, KFVR  
Dennis Lake, KDLR  
Fargo, WDAY  
Grand Forks, KFJM  
Mandan, KGCU

## OHIO

Akron, WADC  
Ashland, WLBK  
Ashtabula, WJPW  
Bellefontaine, WHBD  
Canton, WHBC  
Cambridge, WEBE  
Cincinnati, WAAD, WFBE,  
WERC, WSAI  
Cleveland, WDBK, WEAR,  
WHK, WJAY, WLBJ,  
WTAM  
Columbus, WAIU, WCAH,  
WEO, WMAN  
Dayton, WSMK  
Harrison, WLW  
Hamilton, WMBK, WRK  
Mansfield, WLBY  
Middleton, WRSO  
Springfield, WCSO  
Stuebenville, WJBR  
Toledo, WABR, WTAL  
Toledo, WABW  
Yellow Springs, WRAV  
Youngstown, WKBN, WMBW

## OKLAHOMA

Alva, KGFH  
Bristow, KVOO  
Chickasaw, KOCW  
Norman, WNAO  
Oklahoma City, KFJE, KFJR,  
KGBR, KGFG, WKY  
Tulsa, WLAL

## OREGON

Astoria, KFJI  
Corvallis, KOAC  
Medford, KMED  
Portland, KEX, KFEK,  
KFIE, KFJR, KGW,  
KLIT, KROW, KTRB,  
KWBS, KXL, KFVW  
Sylvan, KOIN  
Eugene, KGEH

## PENNSYLVANIA

Allentown, WCBA, WSN  
Altoona, WBEA  
Bethays, WALK  
Danville, WKBY  
East Pittsburgh, KDKA, KQV  
Grove City, WSAJ  
Harrisburg, WABB, WBAK,  
WBBS, WPRC  
Jennette, WGM  
Johnstown, WJBP  
Kingstown, WAFB  
Lancaster, WGAL, WKJC  
Lewisburg, WJBU  
Monessen, WMBJ  
New Castle, WKBU  
Oil City, WHBA, WLWB  
Parkersburg, WGA  
Philadelphia, WABO, WABY,  
WCAE, WCAU, WFI,  
WFKD, WFBW, WIAD,  
WIBG, WIP, WJBA,  
WLIT, WNAT, WOO,  
WRAX, WFSW  
Pittsburgh, WQV, WCAE,  
WJAS, WMBU  
Reading, WRAW  
Scranton, WGBI, WQAN,  
State College, WPSC  
Wilkes-Barre, WRAX, WBRB  
Washington, WNBQ

## RHODE ISLAND

Cranston, WDWB  
Newport, WMBH  
Olneyville, WCOB  
Pawtucket, WFCI  
Providence, WCBR, WEAN,  
WJAR, WLSI, WRAH

## SOUTH CAROLINA

Charleston, WBBY

## SOUTH DAKOTA

Brookings, KFDY, KGCR  
Dell Rapids, KGDA  
Mitchell, KGFJ  
Oldham, KGDY  
Rapid City, WCAT  
Sioux Falls, KSOU  
Yankton, KSUD  
Zion, WNAX

## TENNESSEE

Chattanooga, WDDO  
Knoxville, WFBC, WNBK,  
WNOX  
Lawrenceburg, WOAN  
Memphis, WGBB, WHBQ,  
WIBM, WMC, WNBK  
Nashville, WFSW, WDAD,  
WFG, WSM  
Springfield, WSIX  
Tullahoma, WFTT  
White Haven, WREC

## TEXAS

Amarillo, KGRS, WDAQ  
Austin, KUT  
Beaumont, KFDM  
Beville, KFBE  
Brownsville, KWVG  
College Station, WTAW  
Dallas, KGDO, KRLL,  
WFAA, WRR  
Dublin, KFPL  
El Paso, KFVH, WDAH  
Forth Worth, KFJZ, KFQB,  
WBAP  
Galveston, KFUL  
Greenville, KFPM  
Houston, KFVJ, KFVJ,  
KPRC, KPUE  
San Angelo, KGEI  
San Antonio, KGCI, KGDR,  
KGR, KTAP, KTSB,  
WCAR, WOI  
San Benito, KFVW  
Texarkana, KFVW  
Waco, WJAD

## UTAH

Logan, KFVW  
Ogden, KFUR  
Salt Lake City, KDYL, KFOO,  
KFUT, KSL

## VERMONT

Burlington, WCAH  
Springfield, WQAE

## VIRGINIA

Arlington, NAA  
Norfolk, WBBW, WPAB,  
WESA, WTAZ  
Petersburg, WLBB  
Richmond, WBBB, WMBG,  
WVRA  
Roanoke, WDBJ

## WASHINGTON

Everett, KFBL  
Lacey, KGY  
Pullman, KWSC  
Seattle, KFOA, KFOV,  
KFON, KGFS, KGOL,  
KGDJ, KJR, KKP,  
KOMO, KPBE, KROX,  
KRSC, KTCL, KTW,  
KVOS, KKRO  
Spokane, KFIO, KRPY, KGA,  
KHQ  
Tacoma, KMO, KVI  
Walla, Wala, KOWW  
Yakima, KFIQ

## WEST VIRGINIA

Huntington, WSAZ  
Wheeling, WWSA

## WISCONSIN

Beloit, WEBW  
Camp Lake, WCLO  
Eau Claire, WTAQ  
Fond du Lac, KFIZ  
Kenosha, WKBR  
La Crosse, WKBB  
Madison, WHA, WIBA  
Manitowac, WQMT  
Marshfield, WGBR  
Milwaukee, WISN, WHAD,  
WISN, WJMJ  
Ontonagon, WJBN  
Poymette, WJBN  
Racine, WRRS  
Stevens Point, WLBI  
Superior, WFCB  
West De Pere, WHBY

## WYOMING

Laramie, KFBU

# No Matter What Set You Have ACME Apparatus will make it better

**T**HESSE are the days of quality reception and that's where Acme comes in, Acme for Amplification. During all these years of Radio Broadcasting, Acme has had this thought in mind, "After all how well you can hear is the thing that counts."

There's the Acme double free-edge cone speaker—thousands in use, thousands of satisfied listeners. It took five years and 320 experimental models to make this speaker.

There's the Acme B Power Supply with Raytheon tube, the first on the market. Three years of experience in making and selling these eliminators has earned the reputation of making the B Power Supply that stands up and works.

People tell us, "I have one of your

first eliminators and it's still going strong."

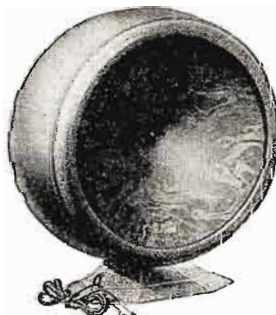
Acme now offers a single stage power amplifier to add to any set. All you have to do is connect your set, your B supply and your speaker to the amplifier, put in a power tube, plug into the lamp socket and your radio enjoyment will increase a hundred fold. No additional A battery current and no C battery to add, both of these supplies are included in the unit.

Acme has two booklets, (Amplification without Distortion) telling how to improve any radio set and (Power Supply for Radio Sets) telling the story of Lamp Socket operation.

Fill in the coupon below for the one you want.



ACME E-4 B-Supply  
\$35.00



ACME K-1 SPEAKER  
\$25.00



ACME PA-1 Power Amplifier  
\$12.50

# ACME

*for amplification*

ACME APPARATUS CO.  
Dept. RCB-1 Cambridge, Mass.

Gentlemen: Please send me a copy of the booklet checked below. I enclose 10 cents for each copy.

Amplification without distortion   
Power Supply for Radio Sets

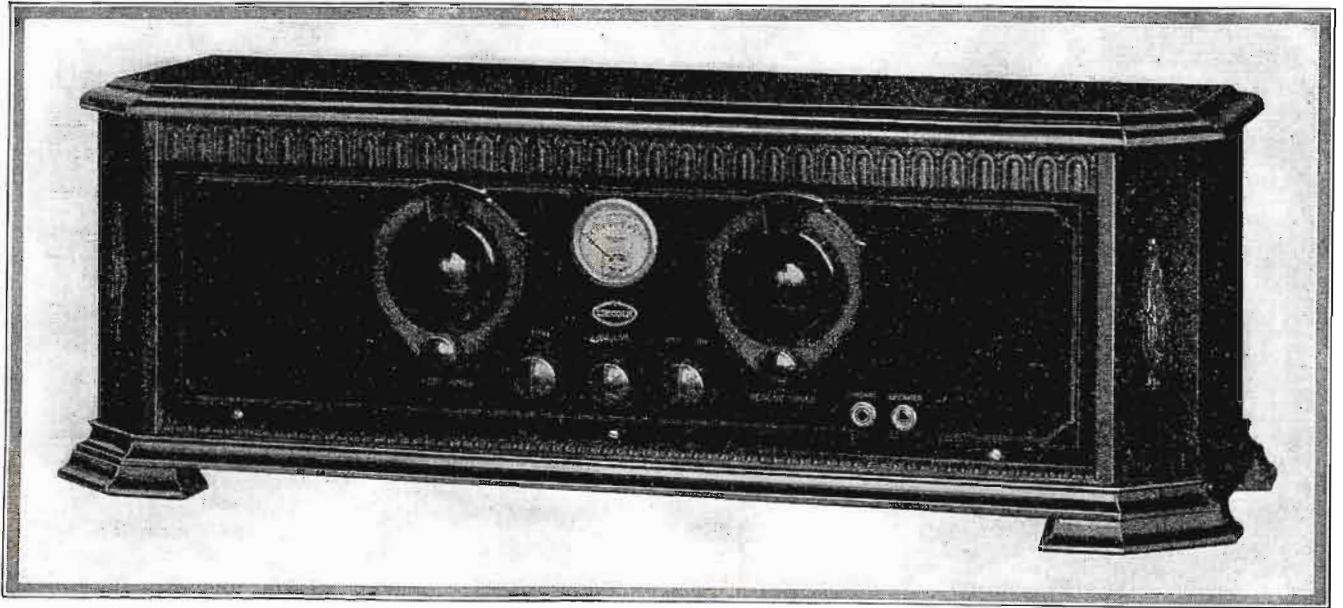
Name .....

Street .....

City ..... State .....

Copy No. 1

**This Is Different!**



**YEARS**  
*the transformer*



*Packed and sold ONLY in the Red-White-and-Blue boxes . . . a symbol of greatness and dependability you can rely on.*

**AHEAD OF ITS TIME—**  
*that's almost human in its amazing delivery*

Overnight LINCOLN transformer has won enviable words. Leaping the gap of time it has snatched radio reception *out of the future*, and brought it back where you can have and enjoy it *right now—TODAY*. Beyond question, in a field where surprises are ever-present, here is one of the most delightful. *And available to all.*

**Four Reasons Why LINCOLN Is Winning Superlatives**

In actual performance LINCOLN more than matches the good things we have said about it. It does its job unbelievably well. Even when you have said "wonderful!" you still feel the word does not do justice to the performance. *Could you be satisfied with less in your set?* Or do you want super selectivity that is super selectivity? And distance that puts local availability into far-off stations? And tone that brings in shading and overtones with exactness of reproduction? And the stability that *keeps* what you want when you want it?

Not on just one—but on *all* of these essential features, LINCOLN is master of the air. Until you actually hear it in operation, you cannot imagine how much difference such a simple thing as a transformer *can make*.

*Send at once for LINCOLN literature. No obligation*

DEALERS AND JOBBERS: LINCOLN offers an unusually attractive proposition. Write for discounts.



**—a remarkable loop**

The ONLY loop with a continuous, unbroken circuit of sixty strands of No. 38 and five strands of No. 36 low resistance wire from grid to filament TAPPED exactly at electrical center. *Small* in size, but a *giant* in performance because of its advanced scientific construction. Surprisingly low priced. Dealers are being stocked as fast as possible—if yours hasn't ZIG ZAG yet; ask him to get it for you.



**BEST LINCOLN RADIO**

**30 EUCLID ARCADE, CLEVELAND, O.**

*Tell 'Em You Saw It in the Citizens Radio Call Book*





**FACTORY PRICES—SAVE 50%**  
Choice of beautiful cabinets offered

3  
Year  
Guarantee

**TRY IT 30  
DAYS FREE**

**BEFORE YOU BUY**

**ALL  
METAL  
SHIELDED  
CHASSIS**

**8 tube ~ one dial  
MIRACO**  
TRADE MARK REGISTERED

Only  
**69<sup>75</sup>**  
Retail List  
Completely  
Assembled

**MAGNIFICENT TONE~SUPER SELECTIVE~POWERFUL DISTANCE GETTER**

**All Electric or Battery Set!**

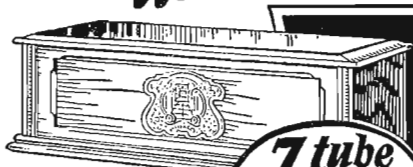
**Big Discounts to  
User-Agents**

America's big, old, reliable Radio Corporation\* (8th successful year) *guarantees* its big, powerful, latest 6, 7 and 8 tube Miraco sets to give "the finest, most enjoyable performance obtainable in *high grade* radios." Unless 30 days' use in your home fully satisfies you and everybody who hears it that a Miraco is unbeatable at any price for beautiful, clear cathedral tone, razor-edge selectivity, powerful distance reception, easy operation, etc.—*don't buy it! Your verdict final!*—absolutely no strings to this. Save or make lots of money on sets and equipment by writing for testimony of nearby users and *Amazing Special Factory Offer*.

choice. Many thousands of Miraco users—who bought after thorough comparisons—testify they enjoy programs Coast to Coast, Canada to Mexico, loud and clear—with the magnificent cathedral tone quality of costliest sets. Don't confuse Miraco's with cheap, "squawky" radios. Miraco's have finest parts, latest approved shielding, metal chassis, etc.—as used in \$200 sets.

**Deal Direct with Big Reliable Makers**

Your Miraco reaches you completely assembled, rigidly tested, fully guaranteed. Easy to connect and operate. *30 days free trial*. 3 year guarantee if you buy. Choice of beautiful consoles [with latest built-in orthophonic type speakers having 8 feet of tone travel] and table cabinets, also offered. You take no risk, you insure satisfaction, you enjoy *rock-bottom money-saving prices* by dealing direct with one of radio's oldest, most successful builders of fine sets.



MIRACO "Powerplus" sets—both in 8 and 7 tube models—have magnificently beautiful, clear cathedral tone quality. Turn one dial for stations everywhere. Ultra-selective. Miraco multi-stage distance amplification gives "power-plus" on far-off stations. Latest all-metal shielded chassis. Illuminated dial. Fully guaranteed. *Try one free for 30 days!* Choice of beautiful cabinets.

**7 tube  
one dial  
METAL SHIELDED  
CHASSIS  
\$49<sup>75</sup>  
RETAIL LIST**

**Run from Light Socket or Batteries**

Miraco's work equally fine on electric house *Dealers Write!* current or with batteries. Take your

USER-AGENTS! *Make big profits showing your Miraco set to friends*  
\*MIDWEST RADIO CORPORATION, Cincinnati, O.

**BEAUTIFULLY ILLUSTRATED  
CATALOG AND AMAZING  
SPECIAL OFFER**

**SEND NO MONEY.—30 DAYS' TRIAL  
Special Wholesale Price Offer to User-Agents,  
Bank References and testimony of nearby  
Miraco users—sent with catalog.**

**Electrify Any Radio  
with  
MIDWEST NO-BATTERY  
"AC" Light Socket  
Power Units**

"A", "B" and "C" power, direct from light socket, without batteries! Write for Midwest prices and discounts. Midwest Units are highest grade—lastingly dependable, quiet in operation, fully guaranteed.

**THIS COUPON  
IS NOT  
AN ORDER**

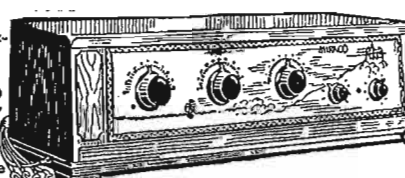


**Free!**

Famous powerful big Miraco Super 6, 1928 model—ultra selective. Thousands find it outperforms and outdistances sets of much higher price.  
Fully Guaranteed.

**6 tube  
Super  
\$36<sup>75</sup>  
RETAIL LIST**

Amazing value as 30 Days' Trial Will Prove



Mail Coupon  
Right  
Now

MIDWEST RADIO CORPORATION  
Pioneer Builders of Sets  
531-A Miraco Building, Cincinnati, Ohio.

Without obligation, send free catalog, AMAZING SPECIAL OFFER, testimony of nearby Miraco users.

NAME

ADDRESS

# Foreign Radio Broadcasting Stations

|  | Call | Wave     | Power |   | Call | Wave  | Power |
|--|------|----------|-------|---|------|-------|-------|
| <b>ALASKA</b>  |      |          |       | <b>New Brunswick</b>  |      |       |       |
| Anchorage: Chorin Supply Co.   | KFQD | 227.1    | 100   | Moncton: Canadian National Railways                                 | CNRA | 322.4 | 500   |
| Juneau: Alaska Electric Light & Power Co.  | KFIU | 225.4    | 10    | <b>Quebec</b>   |      |       |       |
| <b>ALGERIA</b>   |      |          |       | Montreal: Northern Electric Co., Ltd.                               | CHYC | 410.7 | 750   |
| Algiers: Colin & Fils  | SDB  | 310      | 100   | E. Fontaine   | CHRC | 341   | 5     |
| <b>ARGENTINA</b>   |      |          |       | La Presse Publishing Co.  | CKAC | 410.7 | 1200  |
| Buenos Aires: No data. Received at Pernambuco and Valparaiso   | LOO  | 250      | 1000  | Canadian Marconi Co.  | CFCF | 410.7 | 1650  |
| Argentine Association of Broadcasters  | LOR  | 400      | 500   | Canadian National Railways. Uses equipment of other local stations. | CNRM |       |       |
| No data  | LOT  | 272.7    | 1000  | Quebec  | CHRC | 340.7 | 5     |
| Francisco J. Brusa   | LOV  | 352      | 1000  |   | CKCV | 340.7 | 50    |
| Grand Splendid Theatre   | LOW  | 325      | 1000  |   | CKSH | 312.3 | 50    |
| Radio Cultura Magazine   | LOX  | 375      | 500   | <b>Ontario</b>  |      |       |       |
| Radio Nacional   | LOY  | 315      | 100   | Hamilton  | CHCS | 340.7 | 10    |
| University of La Plata   |      | 425      | 1000  | Jack V. Elliott, Ltd.   | CFUJ | 340.7 | 500   |
| <b>AUSTRALIA</b>   |      |          |       | Wentworth Radio Supply Co.  | CFGC | 340.7 | 50    |
| <b>New South Wales</b>   |      |          |       | Brantford: Brant Radio Supply Co., Ltd.                             | CFGC | 297   | 50    |
| Bathurst: Mockler Bros.  | 2MK  | 275      | 250   | Burketon Junction   | CKCV | 329.5 | 5000  |
| New Castle: H. A. Douglas  | 2HD  | 288      | 100   | Cobait  | CKMC | 247.8 | 5     |
| Sydney: Burgin Electric Co.  | 2BE  | 316      | 100   | Huntsville: A. Staples  | CHCO | 247.8 | 5     |
| Broadcasters, Ltd.   | 2BL  | 353      | 5000  | Iroquois Falls: Abitibi Power & Paper Co.                           | CFCH | 499.7 | 250   |
| Farmers Broadcasting Co., Ltd.   | 2FC  | 442      | 5000  | King: York Co.  | CJCO | 291.1 | 1000  |
| Otto Sandel  | 2UV  | 267      | 500   | Kingston: Monarch Battery Co.                                       | CFMC | 267.7 | 500   |
| Theosophical Broadcasting Service  | 2GB  | 316      | 500   | Queens University   | CFRC | 267.7 | 500   |
| Trades Hall Broadcasting Station   | 2KY  | 280      | 1500  | Kitchener: O. Kumpel  | CFRC | 247.8 | 25    |
| Electrical Utilities Supply Co.  | 2UE  | 293      | 50    | London: London Free Press Printing Co., Ltd.                        | CJGC | 329   | 500   |
| Sydney   | 2WA  | 462      | 100   | Ottawa: J. R. Booth, Jr.  | CHNC | 434.5 | 250   |
| Wagga: Otto Sandel   | 2UX  | 200      | 500   | Canadian National Railways  | CNRO | 434.5 | 500   |
| <b>Victoria</b>  |      |          |       | Dr. G. M. Geldert. (For Ottawa Radio Assn.)                         | CKCO | 434   | 100   |
| Brighton: Projected. No data   | 3BP  |          |       | Prescott: Radio Association of Prescott                             | CFCL | 296   | 50    |
| Melbourne: Associated Radio Co. of A. Pty. Ltd.  | 3AR  | 484      | 320   | Preston: Wallace Russ.  | CKPC | 247   | 7 1/2 |
| Broadcasting Co. of Australia Pty. Ltd.  | 3LO  | 371      | 5000  | Scarboro Station: Universal Radio Co. of Canada                     | CJYC | 291.1 | 500   |
| Druleigh Business & Tech. College  | 3DB  | 255      | 500   | Toronto: Star Publishing & Printing Co.                             | CFCA | 358.9 | 500   |
| O. J. Nilson & Co.   | 3UZ  | 319      | 100   | Toronto Radio Research Society                                      | CHNC | 358.9 | 500   |
| L. J. Hellier, Wangaratta Sports Depot   | 3WR  | 303      | 20    | E. Eaton Co.  | CJCD | 358.9 | 50    |
| Mildura: R. J. Egge  | 3EO  | 286      | 20    | Dominion Battery Co., Ltd.  | CKGL | 358.9 | 500   |
| <b>Queensland</b>  |      |          |       | Canadian Broadcasting Corp. Projected                               | CKNG | 329.5 | 5000  |
| Brisbane: Dr. V. McDowell  | 4CM  | 278      | 50    | Toronto   | CJCI | 291.1 |       |
| Radio Manufacturers Ltd.   | 4MB  | 337      | 50    | Northern Electric Co. Uses equipment of other local stations        | CHIC | 856.9 | 500   |
| Queensland Government  | 4QG  | 385      | 5000  | Jarvis Street Baptist Church. Uses equipment of other stations      | CJBC |       |       |
| Fockhampton: Ditto   | 4RN  | 323      | 100   | Evening Telegram. Uses equipment of local stations                  | CJCS |       |       |
| Toowoomba: Gold Radio Elec. Service  | 4GR  | 294      | 100   | Canadian National Railways. Uses equipment of other local stations  | CNRT |       |       |
| <b>South Australia</b>   |      |          |       | Thorobold: D. J. Fendell. Suspended                                 |      | 247.8 | 75    |
| Adelaide: Central Broadcasting Co.   | 5CL  | 395      | 5000  | <b>Manitoba</b>   |      |       |       |
| E. J. Hume. Operated by 5DN Pty. Ltd.  | 5DN  | 313      | 120   | Winnipeg: Manitoba Telephone System                                 | CKY  | 884.4 | 500   |
| Millswood Auto & Radio Co.   | 5MA  | 273      | 500   | Canadian National Railways. Uses equipment of                       | CNRY |       |       |
| Marshall & Co.   | 5MC  | 250      | 1000  | CKY   |      |       |       |
| Sport Radio Broadcasting Station   | 5KA  |          |       | <b>Saskatchewan</b>   |      |       |       |
| <b>Western Australia</b>   |      |          |       | Moose Jaw   | CJRM | 296.9 | 50    |
| Perth: Westralian Farmers, Ltd.  | 6WF  | 1250     | 1000  | Regina: R. H. Williams & Sons, Ltd.                                 | CHWC | 812.3 | 15    |
| <b>Tasmania</b>  |      |          |       | Leader Publishing Co., Ltd.   | CKCK | 812.3 | 500   |
| Hobart: Tasmanian Broadcasters, Ltd.   | 7ZL  | 635      | 3000  | Canadian National Railways. Uses Station                            | CKCK |       |       |
| <b>AUSTRIA</b>   |      |          |       | equipment   | CNRR | 207   |       |
| Vienna: Oesterreichischer Radioverkehr A. G. broadcasts three 2-hour programs daily, including music (opera and popular), weather and market reports and news. Reception reported at Antwerp, تهران, Smyrna, Tunis | ORV  | 577      | 1500  | Saskatoon: The Electric Shop  | CEQC | 329.5 | 500   |
| Oesterreichischer Radioverkehr A. G. Testing; to replace above station in the near future  | ORV  | 577      | 5000  | International Bible Students' Association                           | CHUC | 329.5 | 500   |
| Graz: Oesterreichischer Radioverkehr A. G.   |      | 365.8    | 500   | Wheaton Electric Co.  | CJWC | 329.5 | 250   |
| Innsbruck  |      | 294.1    | 750   | Canadian National Railways. Uses equipment of other local stations  | CNRS |       |       |
| Klagenfurt: Relays Vienna  |      | 272.7    | 750   | Unity: Horace N. Stovin   | CFQC | 329.5 | 500   |
| Linz: (Projected)  |      | 254.2    | 5000  | CHSC  |      | 358.9 | 250   |
| Rosenhugel   |      | 317.2    | 5000  | <b>Alberta</b>  |      |       |       |
| <b>BELGIUM</b>   |      |          |       | Calgary: W. W. Grant Radio, Ltd.                                    | CFCN | 434.5 | 1800  |
| Antwerp: (General, 2 hours daily)  |      | 265.5    | 100   | Calgary Herald  | CFAC | 434.5 | 500   |
| Brussels: Radio Belgique   | SBR  | 508.5    | 1500  | Canadian National Railways. Uses equipment of other local stations  | CNRO |       |       |
| Liege: Radio Wallonie Station  |      | 205      | 100   | <b>Edmonton</b>   |      |       |       |
| Radio Central Station  |      | 294.1    | 100   | Edmonton: International Bible Students' Assn.                       | CHCY | 516.9 | 250   |
| <b>BOLIVIA</b>   |      |          |       | Radio Supply Co., Ltd.  | CFPC | 516.9 | 50    |
| La Paz: (Irregular)  |      | 175, 300 | 50    | Edmonton Journal  | CJCA | 516.9 | 500   |
| <b>BRAZIL</b>  |      |          |       | Canadian National Railways. Uses equipment of other local stations  | CNRE |       |       |
| Bahia: Radio Sociedade do Bahia  |      | 465      | 50    | Lethbridge: J. E. Palmer  | CJOC | 267.7 | 50    |
| Bello Horizonte: National Telegraph Service  |      | 400      | 500   | <b>British Columbia</b>   |      |       |       |
| Fortaleza: Radio Club  |      | 30       | 30    | Burnaby: International Bible Students' Assn.                        | CFVC | 410.7 | 500   |
| Para   |      | 80       | 80    | Kamloops: N. S. Dagleish & Sons and Weller & Weller                 | CFJC | 267.7 | 15    |
| Pernambuco: Radio Club. One hour daily and two hours three days each week  |      | 310      | 300   | New Westminster: Westminster Trust Co.                              | CFXC | 291.1 | 20    |
| Porto Alegre: Radio Society. Broadcasts one hour daily. To be replaced by 50-watt station  |      | 380      | 80    | Sea Island  | CJOR | 291.1 | 50    |
| Rio de Janeiro: Radio Society. Daily programs by local artists   |      | 400      | 1000  | Vancouver: A. Holmstead & William Hanlon                            | CFDC | 410.7 | 15    |
| National Telegraph Service. Praia Vermelha Station. Operated by Radio Club. Daily news and concerts  |      | 312      | 500   | Radio Corporation of Vancouver                                      | CFYC | 410.7 | 10    |
| Rio de Janeiro: No data. Phonograph records broadcast 2 to 4 pm daily, concerts from 7 to 9 pm three or four days each week  |      |          | 10    | Daily Province  | CKCD | 410.7 | 1000  |
| Santos: No data  |      |          | 10    | First Congregational Church   | CWFC | 410.7 | 50    |
| Sao Paulo: Dias Carneiro & Co., operated by the Radio Club of Sao Paulo  |      | 380, 420 | 100   | Canadian National Railways  | CNRV | 291.1 | 500   |
| Radio Club of Sao Paulo broadcasts Hotel Terminus orchestra and phonograph records daily   |      | 350      | 10    | Sprott-Shaw Radio Co. Suspended                                     | CFCC | 410.7 | 20    |
| <b>CANADA</b>  |      |          |       | Pyramid Temple Society. Uses equipment of other local stations      | CUKC |       |       |
| <b>Nova Scotia</b>   |      |          |       | <b>CANARY ISLANDS</b>   |      |       |       |
| Halifax: (Carlton Hotel station, Northern Electric Co., Ltd.)  | CHNS | 322.4    | 100   | Ia Laguna: Servando Ortoll Delmotte                                 | EAJ5 | 280   | 50    |
| <b>Prince Edward Island</b>  |      |          |       | Las Palmas: Canary Islands Radio Club                               |      | 300   | 6     |
| Charlottetown: General during winter   | CFCY | 312.3    | 50    | Club Radio Canarias   |      | 300   | 6     |
| Summerside: R. T. Holman, Ltd.   | CHLC | 267.7    | 25    | Teneriffe: Servando Ortoll Delmotte                                 | EAR6 | 280   | 50    |
| <b>CHINA</b>   |      |          |       | <b>CEYLON</b>   |      |       |       |
| Shanghai: Kellogg Switchboard & Supply Co. Operates four hours daily between 9:45 am and 11 pm   |      | 365      | 100   | Colombo   |      | 800   | 1500  |
| (Note: Stations have been reported in other Chinese cities, but the present operation is very doubtful. The above station is the only one mentioned in more recent reports.)                                       |      |          |       | <b>CHILE</b>  |      |       |       |

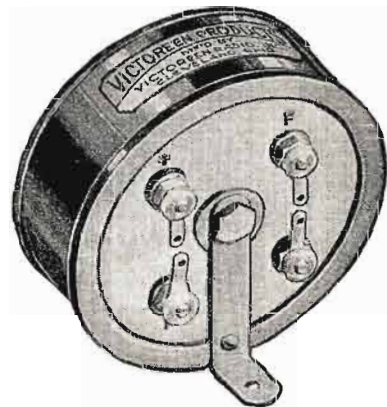
|   | Call   | Wave   | Power | Call  | Wave    | Power         |
|---|--------|--------|-------|---|---------|---------------|
| <b>CHOSEN</b>   |        |        |       |   |         |               |
| Seoul: Under construction.....                                | JODK   | .....  | ..... | Königswusterhausen .....                                      | AFP     | 4000 10,000   |
| <b>COSTA RICA</b>   |        |        |       |   |         |               |
| San Jose: Government. Under construction.....                 | .....  | .....  | ..... | Witzleben .....   | 433.9   | 4000          |
| <b>CUBA</b>   |        |        |       |   |         |               |
| Central Elia: Elia Sugar Co.....                              | 300    | 500    | ..... | Wolfs Bureau .....  | 252.5   | 5000          |
| Salvador Rionda.....  | 7SR    | 350    | 500   | Freiburg .....  | 577     | 1000          |
| Cienfuegos: Jose Gauduche.....                                | 6BY    | 260    | 200   | Bremen: Nordische Rundfunk A. G. Relays Hamburg .....         | 400     | 1500          |
| Habana: Cuban Telephone Co.....                               | PWX    | 400    | 500   | Breslau: Schilesische Funkstunde. Received at Rome.....       | 315.8   | 5000          |
| Bernardo Barrie.....  | 2BB    | 250    | 15    | Cassel .....  | 272.7   | 750           |
| Frederick W. Borton.....                                      | 2BY    | 260    | 100   | Dortmund: Mitteldeutscher Rundfunk A. G. Relays .....         | 283     | 750           |
| El Pais.....  | 2EP    | 353    | 400   | Leipzig programs .....  | 294.1   | 750           |
| Credito y Construction Co.....                                | 2HP    | 293    | 100   | Dresden: Mitteldeutscher Rundfunk A. G. Relays Leip- .....    | 468.8   | 750           |
| Jose Lara.....  | 2LR    | 235    | 50    | Elberfeld .....   | 428.6   | 4000          |
| Manuel y Guillermo Salas.....                                 | 2MG    | 284    | 20    | Frankfurt-on-the-Main: Sudwestdeutscher Rundfunkdienst.....   | 577     | .....         |
| Mario Garcia Velez.....                                       | 2OK    | 366    | 100   | Freiburg i. Br.....   | .....   | .....         |
| Columbia Radio & Cycle Co.....                                | 2OL    | 225    | 100   | Hanover: Nordischer Rundfunk A. G. Relays Hamburg .....       | 250     | 750           |
| Raoul Karman.....   | 2RK    | 315    | 20    | Gleitwitz: Relays Breslau.....                                | 428.6   | 10,000        |
| Roberto E. Ramierz.....                                       | 2TW    | 270    | 20    | Hamburg: Nordischer Rundfunk A. G. .....                      | .....   | .....         |
| Benito Vieta Ferro.....                                       | 2UF    | 265    | 10    | Hanover: Nordischer Rundfunk A. G. Relays Hamburg .....       | 297     | 750           |
| Santiago: Alberto Ravelo.....                                 | 8BY    | 250    | 100   | Kassel: Sudwestdeutscher Rundfunkdienst.....                  | 272.7   | 750           |
| Tuinacu: Frank H. Jones.....                                  | 6JK    | 272    | 100   | Kiel: Relays Hamburg.....                                     | 254.2   | 750           |
| Frank H. Jones.....   | 6KW    | 340    | 100   | Königsberg: Ostmarken Rundfunk A. G. .....                    | 329.1   | 4000          |
| <b>CZECHOSLOVAKIA</b>   |        |        |       |   |         |               |
| Bratislava: Tues. Fri.....                                    | OKR    | 300    | 500   | Langenberg: Rhineland .....                                   | 468.8   | 5000          |
| Brunn: Radio Journal.....                                     | OKB    | 441.2  | 2300  | Leipzig: Mitteldeutscher Rundfunk A. G. .....                 | 365.8   | 4000          |
| Koszice.....  | OKP    | 300    | 2000  | Muenster: Same .....  | 241.9   | 1500          |
| Prague: Kbely.....  | OKP    | 1110   | 1000  | Munich: Deutsche Stunde in Bayern.....                        | 535.7   | 1500          |
| Radio Journal.....  | .....  | 348.9  | 5000  | Norddeich .....   | 485     | 300           |
| <b>DANZIG</b>   |        |        |       |   |         |               |
| Danzig: Relays Koenigsburg.....                               | .....  | 272.7  | 1500  | Nuremberg: Relays Berlin .....                                | 303     | 750           |
| <b>DENMARK</b>  |        |        |       |   |         |               |
| Copenhagen: Radioaadet.....                                   | 337    | 2000   | ..... | Stettin: Relays Berlin.....                                   | 252.1   | 500           |
| Hjørring: Relay station. Government.....                      | 1225   | 250    | ..... | Stuttgart .....   | 879.7   | 4000          |
| Kallundborg (projected).....                                  | 1150   | 7500   | ..... | <b>GREAT BRITAIN</b>  |         |               |
| Lyngby: Relay station. Government.....                        | 2400   | .....  | ..... | Aberdeen .....  | 2BD     | 500 1500      |
| Odense: Relay station. Government.....                        | 810    | 1000   | ..... | Bradford .....  | 2LS     | 252.1 250     |
| Ryvang: Relay station. Government.....                        | 1153.8 | 1500   | ..... | Birmingham: Received at Antwerp, Brussels, Rome.....          | 5IT     | 326.1 1500    |
| Soro: Ministry of War News and weather.....                   | 1110   | 1000   | ..... | Bournemouth: Received at Antwerp, Tenerife, Jeru- .....       | .....   | .....         |
| Viborg .....  | 214.3  | 750    | ..... | Cardiff: Received at Antwerp and Rome.....                    | 5WA     | 491.8 1500    |
| <b>EGYPT</b>  |        |        |       |   |         |               |
| Cairo .....   | SRE    | 255    | ..... | Chelmsford .....  | 2BR     | 353 1500      |
| <b>ESTONIA</b>  |        |        |       |   |         |               |
| Tallinn .....   | .....  | 285.7  | ..... | Daventry: Received throughout Europe, northern Af- .....      | .....   | .....         |
| <b>FINLAND</b>  |        |        |       |   |         |               |
| Bjorenborg: Nuoren Voiman Liiton Radioyhdists. Daily, .....   | 311    | 200    | ..... | Leeds-Bradford .....  | 2LS     | 1604.3 25,000 |
| Hango: Same.....  | 260    | 200    | ..... | Liverpool .....   | 6LV     | 297 2000      |
| Helsingfors: Civil Guard.....                                 | 500    | 500    | ..... | London: Received at Tenerife, Strasbourg, Brussels, .....     | .....   | .....         |
| Mon. Wed. Fri. General.....                                   | 375    | 2000   | ..... | Rome, Barcelona, Tunis.....                                   | 2LO     | 381.4 3000    |
| Helsinki: Same as Helsingfors.....                            | 275.2  | 200    | ..... | Manchester: Received at Rome.....                             | 2ZY     | 384.6 1500    |
| Jakobstad: Irregular.....                                     | 297    | 250    | ..... | New Castle: Received at Brussels, Rome.....                   | 5NO     | 312.5 1500    |
| Jyväskylä: N. V. L. Radioyhdists. Irregular.....              | 318    | 180    | ..... | Nottingham .....  | 5NG     | 275.2 250     |
| Laitis: Three programs weekly.....                            | 566    | 250    | ..... | Plymouth .....  | 5PY     | 400           |
| Mikkeli: N. V. L. R.....                                      | 238    | 100    | ..... | Polldu .....  | 2PT     | .....         |
| Oulu .....  | 254.2  | 250    | ..... | Sheffield .....   | 6FL     | 272.7 250     |
| Pietarsaari: Same as Jakobstad.....                           | 561    | 500    | ..... | Stoke on Trent.....   | 6ST     | 294.1 250     |
| Pori .....  | 400    | .....  | ..... | Swansea .....   | 5SX     | 294.1 250     |
| Tampere: Same as Tammerfors.....                              | 250    | 250    | ..... | <b>HAWAII</b>   |         |               |
| St. Michael: N. V. L. R.....                                  | 400    | .....  | ..... | Honolulu: Marion A. Mulrony.....                              | KGU     | 270 500       |
| Tammerfors: Relays Hfors.....                                 | 250    | 250    | ..... | <b>HAITI</b>  |         |               |
| Ulenborg: Relays Hfors.....                                   | 250    | 250    | ..... | Port au Prince.....   | HRK     | 361.2 1080    |
| <b>FRANCE</b>   |        |        |       |   |         |               |
| Agen: Department of Lot et Garonne.....                       | 2BD    | 297    | 250   | <b>HUNGARY</b>  |         |               |
| Angers: Radio Anjou.....                                      | 275.2  | 500    | ..... | Budapest: Meuzgetemi Radio Magyar Tavarlati Iroda. .....      | .....   | .....         |
| Bezier .....  | 200    | 100    | ..... | Broadcasts market reports and news.....                       | MTL     | 555.6 3000    |
| Blarritz: Cote d'argent.....                                  | 238.1  | 500    | ..... | <b>ICELAND</b>  |         |               |
| Bordeaux: Ministry of Posts, Telephones and Telegraphs.....   | 419.5  | 2000   | ..... | Reykjavik .....   | 333.3   | 700           |
| Lafayette .....   | 277.8  | 1500   | ..... | <b>INDIA</b>  |         |               |
| Caen: Radio Club.....   | 207.5  | 1000   | ..... | Bombay: Bombay Presidency Radio Club.....                     | 2FV     | 387 100       |
| Dijon .....   | 588.2  | 1500   | ..... | Walker Rogers & Co.....                                       | 2AX     | 320           |
| Greenoble: Ministry of Posts, Telegraphs and Telephones.....  | 230    | 500    | ..... | Calcutta: Radio Club of Bengal.....                           | 2BZ     | 800 500       |
| Juan Les Pines.....   | 1800   | 500    | ..... | Owner not reported.....                                       | 5AF     | 425 1500      |
| Issy-les-Moulineaux: Ministry of War.....                     | 287    | 500    | ..... | Karachi: Karachi Radio Club.....                              | .....   | 425 40        |
| Lille .....   | 330    | 500    | ..... | Madras: Crampton .....  | 220     | 120           |
| Limoges .....   | 291.3  | 500    | ..... | Rangoon: Radio Club of Burma and Wireless Club of .....       | .....   | .....         |
| Lyon .....  | 291.3  | 1500   | ..... | Burma. Broadcasts musical programs every Sun- .....           | 2HZ     | 350 40        |
| Dubanchet & Trolliet, Station Radio Lyon.....                 | .....  | .....  | ..... | <b>IRELAND—NORTH</b>  |         |               |
| Ministry of Posts, Telegraphs and Telephones. Station .....   | 478.1  | 1000   | ..... | Belfast .....   | 2BE     | 306.1 1500    |
| La Doua, named for suburb in which located.....               | 309    | 500    | ..... | <b>IRISH FREE STATE</b>                                       |         |               |
| Marseille: Ministry of Posts, Telegraph and Telephones.....   | 400    | 500    | ..... | Cork .....  | 6CK     | 400 1500      |
| Mont de Marsen.....   | 252.1  | 1000   | ..... | Dublin: Government .....                                      | 2KN     | 319.1 1500    |
| Montpellier: Radio Montpellier station.....                   | 362    | 1000   | ..... | <b>ITALY</b>  |         |               |
| Nice .....  | 2850   | 5000   | ..... | Genoa (projected) .....                                       | .....   | 272.7 1500    |
| Paris: Eiffel Tower station. Ministry of Posts, Tele- .....   | 333    | 500    | ..... | Milan .....   | 1MI     | 322.6 1500    |
| graphs and Telephones.....                                    | 350    | 250    | ..... | Unione Radiofonica Italiana.....                              | 1RC     | 320 1500      |
| Journal Petit Parisien.....                                   | 340.9  | 500    | ..... | Naples: Unione Radiofonica Italiana.....                      | 1NA     | 333.3 1500    |
| Lucien Levy.....  | 1780   | 100    | ..... | Rome: Unione Radiofonica Italiana. Broadcasts conc- .....     | .....   | .....         |
| Petit Parisien. Reception reported at Rome Societe .....      | .....  | .....  | ..... | erts and news, 8:30 to 11 o'clock pm daily. Re- .....         | .....   | .....         |
| Francaise Radioelectrique.....                                | 1750   | 4000   | ..... | ceptions reported at Antwerp, Jerusalem, Lille, .....         | .....   | .....         |
| Societe Francaise de Radioelectrique.....                     | 447.8  | 5000   | ..... | Smyrna, Damascus, Barcelona, Tunis and Alex- .....            | .....   | .....         |
| Cie. Francaise de Radiophonie. Reception reported at .....    | 1750   | 5000   | ..... | andria. This is at present the station best .....             | .....   | .....         |
| Teneriffe, Jerusalem, Brussels, Rome, Teheran, .....          | 1750   | 4000   | ..... | received throughout the Levant.....                           | .....   | .....         |
| Smyrna, Barcelona .....                                       | 1750   | 4000   | ..... | Palero (projected) .....                                      | 1CP     | 500 2000      |
| Superior School of Ministry of Posts, Telegraphs and .....    | 447.8  | 5000   | ..... | Venice (projected) .....                                      | .....   | 254.2 1500    |
| Telephones. Reception reported at Rome.....                   | 1750   | 5000   | ..... | <b>JAVA</b>   |         |               |
| Paris: Radio Paris.....                                       | 1750   | 3000   | ..... | Bandoeng: Vereeniging van Radio Amateurs voor .....           | .....   | .....         |
| Ecole Supérieure.....   | 164    | 500    | ..... | Bandoeng en Omstreken.....                                    | No call | 310 30        |
| Pic du Midi.....  | 350    | .....  | ..... | Batavia: Batavische Radio Vereeniging.....                    | JFC     | 220 40        |
| St. Etienne: Radio Club Forezien.....                         | 220    | 50     | ..... | Soerabaja: Two concerts weekly.....                           | .....   | 90, 140       |
| Strasbourg: Military station.....                             | 200    | 15,000 | ..... | <b>JAPAN</b>  |         |               |
| Radio Club .....  | 222.2  | 1500   | ..... | Nagoya: Nagoya Radio Broadcasting Co. Broadcasts .....        | .....   | .....         |
| Toulouse: Radio du Midi.....                                  | 389.6  | 2000   | ..... | daily 9 am to 9 pm; Sundays and holidays, 12 .....            | .....   | .....         |
| Ministry of Posts, Telegraphs and Telephones. Aero- .....     | 260    | 5000   | ..... | and market reports, etc.....                                  | JOCK    | 360 1500      |
| drome station .....   | 308    | 1000   | ..... | Osaka: Onaka Radio Broadcasting Co. Programs in .....         | .....   | .....         |
| Radio Vitus.....  | 178    | 500    | ..... | English and Japanese. 1500-watt station pro- .....            | .....   | .....         |
| Reziens .....   | 178    | 500    | ..... | Osaka Broadcasting station (Proj.).....                       | JIBK    | 385 1000      |
| <b>GERMANY</b>  |        |        |       |   |         |               |
| Berlin: Postal Authorities. Königswusterhausen Station. ..... | 1300   | 12,000 | ..... | Tokyo: Tokyo Radio Broadcasting Co. Programs in .....         | .....   | .....         |
| Relays Vox Haus programs. Reception reported at .....         | 507    | 2250   | ..... | English and Japanese. 155-watt.....                           | JOAK    | 375 200       |
| Rome, Constantinople, Bergen, Algiers.....                    | 568    | 2000   | ..... | <b>GERMANY</b>  |         |               |
| Postal Authorities. Vox Haus station.....                     | 568    | 2000   | ..... | Berlin: Postal Authorities. Königswusterhausen Station. ..... | .....   | .....         |
| Magleburger Platz .....                                       | 1300   | 1600   | ..... | Relays Vox Haus programs. Reception reported at .....         | .....   | .....         |
| Königswusterhausen Station .....                              | 1300   | 1600   | ..... | Rome, Constantinople, Bergen, Algiers.....                    | .....   | .....         |

|   | Call      | Wave     | Power  |   | Call    | Wave  | Power  |
|---|-----------|----------|--------|---|---------|-------|--------|
| <b>JUGOSLAVIA</b>   |           |          |        | <b>SPAIN</b>  |         |       |        |
| Agram (Zagreb)  | .....     | 310      | 1000   | Barcelona: Radio Barcelona Station  | EAJ1    | 344.8 | 1500   |
| Belgrade  | .....HFF  | 225.6    | 2000   | Associated Nacional Radiodifusion   | .....   | ..... | .....  |
| <b>KWANTUNG</b>   |           |          |        | Barcelona: Radio Catalana   | EAJ13   | 462   | 1000   |
| Dairen: Government Bureau of Communications em-<br>ploys a commercial station. Daily programs broad-<br>cast, consisting of music, educational and enter-<br>tainment numbers | .....     | 390      | 200    | Bilbao: Radio Carlton Station. Radio Club Vizcaya   | EAJ9    | 436   | 1000   |
| <b>LATVIA</b>   |           |          |        | Radio Vizcaya Station. Don Armando de Otera   | EAJ11   | 418   | 2000   |
| Riga  | .....     | 526.5    | 2000   | Vizcaya Radio Broadcasting Station, broadcasts mu-<br>sic, provided by local talent, and considerable<br>advertising from 12 to 12 pm daily               | .....   | 294.1 | 2000   |
| <b>LITHUANIA</b>  |           |          |        | Cadiz: Don Francisco de la Liesca   | EAJ3    | 400   | 500    |
| Kovno   | .....     | 219,2000 | 15,000 | Radio Lehera  | EAJ10   | 297   | 1000   |
| <b>LUXEMBURG</b>  |           |          |        | Carthagen. Don Enrique de Orbe  | EAJ16   | 279   | 1000   |
| Luxemburg   | .....LOAA | 217.4    | 250    | Madrid  | EAJ2    | 275.2 | 1000   |
| Luxemburg   | .....     | 1200     | 250    | Don Antonio Castilla  | EAJ4    | 275.2 | 3000   |
| <b>MEXICO</b>   |           |          |        | Radio Iberica Station   | EAJ6    | 577   | 1000   |
| Chihuahua: Federal Government State Capital station   | CZF       | 310      | 250    | Union Radio   | EAJ7    | 375   | 3000   |
| Guadalajara: Federal Military Command   | FAM       | 490      | 1000   | Radio Madritena   | EAJ2    | 306   | 2000   |
| Radio Club  | .....     | 280      | 10     | Association of Radio  | EAJ15   | 490   | 1000   |
| Mazatlan: Castillo Llamas   | CYR       | 475      | 250    | Radio Espana  | EAJ2    | 393   | 3000   |
| Mexico City: Elfrin R. Gomez  | CYA       | 300      | 500    | Malaga: Cia Iberica de Telecomunicacion   | EAJ25   | 325   | 1000   |
| Jose J. Reynosa, operated by El Ruen Tono, cig-<br>arette factory   | CYB       | 275      | 500    | Oviedo: Don Arburio Cima  | EAJ20   | 254.2 | .....  |
| Miguel S. Castro, operated by Le High Life, news-<br>paper  | CYH       | 375      | 100    | Salamanca   | EAJ19   | 201.3 | 100    |
| Raoul Azcarraga, operated by Universal  | CYL       | 400      | 500    | Saragossa   | EAJ22   | 402.5 | 500    |
| Martinez y Zetina   | CYD       | 425      | 100    | San Sebastian: Don Sabino Ucelayeta   | EAJ23   | 325   | 1500   |
| El Excelsior—Parker   | CYX       | 325      | 500    | Seville: Seville Radio Club   | EAJ5    | 344.8 | 1000   |
| Department of Education   | CZE       | 350      | 500    | Don Manuel Garcia Ballesta  | EAJ17   | 400   | 1000   |
| Monterey: Roberto Reyes   | CYM       | 275      | 100    | Don Jorge la Riva, projected  | EAJ21   | ..... | 1000   |
| Constantino de Tarnava  | CYS       | 311      | 250    | Valencia: Radio Corporation   | EAJ14   | 500   | 500    |
| Oaxaca: Frederico Zenilla   | CYF       | 265      | 100    | Under construction  | EAJ24   | 360   | .....  |
| Puebla: Augustin del P. Zaenz   | CYU       | 312      | 100    | Zaragoza  | EAJ23   | 566   | .....  |
| Tampico: El Mundo. Suspended  | CYQ       | 322      | 100    | <b>STRAITS SETTLEMENTS</b>  |         |       |        |
| Cipriano Sagon S en C   | CYZ       | .....    | 20     | Amateur Wireless Society of Malaya: 2-hour program<br>broadcast each Sunday evening, and children's concert<br>on Wednesdays. Received at Colombo, Ceylon | .....   | 270   | 100    |
| Local programs  | CYD       | .....    | .....  | <b>SWEDEN</b>   |         |       |        |
| Vera Cruz   | .....     | 548      | 100    | Boras   | SMRY    | 230.8 | 250    |
| Manuel Angel Fernandez. Recently inaugurated for<br>broadcasting advertising of an American product   | CYY       | 548      | 100    | Drebo   | SMTI    | 237   | 250    |
| Yucatan: Partida Socialista del Sureste   | CYY       | 548      | 100    | Boden: Radiojanst   | SASE    | 1200  | 1500   |
| <b>MOROCCO</b>  |           |          |        | Eskilstuna: Radio Club. Relays Stockholm programs<br>4 days each week, broadcasts local programs other<br>days  | SMUC    | 250   | 250    |
| Casablanca: Radio Club of Morocco, Omega Station  | CNO       | 305      | 2500   | Falun: Radio Club. Relays Stockholm programs 4<br>days each week, broadcasts local programs other<br>days   | SMZK    | 400   | 1500   |
| <b>NETHERLANDS</b>  |           |          |        | Gavle: Radio Club. Relays programs 4 days each<br>week, broadcasts local programs other days  | SMXF    | 204.1 | 250    |
| Amsterdam   | .....     | 760      | .....  | Goteburg: Radiojanst  | SASB    | 416.7 | 1000   |
| Antwerp   | .....     | 508.5    | .....  | Halmstad  | SMSB    | 215.8 | 250    |
| Bloemendall   | .....     | 566      | .....  | Helsingborg: Jonkopings Runradiostation. Relays Stock-<br>holm programs 4 days each week, broadcasts local<br>programs other days                         | SMYE    | 229   | 250    |
| DeBilt  | .....PCFF | 1100     | 1250   | Kalmar  | SMSW    | 233   | 140    |
| Eindhoven: Philips Lamp Works   | PCJJ      | 30.2     | .....  | Kalmar  | SMSN    | 254.2 | 25     |
| Hilversum: Nederlandsche Sintoellen Fabriek and<br>Hilversum Dreadloze Omroep. Reception reported<br>at Teheran   | HDO       | 1071     | 5000   | Karlsborg: Radiojanst. Relays Stockholm programs<br>4 days each week, broadcasts local programs other<br>days   | SAJ     | 1365  | 5000   |
| Scheveningen-Haven  | .....     | 1950     | 2500   | Karlskrona: Relays Stockholm programs 4 days each<br>week, broadcasts local programs other days   | SMSM    | 196   | 250    |
| <b>NEW ZEALAND</b>  |           |          |        | Karlstadt: Karlstadt Runradiostation. Relays Stock-<br>holm programs 4 days each week, broadcasts local<br>programs other days                            | SMXG    | 221   | 250    |
| Auckland: Radio Broadcasting Co. of New Zealand.<br>General, two hours daily  | 1YA       | 420      | 500    | Kristinehamn  | SMTY    | 202.7 | 250    |
| Christchurch: R. B. Co. of N. Z.  | 3YA       | 400      | 500    | Linkoping: Radio Club. Relays Stockholm 4 days each<br>week, local programs other days  | SMUW    | 497.5 | 250    |
| Dunedin: R. B. Co. of N. Z.   | 4YA       | 435      | 750    | Malmo: Radiojanst   | SASB    | 260.9 | 500    |
| Gisborne: Gisborne Radio Co.  | 2YM       | 260      | 50     | Molala  | SASC    | 1305  | 30,000 |
| Wellington: R. B. Co. of N. Z.  | 2YK       | 295      | 120    | Norrkoping  | SMVV    | 275.2 | 250    |
| <b>NORWAY</b>   |           |          |        | Orebro  | SMTI    | 218   | 250    |
| Oslo: Broadcasting Company A. S.  | .....     | 401.5    | 1500   | Osterlund   | .....   | 720   | 1000   |
| Bergen Broadcasters   | .....     | 370.4    | 1500   | Saffle  | SMTS    | 252.1 | 500    |
| Fredrikstad: Relays Oslo  | .....     | 434.8    | 750    | Stockholm: Radiojanst   | SASA    | 454.5 | 1500   |
| Hamar   | .....     | 506      | 750    | Sundsvall: Radiojanst   | SASD    | 545.6 | 500    |
| Porsgrund: Relays Oslo  | .....     | 504      | 750    | Trollhattan   | SMXQ    | 277.8 | 250    |
| Rjukan: Relays Oslo   | .....     | 443      | 250    | Uddevalla   | SMZP    | 294.1 | 250    |
| Trondjhem   | .....     | 243.9    | .....  | Umea: Relays Stockholm 4 days, local programs other<br>days   | .....   | 229   | 250    |
| Notodden: Relays Oslo   | .....     | 447.8    | .....  | Uppsala   | .....   | 500   | 250    |
| Stavanger   | .....     | 277.8    | 250    | Varborg   | .....   | 297   | 250    |
| Tromso  | .....     | 500      | .....  | <b>SWITZERLAND</b>  |         |       |        |
| <b>PARAGUAY</b>   |           |          |        | Basel   | HB3     | 1100  | 250    |
| Asuncion: General, Friday   | .....     | .....    | 12     | Berne: Radio Berne Station, Radio Club of Berne   | HBA     | 411   | 500    |
| <b>PERU</b>   |           |          |        | General Post and Telegraph Office   | .....   | 302   | 1500   |
| Lima: Peruvian Broadcasting Co. (Ltd.)  | OAX       | 360      | 1500   | Geneva: Radio Broadcasting Society of Geneva. Broad-<br>casts music and news  | HB1     | 760   | 1500   |
| <b>PHILIPPINES</b>  |           |          |        | Lausanne: Champ de l'Air Station (Societe Romande<br>de Radiotelephonie Lausanne)   | HB2     | 850   | 1500   |
| Baguio  | KZUY      | 359.9    | 500    | Zurich: Hoengz Station. Radio Genossenschaft Zurich<br>University. Reception reported at Antwerp, Brus-<br>sels, Rome, Vienna                             | HBZ     | 496   | 1000   |
| Manila: I. Beck Dept. Store   | KZIR      | 249.9    | 20     | <b>TUNISIA</b>  |         |       |        |
|   | KZKZ      | 270.1    | 100    | Carthage  | .....   | 100   | 50     |
|   | KZRQ      | 222.1    | 500    | Carthage  | .....   | 1800  | 5000   |
| <b>POLAND</b>   |           |          |        | Tunis: French Army. Two musical programs broad-<br>cast each week   | TA-OCTU | 1450  | 500    |
| Cracow  | .....     | 422      | 1500   | French Army. Two musical programs broadcast each<br>week  | OCTU    | 45    | .....  |
| Lemberg: Under construction   | .....     | 247.9    | 1500   | <b>TURKEY</b>   |         |       |        |
| Posen   | .....     | 273      | 1500   | Stamboul. Station reported projected  | .....   | ..... | .....  |
| Warsaw  | AXO       | 1111     | 10,000 | <b>UNION OF SOUTH AFRICA</b>  |         |       |        |
| Vilna (projected)   | .....     | 234.4    | 2000   | Cape Town: Cape Publicity Association   | WAMG    | 400   | 500    |
| <b>PORTUGAL</b>   |           |          |        | Durban: Town Council  | .....   | 400   | 1500   |
| Lisbon: Grandes Armazenes de Chiado. Irregular  | 1AA       | 267.8    | 500    | Grahamstown: Assn. Scientific and Tech. Societies   | JB      | 400   | 500    |
| Monte Santo   | CTV       | 2450     | 1500   | Johannesburg: Assn. Scientific and Tech. Societies  | .....   | 450   | 500    |
| <b>PORTO RICO</b>   |           |          |        | Cape Town: Cape Peninsula Broadcasting Assn. Broad-<br>casts 54 hours per week, programs by paid orches-<br>tra and local talent                          | .....   | 375   | 1200   |
| San Juan: Radio Corp. of Porto Rico   | WKAO      | 340.7    | 500    | <b>UNION OF SOVIET SOCIALIST REPUBLICS (formerly Russia)</b>  |         |       |        |
| <b>RUSSIA (Now U. S. S. R.)</b>   |           |          |        | Kiev  | RA5     | 775   | 1000   |
|   | .....     | .....    | .....  | Leningrad   | RA42    | 1000  | 10,000 |
|   | .....     | .....    | .....  | Leningrad   | RA6     | 940   | 2000   |
|   | .....     | .....    | .....  | Moscow: Komitern  | RDV     | 1450  | 40,000 |
|   | .....     | .....    | .....  | Radio Paredatcha  | RA1     | 420   | 2000   |
|   | .....     | .....    | .....  | Popoff  | .....   | 79    | .....  |
|   | .....     | .....    | .....  | Popoff  | .....   | 25    | .....  |
|   | .....     | .....    | .....  | Popoff  | .....   | 1010  | 2000   |
|   | .....     | .....    | .....  | Trades Union  | MSK     | 650   | 2000   |
|   | .....     | .....    | .....  | Nijni Novgorod  | RA13    | 1400  | 1500   |
| <b>SALVADOR</b>   |           |          |        | <b>URUGUAY</b>  |         |       |        |
| San Salvador: Govt. National Broadcasting, Mon,<br>Wed, Fri, 8-15 p. m., C. S. T.   | RUS       | 452      | 500    | Montevideo: Crandon Institute   | .....   | ..... | 500    |
| <b>SENEGAL</b>  |           |          |        | <b>VENEZUELA</b>  |         |       |        |
| St. Louis: Senegal Radio Club. Projected  | .....     | 300      | 100    | Caracas: Empress Venezolana de Radiotelefonla   | AYRE    | 375   | 1000   |
| <b>SIBERIA</b>  |           |          |        |   |         |       |        |
| Tomsk   | RA21      | 300      | 250    |   |         |       |        |

# Victoreen

## Dependable Standardized Super Parts Accepted as the Best in Radio

If you want the ultimate in radio reception—if you are one of those who demand range, clarity, volume and selectivity, then you will appreciate Victoreen supremacy in the super field! Victoreen has gained the confidence of those whose radio experience is based on scientific knowledge. They accept the new products of Victoreen, knowing that a progressive step has been made in Radio—one that has passed the experimental stage and arrived at the point of the utmost in satisfactory results.



**VICTOREEN RADIO FREQUENCY TRANSFORMERS**  
No. 170—For Storage Battery Tubes  
No. 171—For Dry Battery Tubes

The very heart of the Super Circuit! These units are instruments of great precision, being matched and tuned to within one-third of one per cent and eliminating the necessity of tube matching. Due to their peculiar construction, stray fields are eliminated, enabling the Transformers to be placed in close relation to each other. Interstage oscillation is prevented in this efficient instrument.

Price \$7.00

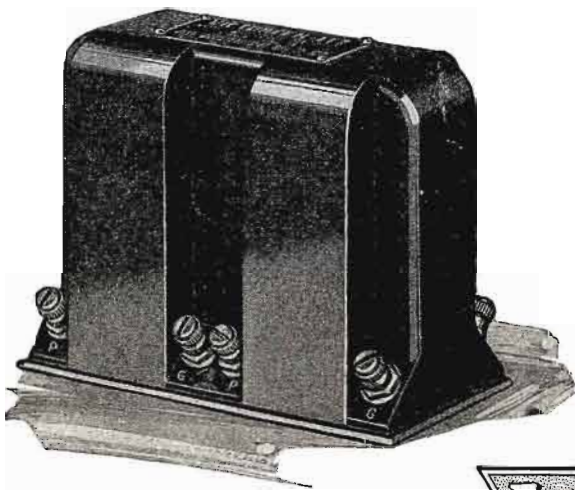
### VICTOREEN 112 AUDIO TRANSFORMER UNIT

This unit is worthy of its place in the Victoreen Circuit and renders a marvelous offering in tonal quality—presenting all the intimate naturalness of the original program.

Designed to handle up to 400 volts of B battery supply, this unit is especially adapted to the Western Electric cone speaker or similar types. The transformer consists of two stages of Audio amplification in one case and is designed

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MERCHANDISERS OF VICTOREEN RADIO PRODUCTS  
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Tell 'Em You Saw It in the Citizens Radio Call Book

**{ AMERTRAN } { AMERTRAN } { AMERTRAN } { AMERTRAN }**

**AMERTRAN RADIO PRODUCTS**  
STANDARDS OF EXCELLENCE—FIRST IN IMPROVEMENTS

**Audio Transformers**

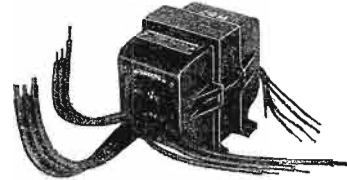
For audio frequency amplification or operation of radio sets from alternating current power lines, AmerTran Radio Products, have the well deserved name of producing results not obtainable by any other devices.

The AmerTran De Luxe Audio Transformer produces absolutely faithful amplification with natural quality. When it is used with proper tubes and loud speaker, and clear signals from a detector tube it will produce natural volume over the entire audible range. Until you have listened to radio amplified by these transformers you have not heard the truest quality of full volume. AmerTran De Luxe transformers are made in two types for first and second stages and are sold at \$10 each.



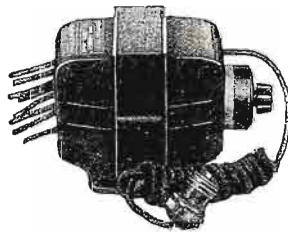
**Filament Heater Transformers**

The AmerTran Filament Heating Transformer Type H-67 is another recent development intended for use with a new RCA UX-226 Raw AC Amplifier Tubes and the new UY-227 detector tube. It also has a third filament winding capable of handling two UX-171 tubes. In connection with the new AC Tubes, Type H-67 becomes a power source for the filament and is therefore a real "A" battery eliminator. With a good plate supply system and a set with the new AC and Power Tubes in the last stage the H-67 AmerTran transforms the ordinary house lighting current down to the lower voltages for a correct operation of the new tubes. This transformer costs \$12.00.



**Power Transformers**

Not content with making it possible to secure quality in the output of your radio set AmerTran has produced a new transformer which makes it easy to eliminate B and C batteries by supplying noiseless rectified current from the alternating current lines. Full descriptive matter of these circuits will be supplied upon request.

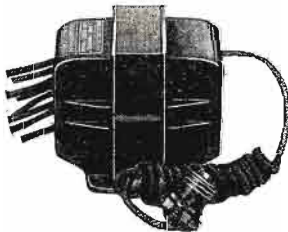


This AmerTran Power Transformer Type P F 52 is for use on 110 Volts, 50 to 60 cycles and sells at \$18.

A new unit, the AmerTran Power Transformer Type P F 281 has been designed for use with a UX-281 Rectifying Tube which can be operated at 550 volts, plate up to 750 volts,

and deliver 110 Milliamperes D. C. as a half-wave rectifier. A 750 volt plate winding with a tap for 550 volts enables the transformer to be used with a UX-281 or 216-B Rectifying Tube where the output plate voltage is not in excess of 450 volts.

In addition, Type P F 281 has filament heating windings for the new AC Tubes and therefore will convert house current into filament and plate current, and grid bias potential. When used with our Type 709 and 854 AmerChokes it is possible to construct a radio receiver which can be operated entirely from a house lighting circuit without an "A" eliminator, trickle charger or batteries. This transformer sells for \$25.00.



**Chokes**

AmerChoke Type 854 is a scientifically designed impedance or choke coil of general utility, designed primarily for use in filter circuits. As an output impedance for by-passing direct current from the loud speaker it is just as efficient and more economical than an output transformer. When used with a 1 mfd. fixed condenser, the tone quality equals that of the best output transformer. DC saturation is prevented by two adjustable butt joints in the core. AmerChoke Type 854 sells for \$6.00. AmerChoke Type 418—1/4 Henry at two amperes—D C Resistance 0.7 ohms is listed at \$6.00. Type 709 AmerChoke—50 to 20 Henries at 120 milliamperes—D C resistance 210 ohms, sells at \$10.00.

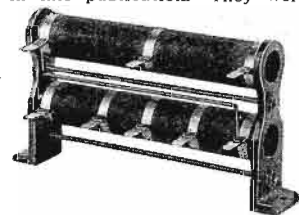


**Resistors**

AmerTran Resistor Type 400 is particularly well adapted for use across the output of high voltage filter circuits to act as a stabilizer and tapped potentiometer for obtaining various plate voltages, and it is also useful for other purposes such as a multiplier for voltmeter, etc. It will withstand current on 30 milliamperes continuously without undue heating in open air. AmerTran Resistor Type 400 has a cold resistance of approximately 41,000 ohms across the two sections in series and contains eight solder terminals. It is priced at \$7.50.

You will note the use of several of the above units in circuits described in this publication. They were selected on the basis of dependable, high quality performance.

Full information on the construction of radio apparatus using the above parts will be gladly sent on request. When writing ask for our booklet, "Improving the Audio Amplifier."



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Tell 'Em You Saw It in the Citizens Radio Call Book

# Unexcelled—

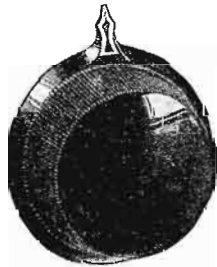
# “The Aristocrat”

*the finest looking—finest tuning*

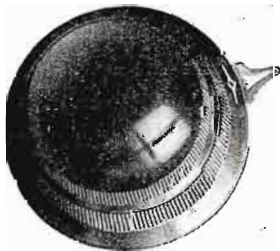
# Vernier Port Dial



This Vernier is foolproof—troubleproof. One turn of the knob drives the dial 14 points on the scale. No gears, chains, or cogs to get out of order. The friction action is sure and simple—and cannot wear out or break down. Readings are visible thru a port in the casing. No back lash is possible. With this new Vernier Dial, you'll bring in stations you've never before been able to tune in.



No. 702  
POINTER KNOB  
3/16", 3/4", One Piece  
(2 3/4" circle)



No. 792  
VERNIER POINTER  
1/4", E-Z-Toon movement  
(3 3/8" circle)

FIRST in noteworthy improvements, the new “Aristocrat” Vernier-Port Dial is no exception to the excellence of Kurz-Kasch products. This new Vernier-Port, all bakelite dial affords you a real opportunity to bring your old set up-to-date and also improve its efficiency, all at a cost no more than ordinary vernier dials.

The Aristocrat is the only efficient Vernier-Port Dial on the market with all mechanism and condenser shaft-ends concealed. It cannot be surpassed for beauty—nor equalled in efficiency. You must install these dials to appreciate what a wonderful improvement they will make on your radio.

You may have this Vernier-Port Dial to match the panel of your radio. Furnished in black, mahogany or walnut finish. The graining of the colored dials is exquisite—obtained by an exclusive KURZ-KASCH process!

The Aristocrat Vernier Port Dial is supplied in three finishes—black with white markings and mahogany or walnut with gold markings—at the same low price—\$2. It is sold at all the better dealers. If yours cannot supply you, tell us about it.

The KURZ-KASCH CO., Dayton, Ohio

# KURZ KASCH

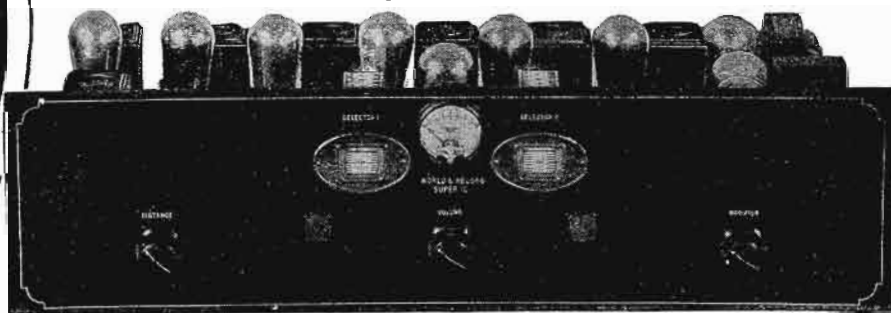
*Aristocrat Dials and Knobs*

Tell 'Em You Saw It in the Citizens Radio Call Book

# Build Radio's New



Mr. E. H. Scott, himself, will tell you how he designed the original DX receiver, with which he made the four World's Records described on the opposite page—how that set has been duplicated hundreds of times, each one performing as well as the original—how later developments and refinements have enabled him to improve on the original in the New World's Record Super 10—and how you can, even without any previous experience, build a World's Record Super 10 for yourself.



**DISTANCE**—Here is the receiver for the man who wants the most powerful and sensitive set it is possible to build. Many claim to have received far distant stations once or twice, but Mr. Scott with his World's Record Super proved his claims to record honors by bringing in consistently, night after night, stations distant six thousand miles or more. The new World's Record Super 10, in actual comparative tests with the original receiver on which the records were made, has proved that it is even more powerful and brings in the far distant stations with almost unbelievable volume.

No other receiver has approached the marvelous DX records that the World's Record Super has established, and it is safe to say none will for years to come.

**REMARKABLE SELECTIVITY**—Here is a receiver for today's conditions. In Chicago, where there are about forty broadcasting stations, the New World's Record Super 10 cuts through with the greatest of ease. It brings in distant stations only a few meters apart with such volume that you think you have a local station until you hear the call letters and find you are listening to a station hundreds of miles away.

**NATURAL TONE QUALITY**—A receiver may have great DX ability and wonderful selectivity, but what good is it if the tone is raspy or distorted? When you hear the New World's Record Super 10, you will

realize that here at last is a receiver that it is a pleasure to listen to.

**EASY TO BUILD**—With the parts here listed, any one can build an exact duplicate of the New World's Record Super 10. The only tools required are a screw driver, pliers, and soldering iron. The building instructions and full size blue prints show exactly where to place each part and how to run every connection, and are so simple and easy to follow that any one, even without previous experience in building a radio receiver, can duplicate this marvelous receiver and own the finest radio set available today.

## — LIST OF PARTS —

|   |         |   |      |
|---|---------|---|------|
| 1 Formica panel drilled and engraved 26x7x $\frac{3}{16}$ | \$ 6.70 | 10 Benjamin sockets No. 9044                          | 5.00 |
| 1 Formica sub panel drilled 25x10x $\frac{3}{16}$         | 7.00    | 1 pr. Benjamin brackets No. 8629                      | .75  |
| 1 Remler 3-in-line condenser No. 633 00035                | 15.00   | 1 Carter Imp. rheostat 1R-15S ohms                    | 1.50 |
| 1 Remler condenser No. 638 00035                          | 5.00    | 1 S. M. balancing condenser No. 340                   | 1.50 |
| 2 Remler drum dials No. 110                               | 9.00    | 1 Carter power rheostat MW-1 ohm                      | .75  |
| 2 Remler R. F. choke coils No. 35                         | 1.80    | 1 Carter Imp. pot. 1R-400 ohms                        | 1.25 |
| 2 Thordarson audio transformers R290                      | 16.00   | 1 Carter fixed condenser 00025 with grid clips        | .50  |
| 1 Thordarson output transformer No. 76                    | 6.00    | 1 Carter fixed condenser 002                          | .50  |
| 2 Selectone L. W. transformers No. B500                   | 12.00   | 1 pr. No. 10 Carter pin jacks                         | .20  |
| 2 Selectone L. W. transformers No. B510                   | 12.00   | 1 Jewel Voltmeter 0.8v Pat. 135                       | 7.00 |
| 2 Selectone R. F. transformers No. 520                    | 10.00   | 4 Tobe Bypass condensers 1 Mfd                        | 3.60 |
| 1 Selectone Antenna coupler No. 530                       | 5.00    | 1 Tobe grid leak                                      | .50  |
| 1 Selectone Oscillator coupler No. 540                    | 5.00    | 1 Jones 10 contact multi-plug and 4 ft. cable type BM | 3.50 |
|   |         | 40 Kellogg soldering lugs                             | .25  |
|   |         | 30 ft. rubber covered hook-up wire                    | .50  |

Here's your chance to build a radio set that will give you all that radio has to give—distance, selectivity, clear and natural tone. Experience is not required, for full instructions will be sent you by Mr. Scott himself. Don't hesitate—don't delay. Send *now* for full details. Then you can't forget it, and you'll never regret it.



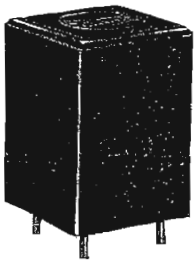
# Greatest "DX" Receiver

## World's Record Super 10

### Here Are the Verified Records

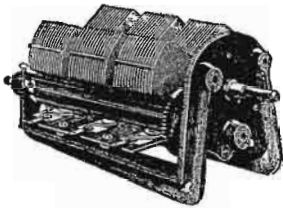
The authenticity of the startling achievements of the World's Record Super (as listed below) is based upon hundreds of verifications by leading Broadcasting Stations and Publications from Coast to Coast.

- 1** On March 17th established new World's Record for *loop aerial reception*—8,375 miles with Loud Speaker Volume.
- 2** On the night of March 29th established new World's Record with the reception of *six f. reign stations* distant 6,000 miles or more.
- 3** Established new World's Record for *greatest number of broadcasting stations* heard that are located 6,000 or more miles away.
- 4** Established new World's Record for *most consistent reception*, night after night, of Stations 6,000 miles or more distant—117 programmes from 19 different Foreign Stations, heard between December 27th and April 10th.

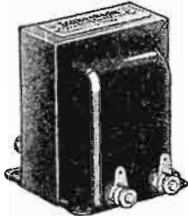


**Selectone Transformers** cut through the local stations with ease, and their tremendous amplification brings in the distant stations with great volume. They are supplied in perfectly matched sets, insuring maximum amplification and the finest tone quality.

**The new Remler Three-in-Line Condenser** with the Remler Drum Dial represents the last word in gang condenser construction. Balancing condensers are integral with the main unit, and are easily and quickly adjusted. A special staggered connection of plates makes it self-shielding, preventing interstage coupling. All insulation is of genuine Bakelite.

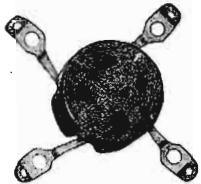


**Thordarson Amplifying Transformers** were used in the original World's Record Super, designed by Mr. Scott. Because of the unusual tone quality obtained Thordarson apparatus is again selected. Two Thordarson R-200 Amplifying Transformers and one R-76 Output Transformer are used in this receiver. If you enjoy good music, insist on Thordarson amplification.

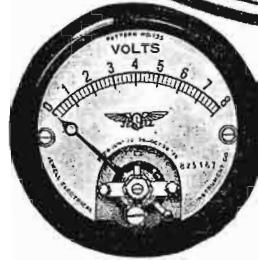


**The famous Benjamin Spring Cushioned Shock Absorbing Socket** was the choice of Mr. E. H. Scott in his original World's Record Super.

Mr. Scott has paid the very highest tribute to the efficiency of Benjamin Shock Absorbing Sockets by again selecting them for this newest and greatest of radio receivers.



**Tobe Condensers.** Only the highest grade parts were selected by Mr. Scott for the World's Record Super 10, and the fact that Tobe parts are specified is one more proof of their claim for leadership in the condenser field.



In the careful selection of parts and accessories for the New World's Record Super 10, it is quite natural that a Jewell Pattern No. 135 Radio Voltmeter should be chosen. The black enameled case encloses a fine, D'Arsonval, moving coil type movement having silvered parts and equipped with a zero adjuster. The scale is silver etched with black characters. A special mounting arrangement makes it easy to mount in a radio panel. It is the ideal instrument for filament control.



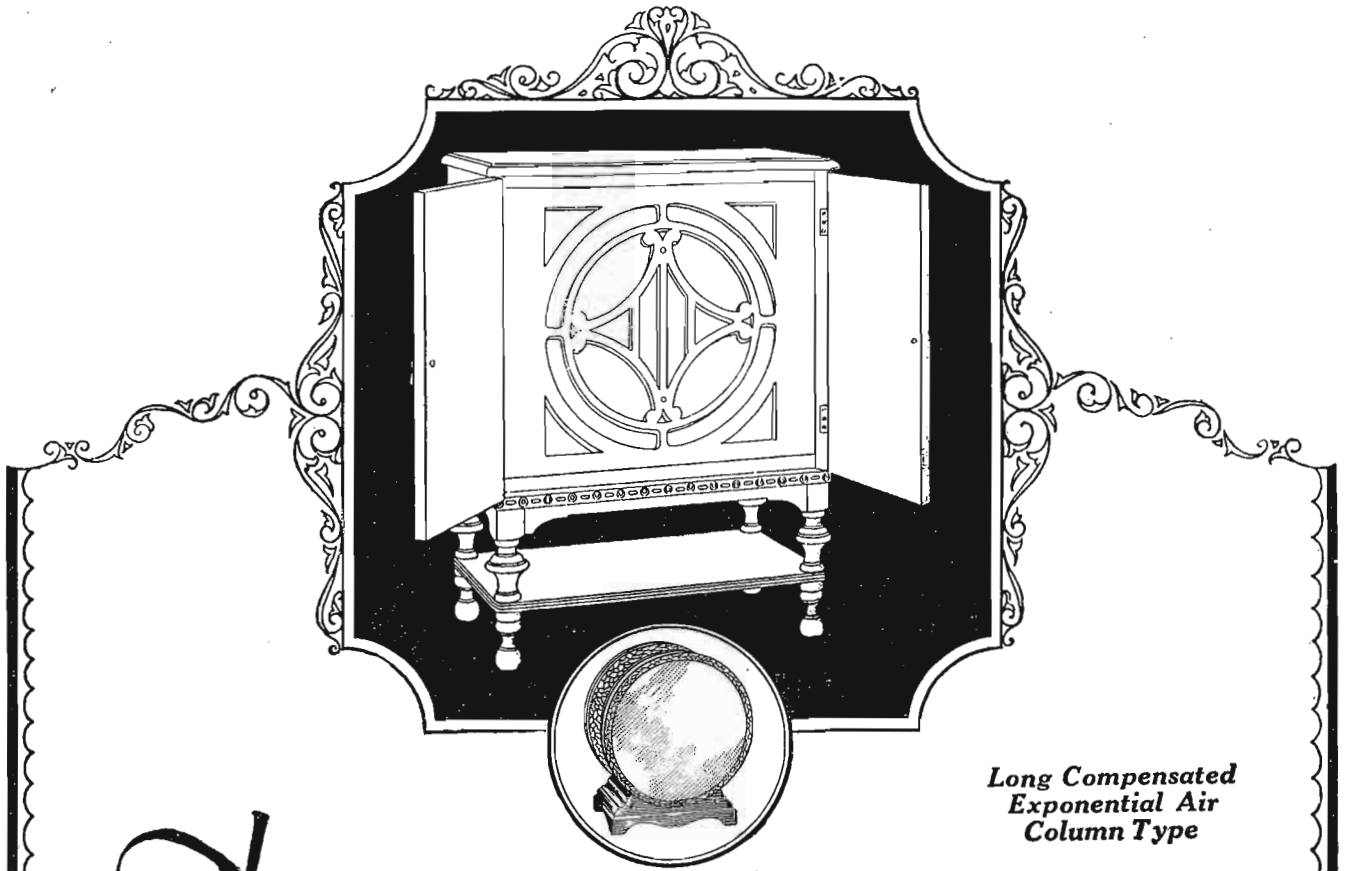
**Carter Rheostats** are so designed that they are self-cooling and contact arm shaped so that it provides smooth contact with constant pressure at all times, making control of filaments noiseless.



Jones Ten Contact Multi-plug and 4 ft. Cable enable all batteries to be placed out of sight and simplify wiring. Now used on over one million receivers; endorsed by leading radio engineers.

**Send Coupon for Full Details**

MR. E. H. SCOTT,  
7618 Eastlake Terrace,  
Chicago, Ill.  
Without obligation, please send me details of  
the World's Record Super you made with your  
Super 9, and full instructions for building your NEW World's Record  
Super 10.  
Name.....  
Address.....



*Long Compensated  
Exponential Air  
Column Type*

# The **TEMPLE SPEAKER**

*improves the tone quality of ANY radio set*

Like a Strad violin, a Steinway piano or other fine musical instruments, the outstanding quality is tone. And that is equally true of radio speakers. No matter how much you have paid for your set, if it fails to radiate purity of tone, then it has failed in its purpose.

Wherever the Temple is heard its audience is more than enthusiastic—it marvels—for no one believed that such reproduction of tone was possible.

No longer need you worry about radio reception. Today, in the **TEMPLE SPEAKER**, you are guaranteed results never before known. Because it is designed on an acoustical principle that is scientifically correct, you can now enjoy a rich-

ness, mellowness and purity of tone that will surpass your fondest expectations. Listen to the Temple once. That's the way to buy speakers. Any dealer will be glad to give you a home demonstration.

Regardless of the cost or make of your particular set, the **TEMPLE SPEAKER** will enhance its tone quality, will increase your pleasure in radio a thousand-fold over what you have been used to. Irrespective of the nature of the program—be it opera, an orchestra, ball game, etc., **TEMPLE** will bring it to you clearly, un-failing in its fullness.

Rigid sales policy backed by extensive advertising campaign.

|                           |         |                          |         |
|---------------------------|---------|--------------------------|---------|
| 13 inch priced at.....    | \$29.00 | West of the Rockies..... | \$32.00 |
| 18 inch priced at.....    | 48.50   | West of the Rockies..... | 55.00   |
| Console Model priced at.. | 65.00   | West of the Rockies..... | 75.00   |

**TEMPLE, INC., 213 S. Peoria St., Chicago**  
*Sales offices in all principal cities*

## **LEADERS IN SPEAKER DESIGN**

*Tell 'Em You Saw It in the Citizens Radio Call Book*

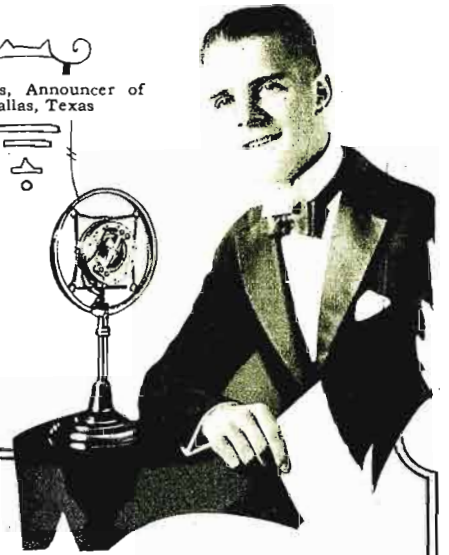


*Radio  
Celebrities  
People you hear  
but seldom see*

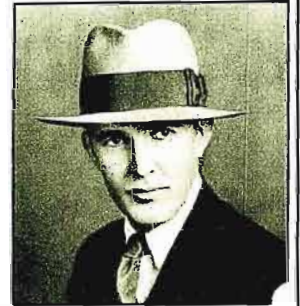


Mixed Quartet, heard every Friday night from WBAL, Baltimore, Md.

Robert Z. Glass, Announcer of KRLD, Dallas, Texas



Genia Zielinska, Coloratura Soprano of the National Grand Opera Co., heard every Monday evening over the Red Network Stations from WEA, N. Y. City



Stephen Gaylord, Chief Announcer and Baritone of KGW, Portland, Oregon



Greenberg and Sanford, Guitar Strummers of KYW, Chicago, Ill.



Bob Brown, Announcer of WGR, Buffalo, N. Y.



Harry C. Brown, Announcer and Studio Director, also Uncle H. C. B. to the children, WGHP, Detroit, Mich.



Richard Rolph, Tenor of WGHP, Detroit, Mich.



National Cavaliers, Male Quartette, WEA, N. Y. City



Harry Lange's Orchestra; heard every evening from eleven to twelve from KMOX, St. Louis, Mo.



Hugo Mariani, leader of the National String Quartet, heard through the Red Network Stations from WEA, N. Y. City, on Monday evenings

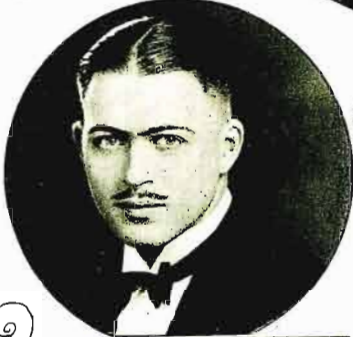


Jack Barnet, Announcer and Program Director of KEX, Portland, Ore.

Nathan Lynn's Troubadours, a feature of KMO, Tacoma, Wash.



Donald H. Clark, Announcer of WOR, Newark, N. J.



Marjorie Buzzell, Program Director of the Head-Of-The-Lake Station, WEBC, Duluth, Minn.



William Fantozzi, Musical Director of WENR, Chicago, Ill.



"The Happiness Boys," Friday night gloom chasers from WEA, N. Y. City



William Fay, Chief Announcer and Studio Director of WMAK, Buffalo, N. Y.



McDonald Sisters, Harmony Team heard over KMOX, St. Louis, Mo.



Keystone Duo, Steele Jamison, Tenor, and Darl Bethman, Baritone; regular Saturday evening feature from WJZ, N. Y. City



Sallie Menkes, staff pianist of KYW, Chicago, Ill.



Wendell Hall, "The Red Headed Music Maker," well-known to every radio fan. Heard from time to time over WJZ, N. Y. City



Cecil P. Underwood, Chief Announcer and program director of KHQ, Spokane, Wash.



Joseph A. Bier, Announcer of WLWL, N. Y. City



Stanley B. Cappall, Chief-announcer and program director of KFWI, San Francisco, Calif.



Norman Baker, owner and operator of KTNT, Muscatine, Iowa



"Bill" Ray, Announcer of KFVB, Hollywood, Calif.



John B. Gambling, physical culture instructor who conducts morning gym classes over WOR, Newark, N. J.



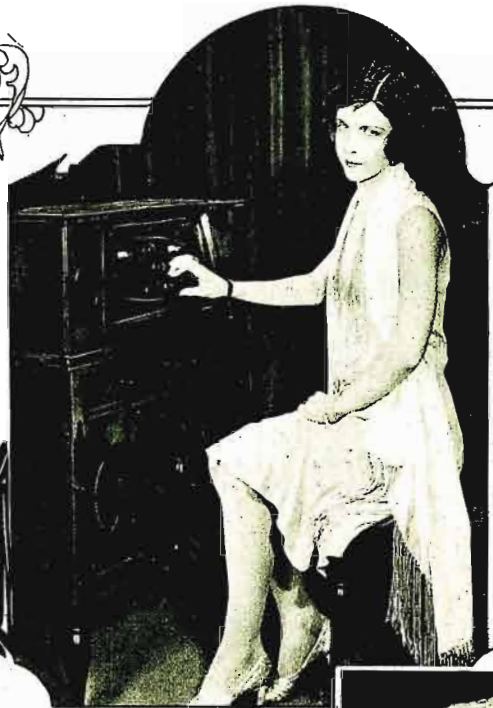
Edward Stockman, Baritone of WSM, Nashville, Tenn.



Capitol Brass Quartette, Harry Conaty, trumpet; Claude Barden, trumpet; George Jankins, Sousaphone, and Charles Saravo, trombone. Heard over WBZ, E. Springfield, Mass.



Tom McCray, Station WTIC, Hartford, Conn.



Permelia Lee Smith, contralto soloist of KFON, Long Beach, Calif.



Red and Gold, Stark's Delicious Apple Boys of KMOX, St. Louis, Mo.



Irene, "The Irresistible" Blues singer of KMOX, St. Louis, Mo.



Charles A. Schenck, Jr., Announcer of WEAJ, N. Y. City



Lillian Watt, Soprano of WSM, Nashville, Tenn.



Ruth Starr, Soprano and studio hostess of WMBC, Detroit, Mich.



Anna Walsh, Staff Soprano and Studio Director of KMOX, St. Louis, Mo.



Delta Upsilon Serenaders of WNAD, Norman, Okla.



George F. B. King, Commercial Manager of KFBI, San Francisco, Calif.



Louis A. Witten, Announcer of WOR, Newark, N. J.



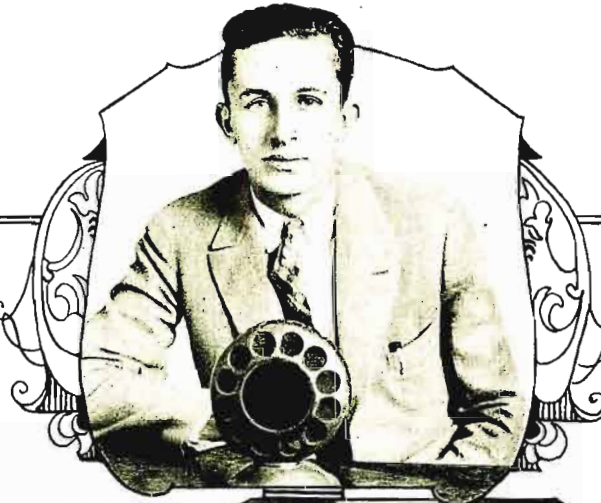
Whittall Anglo Persians heard over WEA, N. Y. City



Lloyd C. Thomas, Announcer of KFKX, Hastings, Neb.



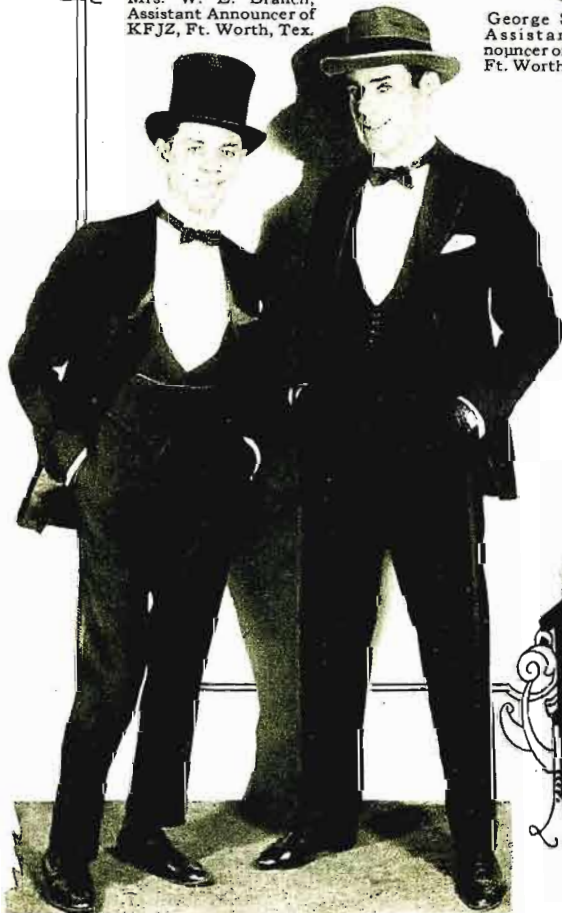
Mrs. W. E. Branch, Assistant Announcer of KFJZ, Ft. Worth, Tex.



George Sloan, Assistant Announcer of KFJZ, Ft. Worth, Texas



Mrs. Wm. D. Reynolds, Program Director of KLZ, Denver, Colo.



Val and Ernie Stanton, "The English Boys from America," heard over WJZ, New York City



Sadie Woodside, who renders popular ballads over KYA, San Francisco, Calif.



John Clark, Announcer of KYW, Chicago, Ill.



The Royal Hero, Heroine and Musicians heard every Friday evening over the Blue Network Stations from WJZ, N. Y. City





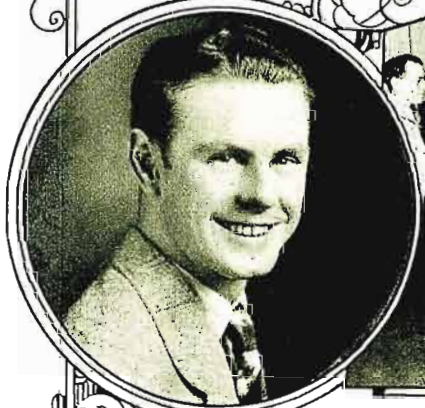
Florence Israel, Assistant Program Arranger of Station KFVB, Hollywood, Calif.



Clyde and Florence Massengale, "The Nightingales of Radio," KFJZ, Ft. Worth, Texas



Beatrice Bangs, Station WTIC, Hartford, Conn.



Hugh Walton, Staff Tenor and Program Director of KGW, Portland, Ore.



The A & P Gypsies heard over WEA, N. Y. City



Louis Katzman, leader of Whittall Anglo-Perisians, WEA, N. Y. City



Earl T. Braden, Announcer of KSEI, Pocatello, Idaho



Lewis Dean, Announcer of WGY, Schenectady, N. Y.



Richard Low, only Chinese Baritone on Radio. Heard over KFAB, Lincoln, Neb.



Harry Reser and his Clicquot Club Eskimos heard over the Red Network Stations every Thursday Evening from WEA, N. Y. City



Leo Fitzpatrick, Chief Announcer and Manager of WJR Detroit, Mich.



E. Guenther, baritone of KFUC, St. Louis, Mo.



The Subantenna Crusaders Quartet, heard every Wednesday evening over KYW, Chicago, Ill.



J. Ames Keough, "Big Brother," who supervises the daily programs for the youngsters from KPO, San Francisco, Calif.



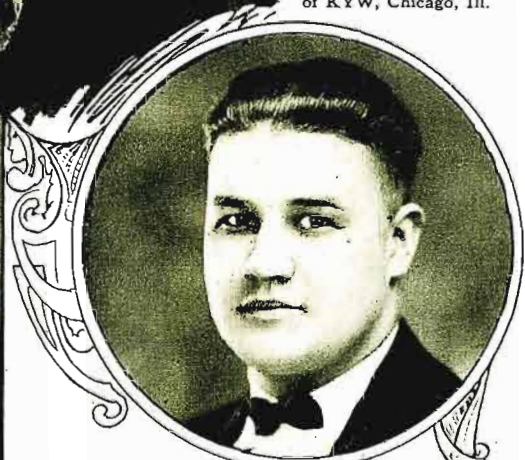
Buddy Baker, banjo player and blues singer of KYW, Chicago, Ill.



Arthur Wellington, announcer and baritone singer of KYW, Chicago, Ill.



Marley Sherris, Announcer of WJZ, N. Y. City



Herbert O. Brickson, Announcer WLBL, Stevens Point, Wis.



Ada and Beulah, "The Golden State Girls." This harmony team is heard every Monday night over KYA, San Francisco, Calif.



Horace Parker Sampson, announcer of WJZ, N. Y. City



Oscar Heather, tenor, featured over WIBO, Chicago, Ill.



Mme. Gizi Szanto, concert pianist of WGHP, Detroit, Mich.



The Christensen Brothers, heard over WIBO, Chicago, Ill.



Pearl Hargrove, Studio Pianist and Blues Singer of WIL, St. Louis, Mo.



Hilda Hinrichs, cellist, heard over WMBB, Chicago, Ill.



Don Bernard, Director of Station WAIU, Columbus, Ohio



Gilbert W. Cattell, General Manager of KFBI, San Francisco, Calif.



Beasley Smith, Director of the Andrew Jackson Orchestra, WSM, Nashville, Tenn.



The Apollo Male Quartette, frequently heard over Station KYW, Chicago, Ill.



The Sunflower Girl of WBAP, Ft. Worth, Texas





Jay Smith, of the team of Jay and George, the Melody Boys, also Announcer of KFJZ, Ft. Worth, Texas



Howard H. Bloomfield, Staff Announcer of WHEC, Rochester, N. Y.



Dean Schaffer, Announcer of KFXX, Hasting, Neb.



Charles Feland Gannon, Assistant Director and Program Director of WOR, Newark, N. J.



J. Frederick Seebach, Announcer and Assistant Program Director of WOR, Newark, N. J.



Herbert Ford, Station Tenor of KMO, Tacoma, Wash.



E. E. May, Announcer of KMA, Shenandoah, Iowa



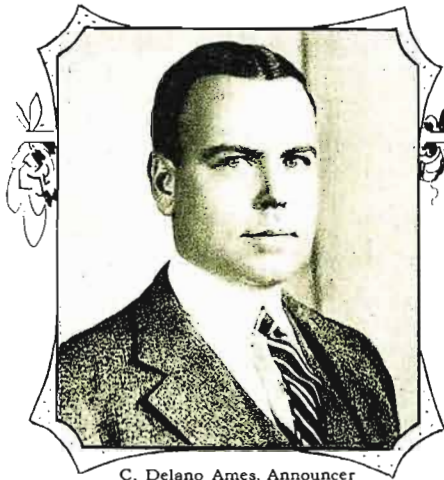
Conrad Rianhard, "The Boy Paderewski," a great favorite with WRVA, Richmond, Va., listeners



Rodney Rogers and Bert Foster, known as "The Red Peppers," exclusive artists, appearing nightly, over WCFL, Chicago, Ill.



Everett Mitchell, Director of Station WENR, Chicago, Ill. Also well-known as a baritone singer and conducts the "Last Minute" Listeners' Club.



C. Delano Ames, Announcer of WBAL, Baltimore, Md.



Vito Pellettieri, Violinist and Director of Vito's Radio Seven, of WSM, Nashville, Tenn.



Harry Sosnik, Staff Pianist of WSBC, Chicago, Ill.



Mrs. Minnaetha Jane White, "Oklahoma's Sweetheart of the Air," Station WNAD, Norman, Okla.



Studio Orchestra of WAPI, Auburn, Alabama



Bernice Altstock, Staff Contralto, KGW, Portland, Ore.



Edward Ludes, Chief Announcer and Program Director of KYA, San Francisco, Calif.



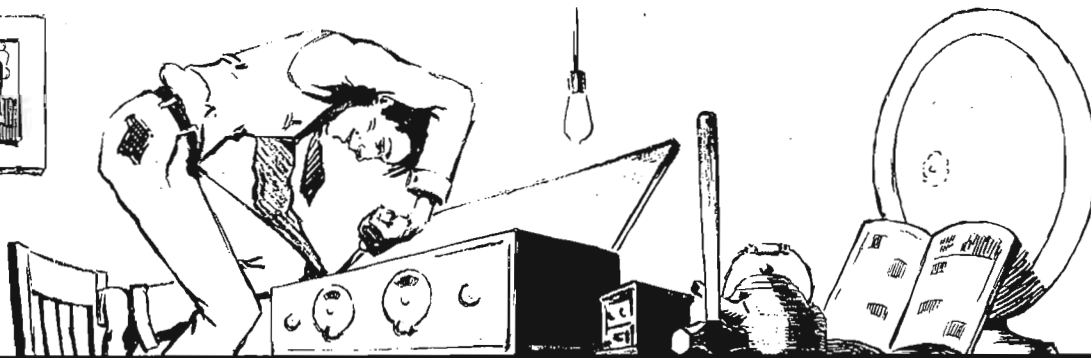
Doris Shank, Studio Pianist and Assistant Organist of WCFL, Chicago, Ill.



Howard B. Cushman, Director of Station WGR, Buffalo, N. Y.



Terese Rose Nagel, in charge of daytime programs of WGBS, N. Y. City



# AMPERE ANDY'S ASSISTORS

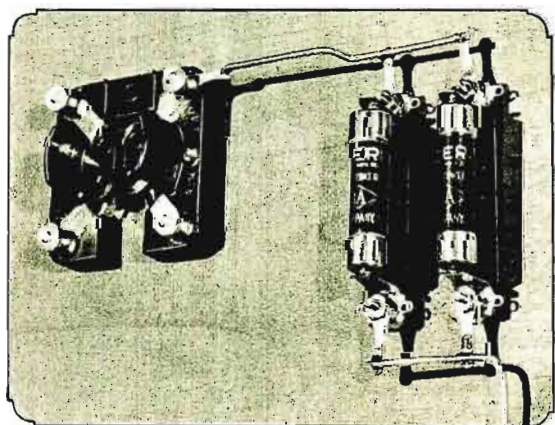


## A New Method for Reaming Holes

A convenient emergency means for reaming a hole in a panel or similar material is found in the use of the tang of a "mill" or "bastard" file. The hole to be reamed should be at least  $\frac{1}{4}$  inch in diameter to allow the insertion of the tang. The file is then revolved first in one direction and then the other, about one-half turn each way. When the hole being reamed is quite large, an adjustable machinist's wrench can be used as a handle for turning the file. Care should be exercised that the "bite" is quite small, when reaming the hole, or the material will be gouged out and seriously chipped.

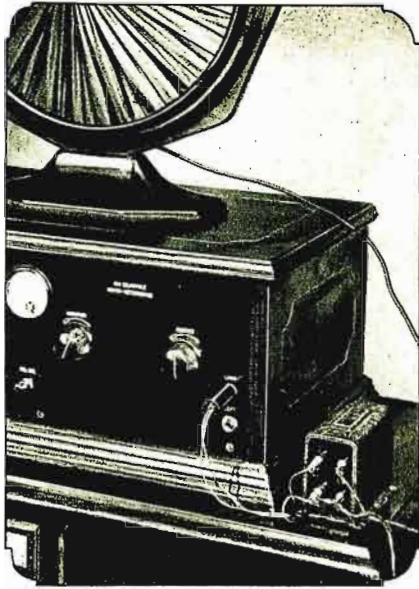
## A Convenient Polarity Indicator

A convenient method for determining the polarity of any type of battery is to use a solution of common table salt in a glass of water. Connect a wire to each terminal of the battery and insert them into the glass of water as far apart as possible. Bubbles will appear around one of the wires. This will be the negative. Care should be observed in testing batteries by this method that high voltages are not handled, since the salt solution is a partial conductor of electricity and such a combination is dangerous. If a salt solution is inconvenient, a potato may be used for the same purpose, by peeling part of the outer skin away and sticking the two wires into the potato. A blue stain will appear around the positive wire.



## Solving an Old Problem in Filament Control

The experimenter does not have at all times the proper values of filament resistors in his experimental work. A convenient means for inserting a proper resistance for a ballast resistor is in the use of two or more quarter ampere resistors in parallel. As an example: suppose a power tube requiring one-half ampere is to be used with a ballast resistor. The correct voltage may be applied to the tube by connecting two quarter ampere resistors in parallel. The current passed between two resistors will be sufficient to properly operate the tube and is the same as that passed by a one-half ampere ballast resistor or Amperite. In like manner one ampere tubes may be operated by the same method.



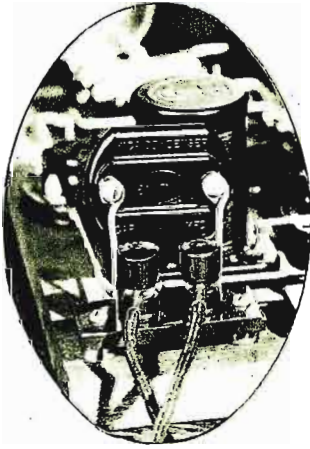
### Keep High Voltage Out of Speaker Windings

High voltage may be effectively kept out of the windings of an expensive loud speaker by the use of an output transformer. This device is an especially designed transformer of the proper ratio, which is connected to the receiver in the same manner as a loud speaker. The speaker in turn is connected to the remaining two terminals of the output transformer. Electrical impulses are transferred through the transformer and actuate the speaker in the regular manner without high voltage being present. Output transformers are obtainable in a number of different types, either for mounting in the exterior or interior of the receiver. The use of an output transformer insures a longer life in respect to the speaker, as well as considerably improving the quality of the reproduction.



### A Handy Vernier Adjustment

Many radio sets are still equipped with a plain circular dial which characterized receivers a few years ago. These particular dials are just as efficient as the newer type of vernier dials and many set owners still use them. A handy vernier adjustment for this type of dial may be found in the use of the rubber eraser on a new pencil. The rubber is placed partly against the panel and partly against the edge of the dial and slowly rotated in the proper direction to turn the dial. Sufficient friction is obtained between the rubber eraser and the dial to turn it a few degrees for a minute adjustment. With a little practice the operator will find this type of vernier to be as good as the more expensive types.

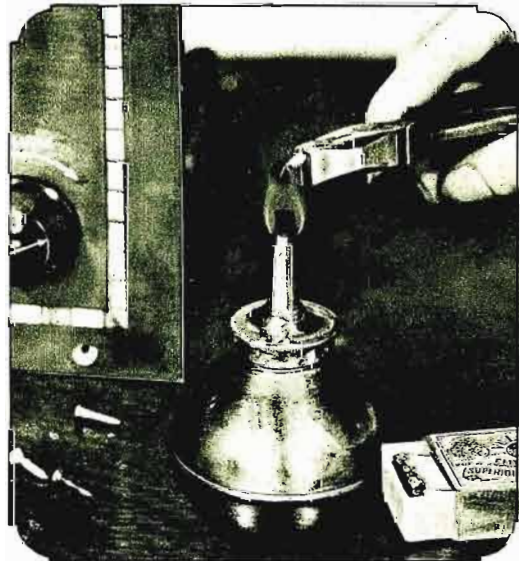


### Improving Tone Quality

The tone quality of a receiver may be often improved by shunting a condenser across the speaker or head phone terminals. The proper capacity of this shunting condenser is best found by trial. Any capacity from .005 mfd. to .02 mfd. will give excellent results. The use of a condenser for this purpose will decrease the volume of the receiver to a very slight degree, but the added quality of reproduction fully compensates for the loss in volume.

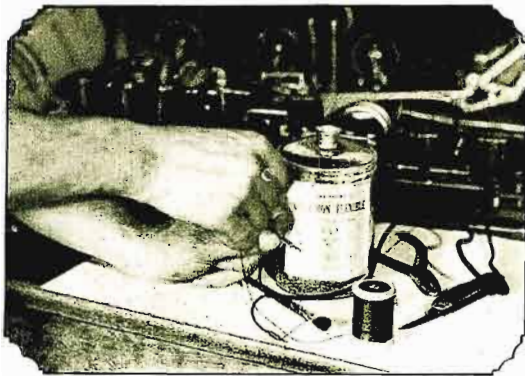
### Improving Contact Between Spade Terminals and Binding Posts

Spade terminals on battery cables will usually slip from the binding post unless the post is at all times tightly clamped down. The constant vibration experienced by a radio set due to passing traffic, will shortly jar the terminal loose, and crackling and other extraneous noises will be heard in the reproduction. A convenient method for insuring a positive contact between the binding post and spade terminals is to bend each of the side members of the terminal, one in one direction and the other in an opposite direction, so that a condition similar to a lock washer exists. A terminal bent in such a manner will invariably hold its place even though the binding post is not securely clamped.



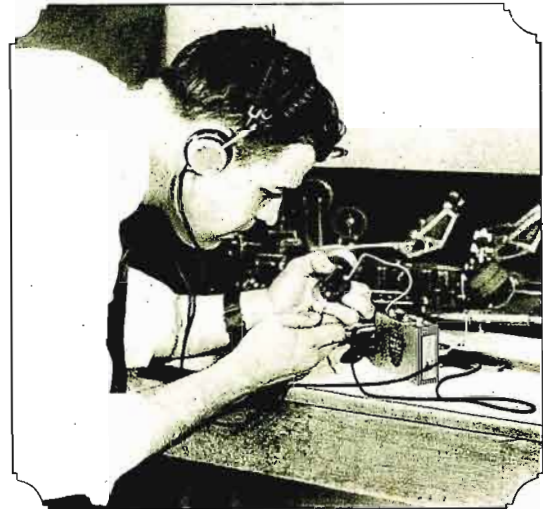
### Bluing Screw Heads

It is often desirable to have a number of wood screws with blue heads for use in mounting the front panel on a radio set. If the blue screws are not handy, they may be easily made by heating common iron screws of the proper size and screw head in an alcohol or gas flame until they have the proper color. The flame must be one of intense heat and the screw must remain in the hottest part of the flame for some length of time so that the blue oxide may form. After the proper color has appeared, the screw may be dropped in a container of water nearby so that it may be quickly cooled.



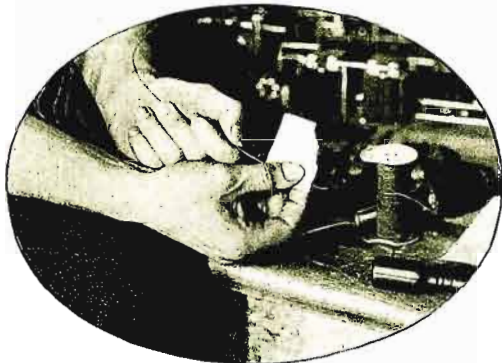
### Repairing Frayed Cord Tips

Cord tips are sometimes subject to a fraying in which the fabric around the tinsel works out from within the cord tip. Since this braided covering acts as a strengthening device in respect to the conductor, the cord tip soon breaks loose from the wire if the end of the fabric becomes frayed. If a short length of fine black or brown silk thread is "whipped" around the frayed portion of the cord and securely held in place while a liberal coat of flexible collodion is applied, a permanent repair will be made. In fact, such a repair will withstand continuous abuse for a much longer period than the original type of construction.



### Testing Fixed Condensers for Short Circuits

It is often desirable to test a fixed condenser to determine whether or not it is short circuited. The average fixed condenser of today will invariably break down if an excessive voltage is applied. If the condenser under suspicion is included in a circuit containing a pair of head phones and a battery, it may be readily tested. If a decided click is heard in the head phones when the circuit is completed, the condenser is short circuited and should be immediately discarded.

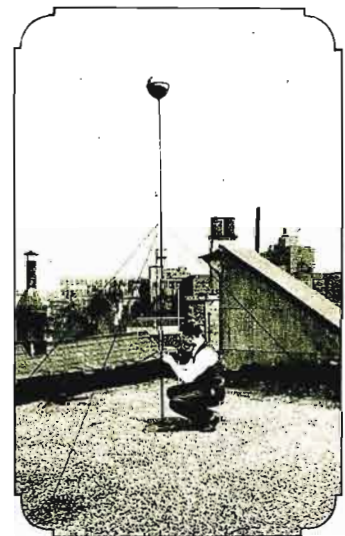


### Skinning Silk Covered Wire

The use of a pair of pliers or a knife in skinning a length of silk covered copper wire often results in the free end of the wire being cut off. This often necessitates rewinding of a coil. The best procedure for skinning silk or cotton covered wire is to double over a piece of No. 00 sand paper and draw the wire between the folds. The fineness of the sand paper is just right to grasp the tiny fibers of the insulating material and will effectively remove the covering. A distinct advantage in using this system is that the sand paper also polishes the wire, which allows it to be easily soldered.

### A Novel Out-Door Antenna

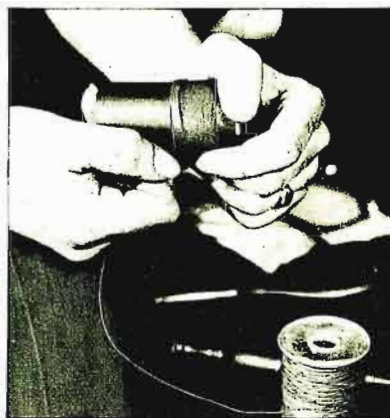
A unique and highly efficient out-door antenna has recently been placed upon the market by a Mid-western manufacturer. The antenna consists principally of a large hollow globe of a non-corrosive aluminum alloy. The efficiency of this type of antenna is extremely high, due to the high mass conductivity and the bunched capacity effect of such a construction. A condenser is formed between the supporting shaft and the ball proper, due to their insulation from each other. This condenser acts as a neutralizer of the entire antenna system. All-around results with this particular type of antenna are characterized by increased selectivity and a decided lack of interference.



### A Handy Drilling Template

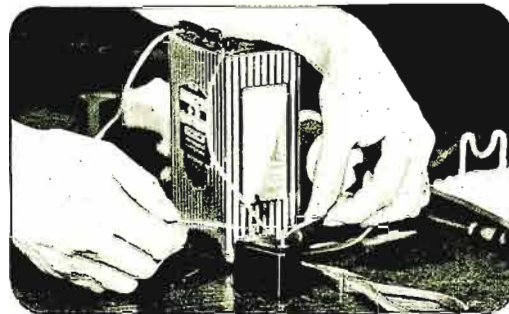
It is sometimes necessary to drill a panel for mounting a condenser or other device, and no template for the proper drilling of holes is available. An accurate template may be easily made by using a piece of cardboard or other stiff paper similar to that used for the cover of the average magazine. Pierce a hole in the center of the paper and force it over the shaft of the condenser or other piece of apparatus. Then with a sharp pencil feel around on the surface of the paper until you are directly over one of the screw holes, and then with a slight push pierce the paper and repeat until all the holes are located. This method, if care is exercised, will accurately transfer the location of all holes on the piece of apparatus which are necessary for its proper mounting. The same accuracy is possible in using this type of template as is with the template supplied with the part originally.





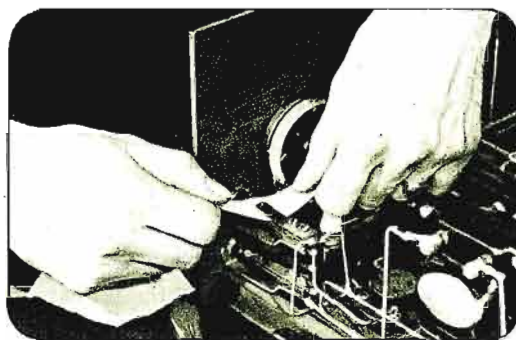
### Holding Wire in Place on an Unfinished Coil

It is often necessary to lay aside a coil before the winding is completed. This will invariably result in the wire becoming loosened, due to its inherent springiness and the coil, therefore, must be rewound. If a heavy rubber band is placed around the coil, it may be easily slipped over the unfinished end of the coil and will securely hold the wire in place, so that there is little possibility of the wire slipping.



### Testing By-Pass Condensers

The question often arises as to whether or not a by-pass condenser is in good condition. A simple method for testing a condenser is to apply 90 Volts of Direct Current to the terminals for a few seconds and then allow the condenser to remain undisturbed for two minutes without any voltage being applied. Then "short" the terminals with a piece of insulated wire. If a healthy flash is observed when the terminals are shorted, the condenser is in good condition.



### Cleaning Jack Contacts

Crackling and other extraneous noises in a radio receiver may often be traced to dirty contacts on jacks. Perfect contact by the various springs is an absolute necessity. Jacks should be given a periodical overhauling and their contacts carefully cleaned, either by the use of a very fine file, such as is used for filing points in automobile timers, or a very fine grade of sand paper. Care should be taken in the use of the file or sand paper that only the corrosion is removed from the contacts. If too much of the material is removed, the various springs will not make the proper connection.

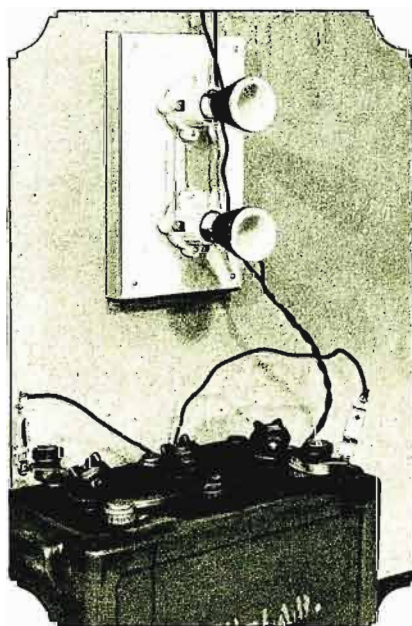


### Straightening Bus-Bar Wire

The experimenter is often confronted with the difficulty of straightening the coil of hook-up wire which is usually included in a kit of parts used in the construction of a receiver. There are a number of methods in common use which may be used. One of them is to twist one end of the wire around the pin of the lower hinge supporting a heavy door and tugging on the free end of the wire, which is securely held by a pair of heavy pliers. The wire is usually a soft drawn copper, and is easily stretched. The stretching process, if properly done, will straighten the wire to a remarkable degree. After the wire has been straightened, it may be laid upon the floor and cut into convenient lengths for use. Another method is to proceed as above, but instead of using a pair of pliers, fasten the wire in the chuck of a machinist's hand drill and slowly turn the handle until the wire is twisted into a straight length. The last mentioned method hardens the wire somewhat and does not allow it to be repeatedly bent at the same point without the possibility of breaking.

### Charging a Storage Battery on Direct Current

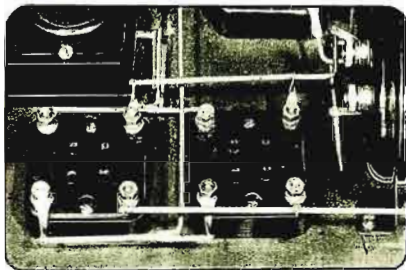
Storage batteries may be easily charged from the 110 Volt Direct Current power supply by the introduction of a suitable resistance in one side of the circuit. A resistance suitable for this purpose is the heater element used in the ordinary electric heater employing the reflector principle. Its power rating should be approximately 600 watts. This will give a charging rate of approximately 5 amperes. If a lower charging rate is desired, two elements may be hooked in series, which will give a charging rate of approximately  $2\frac{1}{2}$  amperes. Some suitable mounting device should be made for holding the elements, since the heat developed is quite intense and damage will result to the surrounding furniture or woodwork due to the blistering of the varnish. A sheet of transite board (compressed asbestos) is admirably suited for this purpose. A device of this type should be mounted in some out-of-the-way place where children can not reach it. A good circulation of air around the element is necessary.





### Good Contact Between Socket and Tube Necessary

Lack of sensitivity and volume in a receiver can often be traced to poor contact between the socket contact springs and the prongs of the tube. The exceedingly feeble currents passing through the socket must meet with a minimum of resistance, and in this respect, perfect contact between the prongs and socket is an absolute necessity. A liberal application of a fine grade of sand paper on the tube prongs will quickly remove any of the corrosion and high spots which make for a poor contact. It is advisable to clean the prongs at regular intervals.



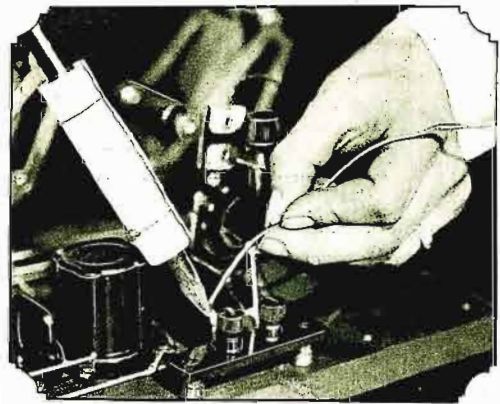
### A Power Tube Substitute

The experimenter is not always the proud possessor of a power tube and yet he has often desired one. A reasonable substitute for a power tube in the last stage of audio amplification can be found in connecting up two ordinary 201-A type tubes, with their plate and grid elements in parallel. In other words, an extra 201-A tube is connected to the plate and grid terminals of the last audio frequency amplifying tube. The filament of the extra tube is connected to the "A" battery in the regular manner through a ballast resistor or rheostat. The accompanying photograph clearly illustrates the proper connections.



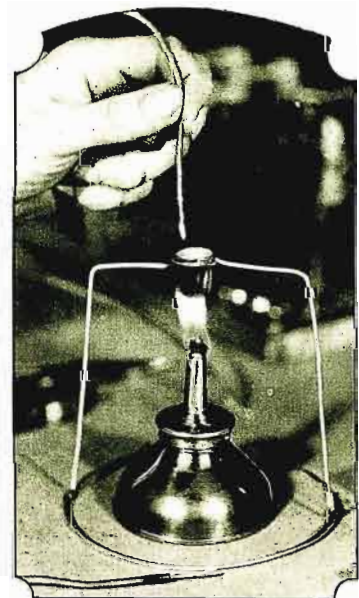
### A Heat Insulated Soldering Iron

Comparatively few experimenters have not experienced the difficulty of mutilating or even destroying component parts in a receiver, due to an accidental touch with the hot part of the soldering iron. Invariably the soldering tip alone does not create any damage. The metal housing immediately in back of the tip is usually the part which comes in contact with the moulded portion of an instrument or the like, and the extreme heat will cause the composition to melt or char. This difficulty may be completely overcome by wrapping a piece of sheet asbestos around the heated portions of the iron, which are not in use for actual soldering purposes. With this precaution it is possible to use the soldering iron with impunity among delicate pieces of apparatus in the receiver. It is advisable to remove the asbestos when ordinary soldering is done, since the iron may be damaged through overheating.



### A Tinning Bath

An easily constructed tinning bath may be quickly made from a few spare parts around the work-shop. Procure an old oil-can and cut off the spout about 1 inch from the bottom. Form a wick from a number of strands of cotton string, or if piece of wick from an old kerosene lamp is handy, use it. Insert the wick through the opening in the base of the spout and allow approximately  $\frac{1}{4}$  inch to project beyond the other end. Be sure to have a sufficient length of wick so as to allow it to reach the bottom of the oil-can. Fill the can with denatured alcohol and permit the alcohol to be absorbed by the wick. This will make an excellent alcohol lamp, which is capable of creating a very intense heat. Next construct a stand from a length of busbar wire, to support a thimble directly over the alcohol lamp. Use care in forming the stand so that no solder joints are in the vicinity of the lamp is burning is sufficient to melt them. Light the lamp and suspend the thimble over the flame. Only a short time is required before the thimble is hot enough to melt any solder which is placed within it. After sufficient solder has been melted to almost fill the thimble it may be used as a tinning bath for tinning the ends of wires, spring contacts, etc.



### A Panel With a Satin Finish

A very pleasing satin effect may be given any panel by observing the following procedure. After the panel has been drilled, lay it on a piece of newspaper which has been placed on a flat surface. Then with a fine grade of sand paper, No. 0 or 00, sand the surface of the panel along its length, applying at the same time a liberal quantity of lubricating oil. Do not limit the strokes in sanding to less than the total length of the panel, or the satin effect will not be uniform. After the total surface has been covered, remove the surplus oil with a soft cloth, wash the surface with gasoline or a similar cleaning compound, and polish with a dry cloth. Under no circumstances use a coarse grade of sand paper, since its application on the highly finished surface of the panel will gouge out deep scratches, which are virtually impossible to remove.

# KING OF THE MAGIC AIR

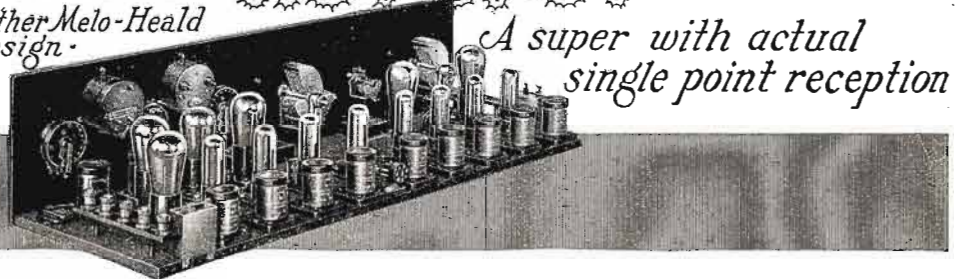


Razor Edge Selectivity-No Receiver Harmonics-No Repeats.

## THE FAMOUS HOT SPOT FOURTEEN

Another Melo-Heald Design.

A super with actual single point reception



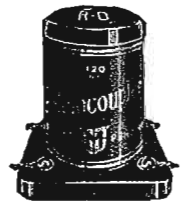
Like a Thermometer - It Registers at One Point



**H**OT SPOT Reception is another achievement of that well-known master of the ether, Merwyn Heald, B.S., E.E. His great success in designing The famous Melo-Heald Eleven Circuit is fully covered in your copy of the Spring, 1927 Call Book. The Call Book now covers this latest development in radio reception. The famous HOT SPOT Fourteen, in full detail in the editorial pages of this issue for your benefit. See page 121. Certified Meloformers (audio frequency) and Certified Melocouplers (radio frequency), the transformers that make such excellent reception possible, are the secret of the great success of these two wonder works in radio. The same mixing system is used in the HOT SPOT Fourteen that made the Melo-Heald Eleven famous. Each intermediate transformer is designed specifically for its position. Only one oscillator setting is necessary for each station—real single point reception. 14 Tubes—No Oscillator Repeats. 8 Stages of Intermediate—3 Stages of Audio. 2 Tuning Controls—Easily Tuned as Single Stage. "A" BAT., 2 Amps.—"B" BAT., 55 Milliamperes. Loop Regeneration—Potentiometer—Volume Control. Refer to the article and let the Editor of the Call Book tell you the rest of its virtues, and how to build The famous HOT SPOT Fourteen.



Certified MELOFORMERS make three stages of ideal audio possible, and also render beautiful reproduction without slightest distortion on as high as four stages. Meloformers can be used for audio frequency in any set, as well as those designed by Mr. Heald and described in the Citizens Radio Call Book. Specifications: Height, 2 1/4 in. O. A.; Base, 2 in. square; Top, 1 3/8 in. diameter. Can be obtained through Dealers everywhere.



Certified MELOCOUPLERS are guaranteed radio frequency transformers for specific service in high-powered Fourteen and Eleven Tube Circuits. Each is built with an air-core, peaked, wound and tested at the same point of efficiency, making kits unnecessary, which is also true of Certified Multistage Meloformers. Specifications: Height, 2 1/4 in. O. A.; Base, 2 in. square; Top, 1 3/8 in. diameter. Can be obtained through Dealers everywhere.

## The Famous Melo-Heald Eleven Circuit

William H Reimann,  
2629 N. Washburn Ave.,  
Chicago, Illinois.

Mr. Robertson;

After experimenting with and listening to many types of radios for the past four years, I was entirely at a loss in regards to which one would satisfactorily combat the present Chicago radio congestion until I saw one of your circulars on the "Melo-Heald Eleven".

Although, I must admit I looked at it rather skeptically, as the claims seemed too good to be true. Most of the circuits are good in their descriptions only; but I figured that if the "Melo-Heald Eleven" was only half as good as what you claimed it was, it would be an exceptionally good receiver. Therefore, I decided to try once more.

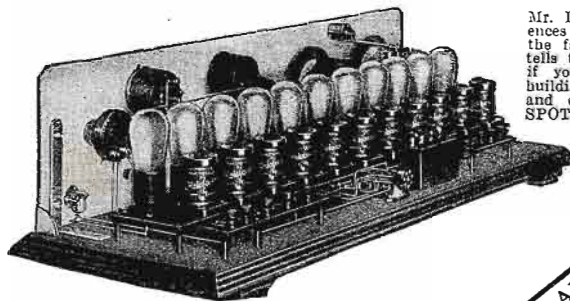
After having the set a few weeks, I had tuned in about thirty stations thru the Chicago broadcasters, and have a log consisting of twenty-three DX stations tuned in thru Chicago in one evening, with only one revolution of the dials in a period of about two and one half hours between seven and ten P.M. The stations heard that evening were as follows:

- |      |      |      |      |      |
|------|------|------|------|------|
| WHO  | WGX  | WOC  | KPT  | WJZ  |
| WGS  | WBS  | WHAS | WTAX | WGY  |
| WWJ  | WBAF | WPAA | WPAB | WAEC |
| WEMC | WKA  | WUR  | WEAO | WOD  |
| WRVA | KWJC | WSOE |      |      |

After this wonderful achievement I can truly say that "Melo-Heald Eleven" does everything its sponsors claim. In fact, I think that they must be just a trifle modest, at least very conservative in their description of the receiver and its merits. The selectivity is nothing short of marvellous, the tone superb, and the volume on distance is such that most of the DX stations can not be distinguished from locals until the call letters are announced.

Wishing you further success with this really wonderful receiver, and closing by saying, "Ho, who has not heard a Melo-Heald Eleven has not heard a real radio", I am

Yours very truly,



Mr. Reimann's letter gives the experiences of a Call Book reader with the famous Melo-Heald Eleven. It tells the results you may expect, if you are not interested in building a receiver as sharp and efficient as the HOT SPOT 14.

FREE. Plans for building either receiver designed by Mr. Heald and described by the Call Book will be sent free on return of the coupon. Fill in and mail.

ROBERTSON-DAVIS  
COMPANY, Inc.  
412 Orleans St.  
CHICAGO  
U. S. A.

**FILL IN AND MAIL TODAY FOR FREE PLANS TO CONSTRUCT RECEIVER**

**Robertson-Davis Company, Inc., 412 Orleans Street, Chicago, U. S. A.**

Gentlemen: Without charge or obligation, please send me Plans and Specifications for construction of receiver designed by Merwyn Heald and described in the Citizens Radio Call Book. Also, send further particulars regarding Certified Meloformers and Melocouplers manufactured by you and in designing Mr. Heald's sets. (Check receiver you are interested in.)

I am interested in The Famous HOT SPOT Fourteen

I am interested in The Famous Melo-Heald Eleven

Name.....  
Address.....  
City.....

(WRITE OR PRINT CLEARLY)

REC-9

Tell 'Em You Saw It in the Citizens Radio Call Book

# The Tyrman Ten

Constructed in Citizen's Radio Laboratory, This Receiver Incorporates the Most Outstanding Features of Design. Its Performance Surpasses All Expectations

**S**INCE the last three years a great number of engineers endeavored to design the "ideal" super-heterodyne receiver and endless articles have been written telling the set builders how and why this set should be built.

However, progress had to be made from year to year. Instruments underwent a process of improvements and today it does not mean difficulties to produce intermediate frequency transformers of exact calibration in large quantities. It was emphasized in previous publications, that the intermediate frequency transformer is the very heart of the super-heterodyne circuit. But thousands of these receivers have been built using properly matched units without giving the expected satisfaction. Where was the fault and who was to blame? The fact is that a properly designed intermediate frequency amplifier will not function properly if subjected to a faulty input construction and a wrong amplifying system after its rectification. What is proper in these questions might be an interesting subject for discussion among designing experts. It occurs that super-heterodyne receivers, which are marvelous in the laboratory will not satisfy if duplicated outside of that scientific work bench, and this because the home builder does not incorporate certain engineering thoughts like diminishing wiring feedbacks, straight capacities, etc. It remained to our laboratory to lay out a receiver where least chance is given to deviations of very important details and where the duplication of our model is compulsory.

This was especially necessary with this new circuit, where all newest improvements have been incorporated and harmony had to be created between a number of circuits. The "one spot" idea has been made use of with a compromise to eliminate all critical features of shorter wave intermediate frequency amplification. The theory of this system is in the separation of the two beat notes to an extent where one of them will appear beyond the dial range. Thus we have seen the following system of super-heterodynes in the past:

First. The standard super-heterodyne receiver. The receiving sig-

nal was changed by the oscillator signal to a long wave. For example, if the intermediate frequency amplifier was designed to a frequency of 40 K.C., a signal of 700 K.C. (428 meters) had to be counteracted with an oscillator frequency of 740 or 660 K.C. (405, respectively 455 meters). There are two settings for each station on the oscillator condenser, and of course this caused not only difficulties

in logging but also heterodyne interference, when the lower beat of one station touched the high beat of the other. The advantage of this original super-heterodyne was its stability (if the I. F. amplifying transformers happened to be of proper design). Combinations of iron and air core units were used. These transformers, however, even if matched on instruments, were subject to electrical changes when working in cascade, and especially iron core stages change their characteristics as soon as regeneration sets in.

Second. The short wave intermediate frequency super-heterodyne receiver: This system, instead of utilizing the difference of frequencies for intermediate frequency amplification, uses the same frequency for this purpose. An intermediate frequency amplifier of 3000 K. C. will require a beat frequency of 2300 K. C. for a 700 K. C. signal. It is seen that two critical features play their part in this circuit. First, the short wave oscillator, and, second, the short wave intermediate frequency amplifier. The difficulties can be overcome only with extremely careful design and expert layout.

Third. The one spot long wave transformer utilizing a frequency slightly lower than the broadcast band.

A compromise had to be reached and finally a transformer of 340 K.C. maximum amplification has been decided on by the engineers, utilizing the stabilizing advantages of long wave amplification but remaining below that wave to avoid the double beat interference. The above

700 K. C. signal will require an oscillator frequency of 1040 respectively 360 K. C., the latter being outside of the dial range. Only signals above 890 K. C. (below 330 meters) can have a double setting on the oscillator tuner if the antenna dial is left

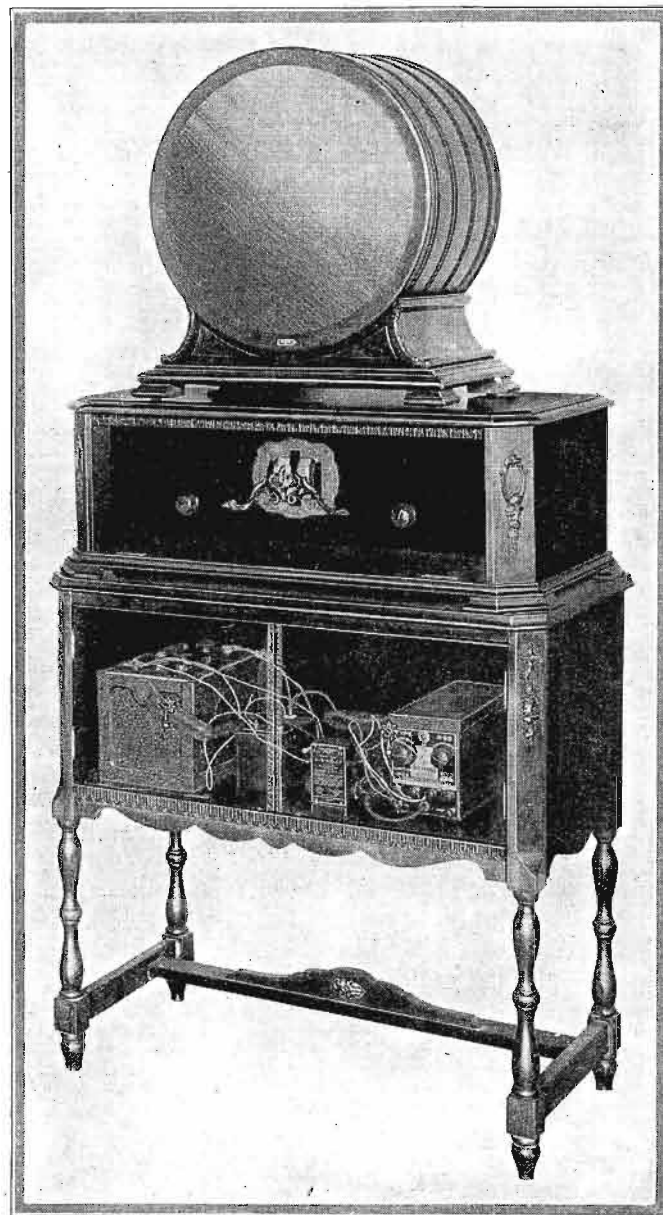


Photo A—Suggested assembly of Tyrman Ten with loudspeaker and accessories

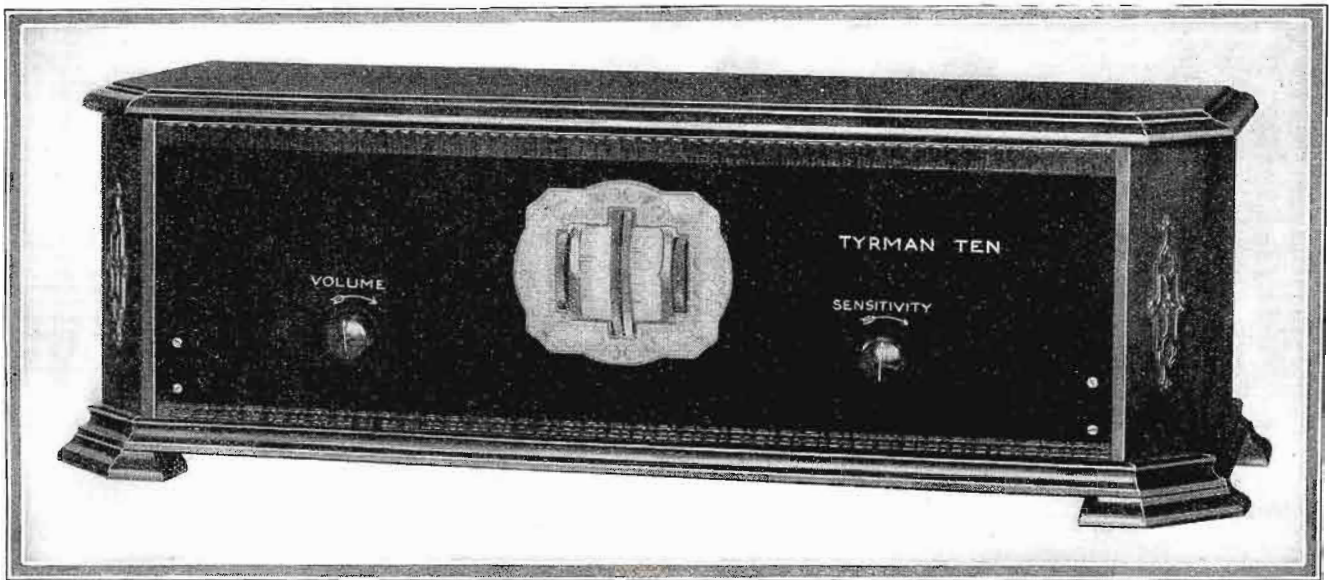


Photo B—Front view of receiver showing harmonious panel arrangement

in resonance. However, tuning both dials to the resonance no signals appear twice on the dial, as the 640 K. C. separation between beat notes will not allow duplication with a very selective antenna system.

Thus we have arrived at a stage where compromise is reached between extremes in construction, as it was done in innumerable cases of other industrial achievements.

The new radio conditions culminating in greater activity of home construction are characterized by the strife for greater satisfaction, and leading designers recognize the fact that only quality in its highest sense will meet the approval of the most discriminating set building public of these days.

Constructively this receiver offers a keynote for standardization and simplicity. The strikingly pleasant appearance of its front view with the centralized Vernier Drum control keeps harmony with the layout of the subpanel, the instruments being placed to make use of every space available. All Tyrman parts are designed for subpanel wiring. The transformers simply hook into the Kurz-Kasch Capacity Connector which is placed under the subpanel and contains a moulded wiring system. Thus, this receiver inaugurates the first step for the standardization of amateur set building, enabling the beginner to construct a duplicate of our laboratory model. The shielded tube socket will not only assure each tube to function under

the influence of magnetic and static fields, but acts also as shield between the stages of the radio frequency cascade. This layout together with the capacity effect of the Kurz-Kasch Capacity Connector is responsible for the perfect electrical stabilization of the circuit.

A stage of radio frequency is built ahead of the long wave amplifying system. Although this was not carried out satisfactorily in previous amateur-built super-heterodyne circuits, it is greatly responsible for the success of this receiver. The designer's aim was to create selectivity on the antenna stage equal to that obtained by a directional loop, and thus localize the tuning control to the dials. As it is well known by experimenters, there was a poor balance in selectivity between the antenna and oscillator circuits, and previous receivers had to rely on an extremely selective oscillator tuning, thus cutting into the side band and inflicting upon tonal performance. In our case the radio frequency stage is sufficiently sharp to allow more broadness in the oscillator for obtaining same selectivity.

The audio amplifying system consists of one stage of straight transformer coupled amplifications and a push-pull stage for the second audio. It was emphasized in an earlier issue of this magazine that transformer coupled audio amplification is the most suitable for super-heterodyne circuits, and again this method is

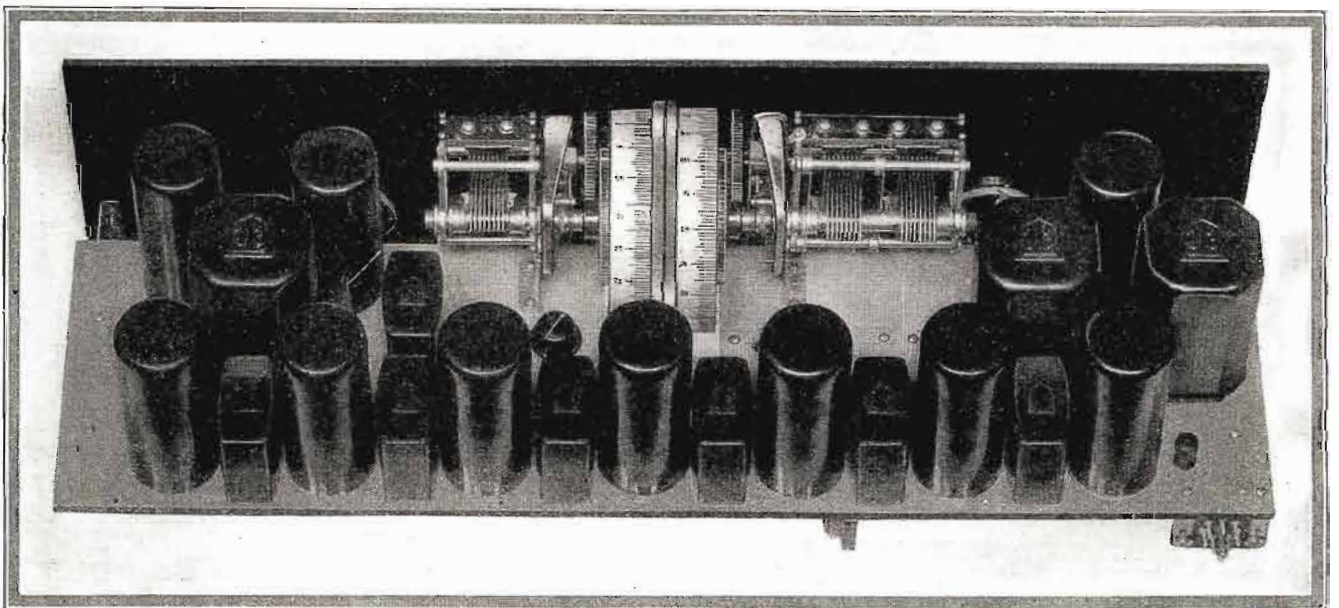


Photo C—Rear view of apparatus mounted on sub-panel showing shields provided for tubes

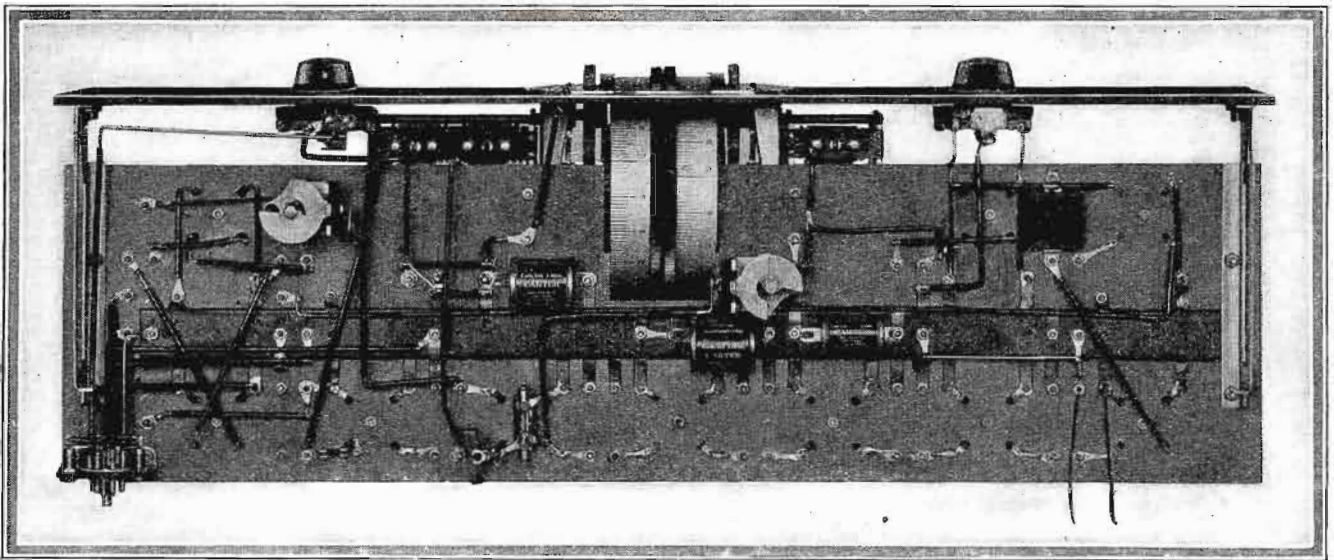


Photo D—Bottom view showing position of Kurz-Kasch capacity connector

advised by the designers. The push-pull stage of the second audio, and especially the output transformer, assures perfect tonal quality. It was more than useful to provide on these transformers a ground connection for their cores leading to a perfect stabilization of the audio frequency amplifying circuit.

The input circuit is combined of one stage of radio frequency and an oscillator. The Tyrman Type 8-70 Radio Frequency Transformer is used for the first, these units covering 200 to 550 meters with a .00035 condenser. To assure uniformity, moulded tubings are provided for the secondary windings; the specified Camfield condensers with adjustable capacities are a further aid in matching the radio frequency stages. As both grid returns have the common negative potential, a .00025 condenser is inserted in the grid of the first detector and a positive bias for this grid obtained by a 3-megohm resistance to the positive filament.

The oscillator stage with its Type 8-71 Tuned Radio Frequency Transformer, covering 900 to 1850 K. C., is coupled to the grid of the first detector by a 50-mmf. Midget Condenser. This capacity feed is the simplest and most efficient coupling method and has to be adjusted but once.

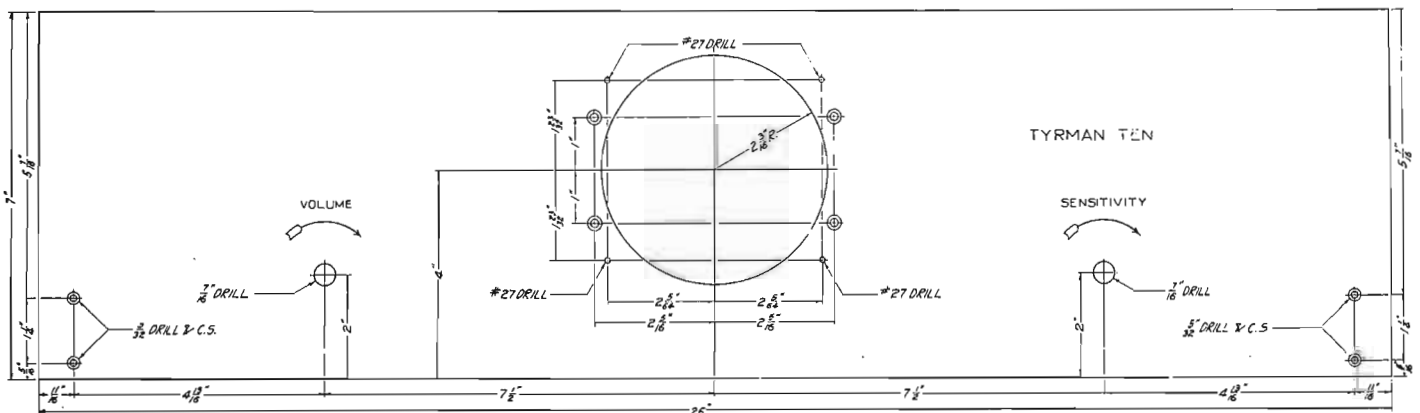
Two volume controls are provided on the front panel, the 25-ohm Rheostat for the first detector tube and a 200-ohm Potentiometer for the grid returns of the intermediate frequency amplifier. The rheostat can be left in one position except on the most powerful local signals. All tubes except the one mentioned are automatically kept at five volts by fixed resistances.

Before assembling the parts it is recommended to prepare the Kurz-Kasch Capacity Connector according to Fig. 3. Only the con-

nection actually to be used are left on the strip, while all those marked with "off" should be removed by bending them back and forth until they break. Two tabs are provided for each minus A and each plus B connection. It will be noted that both minus A tabs are used for the filaments throughout except the first detector, which is controlled by a 25-ohm Rheostat. It is emphasized that the removing of tabs has to be done every carefully, especially where only one of the double tabs (plus B, minus A) is used. The terminal strips are separated by very thin strips of bakelite and there is a possibility of short-circuiting, if the tabs are not broken off close to the strip. Of the plus B terminals the upper tabs represent the plus 45 V lead, while the lower one contains the plus 90 V connections. It will be noted that a number of tabs are bent above the strip where the center holes are used for mounting other apparatus. Utmost care should be taken of the extreme left plus B terminal, where the upper (plus 45 V) tab is removed, while the lower tab is bent around; at this place the bend is not made close to the edge in order to avoid short-circuiting the two plus B leads. Where both of the double B and double A tabs are removed both breaks should be inspected for short-circuiting and in case of touching the stubs should be separated with a knife.

It is advisable to keep the following schedule of assembling:

1. Front Panel and Subpanel
2. Audio Transformers
3. Capacity Connector
4. All other apparatus on subpanel
5. Vernier Drums



NOTE - ALL HOLES NOT SPECIFIED ARE  $\frac{1}{16}$ \"/>

Fig. 1—Panel Layout

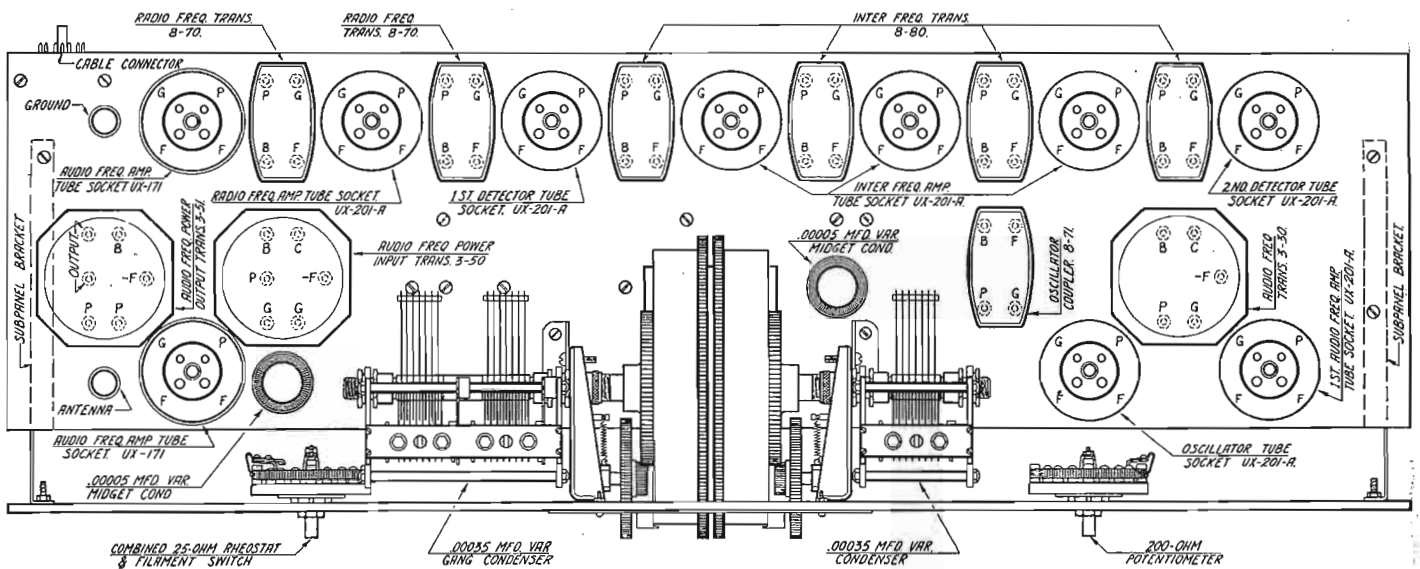


Fig. 2—Diagram showing top view of receiver

It will be noted that several terminals of the audio transformers and two terminals of the 7-71 R. F. Transformer (oscillator coupler) fit through the center holes of the capacity connector. If the latter is prepared according to the instructions given above, the terminals of the transformer will fit through the tab holes of the capacity connector and actually comply with the circuit diagram. Figure 2 gives a detailed picture of the position of parts on the subpanel, while Figure 3 will show all wiring connections as they are made on the lower part of the subpanel. Where possible solder lugs are used instead of wire, thus assuring short leads. The dial brackets are connected with the subpanel by means of auxiliary brackets, and this system, representing the rotor terminal of the tuning condenser, is used also for connecting it to the minus A tab of the Capacity Connector.

It will be noted that a midget condenser is used for aerial coupling. The advantage of this coupling is eminent, as it allows positive regulation of the signals, whatever antenna is to be used, and also serves for regulation of selectivity to any desired degree. For average use thirty to forty feet of indoor aerial would be

sufficient to bring in long distance stations. It is advisable to set the midget condenser receiving a wave of approximately three hundred meters to the best volume without oscillation and leave it in this position. The midget condenser regulating the capacity feed of the oscillator should be tuned to the lowest volume on a distant station.

It is advisable to ground the escutcheon on the front panel to the minus filament, utilizing one of its mounting screws for this purpose. The speaker jacks are incorporated in the new No. 669 Yaxley Cable plug especially designed for this purpose and connected to the output terminal of the Type 3-51 Tyrman transformer. No external capacities are required for these audio units. All necessary by-pass condensers are incorporated in the transformers.

The model of this receiver constructed in the laboratory of the CITIZENS RADIO CALL BOOK was built from the exact list of parts appearing herewith. While it is possible for the experienced constructor or experimenter to successfully substitute other reliable parts for those actually specified, it is recommended that the novice strictly

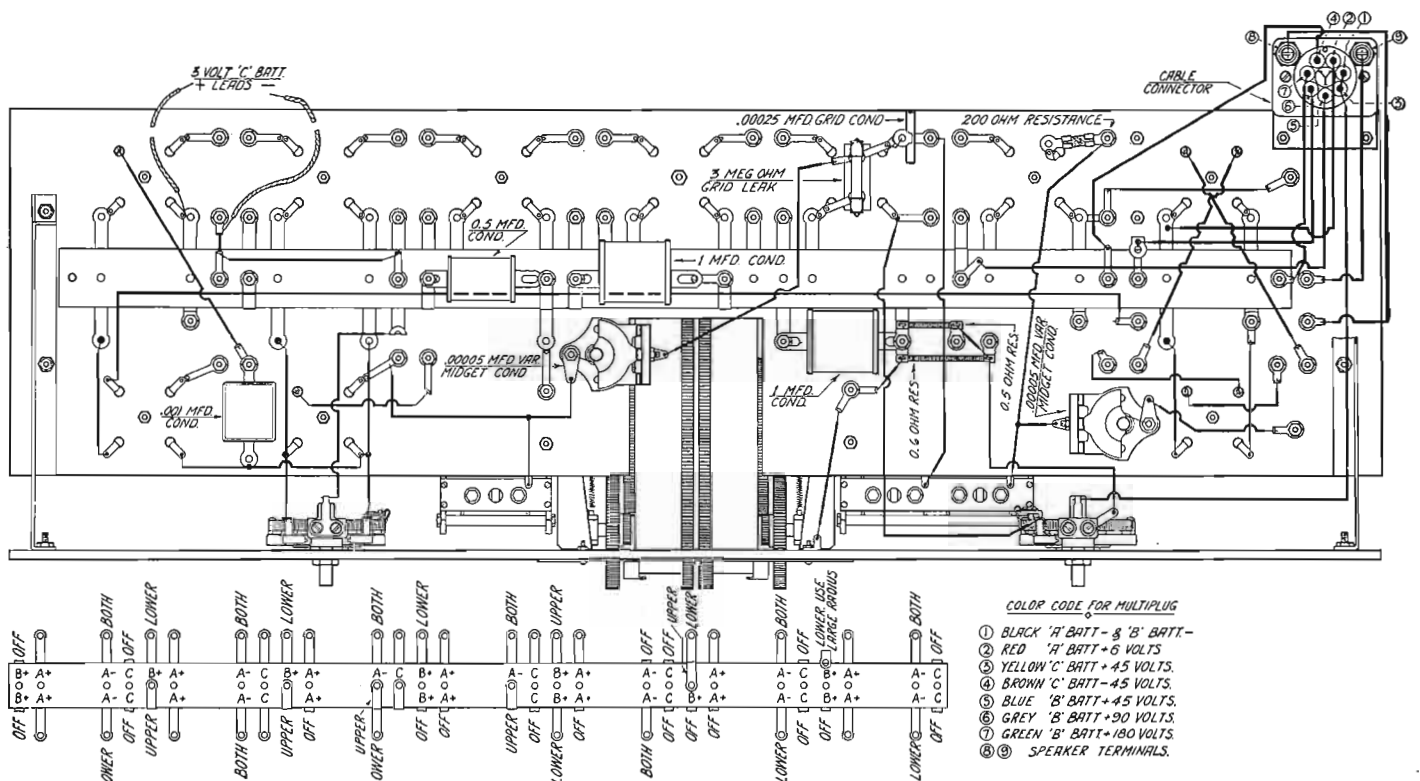


Fig. 3—Pictorial wiring diagram with all parts mounted on the sub-panel

adhere to the list of parts as given below.

- 2 Tyrman Type 8-70 R.F. Transformers
- 1 Tyrman Type 8-71 R.F. Transformer
- 4 Tyrman Type 8-80 R.F. Transformers
- 1 Tyrman Type 3-30 Audio Transformer
- 1 Tyrman Type 3-50 Power Input Transformer
- 1 Tyrman Type 3-51 Power Output Transformer
- 1 Tyrman Double Vernier Drum Dial
- 10 Tyrman Shielded Tube Sockets
- 1 Kurz-Kasch Capacity Connector
- 1 Camfield Type 351 .00035 Mfd. Variable Condenser
- 1 Camfield Type 352 .00035 Mfd. Variable Condenser
- 1 Formica 7"x26"x3/16" Drilled and Engraved Front Panel
- 1 Formica 7"x26"x3/16" Drilled Ivory Sub-Panel
- 1 Pair Benjamin Type 8629 Shelf Brackets
- 2 Carter Type 110 1-Mfd. By-Pass Condenser
- 1 Carter Type 105 .5-Mfd. By-Pass Condenser
- 1 Carter .00025 Mfd. Mica Condenser
- 1 Carter .001 Mfd. Mica Condenser
- 1 Yaxley Type 660 Cable Connector

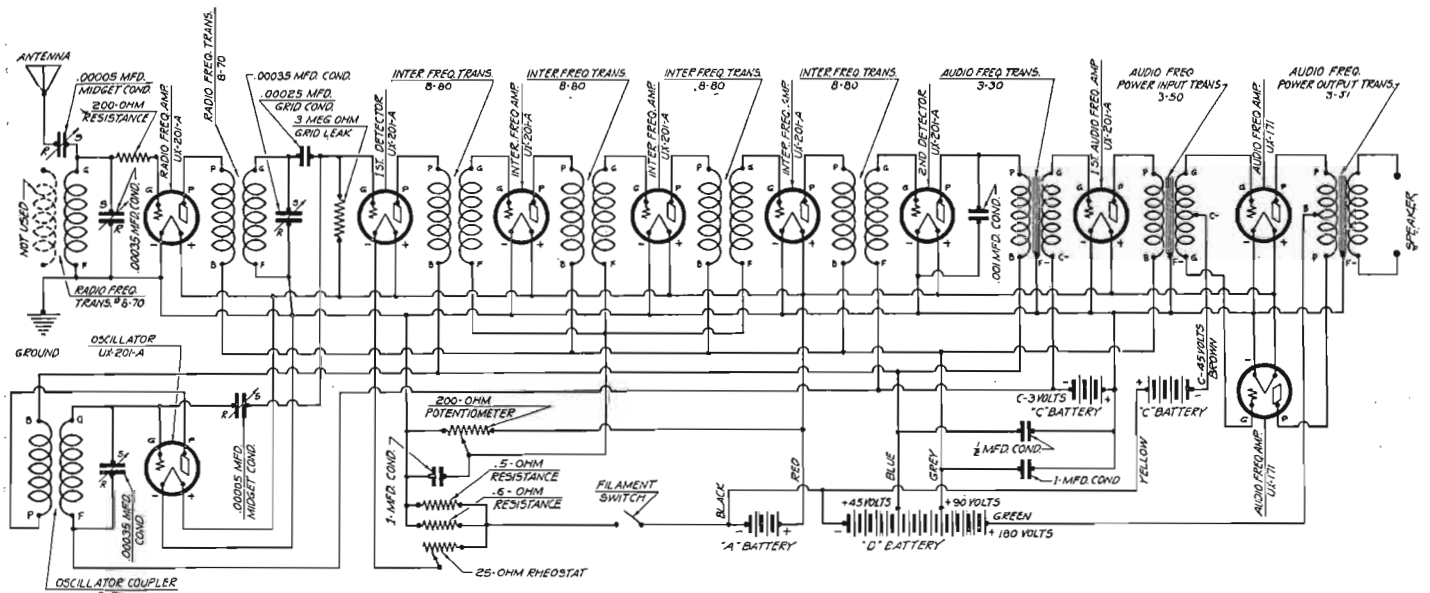


Fig. 4—Schematic wiring diagram. Notice that the primary on the first radio frequency transformer is not used

- 1 Yaxley Type 6L Filament Resistance, 1½ Amp. 5 Volts
- 1 Yaxley Type 5L Filament Resistance, ¼ Amp. 5 Volts
- 1 Yaxley Type 200 200-Ohm Potentiometer
- 1 Yaxley Type 7200 200-Ohm Grid Resistance
- 1 Yaxley Type 125K Switching Rheostat
- 1 Muter 3 Megohm Grid Leak with Mounting
- 2 Eby Engraved Binding Posts
- 2 Hammarlund 50 Mmid. Midget Condensers
- 2 Ceco Type J-71 Radio Tubes
- 8 Ceco Type A Radio Tubes
- 1 Package Kester Radio Solder
- 1 Ekko Ground Clamp
- 10 Feet Flexible Acme Celasite Wire
- Miscellaneous Screws, Soldering Lugs, Etc.

List of Accessories for Use with the Tyrman Ten Receiver

- 1 Corbett Walnut Console Type C-10-20.
- 1 Corbett Walnut Cabinet Type C.
- 1 Willard 120 Amp. Hour Storage "A" Battery.
- 1 Sterling Type R-98 "B" Supply.
- 1 Temple Type 18 Speaker.
- 1 Kodol Kuprox Charger.
- 1 Jewell Type 595 A-B Relay.

The model C-10-20 Corbett console shown in photo "A" consists of two parts, the cabinet and the table. They may be bought separately or together. The combination makes an attractive piece of furniture well worthy of a place in the finest home.

Walnut is used, rubbed to a high gloss, with embossed ornaments on the corners and doors. The lower compartment has ample room for all the batteries, charges and other accessories.

The Corbett "C" cabinet shown in photo "B" is for use when the set is to be placed on a table. It is designed in the style of an ancient Italian treasure chest and presents quite an attractive appearance. Walnut is used, in the natural finish, polished to an eggshell gloss. Both the console and the cabinet are manufactured by the Corbett Cabinet Mfg. Co., St. Marys, Pa.

The Willard storage battery is contained in a hard rubber case with threaded rubber insulation, insuring a maximum life and stability of output. There are three sizes recommended for radio work, that of 120 ampere hour capacity being best suited for this particular set. A smaller capacity will do, but to render the same service as the larger battery it must be charged more often.

The Sterling R-98 power supply furnishes both the "B" and "C" current at any value desired from 0 to 180 volts, readily regulated by means of variable resistances controlled by external knobs. A type "BH" Raytheon tube is used, insuring the utmost smoothness of operation. The unit is mounted in an attractive metal

case with all terminals and controls brought out to a single panel. A cord and plug makes it convenient to connect to the light socket. The power supply is manufactured by the Sterling Mfg. Co., Cleveland, Ohio.

The Temple 18 speaker is built on a newly developed plan that gives true reproduction over a full scale of seven octaves, allowing realistic values to everything from a single instrument to an entire orchestra. The speaker is eighteen inches in diameter and is mounted in an attractive metal case finished with brown crystalline enamel. It is made by Temple, Inc., Chicago, Ill.

The Kodol Kuprox charger uses a dry metallic rectifier which is silent in operation and practically foolproof, as well as positive in operation. The battery charger is manufactured by the Kodol Radio Corp., Cincinnati, Ohio.

The Jewell 595 AB relay is a device that automatically controls the accessories used with this receiver. When the set is turned on, the power flowing through the Kuprox charger is cut off, and the "B" Power Supply energized. As soon as the receiver switch is thrown to the off position, the relay automatically turns on the power and places the charger in operation so that the charge withdrawn from the battery is replaced. At the same time the "B" Power Supply is turned off. This always keeps the storage battery at peak charge, where it delivers the most efficient service. The relay is made by the Jewell Electrical Instrument Co., Chicago, Ill.

(If further information on any of the above accessories is desired, it may be obtained by writing direct to the manufacturer.)



# The Aero-Seven Receiver

Here Is a Single Control Receiver That Gives  
Excellent Quality

This Receiver Was Constructed and All Illustrations Made in the  
Laboratory of the Citizens Radio Call Book

**T**HE Aero-Seven is a seven-tube receiver using a ballast tube antenna coupling, two stages of tuned radio frequency amplification detector and three stages of resistance coupled audio amplification.

All three tuning condensers are coupled to a single shaft eliminating all difficulties in tuning and making the set a single control affair. All condensers must be identical and all the coils of the same size and number of turns.

The ballast tube is a refinement of the aperiodic coupled antenna system so extensively used in commercial radio stations. The tube acts as a rectifier, allowing the incoming signal to pass from the grid to the plate and it effectively retards any tendency to radiate energy.

Aperiodic coupling makes the set independent of the aerial. The antenna simply acts as a collector of energy and is in no way instrumental in affecting the tuning of the set itself. This means that there is no need of having an antenna control or variable coupling device.

The fixed antenna coil and the two radio frequency transformers are identical. They are of low loss construction, having the minimum dielectric in the field, consistent with mechanical strength and uniform operation.

The transformers are long and slender,  $3\frac{3}{8}$  inches high and 2 inches in diameter, the secondary being wound with 77 turns and the primary with 15. The wire on the primary need not be as large as the secondary. The primary fits inside the coil nearest the filament end.

Due to the small diameter of the coils, their magnetic field is so restricted they may be mounted vertical if at least 4 inches apart with no danger of intercoupling. All connections are brought out at the base.

The tuning unit consists of a gang of three .0005 mfd. variable condensers controlled by a single shaft. The unit is base mounted and controlled by a drum type dial with a friction vernier. As pressure is constant at all times, there is no slipping or backlash and tuning is smooth and positive. A distinct advantage of the drum type dial is that the reading is always at a plane with the eyes and the numbers are large enough to read at a distance. This enables one to tune without having to lean forward.

A 1000-ohm fixed resistance is shunted between the antenna and ground terminals. Two .5 mfd. condensers are used, one between the ground and the secondary of the first radio frequency transformer, the other between the ground and the secondary of

the second transformer. No condenser is needed for the third, for the condenser connected to the first transformer serves that one as well.

Volume is controlled by a 200-potentiometer shunted across the filament leads, the rotating arm being connected to the filament terminal of the three transformers.

The filament current for the ballast tube and the two radio frequency tubes is controlled by a 6-ohm rheostat, that for the detector and three amplifiers by 11-ohm, 1-ampere fixed resistance.

The detector tube is mounted in a spring suspension socket, which absorbs vibration, eliminating microphonic noises. Do not use a soft tube for a detector in this circuit, for tests have shown that the same type of tubes in all sockets, save the last, give the most satisfactory results. Take particular note that the grid leak is connected between the grid and filament, not across the grid condenser. Use a high resistance leak, about 5-megohm.

The grid condenser is an impregnated .00025 mfd. There is no need in using one with a grid leak mounting, for the mounting will be of no service. A separate mounting concealed under the baseboard holds the leak. Keep the leads in the grid circuit as short as possible. A good plan is to mount the condenser directly on the grid terminal of the socket.

A .001 fixed condenser is shunted across the plate and negative filament leads. This condenser is to bypass the radio frequency current and keep it out of the amplifier.

A small radio frequency choke in the lead between

the plate and the amplifier effectively prevents the radio frequency current from entering.

The first audio amplifying unit consists of two resistances, one of  $\frac{1}{4}$ -megohm, the other 2-megohm with a small fixed condenser in the grid lead between them. The next one is a coupling of  $\frac{1}{4}$ -megohm and 1-megohm, while the last is .05-megohm and  $\frac{1}{2}$ -megohm.

These units may be assembled out of the parts or may be purchased in a block. Resistance coupled amplification gives smoother signals than transformer coupled and there is no distortion due to transformers. However, it will not give volume of transformers, so three stages will have to be used.

The added mellowness will well repay for the use of the extra tube. Resistance coupled amplifiers will take a higher B voltage than transformers and it is advisable to employ an eliminator, for the drain is rather heavy. A power tube is used for the last

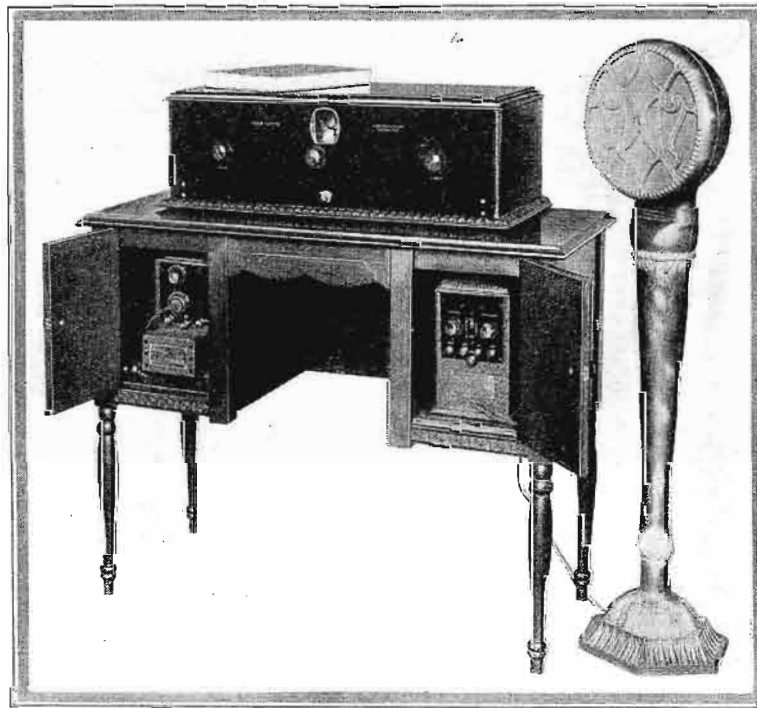


Photo A. View of receiver mounted on table with suggested accessories

stage with anything up to 200 volts on the plate. It is not advisable to go beyond this point, it is not advisable to go beyond this point, for no additional amplification will result.

Ninety volts for all the rest of the tubes is satisfactory. Use

- 6—Amsco Sockets
- 1—Amsco Floating Socket
- 1—Amsco 5-megohm Grid Gate and Mounting
- 1—Amsco ½-megohm Grid Gate

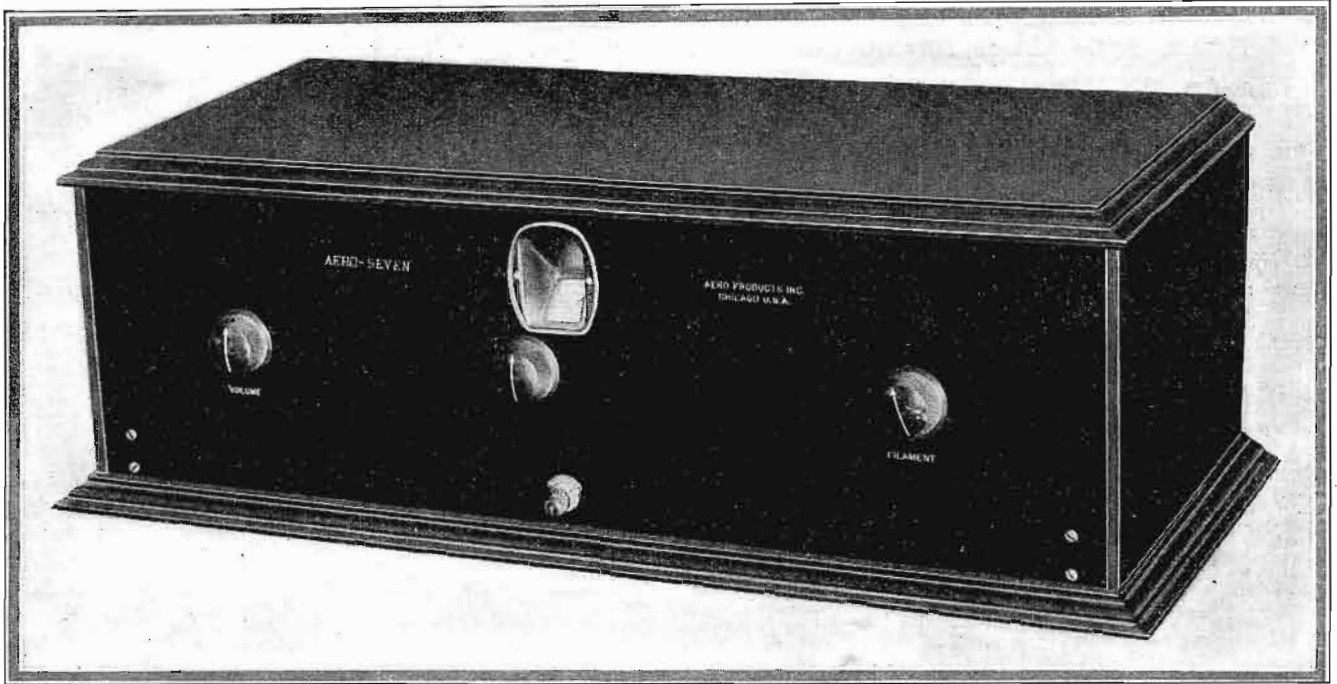


Photo B. View showing receiver in cabinet

a 4½-volt grid bias on the first and second amplifier tubes, while 45 will be best for the last tube. Try by experiment till the correct voltage has been obtained.

The entire set, save the rheostat, potentiometer and tuning control, is mounted on a bakelite baseboard. The wiring is all put

- 2—Amsco ¼-megohm Grid Gates
- 1—Amsco .05-megohm Grid Gate
- 1—1-megohm Grid Gate
- 1—Amsco 2-megohm Grid Gate
- 3—Amsco RC-1 Resistor Couplers

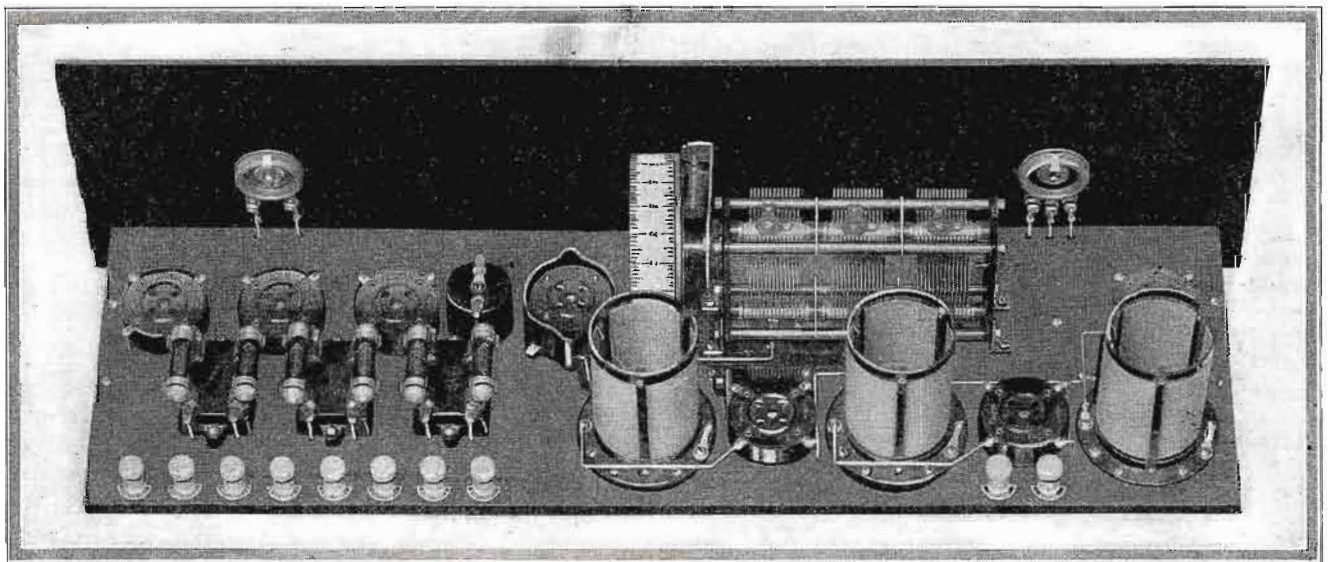


Photo C. Rear view of receiver showing neat, symmetrical arrangement of parts

on the under side, the location of the parts making that possible. Shorter leads may be obtained by sub-wiring the surface, for they can go in straight lines instead of having to weave back and forth between instruments. Also there is less danger of short circuiting by careless handling, and no need to use great quantities of spaghetti insulating.

#### List of Parts

- 3—Aero R. F. Transformers
- 1—Aero R. F. Choke Coil

- 1—Amsco .0005 Three-Gang Variable Condenser STL

- 1—Silver-Marshall Drum Dial
- 2—Silver-Marshall Brackets
- 1—Carter 6-ohm Rheostat, Midget
- 1—Carter 200-ohm Potentiometer, Midget
- 1—Carter No. 810 Fixed Resistance
- 1—Carter 1000-ohm Fixed Resistance
- 1—Carter Filament Switch
- 2—Carter .5 mfd. By-pass Condensers
- 1—Carter .001 mfd. Fixed Condenser
- 1—Carter .00025 mfd. Fixed Condenser

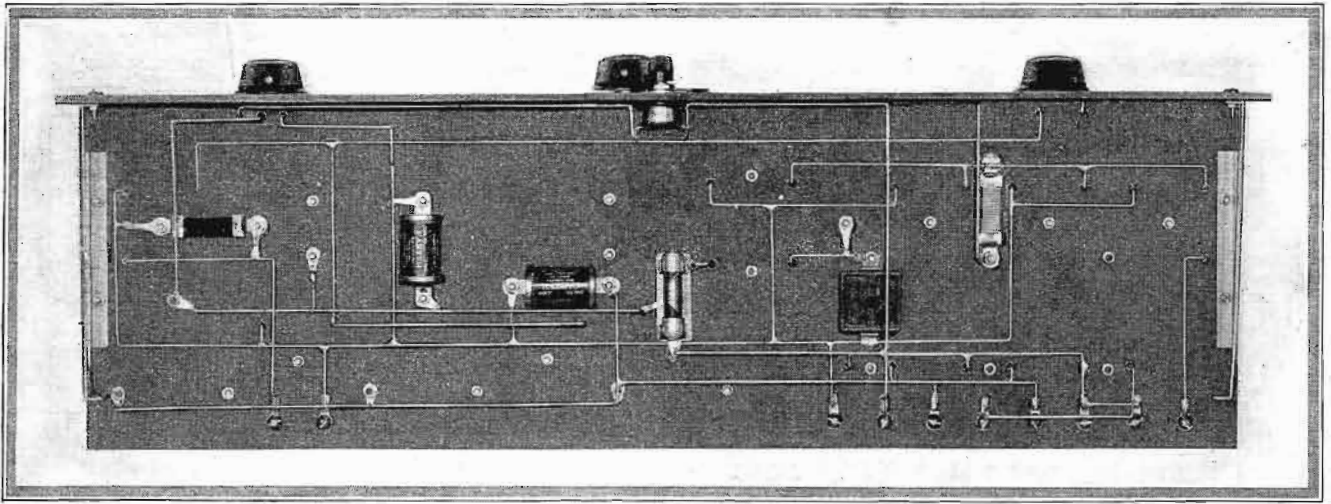


Photo D. Bottom view of receiver showing neat wiring possible

- 10—X-L Binding Posts
- 1—Micarta 7x24x3/16-inch Drilled and Engraved Panel
- 1—Micarta 7x23x3/16-inch Drilled Sub-Panel
- 30 Feet Acme Celesite Wire
- 1 Package Kester Radio Solder

tested with the Aero Seven Receiver and have been found to operate most satisfactorily with it. While these particular accessories are suggested, it is possible to make any reasonable substitution without decreasing the all around efficiency of the receiver:

- 1—Southern Toy Company's 7x24x10-inch Iveyline Cabinet

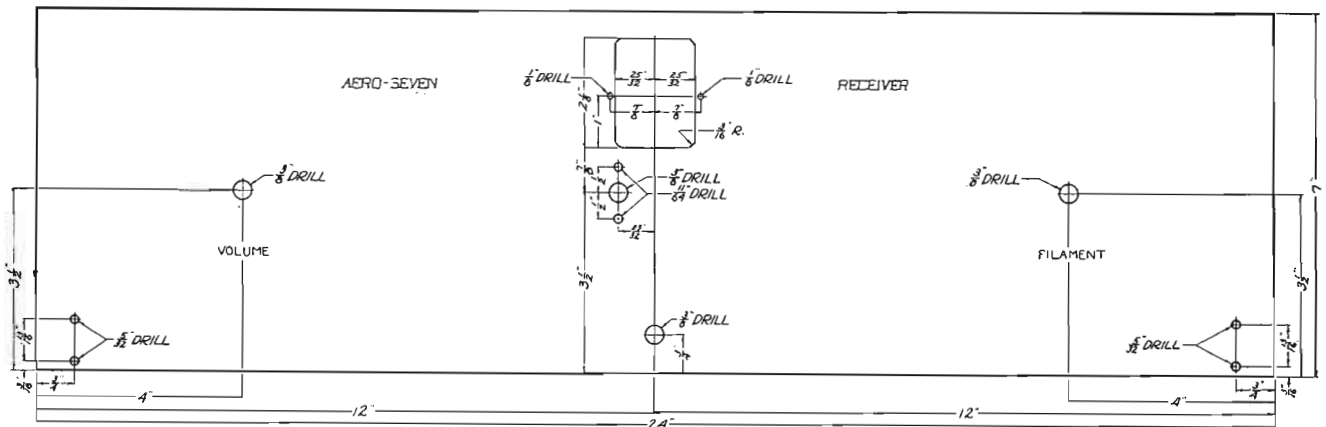


Fig. 1. Panel layout

- 1—Ekko Ground Clamp
- Miscellaneous Lugs, Bolts, Nuts, etc.
- 5—Sonatron Type Mu-X20 Tubes
- 1—Sonatron Type 201-A Tube
- 1—Sonatron Type 171 Tube

- 1—Southern Toy Company's Mahogany Radio Table
- 1—Majestic "A" Current Supply
- 1—Majestic Super "B" Current Supply
- 1—Yar True-Tone Speaker

**List of Accessories Used with the Aero Seven Receiver**

The following is a list of accessories which have been actually

Photo "A" shows the Aero Seven Receiver installed in a Southern Toy Company's Cabinet in conjunction with the Southern Toy Company's Radio Table. Both pieces of furniture are manufactured by

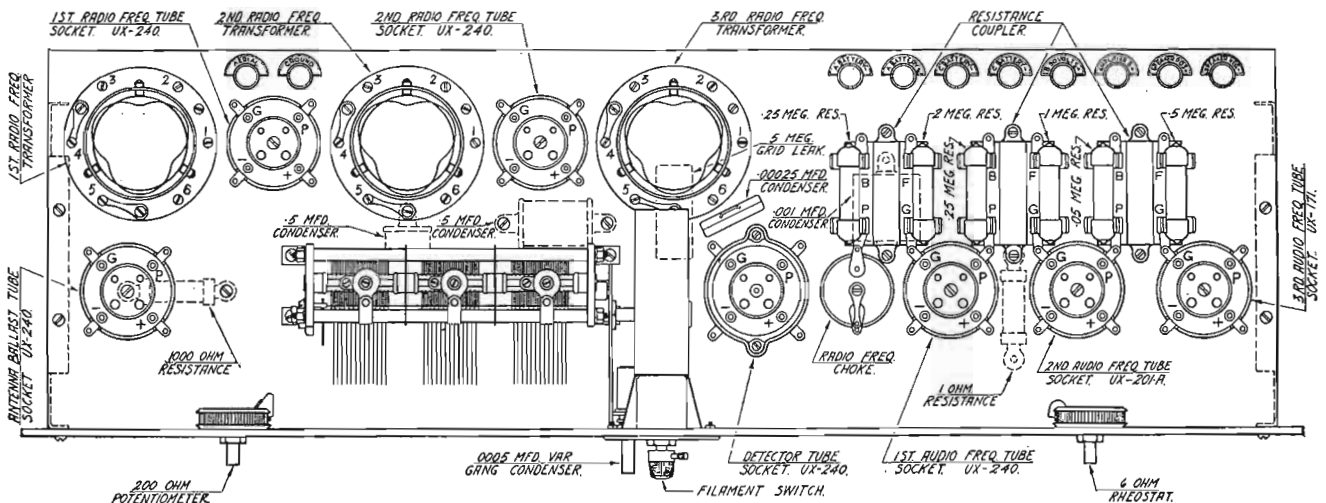


Fig. 2. Sub-panel layout

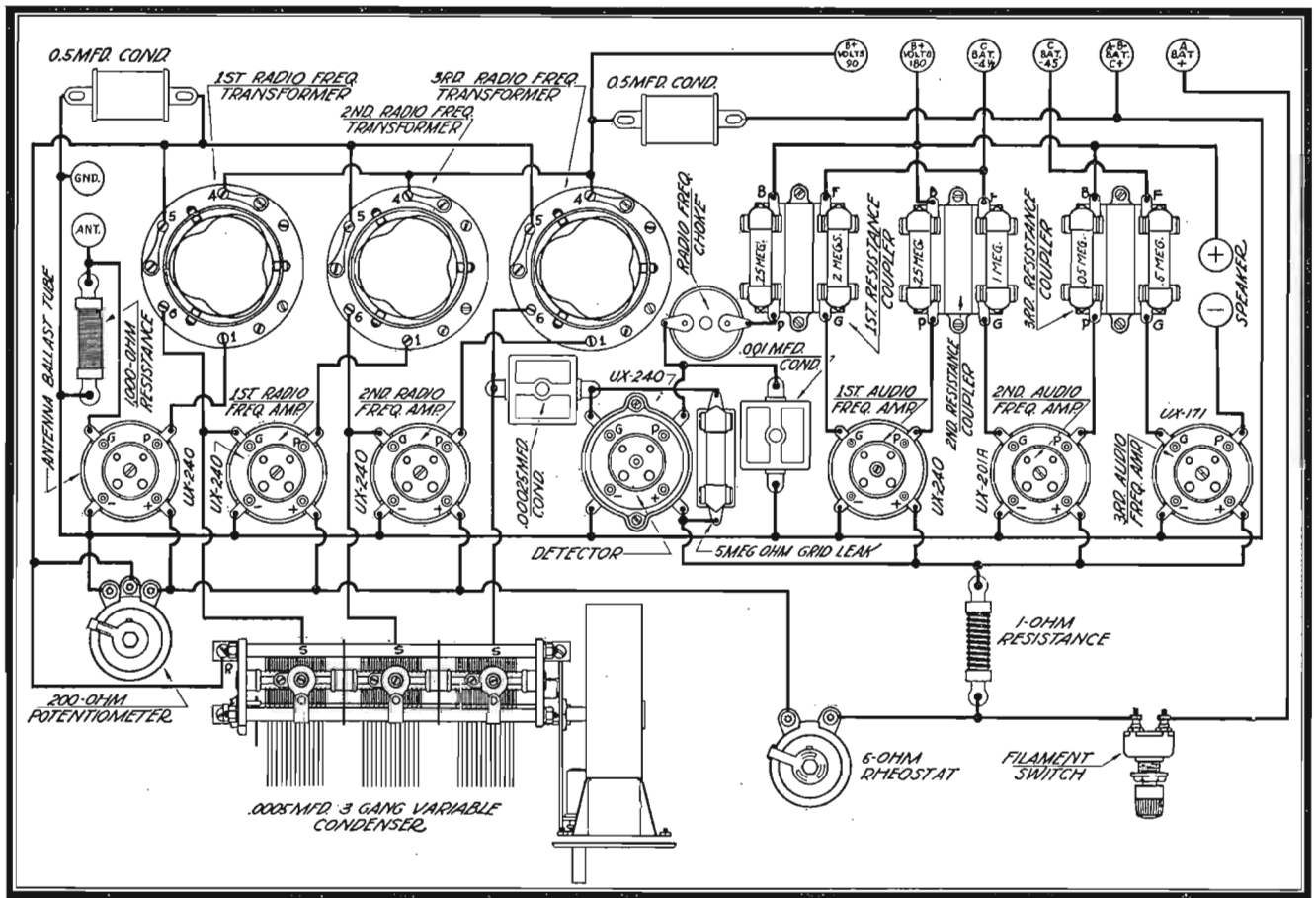


Fig. 3. Graphic wiring diagram illustrating in a pictorial manner all connections to the various parts in the receiver

the Southern Toy Company of Hickory, North Carolina. Both the Cabinet and Radio Table are beautifully finished in a varnished and oil rubbed finish. Each piece of furniture is sturdily constructed with sufficient room provided for the proper storage of accessories and "C" Batteries.

The speaker shown is a product of the Yahr & Lange Manufacturing Company of Milwaukee, Wisconsin. This speaker is unique since it uses an exponential air column. This type of construction when used in connection with the excellent reproducing unit supplied with this speaker will give wonderful tone quality. The speaker is tastefully finished in dark green and gold enamel.

Both "A" and "B" power supply is derived from Majestic Current Supply units manufactured by the Grigsby-Grunow-Hinds Company of Chicago, Illinois. Both of these units are similar in physical appearance. The "A" current supply is capable of supplying 2½ amperes at 6 volts and has a number of safety devices for preventing excess

voltage being applied to the filaments of the tubes in the receiver. In addition to these a receptacle is provided in the case of the "A" current supply for the plugging-in of the Majestic "B" supply. The switch on the "A" current supply will then control both "A" and "B" power supplies. The "A" current supply uses a dry plate rectifier whose operating characteristics insure a long and dependable life. The Majestic "B" current supply used in this installation has a maximum power output of 50 mills at 180 volts. The combination of four terminals for "B" current supply as well as a "high" and "low" switch affords an extremely wide range of "B" voltages. The rectifier tube used in the Majestic "B" power supply is manufactured by the makers of the Majestic units and is guaranteed for 1,000 hours, which is equivalent to one year of average use.

(If further information on any of these accessories is desired, it may be had by writing direct to the manufacturers.)

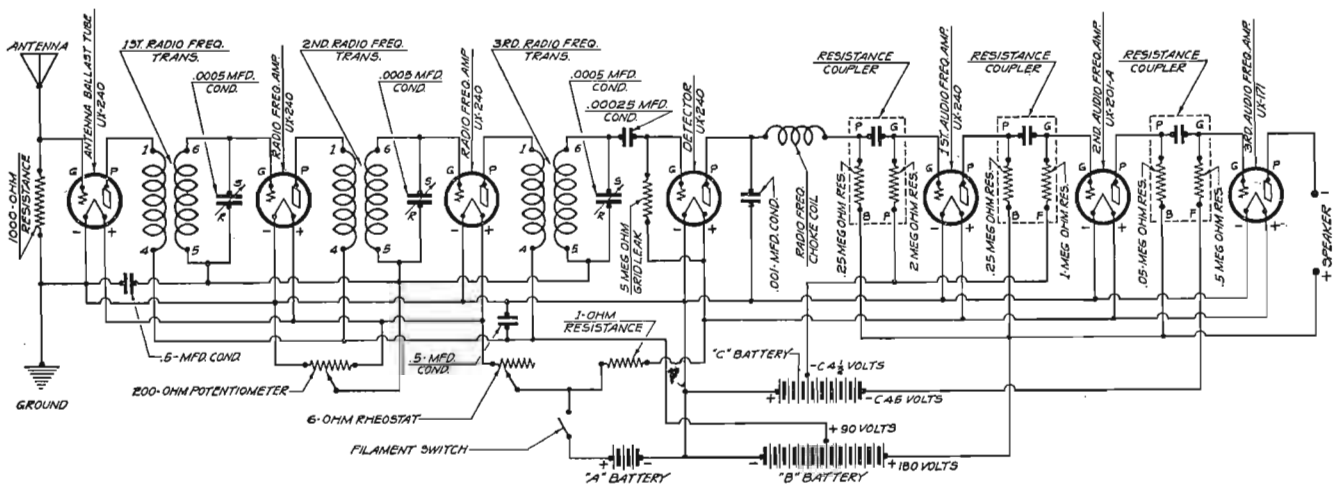


Fig. 4. Schematic wiring diagram

# The New World's Record Super 10

Recent Additions and Refinements Make the New World's Record Super 10 a Leader in Multi-Tube Receivers

All Illustrations and Construction Data Prepared in the Laboratory of The Citizens Radio Call Book

**T**HE New World's Record Super 10 is, as its name implies, a ten-tube receiver, using six-volt 201 A type tubes in all circuits but the last audio, which requires a 210 type in order to handle the tremendous volume. It is designed for operation with a short indoor or outdoor antenna of about 20 feet or 30 feet overall length, a feature which contributes materially to the selectivity of the receiver. Sub-panel type of construction is used, which facilitates assembly and wiring, beautifies the receiver, and adds considerably to the efficiency of the set as a whole because of the shorter plate and grid leads thus made possible.

The set has two major and three refining controls, symmetrically located on the panel in such manner as to make operation simple and easy, yet still retaining highest efficiency. The first major control (directly to the left of the filament voltmeter, Photo B) is geared to a drum dial which varies the setting of a three-gang condenser unit, tuning the input system of the receiver. The opposite major control, in connection with another drum dial and single section condenser, is used to tune the oscillator,

which generates the heterodyning frequencies, producing the beat signal which is amplified by the intermediate stages. The three refining controls, from left to right on the panel, are adjustments of the input circuit, the R. F. filament current, and the stabilization of the intermediate stages respectively. No filament switch is in evidence on the panel, this being built in the rheostat controlling the two R. F. tubes, which is located directly under the 0-8 volt Jewel Filament Voltmeter. When this rheostat is in OFF position, the filament current is automatically shut off by the action of an ingenious spring switch which is positive in its action. Filament current for all tubes but the first two input tubes is adjusted to the proper value by a master Rheostat located on the sub-panel. The exception of the two input tubes is necessary in order to effect the highest efficiency from the input amplifying circuit. The master rheostat is set at the value giving 5 volts reading on the voltmeter, and once correctly set, requires no further attention. From the foregoing, an idea of the ease and simplicity with which the World's Record Super 10 is adjusted and operated, can be quite readily acquired.

The receiver in itself consists of two stages of tuned radio fre-

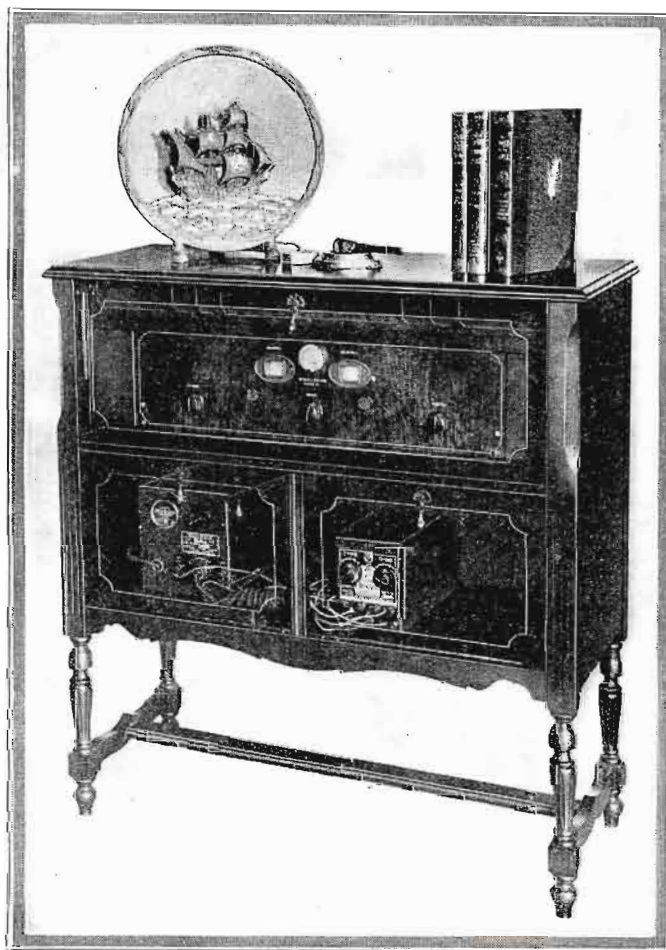


Photo A. The World's Record Super 10 Installed in a Console

quency amplification, with antenna pickup arrangement, preceding the first detector of the familiar super-heterodyne circuit. Considering the circuit in its respective divisions, we find first two tubes devoted to radio frequency amplification, a first detector, an oscillator, three stages of intermediate frequency amplification, a second detector, and two stages of cascade audio frequency amplification. The ten tubes are all so connected into the circuit that the object of the receiver—the interception and amplification of distant and local signals—is most admirably accomplished.

In sharp contrast to the previous models, the Super 10 is designed for antenna operation. This system of signal pickup is possible because of the two radio frequency amplifying stages, which intensify weak and minute signals, ordinarily too feeble to actuate the first detector tube of the average super. The use of two stages of tuned radio frequency preceding the detector in connection with the antenna, thus extends the range of the receiver to heretofore unattained distance.

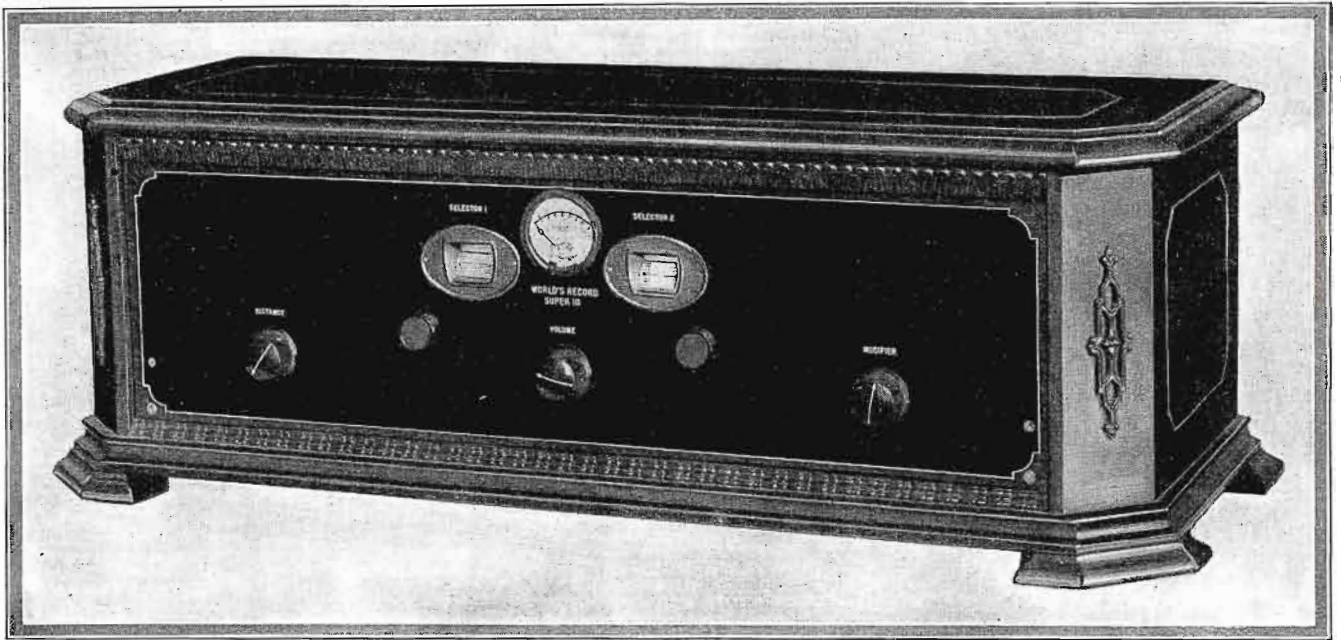
People who find it inconvenient to use a loop antenna

will greatly appreciate the advantages this new arrangement permits.

Aside from the extended range and sensitivity added by the RF amplifier, there are a number of other minor but important features that are only peculiar to the World's Record Super 10. The use of RF preceding the first detector of the super-heterodyne receiver is a generally recommended procedure when greatest sensitivity and selectivity is wanted.

This new receiver employs in the radio frequency stages three radio frequency couplers expressly designed and matched for use with the super-heterodyne and gang control tuning. The secondaries of these new units are actually matched to within one turn in an effort to secure uniform tuning on the gang condenser, so that resonance of each stage will take place when all three sections of the 3-gang condenser are alike in setting. Differences in wiring, and the effects of different types of antennas are compensated for by the use of four separate adjustments, of which three are made when the receiver is given the initial test and not touched again.

Changes in the inductance of the antenna coupling unit, caused



*Photo B. View showing panel arrangement and drum dials*

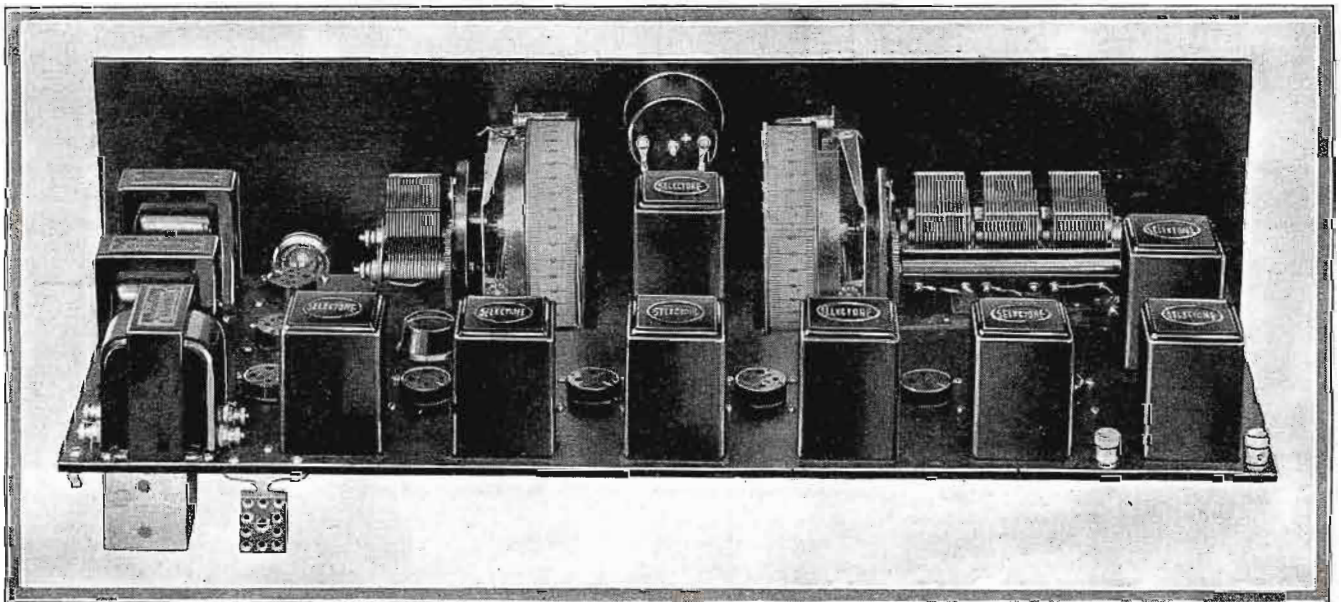
by antenna resistance and characteristics, are compensated with a midget condenser which is shunted across the end section of the 3-gang condenser, which tunes this unit. The midget is located at the extreme left of the panel, and is only semi-active in operation, being one of the refining controls used when tuning extreme long distances. Inequalities in the two remaining circuits, caused by differences in wiring and slight inconsistencies in equipment, are balanced off with small trimmers located on the frame of the gang condenser. By looking over the top of the set, it will be noted that between each section is located a small set screw. This set screw is the adjustment for a semi-fixed variable trimmer capacity, which is used to adjust any inequalities caused by influences as mentioned above. The adjustment of these trimmer capacities is accomplished by tuning in a comparatively weak station with the midget condenser set so that the plates mesh about one-half. The trimmer set screws are then adjusted until the station comes in with maximum strength and clarity.

The output of the RF stages is delivered to the first detector of the receiver, where the heterodyne frequency is impressed on the incoming signal. This takes place in the grid lead of the detector tube, where the oscillator pickup coil is located. It will

be noted that a grid leak and condenser is used on the first detector and that the first detector has a negative connection to the filament. Usually when condenser and grid leak are used, the grid return is positive, but in this particular receiver, better results are secured with a negative bias. A choke in the plate lead of the first detector prevents radio frequency strays from finding their way into the intermediate frequency stages, being by-passed by the .0001 mfd. fixed condenser shunted across the plate and A neg. filament lead.

This brings us to the second amplifying circuit of the receiver: by intermediate stages, which amplify the beat frequency produced by the heterodyning of the oscillator frequency and the incoming signals. Two transformers are used as filters, and two other transformers are used to step up the amplification.

The intermediate frequency amplifier is stabilized with a 400-ohm potentiometer which enables operation on the right portion of the curve of the transformer, and makes control of the amplification and volume simple and smooth. This potentiometer is the sensitivity control of the intermediate frequency stages and should be so adjusted that the tubes are just below the point of oscillation, where the greatest sensitivity, amplification and tone



*Photo C. Rear view of completed receiver*

is obtained. This is important while tuning for long distance stations.

The output of the intermediate frequency amplifier is delivered to the second detector, which is of the grid bias rectification type. The use of this method of rectification accounts for the great stability and freedom from noise which is an outstanding characteristic of the New Super 10. The second detector is heavily loaded, and the grid bias eliminates the possibility of distortion caused by overloading. A second choke in the plate lead of this detector in connection with a .002 mfd. fixed condenser makes certain that no strays find their way into the AF amplifier.

The Audio Frequency Amplifier is so generally and favorably well known that it hardly needs description. Two Thordarson R-200 transformers are used in connection with a 201-A and CX 210 tube. The output of the set is fed to the speaker through an output speaker coupling transformer, used in the plate circuit of the last tube to isolate the direct potential from the speaker windings.

Due to the terrific volume delivered to the last stage by the amplifying circuits of the receiver, it has been found advisable to use a 210 Power Tube in the last state of the audio. The use of this tube makes it possible to operate the set at full volume

facilitates wiring. In assembling the set and wiring, as much of the apparatus as can be conveniently put in place should be installed, and the greater part of the wiring may be done with the panel and base separate. When all the connections have been made that are possible with the panel and sub-base apart, they can be fastened together and the receiver completed.

Wiring should be systematically completed in divisions to avoid mistakes and confusion. It is a wise procedure to first wire all the filament circuits, and by screwing the panel and sub-base together temporarily make sure that all the circuits are correctly connected. The last audio stage can be tested separately with a 201A and storage battery for continuity. When you are sure the filament circuit is absolutely right, wire up the radio frequency stages, the intermediate frequency stages, first and second detector and oscillator, and the first audio stages. First wire in plate and grid circuits, leaving the B positive and grid returns to the last.

While the tuning is not difficult or critical, it will take a night or two to become thoroughly familiar with the operation of this set. The potentiometer on the right and the 15-ohm rheostat in the center control both volume and selectivity. The small midget condenser on the left is used principally when tuning for DX. On

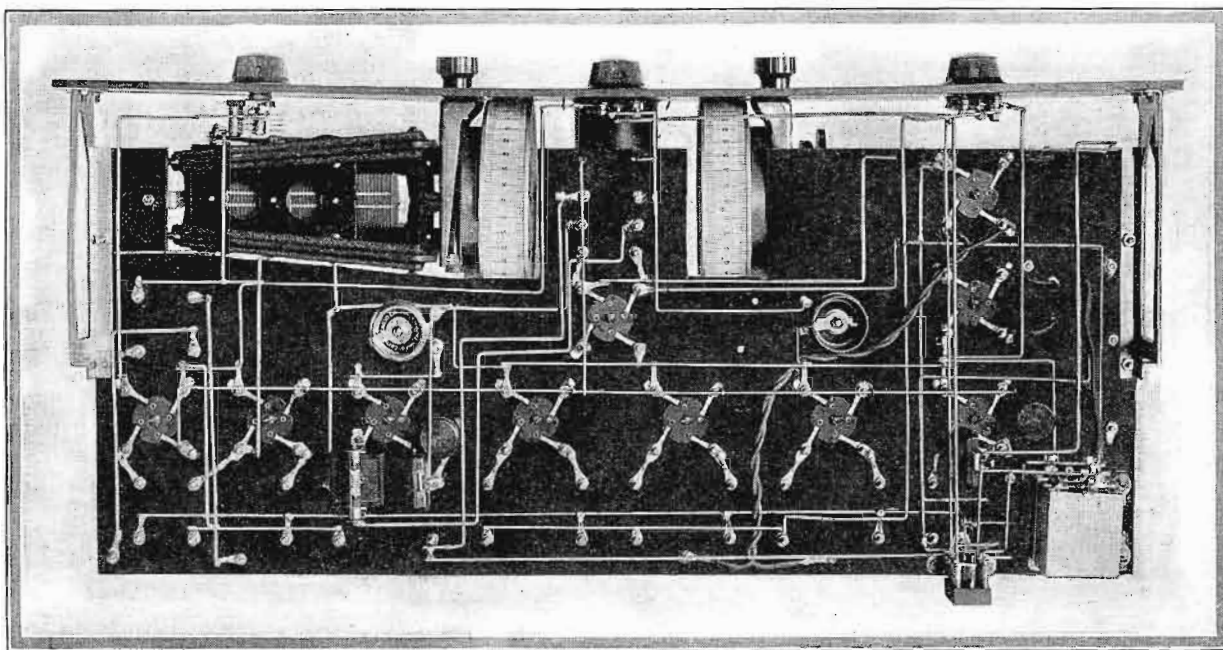


Photo D. Bottom view showing arrangement of parts mounted on under side of sub-panel

without the slightest trace of distortion even on the most adjacent stations, due to its heavy load carrying capacity.

Its use makes necessary the construction of a Thordarson Heavy Duty Plate Supply Unit to furnish sufficient current to handle the load of this tube, but as this is easily assembled, it is recommended as a source of plate potential.

There are four leads taken off the eliminator, coded as follows on the Jones 10 wire base mounting battery outlet: The Blue 45 volts for the oscillator and first detector, Pink 90 volts for the RF, Intermediate second detector and first audio tubes, and 400 volts (Brown) for the last audio stage and 210 amplifier. The 210 uses filament current from the light socket, a separate provision having been made for this feature on the Plate Supply Unit. The grid return lead from the last Audio Transformer (White) is connected to the filament winding of the Eliminator and provides the necessary C bias on the 210. The Yellow cord is the negative and Eliminator Negative, and 4½-volt C positive common return. The 4½ negative bias for the second detector and first Audio tubes comes from the Orange wire of the cable. The usual filament Red for Positive and Green for Negative is used in this new cable arrangement.

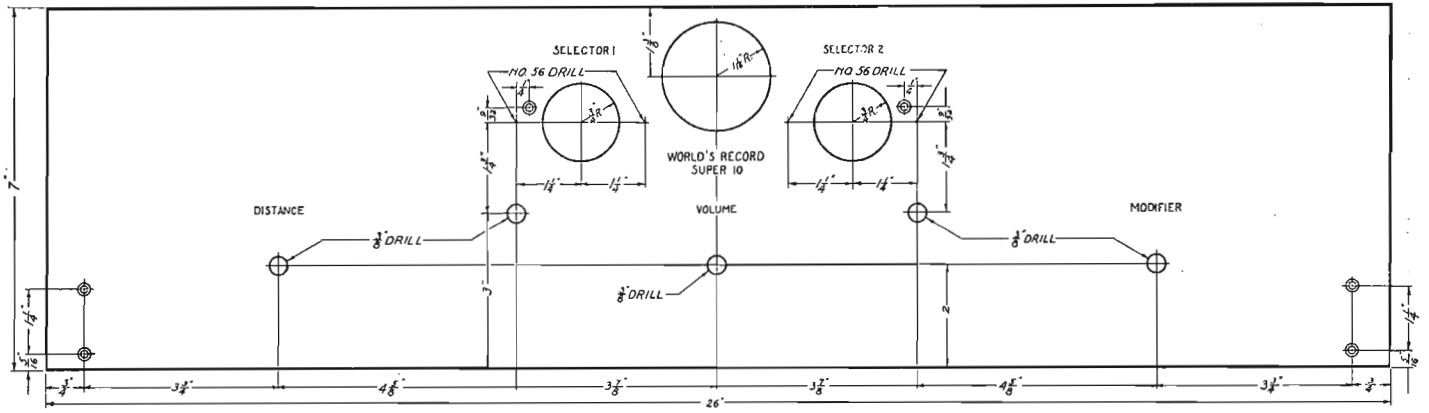
The construction of the receiver is even easier than previous models due to the use of the sub-panel construction, which greatly

strong local stations keep the filaments on the radio frequency tubes fairly low. If they are burned too brightly, they will oscillate and tuning will be very broad. If a strong local station appears to cover a large part on one or both dials, the filaments of the radio frequency tubes are too bright. Turn the rheostat in the center anti-clockwise to reduce the filaments and turn the potentiometer as far as possible in a clockwise direction without causing the intermediate frequency tubes to oscillate or squeal.

#### List of Parts Required for the Construction of the World's Record Super 10 Receiver

The list of parts given below were used in the construction of the laboratory model of the World's Record Super 10 Receiver. Experienced experimenters will have no difficulty in substituting other good makes of apparatus for those specified. The novice, however, is advised to strictly adhere to the list as given herewith, since he will then be assured of satisfactory results.

- 1—Remler .00035 mfd. Variable Condenser
- 1—Remler 3-gang .00035 mfd. Variable Condenser
- 2—Remler Universal Drum Dials
- 2—Remler R. F. Chokes No. 35
- 2—Sleecetone Transformers B-500



NOTE: UNLESS OTHERWISE SPECIFIED, ALL HOLES ARE 3/8" DRILL AND G.S.

Fig. 1. Panel layout

- 2—Selectone Transformers B-510
- 2—Selectone R. R. Transformers B-520
- 1—Selectone R. F. Transformer B-530
- 1—Selectone Oscillator B-540
- 2—Thordarson Audio Transformers R-200
- 1—Thordarson Output Transformers R-76
- 1—Carter Imp. 400-ohm Potentiometer
- 1—Carter Heavy Duty Rheostat, 1-ohm
- 1—Carter 15-ohm Rheostat with Switch
- 2—Carter Tip Jacks
- 2—Carter .00025 Grid Condenser
- 1—Carter .002 Fixed Condenser
- 1—Carter .0001 Fixed Condenser
- 1—S. M. Type 340 Midget Variable Condenser
- 10—Benjamin Sockets
- 1—Pair Benjamin Brackets 8629
- 4—Tobe 1 mfd. By-pass Condensers
- 1—Tobe 3-megohm Grid Leak

- 1—Jones Multiplug, 10 contact
- 1—Jewell 0-8 Volt Voltmeter Pat. 135
- 1—Pkg. Kester Radio Solder
- 1—Formica x26x3/16-inch Drilled and Engraved Panel
- 1—Formica 10x26x3/16-inch Drilled Sub-panel
- 60—Kellogg Solder Lugs
- 40—Ft. Acme Flexible Celestite Wire
- 2—X-L Binding Posts
- 1—Ekko Ground Clamp
- Miscellaneous screws, nuts, etc.

List of Accessories

- 1 Excello Model R-22 Console.
- 1 Corbett Type "C" Cabinet.
- 1 Tower "Pirate Ship" Model Speaker.

The Excello Model R-22 is a wall type console made of American Walnut with five-ply walnut top and panels. Front doors are of matched butt walnut. The tone chamber is built in the receiver compartment and is hinged as part of the cover top.

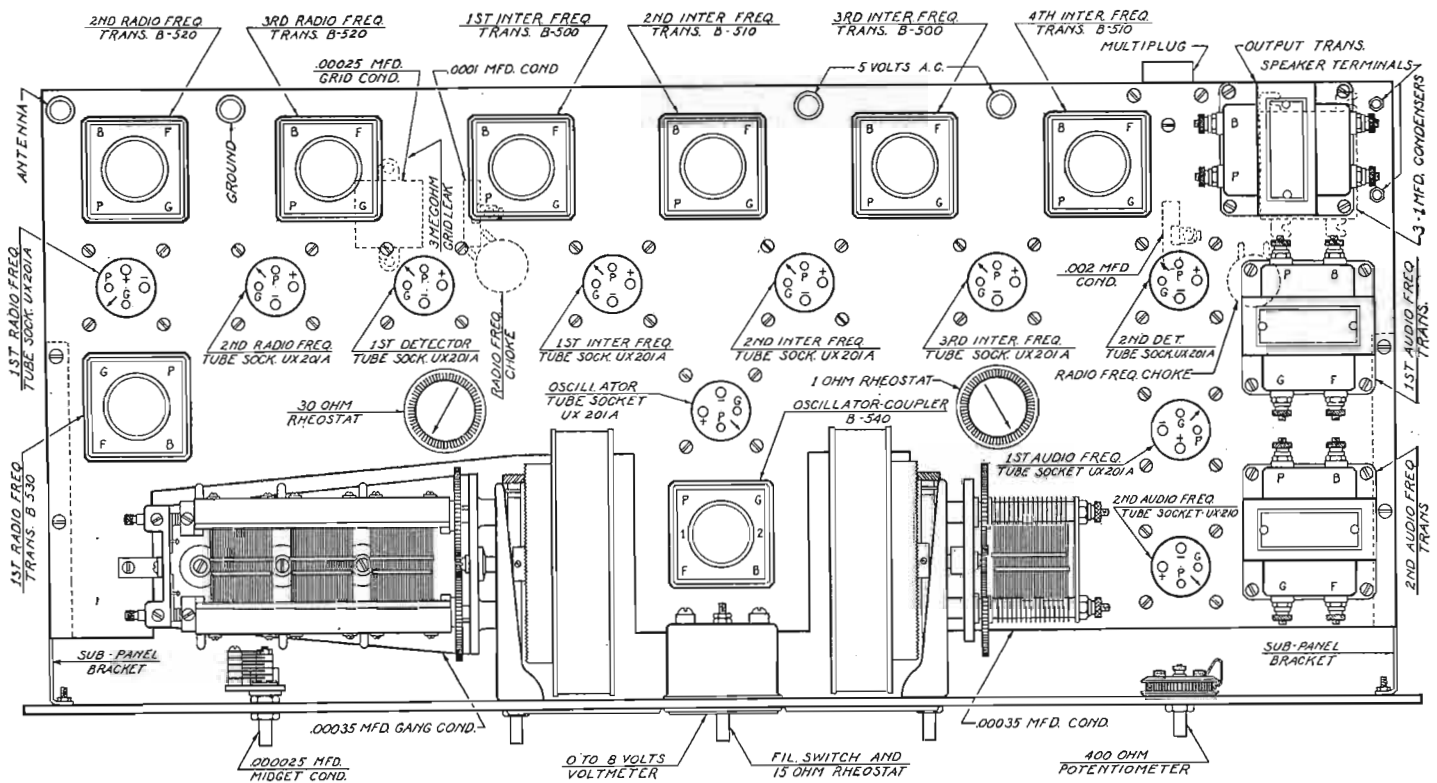


Fig. 2. Baseboard layout showing arrangement of parts



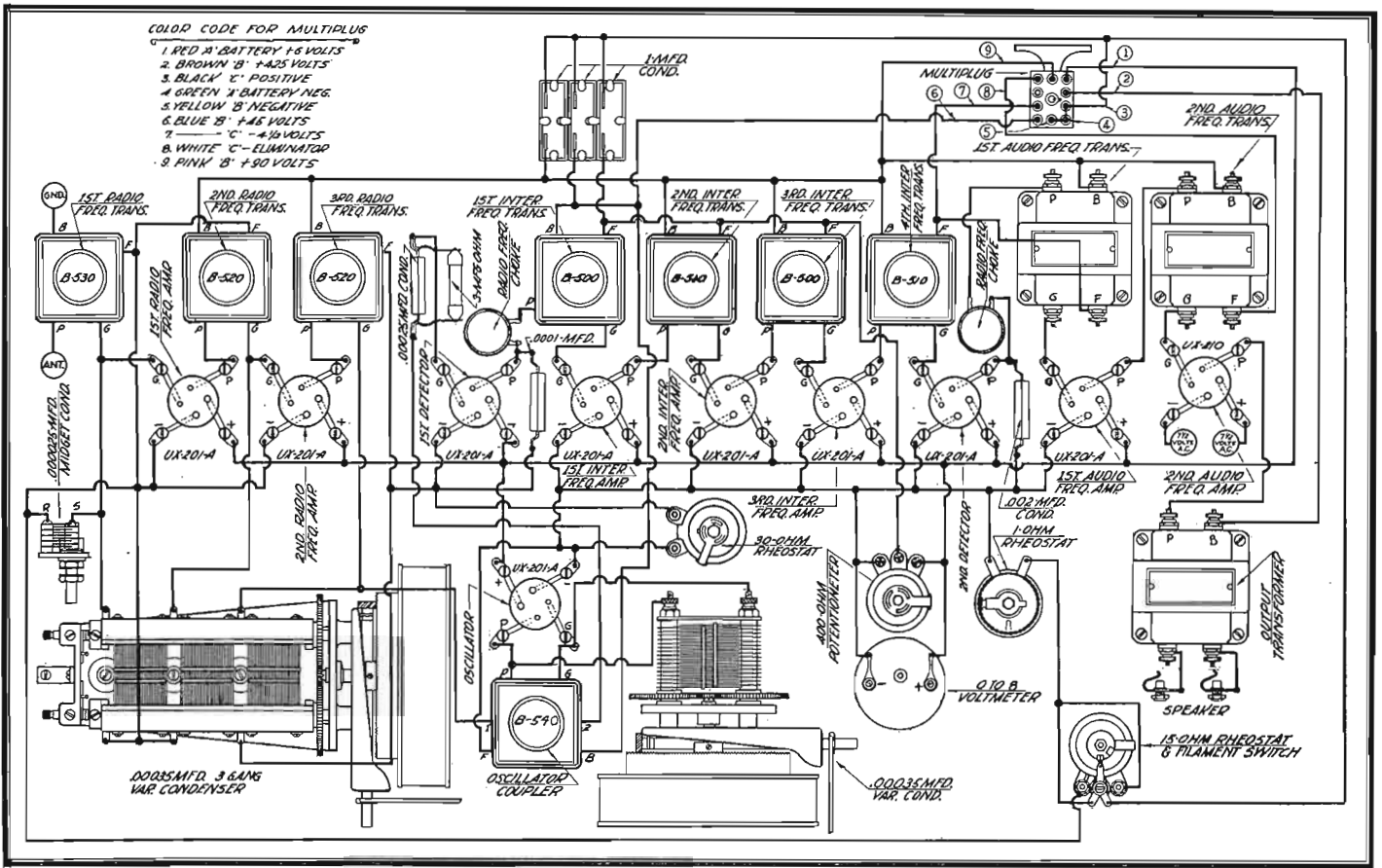


Fig. 3. Pictorial wiring diagram. Check this drawing against completely wired receiver

This tone chamber when used in conjunction with the external cone speaker will give an excellence of reproduction which is quite surprising. There is ample space for batteries and accessories. The "A" supply rests on a shelf, which may be drawn forward for inspection and removal of the unit. This eliminates all possibilities of scratching the woodwork. The console is finished in a beautiful two-tone piano finish.

A Corbett Type "C" Cabinet is recommended for housing this set if the use of a console is not advisable. The one in question is a beautiful piece of furniture, designed along the same lines as the Italian furniture of the Renaissance Period. Delicate scroll work and embossed ornaments are used to add attractiveness to an already beautiful cabinet. It is finished in natural walnut, rubbed to a high gloss.

The Tower "Pirate Ship" Model Speaker is an attractive ornament as well as a most practical instrument. Designed with the object in view of combining the beautiful with the useful, it easily fulfills the utmost expectations of the critical fan. Gazing upon the stately galleon plowing its foamy path over the billowing waves will throw one into the state of reverie so essential to fully appreciate the splendid tone quality and truthful reproduction of the speaker proper. The cone is 14 inches in diameter and is of such construction as to respond readily to all the delicate impulses of fine music. The speaker is made by the Tower Manufacturing Corporation, Boston, Mass.

(If further information on any of the above described accessories is desired, it may be secured by writing direct to the manufacturer.)

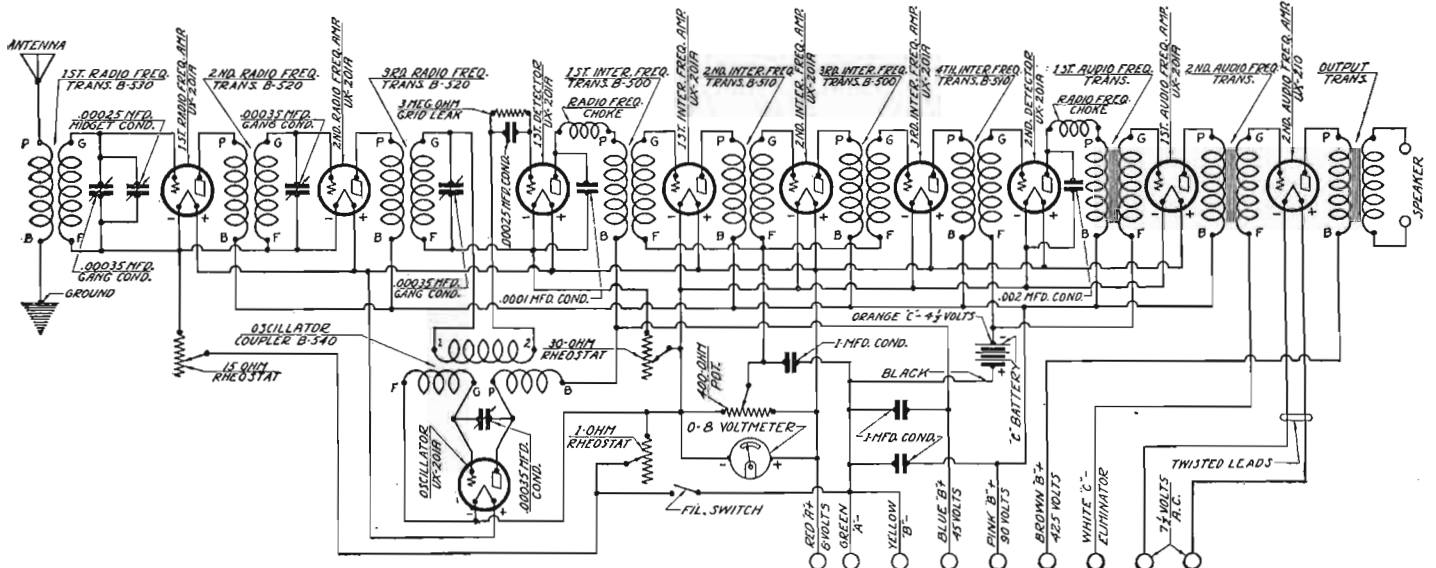


Fig. 4. Schematic wiring diagram

# An Ultra Powerful Distortionless Amplifier for Radio Set or Phonograph

The Unipac May Also Serve as a Receiver A B C Power Plant Without Alteration

**T**HE power pack described herewith is an unusually powerful device, and of very wide application, since operated from a 105 to 120 volt, 60 cycle, light socket, it will provide a stage of practically distortionless power amplification for any radio receiver, B power for any standard set, A, B and C power for any receiver employing A.C. tubes, or it will, without alteration, serve in conjunction with a magnetic record

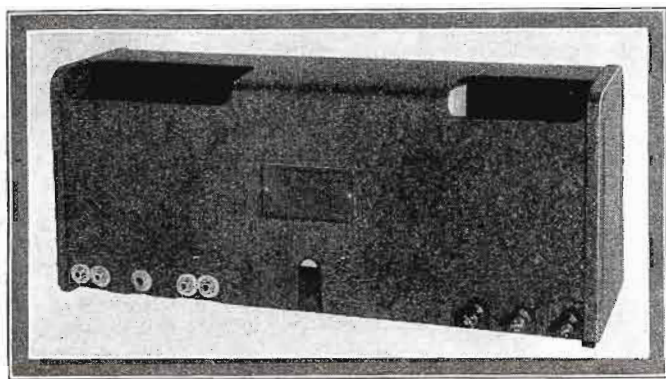


Photo A—Front view of Uni-pack mounted in metal cabinet

pick-up and a loud speaker, to convert any phonograph into the latest type of electrical reproducing instrument. Because of the universal nature of its uses, it has been termed a "Unipac," and in the following paragraphs its particular advantages, constructional features and operating details will be considered.

The Unipac consists of a stage of power amplification, and an A, B, C power plant in a single metal cabinet. The amplifier consists of a very high grade input transformer feeding a CX310 power amplifier tube, together with an output transformer to prevent damage to a loud speaker due to the high plate current involved. This stage may be joined to a radio receiver as a final high power output stage, but its amplification is not sufficient for direct use with a phonograph pick-up. For phonograph use, a CX326 amplifier tube is used, connected between the record pick-up and the input transformer primary, thus providing two amplifier tubes in all, the pair serving to develop ample volume for dancing in a small auditorium, or even out of doors, so great is the amplification and undistorted power output.

Power for the operation of the amplifier tubes is obtained from two power transformers which feed raw A.C. direct to the filaments, and which also provide the high voltage necessary for the two CX316B rectifier tubes, the output of which, properly filtered, is used for plate and grid voltages. A portion of the rectifier output is taken through a voltage dividing resistor, to be used for the B (and C) circuit of any standard receiver. In order to provide constant unfluctuating power to a radio receiver B circuit, a voltage regulator tube is used. The power transformers each have an extra 1.5 volt winding, one winding of one transformer being used to light the CX326 input amplifier tube filament. This, as well as the other winding, may be used to light the CX326 tubes of a receiver, while both windings also connected in series will serve to light a CX327 detector tube.

The need for a power amplifier output stage in conjunction with any receiver is today generally recognized, for it is now known that none of the smaller receiving amplifier tubes such as

the 201A, 112, or even 171 type can possibly deliver, without distortion, the power necessary for home entertainment at ordinary volumes. The maximum undistorted power output of a 201A tube is 55 milliwatts; of a 112, 195 milliwatts; and of a 171 tube, 700 milliwatts. The only tube at present available that, for second or last stage audio operation, will give the 1,000 to 1,500 milliwatts of undistorted power output necessary is the 210 type. In the Unipac a 210 amplifier is employed. The input and output transformers feeding this tube are the well-known Silver-Marshall 220 and 221 audio and output transformers, which give a rising amplification curve, so that the amplifier delivers greatest power to a loud speaker such as the Western Electric cone, at 30 cycles. This is desirable since the efficiency of all speakers falls off at low frequencies, and the Unipac amplifier thus tends to compensate for this failing. Above 200 cycles, the amplification is substantially equal for all frequencies up to 5,000 cycles, above which frequency the amplifier rapidly "cuts off," or ceases to amplify.

The power stage is connected directly to the first stage output of a radio set, but in cases where the receiver has no audio amplifier, or one so old as to be discarded because of distortion introduced, the extra 326 input tube in the Unipac may be used as a first stage amplifier by simply joining the detector output to the Unipac input through the medium of a good audio transformer or a resistor coupler unit. Ordinarily, this 326 input tube serves to amplify the output of a magnetic phonograph record pick-up up to the value needed to be impressed on the 210 power stage, but, as stated, its use is not limited, and it may be used as a first stage audio tube as well, so that the Unipac becomes a complete receiver amplifier and A, B, C power supply as well.

Two values of receiver B voltage are available from the Unipac—45 volts at up to 10 milliamperes, and 90 volts at up to 45 milliamperes. Both voltages are unusually constant under varying current drains and as a result of the use of an 874 voltage regulator tube, there is absolutely no tendency to motorboating or

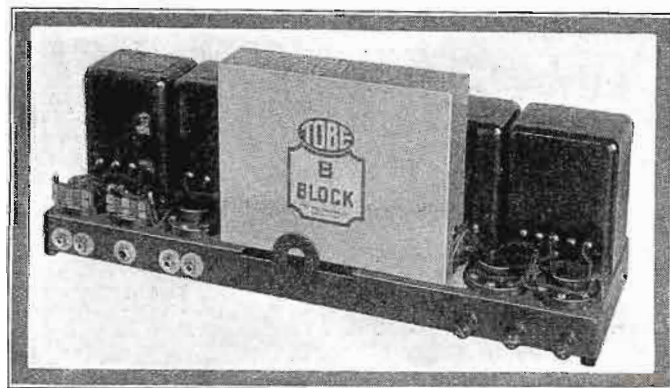


Photo B—View of assembly with cabinet removed

other noises when the Unipac is used as a receiver B power supply. Extra windings on the power transformer provide 115 volts for the lighting of the new 1.5 volt A.C. tubes as used in a radio set, while the two 1.5 volt windings of the two transformers if connected in series will also serve to light a standard 2.5 volt heater type detector. (The transformer voltage is then 3,

but about 1/2 volt is lost in the wiring, so that the 2.5 volt tube may be lighted direct from the 3 volt source.)

**PARTS LIST**

- 2—S-M 330A Power Transformers
- 1—S-M 331 Unichoke
- 1—S-M 220 Audio Transformer
- 1—S-M 221 Output Transformer
- 5—S-M 511 Tube Sockets
- 1—Ward-Leonard 16,500-W Resistor
- 2—Frost FT64 Resistors

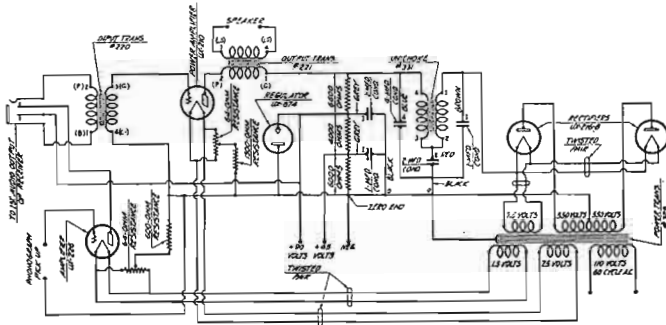


Fig. 1—Schematic wiring diagram

- 4—Frost 253 Tipjacks
- 1—Frost 953 Jack
- 3—Eby Posts Neg., +45, +90
- 1—Van Doorn Chassis and Cabinet (hardware included)
- 1—Tobe 662 Condenser Block
- 25 Ft. Kellogg Hook-up Wire

**Tubes Needed**

- 2—CX316B Rectifiers
- 1—CX310 Amplifier
- 1—CX374 Regulator
- 1—CX326 A.C. Amplifier

To assemble the Unipac, all transformers are mounted on the chassis, leaving the condenser until last (its mounting feet are clamped under two of the tube sockets). The binding posts and jacks are mounted upon the chassis edge, using the insulating washers accompanying it. The resistor is mounted by having

two of its lugs soldered to the +45 and +90 binding posts. The small FT64 resistors are mounted directly on the amplifier tube sockets, the socket mounting screws falling under them being left out.

The wiring is easily done, fastening wire ends under terminal screws or soldering to lugs, as most convenient. While no pictorial diagram appears, no difficulty should be found in following the schematic, as all terminal markings are exactly as on the instruments themselves. After the Unipac has been wired, it should be carefully gone over to see that no connection errors have been made, and that the twisted filament lines from the amplifier tube sockets to the power transformers are isolated from the rest of the wiring.

To test the Unipac, it should have both power transformer attachment plugs inserted in a two-way receptacle and the 336 and 310 tubes inserted in the two left sockets. Both should light—the 326 very dull, the 310 fairly bright. Both tubes should be removed and one 316B inserted in one of the two right sockets, followed by the CX374 in the center socket. The 316B should light and the 374 should glow with a pinkish discharge. If the second 316B is put in the remaining light socket, the glow tube should brighten perceptibly. If a voltmeter is handy, the 45 and 90 volt readings should be checked. The former should show 45 to 50 volts, the latter between 85 and 95, depending upon individual glow tubes.

With both amplifier tubes also in place, and a speaker connected to the output jacks, a roar should be heard, disappearing if the input tipjacks are shorted, or decreasing to a slight hum if a record pick-up is connected to the input tipjacks. Reversing one of the plugs from a power transformer will probably decrease the hum, and they should be left connected in the fashion giving the least hum. (Both cords may be connected to one plug, if desired, which will serve as an on-off switch. The cords must be carefully "poled," though, for least hum.)

For operation with a receiver, a pair of leads from the first audio stage output should terminate in a plug, to be inserted in the double-circuit jack of the Unipac. This connection drops the input tube, which is then only used with a record pick-up. Of course, the first audio stage receiver tube may be dropped, and the grid lead of the receiver first audio stage connected to the input tipjack connecting to the grid of the 326 tube. The grid return is then made through the negative B connection from Unipac to receiver.

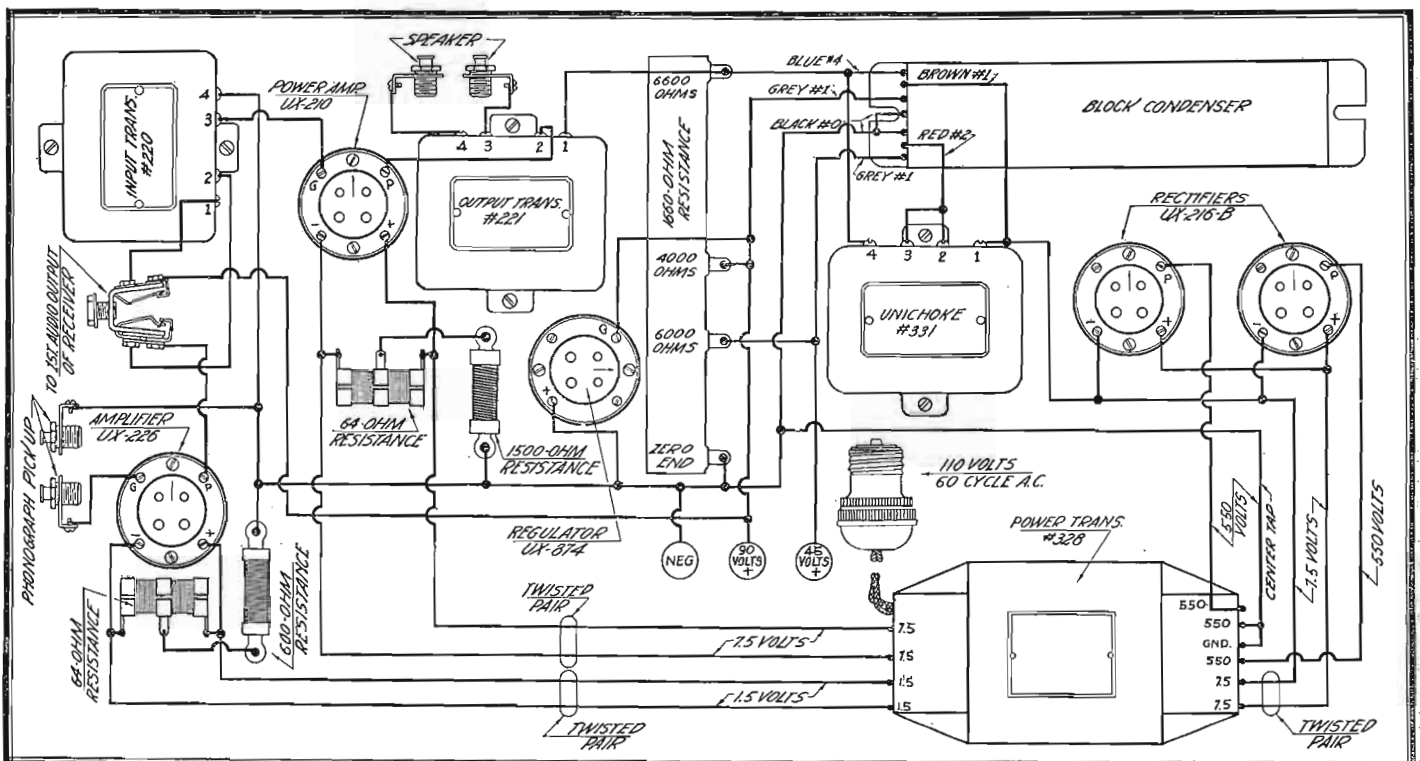


Fig. 2—Graphic illustration showing all connections

# The Eight-in-Line Super-Heterodyne Receiver

An Entirely New Conception of a Super-Heterodyne Which May Be Assembled and Placed into Operation Within Fifteen Minutes

This Receiver Was Constructed and All Illustrations Made in the Laboratory of the Citizens Radio Call Book

“NOW if it doesn't work, I am going to murder someone,” is the popular sentiment of one who has just used up a pound of solder, a mile of bus bar, the spare time of a week and most of his precious supply of patience assembling a Super Heterodyne Receiver. It is an enormous task, even if the results are worth the effort. But when it just simply won't quit oscillating, or can't be made to oscillate, or won't amplify or the tubes won't light, things take on a different aspect and there is some likelihood of the threat being realized.

Someone is always taking the joy out of life, but for every one removing smiles and dimples there is another who takes delight in putting them right back where they belong, so we continue our balanced existence.

Always some broadminded soul is at work to make our tasks lighter, our troubles less and our pleasure greater. Just think how much easier it is to press a button in the wall and have light than to have to blunder around, stumbling over chairs till the oil lamp is found, then strike a match and light it.

But that is getting away from radio, but contrary to general practice let us go a bit farther and consider the man who contemplates building himself a motor boat. He has visions of the type of craft he wants, knows the lines and has an idea of the results he may expect. He goes ahead and builds it, following his own inclinations as to shape of hull and appearance. Now the craft is finished, all but the engine. He can build that also if he wants to. But just how many individuals will take the trouble to make a gasoline engine when they know that they can buy one all put together and ready to run for less than the parts and labor would cost? It is quite true that a number do go around to garages and machine shops and pick up parts here and there until a complete engine results. It may run, but more than likely it will creep.

What has all that to do with radio you ask. Simply this. A sympathetic engineer in Colorado grew tired of seeing his friends tearing their hair because their home made supers would not work properly, or still worse, refusing to even start building them because the mountain looked too steep to climb. Funny isn't it, how steep a hill always looks till we start going up it.

Anyway, this engineer, being a friend of humanity, sought to help his suffering fellow men by providing all the “workings” of a Super Heterodyne in a single, foolproof, dust-proof, con-

venient unit.

This he did, and now the fellow who built his boat but bought the engine may get out the old saw and screwdriver and make himself a panel and cabinet, confident that he can buy the “engine” in one piece, at one place, and rest assured it will work and do what he wants. The particular advantage of this plan is that it allows an individual a chance to express his individuality, both as to appearance of the set and selection of the instruments to be mounted on the panel.

The “workings” consists of a plywood box shaped much like the toy piano usually purchased for little daughter at Christmas time. Instead of keys it has a shelf on which are flush mounted the eight sockets to accommodate the tubes.

On the vertical panel under this shelf are a row of binding posts. These connect to the loop, batteries, instruments on the panel and loud speaker. And that is all that is visible on the outside.

Inside it is a different story, but you may rest assured that the instrument you will purchase will be sealed, with the guarantee broken the same time the seal is. The normal individual is not likely to dissect his Waterbury to find out what makes it go, and there is no more reason why he should open the box.

First comes the oscillator coil which consists of a primary and a split secondary, bank wound between bakelite discs. Next the first detector. The grid leak and condenser are soldered directly to the terminal of the socket eliminating all leads in this circuit.

The intermediate transformers are tuned to a frequency of 85,000 cycles. They are mounted on a bakelite strip and screwed in place.

The balancing of the intermediate frequency transformers is done by means of small two plate condensers. These are controlled by means of a lock nut which is set and locked as soon as the correct position is found. This eliminates the variance of the frequency on the cycle peaks, insuring

absolute co-ordination of all three instruments.

The amplifying transformers are worthy of note as they are not separate finished instruments but are incorporated directly as part of the set.

Distortionless amplification is obtained, due to the generous proportions of the amplifying transformers and their design.

All leads carrying heavy current are square bus bar, the other connections tinned, stranded cable. A notable fact is that there



Photo A. View of receiver in console showing suggested accessories

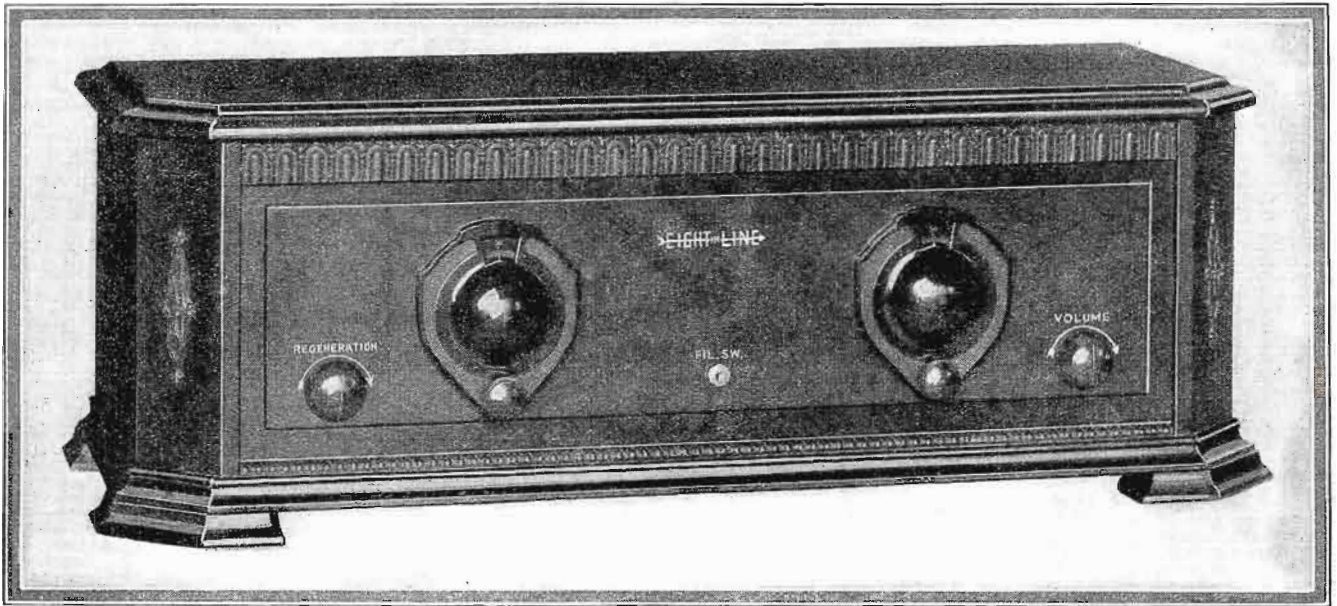


Photo B. View of receiver in cabinet

are no leads of any considerable length in the oscillator or radio frequency circuits.

The set is, as a newspaper writer put it, a superheterodyne with the "IF" taken out. "If it works" is the common alibi of set builders. This unit is bound to work because everything is adjusted to harmony before leaving the factory. In fact the manufacturers are so confident of the merit of this device that they guarantee it to operate satisfactorily.

The layout of the panel is optional to the likes and dislikes of the builder. A suggested layout is given, but there is no special advantage of adhering to it as one slightly different may be more pleasing to your eye, and will work just as well. The only instruments to be mounted on the panel are a rheostat large enough to carry the current of the tubes, two .0005 variable

condensers of the straight line frequency type, one midget condenser and a switch for the filament.

Leads from the binding posts on the unit go directly to these instruments. Flexible, rubber covered wire is best, as it does not break easily.

The distinct advantage of this set is that the "works" do not need to be behind the panel. They may be above or below, or over to one side, anywhere as long as the leads do not exceed a reasonable length.

This makes the set adaptable to any cabinet that may be on hand, able to fit into a phonograph, or built into an automobile with a small control panel within reach and the "works" and batteries under the seat.

Standard 201-A type tubes are used for all but the last ampli-

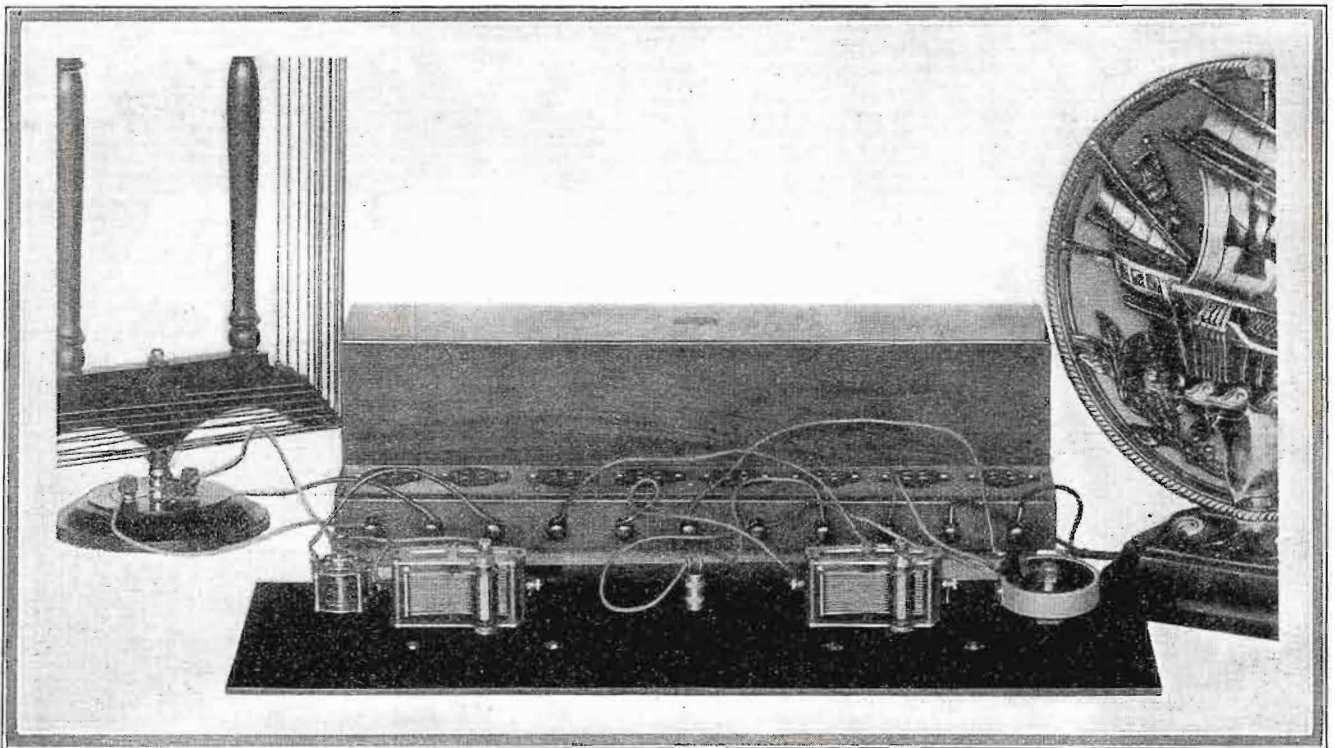


Photo C. View of receiver showing connections as made to the panel, loop and loud speaker

fier and a power tube may be used if more volume is desired.

This set will not bring in the same station at more than one point on the dial save at the high end of the waveband, and even there it is not bad enough to be really objectionable.

The loop is directional and greatest amount of volume is obtained when the loop is pointed towards the station wanted. If a nearby

adjustment and therefore does not require any careful adjusting.

**LIST OF PARTS FOR EIGHT-IN-LINE RECEIVER**

The model of this receiver constructed in the laboratory of the Citizens Radio Call Book was built from the exact list of parts appearing herewith. While it is possible for the ex-

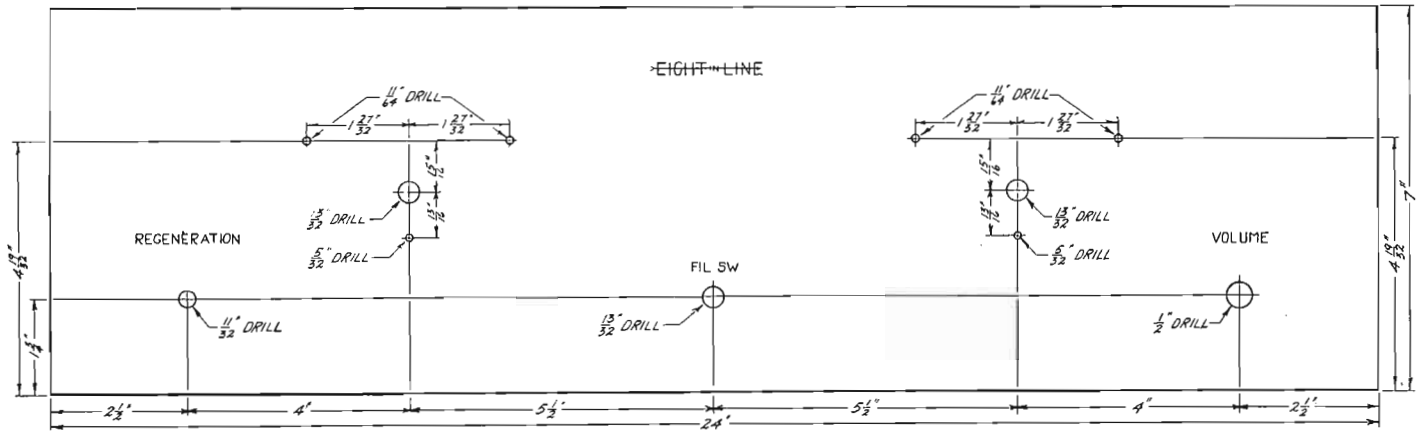


Fig. 1. Front panel layout

local station is in the same direction as the distant one desired, turn the loop broad side against the interfering station until it is nearly completely turned out. Retune the receiver for the station wanted, leaving the loop in the same position until reception is satisfactory. This method will slightly decrease the amount of volume from the distant station, but will eliminate the interference from the nearby broadcasting station.

The receiver is very easy to tune, as there are only four variable controls on the front panel. The two variable condensers are for tuning the oscillator and loop circuit; the rheostat controls the filaments of the intermediate tubes. The small condenser is for controlling the proper amount of regeneration required in the loop circuit.

perienced constructor or experimenter to successfully substitute other reliable parts for those actually specified, it is recommended that the novice strictly adhere to the list of parts as given below.

- 1—Eight-In-Line Unit
- 1—Lignole 7"x24" Drilled and Engraved Panel
- 1—DeJur 10 ohm Rheostat
- 2—DeJur .0005 mfd. Variable Condensers
- 1—Muter Filament Switch.
- 1—Marco .000045 mfd. Midget Variable Condenser
- 2—Gurz-Kasch Aristocrat Varnier Dials, Walnut Finish

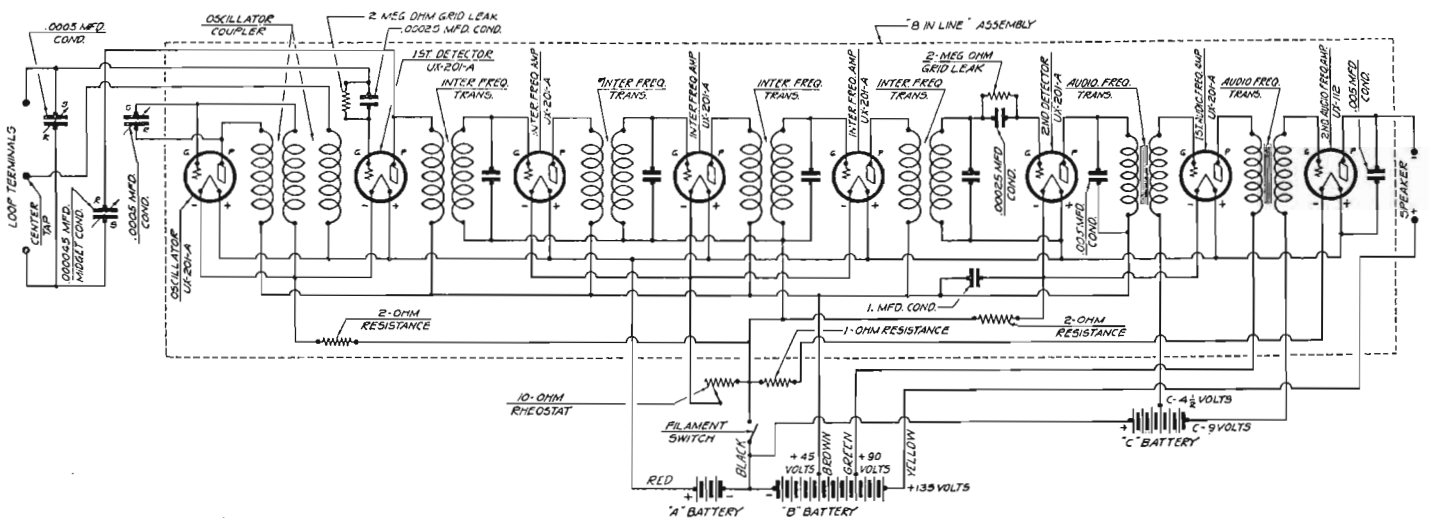


Fig. 2. Schematic wiring diagram

When receiving nearby stations, it is advisable to set the regenerative condenser at minimum. Increasing it will enable you to obtain a greater amount of sensitivity on weak signals. The proper adjustment of this condenser is of great help for adding sensitivity in the loop circuit.

The rheostat controlling the intermediate tubes is not critical in

- 1—Yaxley 1 ohm Resistance
- 1—Pkg. Kester Radio Solder
- 10—Ft. Acme Flexible Celesite Wire
- 7—Sonatron Type 201-A Tubes
- 1—Sonatron Type 171 Tube

List of Accessories for Use with the Eight-In-Line

The following is a list of accessories which have been tested in actual performance of the Eight-in-Line Receiver and have given favorable results. While these particular accessories are recommended, it is possible to make any reasonable substitution without loss of efficiency in the receiver.

- 1—Corbett D-20 Console
- 1—Corbett "C" Cabinet
- 1—Webster Bone-Dri AB Eliminator
- 1—Baker-Smith Type G Speaker
- 1—Bodine Loop

The Corbett C-20 Console shown in photo "A" is a very attractive piece of furniture, well worthy of a place in the

by a sensitive reproducing unit and none of the delicate overtones are lost, nor is reception ever hazy or blurred. This reproducing unit is made by the Baker-Smith Co. of San Francisco, California.

The Bodine loop as illustrated is a product of the Bodine Electric Company of Chicago. The wire constituting the loop is bank wound. A jack arrangement is made at the base of the loop by which contact is made to the two ends and the center tap of the loop. This allows the loop to be rotated at will without the possibility of the wires becoming entangled. A further advantage of the loop is that it may be easily adapted for short wave reception by simply withdrawing the loop partly from the base so that only the two upper springs make contact. This will "cut out" one-half of the loop and will allow the reception of signals as low as 150 meters.

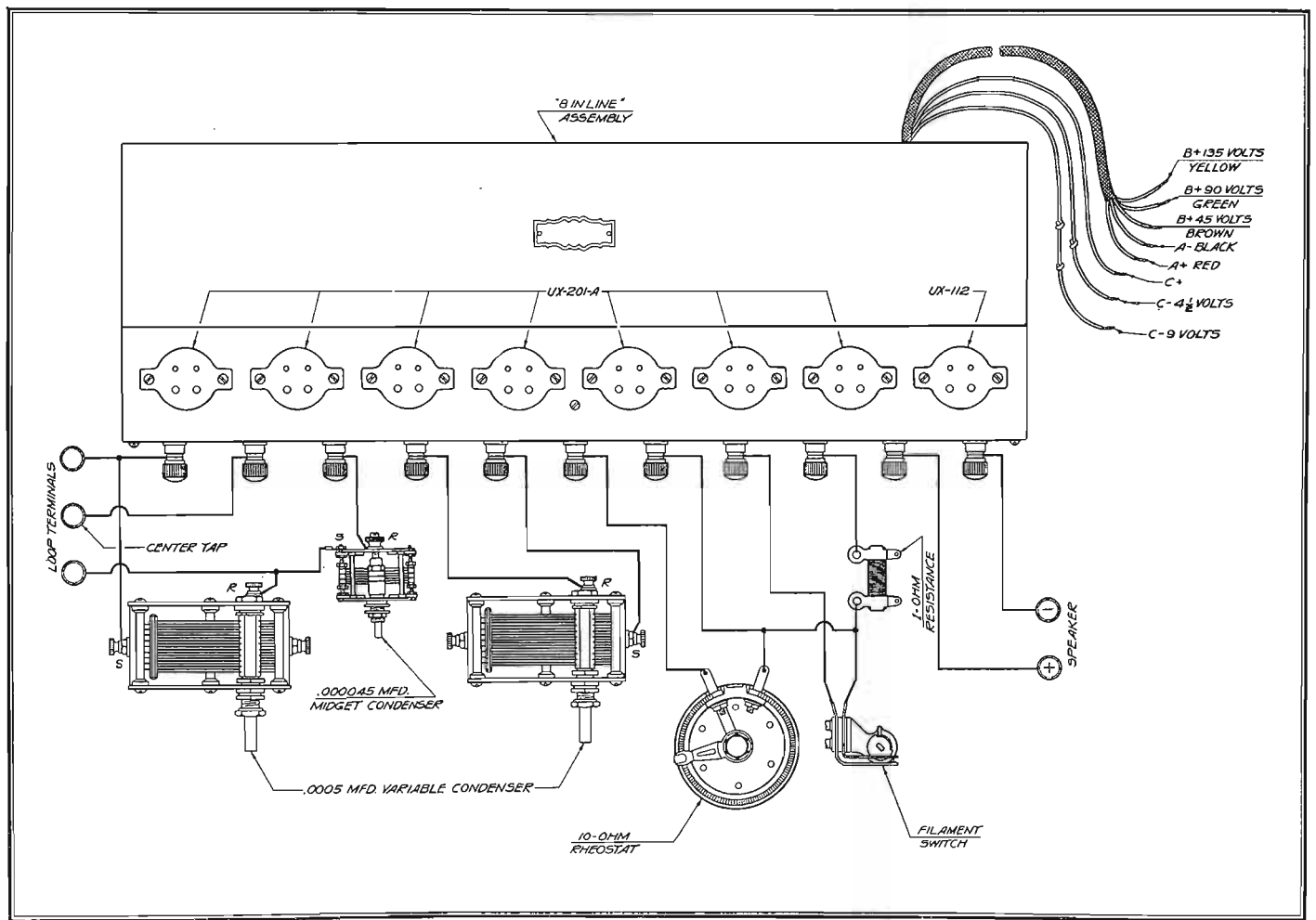


Fig. 3. Graphic wiring illustration showing all connections

finest home. Walnut is used, rubbed to a high gloss, with embossed ornaments on the corners and doors. The lower compartment has ample room for the eliminator and other accessories which might be stored there. The Corbett Type "C" Cabinet shown in photo "B" is used when the set is placed on a table. It is designed in the style of an ancient Italian treasure chest and presents quite an attractive appearance. Walnut is used in the natural finish, polished to an egg shell gloss. Both the console and the cabinet are manufactured by the Corbett Cabinet Manufacturing Co. of St. Mary's, Pennsylvania.

The Baker-Smith reproducer portrays a ship of the time of Columbus under full sail. The design is attractively moulded in cast white metal, the only kind that will not audibly vibrate when placed in the path of sound waves. The cone is controlled

The Webster Bone-dri AB Eliminator as illustrated in photo "A" is a new adaptation of AB eliminators. It will supply "A" battery current up to receivers using ten tubes. The rectifier consists of two Raytheon cartridges which give full wave rectification, assuring no audible hum. The "B" source is rectified by means of a Raytheon type gaseous rectifier. The eliminator is supplied with knobs by which the "B" voltage may be rectified on all circuits. There is also a control by which the "A" battery voltage may be regulated to compensate for the difference in multiples of tubes. This eliminator is very staple and does not require attention at any time.

(If further information is desired on any of these accessories it may be had by writing direct to the manufacturer.)

# The New Two Control Equamatic Receiver

Here Is a Vastly Improved Receiver Designed to Replace the Original Equamatic Receiver

This Receiver Was Constructed and All Illustrations Made in the Laboratory of the Citizens Radio Call Book

**F**EW receivers have bounded forward into general favor with such rapidity as the Equamatic. This is not altogether due to "follow the leader" tactics nor to stimulus on the part of the manufacturers.

The receiver is really worthy of sincere praise, for it follows a design that gives the largest output for the smallest input. It gives value received for every cent invested. Since first described in these columns a year ago, many letters have been received from enthusiastic builders telling of the remarkable results they have obtained.

And some of them seem all the more remarkable when one pauses to consider that the receiver uses but five tubes and can be built complete with tubes and batteries for less than one hundred dollars.

And now comes an improvement that will be pleasing to many. The design has been altered so that the receiver may be operated successfully by the truly unfortunate people who are blessed with only two hands. By joining the two radio frequency controls with a link coupling, they may be turned as a unit, speeding up tuning and eliminating the bother of first swinging one condenser, then the other, several times till at last they are in unison.

Any lack of synchronism that may have resulted as an error in building may be easily overcome. The primary of the transformer is fastened to the condenser shaft by a set screw. It may be set on the bias slightly, or if that does not give the desired results, its axis may be shifted.

The units are assembled with such precision before leaving the factory one need suffer no apprehension as to any extreme difficulties.

If they are home made, extreme care must be exercised, for the two must be identical or they will not function in synchronism over the entire wavelength scale. For your convenience, the secondary consists of sixty turns of No. 20 D.C.C. wire wound on a two and one-half inch tube, while the primary is a fifteen-turn coil, two inches in diameter. In order to have the wire remain in place without dope, the primary tube is machine turned with a channel wide enough for the fifteen turns.

It takes more tools than a hammer and screwdriver to make the mountings. By consulting the diagrams you may determine the particulars. The only way a good job may be done is by employing some machine work. If the builder does not possess these requirements, it is best to purchase the coils ready made. They are the heart of the set and the secret of its success, and

any error on their part will spoil the entire system. In fact, it is not advisable for anyone but the most experienced experimenter to attempt to wind the coils, since a novice will invariably have poor results.

The condensers must be of the straight line frequency type or they will not co-ordinate with the rotating coils. Be sure they have shafts extending far enough for the coil to be attached.

Builders will notice that the panel of this set is much shorter than last year's model. This is accomplished by doubling back the amplifier instead of continuing it in line. Due to the new type of shielded transformer this is possible without setting up any magnetic fields to run loose through the set, causing much trouble. An output transformer used is very desirable, since it keeps the high voltage direct-current out of the loud speaker, improving tone quality and preventing damage to the driving magnets.

One especial advantage of this set is that the length of the aerial makes no material difference in regards to reception as long as it is kept within reasonable limits. For the builder who is far from local interference and has all the space he can use, an aerial two hundred feet long will be none too large. And for the city brother who must share the apartment house roof with at least twenty others, and is close to several of the high-powered broadcasting stations, an aerial from twenty to one hundred feet will be perfectly suitable. Reception in the city is not nearly so satisfactory as in the country, due to no fault of the set or the operator.

With the air full of a multitude of sounds, including street cars, ice machines, static and power hums, a certain amount of signal intensity is obliterated. If this amount happens to be

that infinitesimal portion that determines whether a signal is or is not inaudible, it makes quite a difference in the range of the set.

Here is where the Equamatic shines. Figuratively speaking, it is as flexible as a piece of rubber hose. There are so many means of adjustments besides the main tuning controls, and a person with average patience may adjust it till much of the local interference is choked out. The coupling between the primary and secondary of the variocoupler, the one hooked to the antenna and ground, may be loosened. That is, the set screw holding the secondary to the baseboard may be loosened and the coil drawn farther from the primary. The looser the coupling, the sharper the signal.

And by a sharp signal is meant that the band of transferred



Photo A. View showing two control Equamatic Receiver mounted in an Excello Console, with appropriate accessories





Photo B. Front view of receiver mounted in a Southern Toy Cabinet

energy is lessened. If the coil tunes in a band of three meters with the coupling jammed tight, it may cut down to one-half meter by opening the coupling to one inch.

That means that only the energy which radiates on that particular half-meter channel is received. It is a strange phenomenon that there is no material decrease of the volume of the desired signal. It is often confined in such a narrow range of the tuning condenser one may tune right past the point without hearing a sound if not looking for that particular station.

All radio frequency amplifiers have a tendency to oscillate, often very pronounced. There are several ways to eliminate this, the one used in the Equamatic being a radio frequency choke consisting of one hundred turns of fine wire wound on an iron core. This successfully throttles the undesirable oscillations. The coupling of the radio frequency transformers may also be varied. This depends on the receiver, tubes used, and plate voltage. It will do no harm to experiment; it is quite possible it will improve reception and selectivity. In addition, a variable condenser between the plate and negative filament of the radio frequency tubes act as a neutralizer. This is an improvement that was not in last year's model and does much to correct the differences of internal capacity of the tubes. It is a good policy to leave the tubes in the sockets, once they have been placed and adjusted. Changing will only cause confusion.

The filament current of the radio frequency tubes is controlled

by a ten-ohm rheostat, that of the detector by a twenty-ohm rheostat, and the audio frequency amplifiers by Amperite resistors inserted directly in the lead.

The grid condenser of the detector is of .00025 mfd., the leak is two megohms. Place the condenser as close to the socket as possible. The shorter the grid leads, the better the efficiency. Cushion sockets eliminate all microphonic vibration which is so evident in regions of flimsy building construction, heavy coal trucks and the like. Often the only reason a tube howls is because the elements are vibrating. If the shocks are all absorbed before reaching the tubes, the noise is also eliminated.

The Multiplug is an ideal method of connecting the batteries. It eliminates the row of binding posts and saves time and trouble in making connections. As the leads are all marked and each a different color, there is no danger of them becoming confused. Consequently there is little danger of tube blowouts due to wrong connections. A baseboard of bakelite with concealed wiring is used. This has the double advantage of having most of the wiring out of sight, and also making it easy to dust the set. Diagrams are given showing the layout of the instruments. This should be followed closely in regard to mounting the instruments, especially the radio frequency transformers. These must be placed at an angle of 58 degrees, for at that point intercoupling is reduced to a minimum. A good plan is to inscribe a line showing the angle at the base of each coil and fill it with white

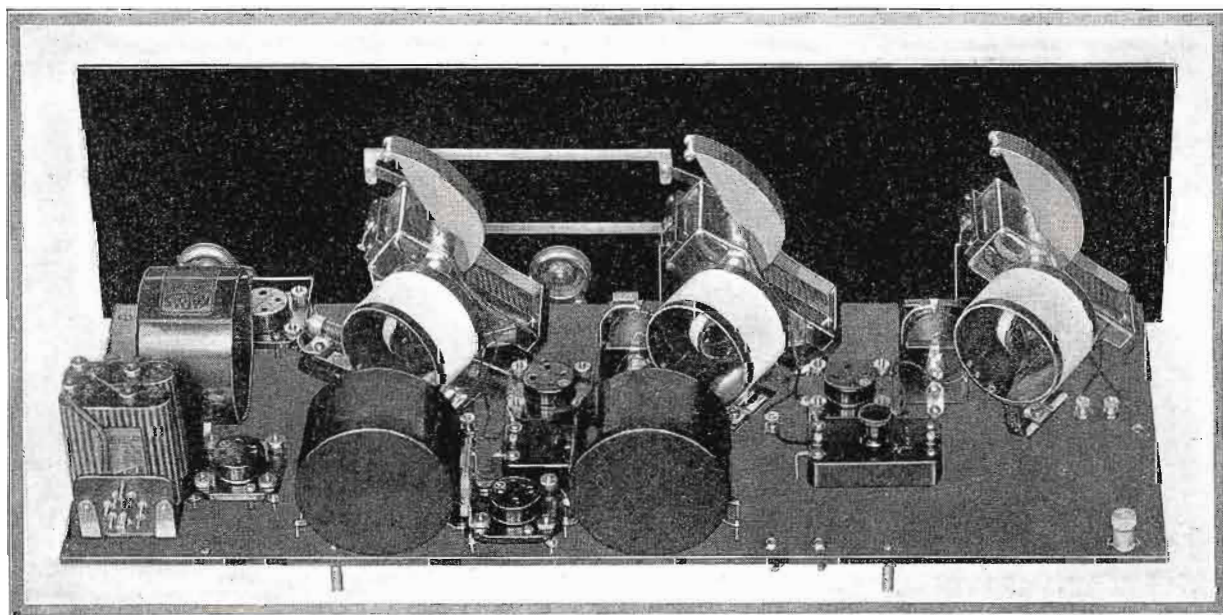


Photo C. Rear view of completed receiver

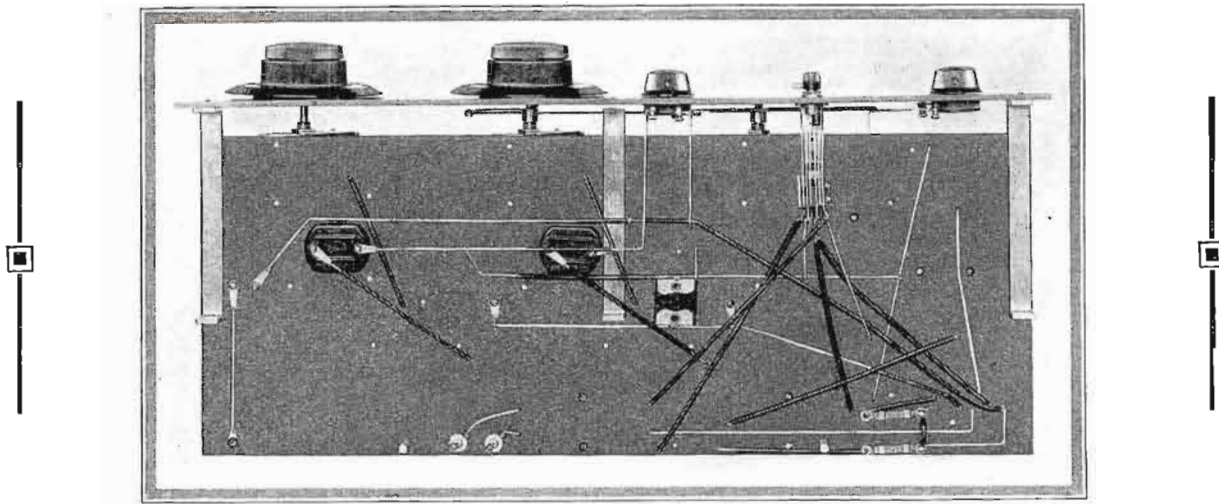
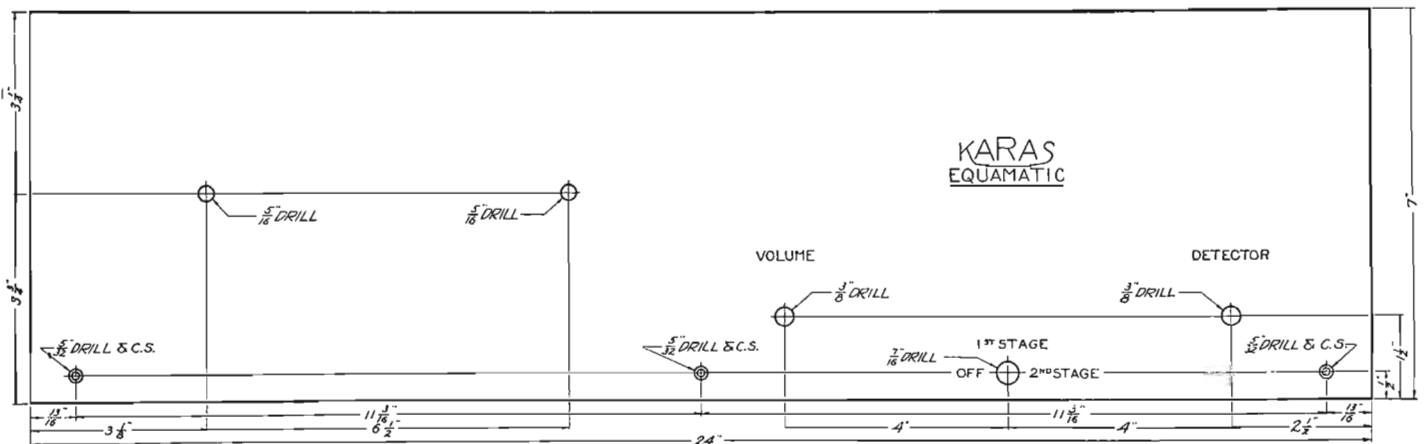


Photo D. Bottom view showing arrangement of fixed condensers and switch



Panel layout

lead, or a similar marking material. Then in case the coils become shifted or jolted out of line in construction or use, they may be again set in the proper relation without having to resort to measuring.

Before placing the set in use, insert the tubes in the sockets and connect the "A" battery. This is a simple precaution to determine whether the wiring is correct. To further check the circuit, disconnect the positive "A" and touch all the other leads

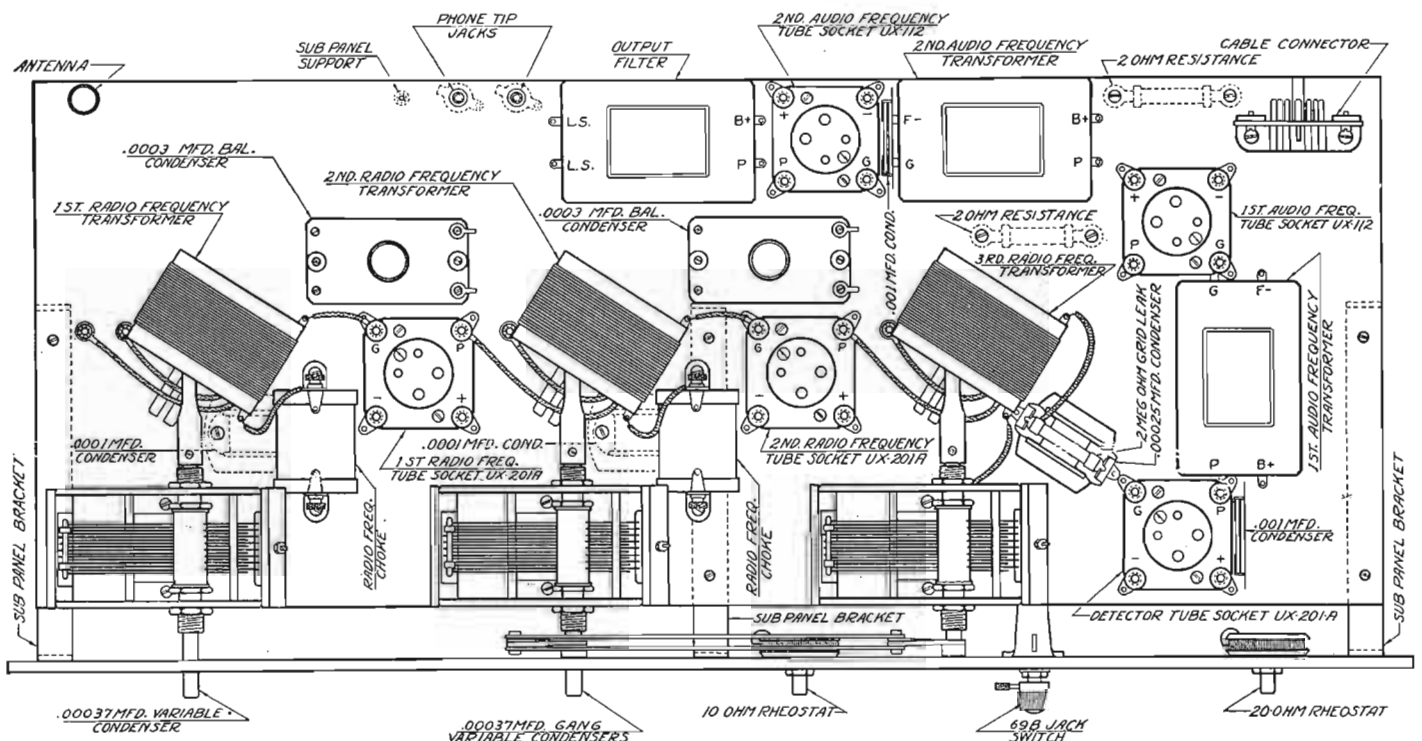


Fig. 2. Baseboard layout giving location of parts

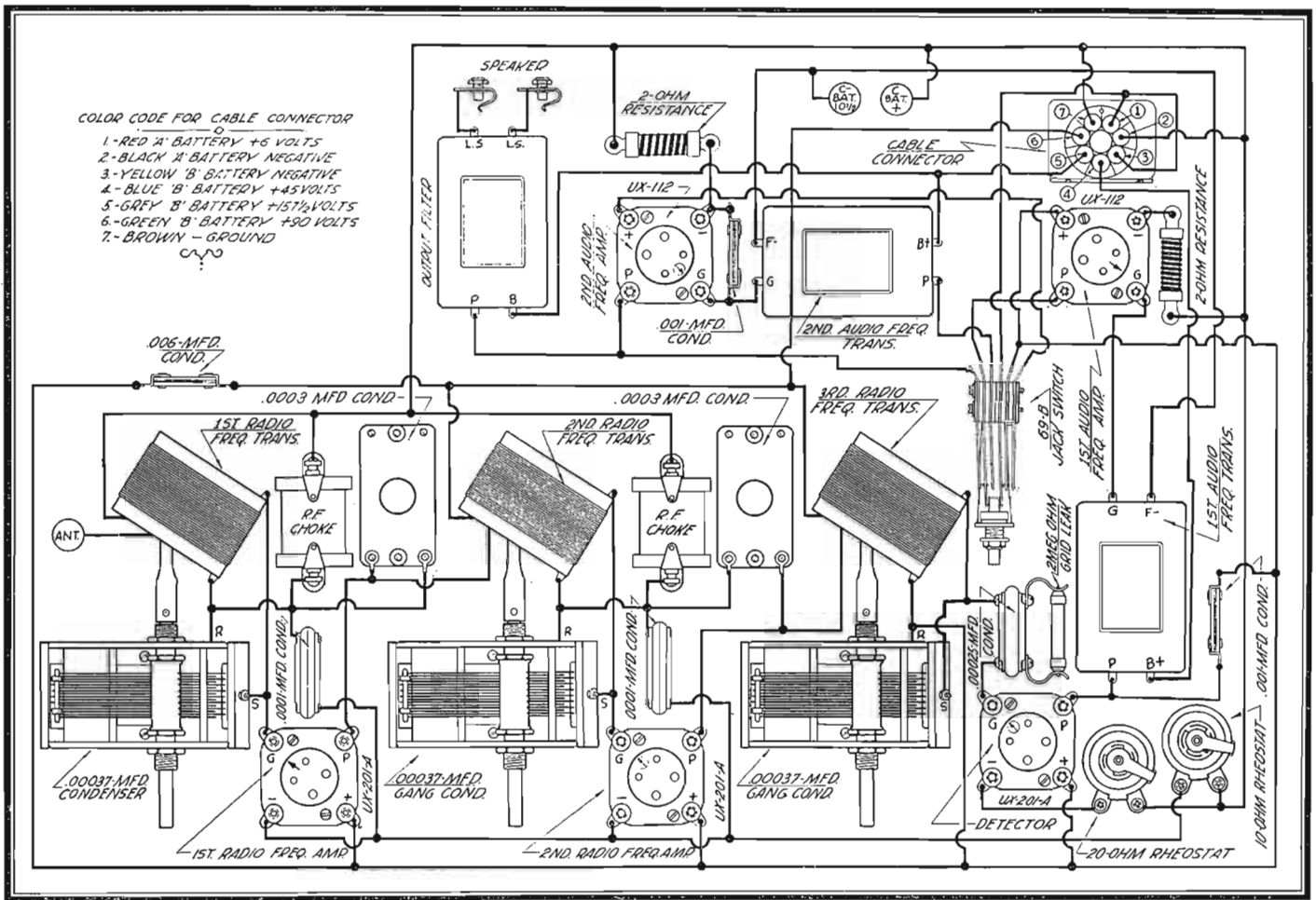


Fig. 3. Graphic illustrations showing all connections. Check carefully against completely wired receiver.

to the terminal of the battery. Should the tubes light, there is a "short" somewhere. If not, then connect the leads to their proper terminals and the set is ready to use.

The following is a list of accessories which have actually demonstrated their ability to properly operate the Two Control Equamatic Receiver. While these particular accessories are suggested, any reasonable substitute may be made without decreasing the all-round efficiency of the receiver.

- 1—Excello R-31 Model Console
- 1—Southern Toy Company "Blue Ridge" Cabinet
- 1—Fansteel Model A-6 "A" Power Supply
- 1—Burns "B" Power Supply
- 1—Burns Cone Speaker

The De Luxe Model Excello Console is simple in design and massive in proportions, lending much of the rugged substantial-  
(Continued on Page 166)

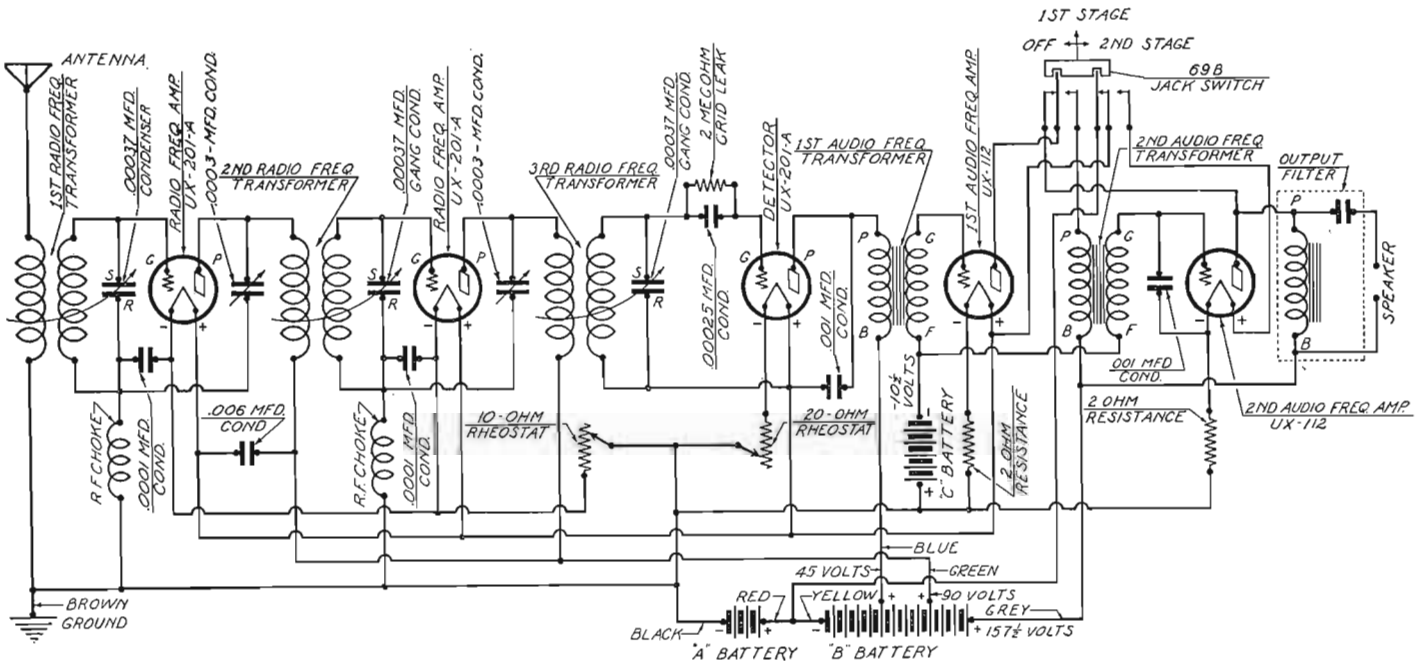


Fig. 4. Schematic wiring diagram

# The Magnaformer 9-8 Receiver

A Receiver Incorporating Precision Built and Perfectly Matched  
Shielded Tuned Intermediate Transformers

This Receiver Was Constructed and All Illustrations Made in the  
Laboratory of the Citizens Radio Call Book

**T**HE success of any Super-Heterodyne receiver is dependent primarily upon its stages of intermediate frequency amplification. To insure the finest operation the transformers in the intermediate frequency amplifier must be built with extreme care and precision. In this respect the transformers used in the Magnaformer 9-8 receiver may be considered the ultimate insofar as efficient operation is concerned. The transformers are the result of a number of years of research both in laboratories and practical operation. Not only has the best of radio engineering ability been employed in obtaining the final product, but the mechanical design has been given every consideration together with the fundamentals of engineering other than those usually employed in the radio field.

The Magnaformer 9-8 receiver may be truly considered to be a receiver that is designed from the best available parts possible to produce all perfectly matched into a compact, high quality receiving set of the first order. Its ability to detect and reproduce signals is so acute that the set has an unlimited range. All musical notes within the audible scale are passed from the second detector and if a good speaker is used there will be a perfect reproduction of a studio program. The selectivity is so marked that even the most powerful local station can be tuned out and a DX station brought through with a minimum of interference.

This receiver is so powerful that a switching device is provided by which either eight or nine tubes may be used at will. This is highly desirable since the tremendous volume delivered by the set when nine tubes are used on local stations is overbearing. Therefore only eight tubes are necessary. The nine tubes are extremely convenient, however, when distant reception is wanted. This arrangement is only possible through the use of five stages of intermediate frequency amplification. Up to the present time only three or four stages of amplification were normally possible. However, the excellent design of the transformers used in this receiver allow the use of five stages with attendant increased selectivity and reception range.

Mechanically, the transformers are as nearly perfect as engineering skill can make them. The primary and secondary coils are wound on bakelite and are permanently fixed so that their inductance cannot possibly change. The secondary coil is accurately tuned in the

manufacturer's laboratory by small variable condensers which are fixed and locked after the tuning is done.

These small condensers are outside the shielded metal case, being entirely clear of the electrostatic field of the transformer and therefore not affected. They are sealed in an air-tight compartment and connected across the secondary. No jar or jolt can change the capacity of the condenser, nor are they affected by moisture or climatic changes. This means that there is a uniform performance the year around and the set will work just as well, as far as the transformers are concerned, in any climate or geographical location.

Due to the efficient shielding, the transformers may be mounted closely together. There is no need of employing an engineer to determine the angle of mounting. They are mounted in a single plane, all parallel.

The characteristics of the transformers are such that the incoming signal receives double the usual amplification in each radio frequency stage, hence, a powerful output which may be controlled from a mere whisper to such volume so as to fill a large hall.

The Magnaformer 9-8 receiver may readily be classed with the "easy to build" sets because all parts are placed where they are readily accessible. The easiest and most logical layout is the one used. Every part fits in perfect harmony with its neighbor, giving a minimum of wiring and a maximum amount of internal beauty and accessibility conveniences that are often sadly ignored in home constructed receivers.

The oscillator is located midway between the two tuning condensers and is well out of the way. Its location allows the total length of the front panel to be reduced three inches.

The five intermediate frequency transformers, the two audio transformers and the output filter are mounted in a line at the rear of

the baseboard, the tube for each transformer being placed directly in front of it. Spring suspension sockets are used, eliminating microphonic noises and any damage to the tubes due to rough handling.

Directly behind the first intermediate transformer are the plug-in jacks for the loop aerial. Only two are used since this receiver does not require regeneration. Regeneration is not necessary in the Magnaformer circuit to obtain extreme selectivity and ample volume on distant stations, but it can be readily incorporated if one so desires.

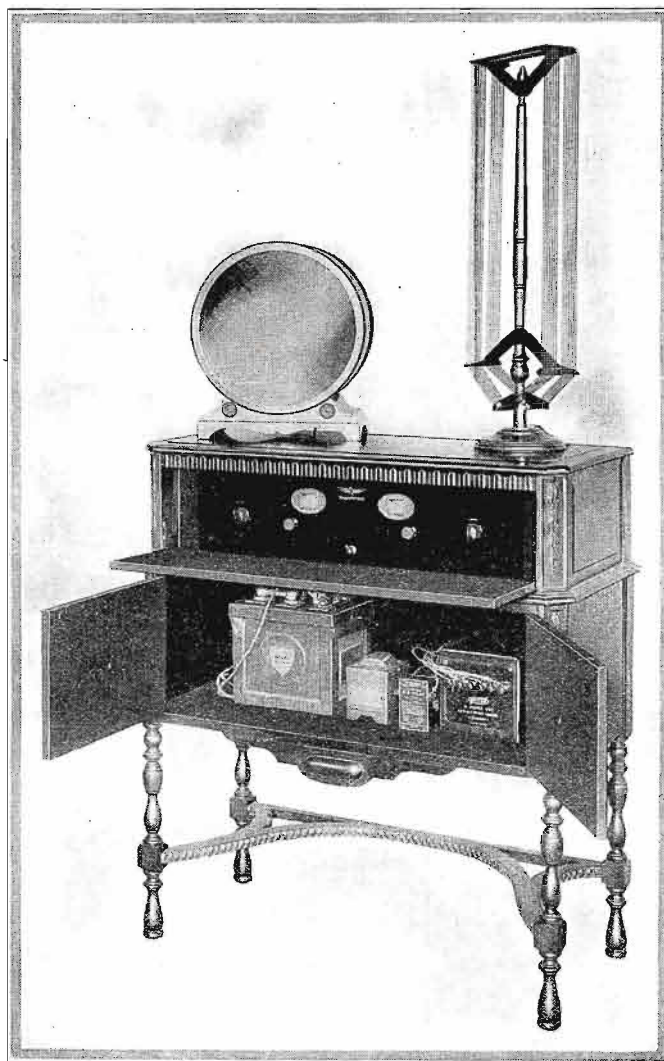


Photo A—How the Magnaformer 9-8 Receiver appears when installed in a console with appropriate accessories

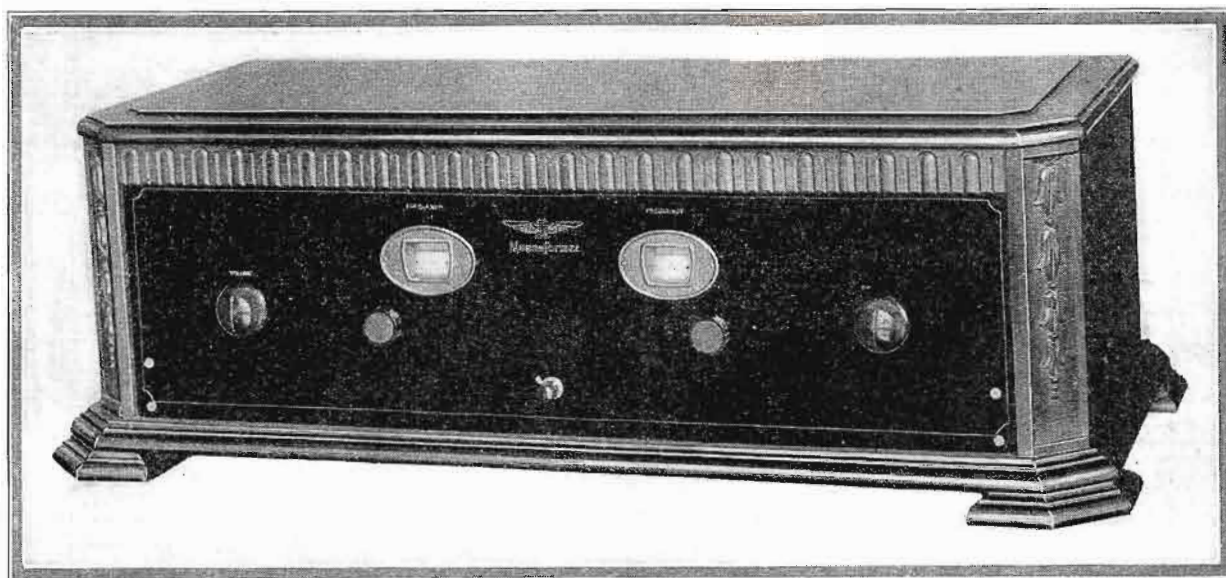


Photo B—The completed receiver installed in a cabinet

However, regeneration is not advised for any but the experienced operator. It complicates tuning and has a tendency to make the set howl and squeal if not properly controlled when tuning in stations. If the urge for additional work and worry is irresistible, regeneration may be accomplished by revamping the hook-up in the following manner.

The wire from the coupler which is normally connected to the rotor of the condenser, or in the case of the Remler condenser, the side which does not connect in the filament circuit, should be disconnected and fastened instead to the center tap of the loop. This means that three plug-in jacks, instead of two will be needed.

The condenser is now cut out of the circuit. Run a wire from the plate tap of the first radio frequency transformer to the rotor of a midget condenser which must be installed. From the stator of the midget condenser run a wire to the rotor of the variable condenser and from there to the lower post on the loop. This gives a three-terminal loop and an additional control to juggle.

Now to return to the description of the receiver. The oscillator coil is mounted in a bakelite case with the six taps brought out to terminals, the two primary on one face, the four secondary on the other.

Remler twin rotor condensers are used for tuning. These are controlled by a drum type vernier dial with worm gear mechanism. Due to the high ratio of the reduction, unusually slow movement may be obtained, which is quite essential in tuning in distant stations. The condenser is hung from the panel by a bracket. A unique arrangement is that the supporting screw and the lock nut that holds the tuning shaft are covered by the bezel. This gives a pleasing panel display free from unsightly screw heads.

The dial on the drum is of paper of such a texture that the calls of stations may be written on it with ink without the danger of them blurring, or with pencil, which may be erased without leaving an unsightly splotch. The dial is graduated throughout the entire circle in a scale of 0-200.

The dials are illuminated by means of a six-volt lamp run from the battery or eliminator. As the light is thrown on the face of the dial instead of through it, the glow is rather diffused, giving a mellow effect, bright at the top of the bezel and fading into darkness at the bottom.

The two tuning controls are all that need be seen when the set is in operation. A good plan is to turn out all the lights in the room and listen-in in the darkness. It is a well-known physical fact that when the eyes are at rest the ears are more sensitive. Signals may often be logged in the darkness that would be inaudible in the light.

The double-pole double-throw switch to "cut out" one of the intermediate frequency transformers is located at the lower center of the panel between the two tuning controls. It is of the rotary cam type,

a twist of the fingers changing from one combination to the other.

Three rheostats, two fixed resistances and a potentiometer are the supplementary controls. These need only be touched at the initial adjustment, or when some change is to be made in the operation of the set. The potentiometer and the six-ohm rheostats are mounted on the panel, one at each end. The potentiometer controls the volume and the rheostat the brilliancy of the filaments. Soft tubes are always best for detectors if any real selectivity and sensitiveness to weak signals is desired. They are quite critical as to filament consumption and additional rheostats must be provided. These are mounted on the baseboard, for they need to be set but once and then left alone. The Amperites for the two audio amplifier tubes are slung in cartridge clips to the under side of the baseboard.

A small radio frequency choke must be in the plate lead of the second detector. This is to prevent radio frequency current from feeding into the amplifier.

An output filter is used to remove all harshness and discord from the amplified signal. It also keeps the direct current out of the loud speaker, preventing it from becoming polarized and therefore less sensitive.

All battery connections are made through a Multiplug. The receptacle mounted on the under side of the baseboard in the center, the place most conveniently located for accessibility to all parts of the set.

Standard bus bar wire should be used throughout. Bare wire if possible and insulated wire only where there is danger of two leads becoming shorted.

A simple test to insure against any danger to tubes due to any defect in wiring or excessive voltage on the filament is the insertion of an ordinary electric lamp in series with the negative B line at the B battery terminals. Now turn on the set, and if the lamp does not light, the wiring is safe. If the lamp does light, correct the trouble before taking it out of the line. Be certain to remove the bulb before trying to operate the set, as you cannot get satisfactory results with the lamp in series with the "B" battery due to its high resistance.

It is very simple to tune the receiver. Begin by turning the knob of the filament rheostat to the right. This will light the filaments of all the tubes and the lamps on the dials as well. Turn the control knob of the potentiometer about one-third or one-half to the right. Now turn the two tuning dials through any particular range, keeping them pretty close together. When you hear a signal, tune sharply with the right hand dial, then further increase the resonance and volume with the left hand dial. Then adjust the volume control and the rheostats until results are satisfactory.

Under favorable circumstances this set will give a tremendous volume, and music and speech of such resonant tones and purity as to be surprising. Due to the great amplifying power of the intermediate frequency transformers, distant stations may be brought in with gratifying volume that are inaudible on the average set.

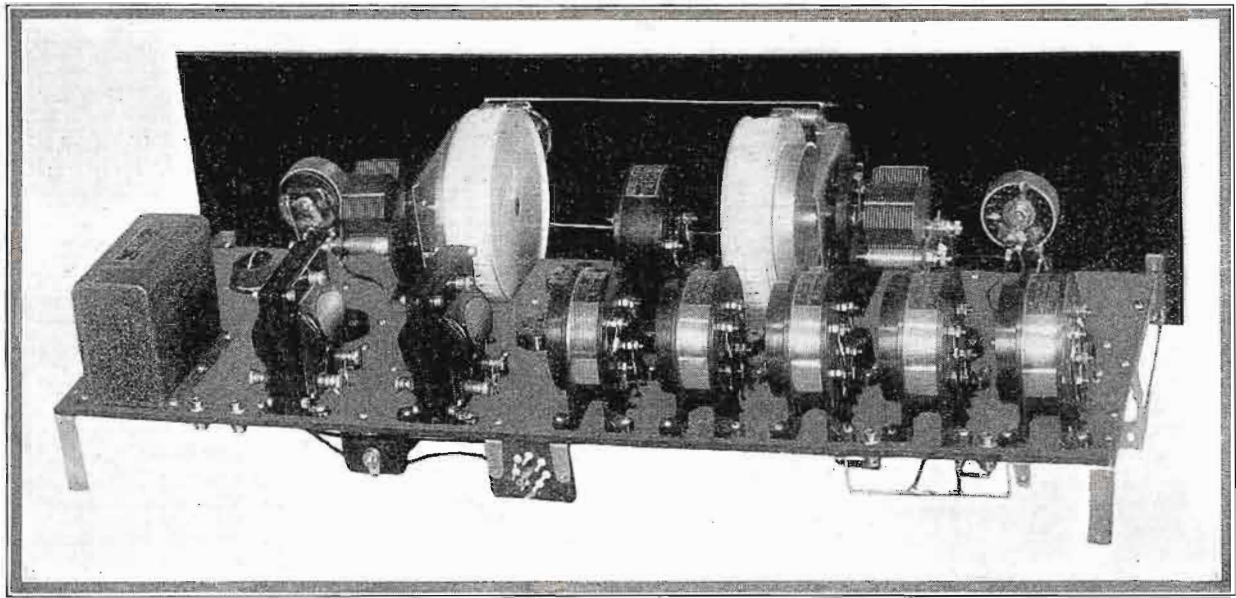


Photo C—Rear view of Magnaformer 9-8 Receiver

**List of Parts Required for the Magnaformer 9-8 Receiver**

The laboratory model of the Magnaformer 9-8 receiver was constructed from the list of parts given below. While it is possible for the experienced constructor to substitute other good apparatus for that actually specified, it is advisable that the novice strictly adhere to the list given herewith.

- 1—Formica 7x26x3/16 inches Drilled and Engraved Panel
- 1—Formica 9x25x3/16 inches Drilled Sub-Panel
- 5—Magnaformer Intermediate Transformers
- 1—Unicoupler
- 2—Remler Universal Drum Dials with Control No. 110
- 2—Remler .0005 mfd. Variable Condensers
- 9—Benjamin Sockets No. 9040
- 2—Benjamin Brackets No. 8629
- 2—Ferranti Audio Frequency Transformers No. F-3
- 1—National Tone Filter
- 1—Samson Radio Frequency Choke No. 85
- 2—Aerovox .00025 mfd. Grid Condensers with Mountings
- 1—Aerovox 1 mfd. By-pass Condenser
- 2—Durham 2 megohm Grid Leaks
- 1—Frost DeLuxe 400 ohm Potentiometer
- 1—Frost DeLuxe 10 ohm Rheostat with Switch
- 1—Frost DeLuxe 10 ohm Rheostat
- 1—Frost DeLuxe 30 ohm Rheostat
- 4—Frost Tip Jacks
- 2—Amperites No. 112
- 1—Yaxley Cable Connector
- 1—Yaxley Jack Switch
- 40—Feet Acme Celesite Wire

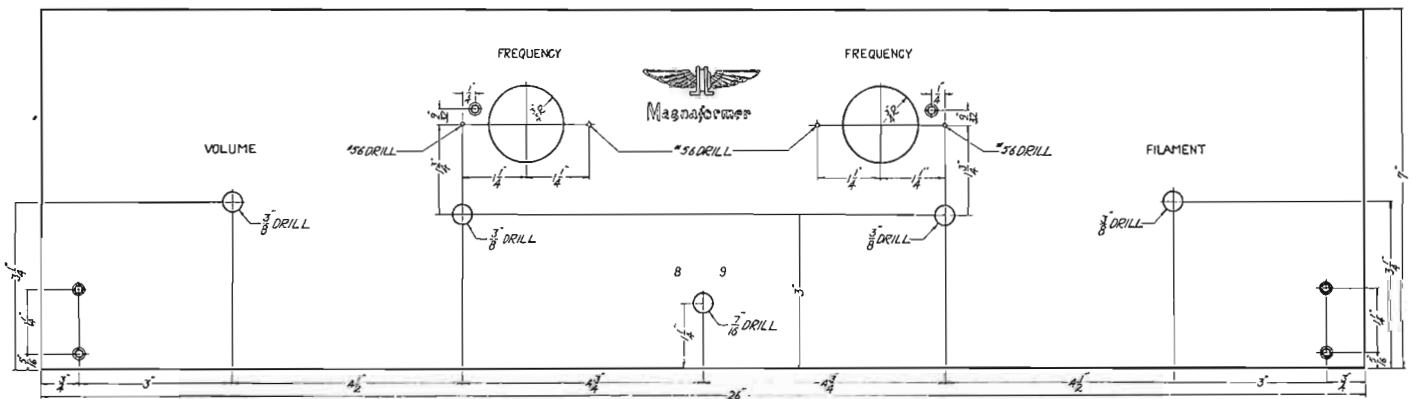
- 1—Pkge. Kester Radio Solder
- 7—Ceco Type "A" Tubes
- 1—Ceco Type "F" Tube
- 1—Ceco Type "J-71" Tube
- Miscellaneous lugs, screws, nuts, etc.

**List of Accessories Used with the Magnaformer 9-8 Receiver**

The following is a list of accessories that have actually demonstrated their ability to properly operate the Magnaformer 9-8 Receiver. While these particular accessories are suggested, it is possible to make any reasonable substitution without decreasing the all-around efficiency of the receiver.

- 1 Fritts Super Consolette.
- 1 Fritts 26-inch Standard Super Cabinet.
- 1 Rowan 100 ampere-hour "A" Grade Storage Battery.
- 1 Muter "B" Power Supply
- 1 Temple Model 13 Speaker.
- 1 Sterling Type R-108 Charger.
- 1 Qualitone Loop.
- 1 Jewel Type 595 A-B Relay.

The large photographic reproduction shown in Photo "A" shows how the Magnaformer Receiver appears when installed in a Fritts Super-Consolette. The smaller photographic reproduction shown in Photo "B" illustrates how the receiver appears when it is installed in a Fritts Standard Super Cabinet alone. Both of the above mentioned pieces of furniture are manufactured by the D. H. Fritts Company of Chicago, Illinois, who specialize in solid walnut radio furniture. The consolette is beautifully carved and is finished in a two-tone effect. The hardware is slightly polychromed, which sets it off very beautifully against



NOTE—UNLESS OTHERWISE SPECIFIED ALL HOLES ARE  $\frac{1}{32}$  DRILL G. C. S.

Figure 1. Front panel layout

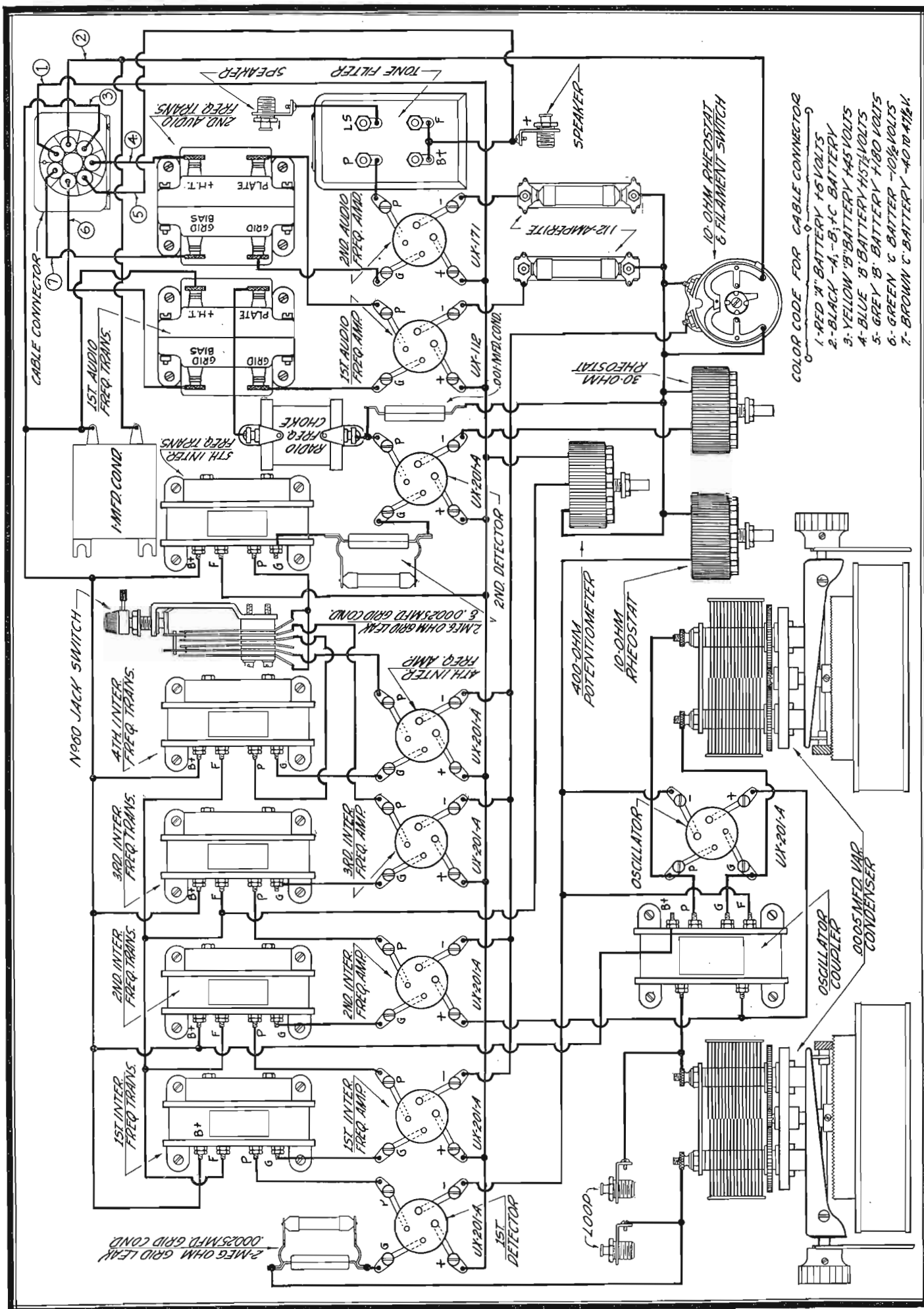


Figure 2. Graphic wiring diagram. Carefully check the completed receiver against this diagram

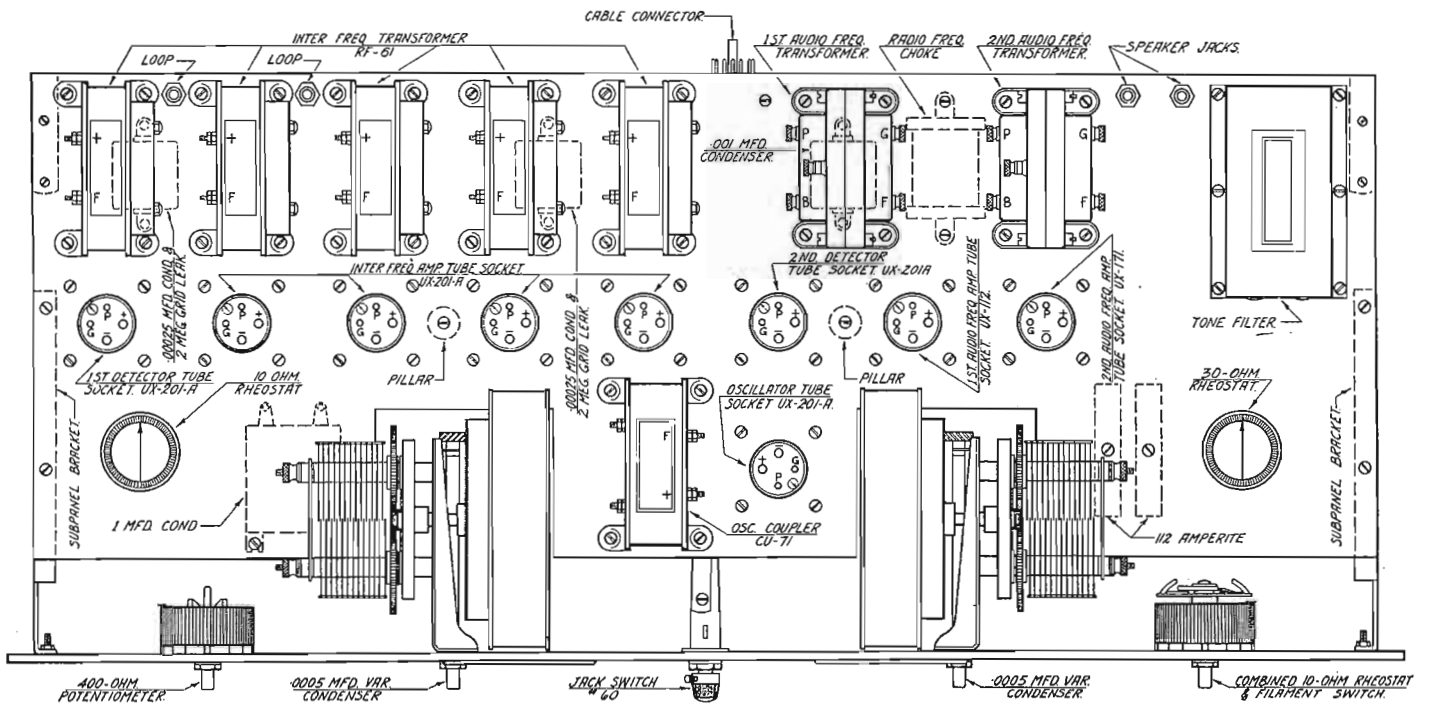


Figure 3. Baseboard layout of Magnaformer 9-8 Receiver. Note symmetrical layout of apparatus

the darker wood constituting the console. Ample space is provided in the battery compartment of the console for the storage of all necessary apparatus for the proper operation of the receiver.

A Rowan Storage Battery is used to supply the necessary "A" voltage for heating the filaments of the tubes. This particular battery is well made and is contained in a solid rubber case. A handy carrying handle is provided which is a distinct advantage. Screw terminals are provided for an easy attachment of the connecting wires.

The "B" battery supply is obtained from a Muter "B" Power Unit. This device is manufactured by the Leslie F. Muter Company of Chicago, Illinois. Rectification is accomplished by the use of a standard full wave rectifier tube such as the RCA UX 213 Tube. Five "B" voltages are obtained with the "Power" binding post delivering 180 volts for a UX 171 tube. The Temple Speaker shown with this installation is manufactured by Temple, Incorporated, of Chicago, Illinois. In outward appearance this speaker appears to be a cone type, but such is not the case. A coil horn is used which is a slightly modified exponential type recently developed. An air column of approximately 6 feet is used, which when combined with the reproducing unit of excellent

design gives a reproduction of music and speech which is startling in its clarity and strength.

The "A" battery is kept at full charge at all times by the use of a Sterling Charger. This charger is by far the smallest on the market at the present time, and delivers 2½ amperes of fully rectified current to the battery. The extreme compactness is due to the use of two Raytheon Cartridge Rectifiers. Acids, bulbs and other means of rectification are not used in connection with this charger.

The Qualitone Loop shown with this installation is manufactured by the Duro Metal Products Company of Chicago, Illinois. It is entirely constructed of solid walnut lumber, and is very beautiful in design. The Jewel Relay shown makes the entire installation of accessories automatic in character, since the relay automatically turns the power devices on and off. All of the accessories are directly controlled by the filament switch on the receiver. The charger is turned on when the set is not in use and the "B" Eliminator is turned on when the set is in use.

(If further information on any of these accessories is desired, it may be had by writing direct to the manufacturers.)

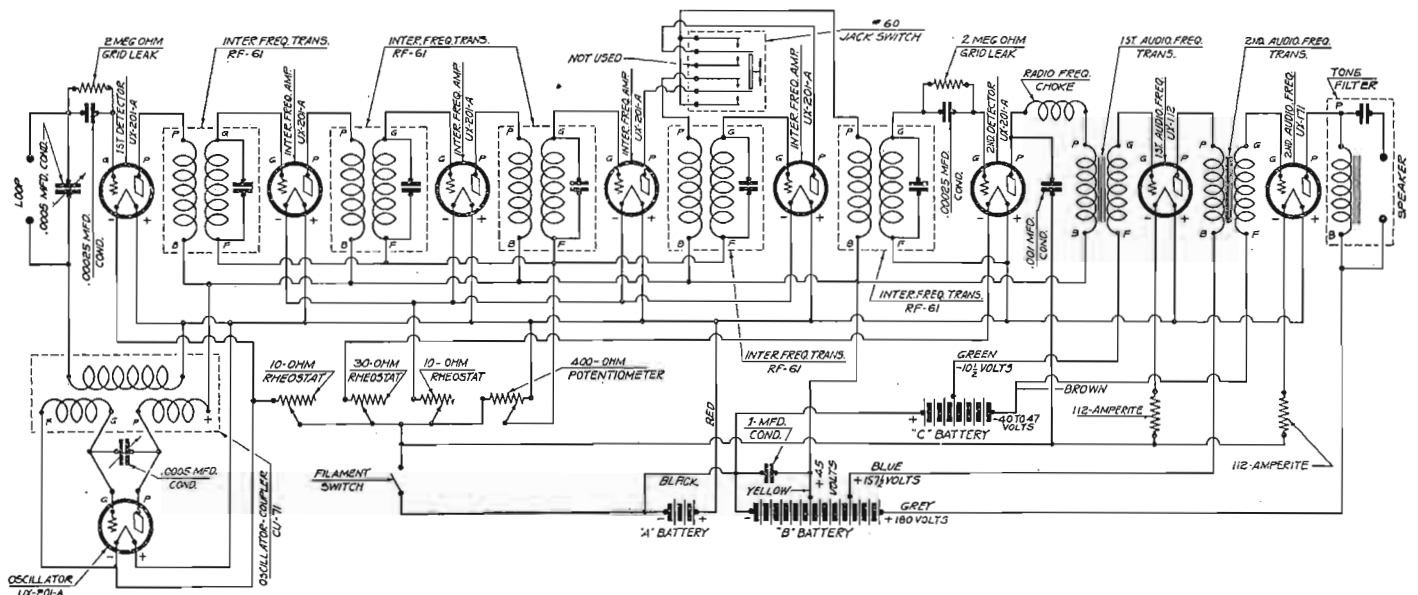


Figure 4. Schematic wiring diagram of receiver



# A New Raytheon A B C Power Unit

Here Is a Complete Power Assembly That Does Away  
With All Batteries

This Unit Has Been Constructed and Completely Tested in Our Laboratory

**A**ND now has been developed a really efficient, compact, reliable eliminator that performs all the work of the three sets of batteries, does it better, cheaper and requires practically no maintenance.

Due to the heavy duty of both lighting filaments and supplying plate current, the eliminator must of necessity be of generous proportions.

Some builders like to incorporate the set and the eliminator into a single unit placed in a console cabinet, while others would rather have it remote, connected with a multicord cable.

For the sake of clearness of description, we consider our instrument as a separate unit in itself. The only drawback in including it in the set proper is that the losses are released in the form of heat.

Cooling is best effected by placing the instrument in an ex-

posed position where air may circulate freely about the tube, but if there is danger of mechanical injury resulting, a well perforated metal cover may be placed over it. The heart of this eliminator and the reason it is practical is the new Raytheon type BA tube. It has a bulb very much like the old style Mazda lamp, clear glass with the tip on top. It is fitted with the standard four prong base and will fit all modern sockets.

The elements are similar to the two smaller tubes, but are of more rugged construction and the cap is shaped like half a walnut shell.

The reason the glass is so much larger than the lighter duty tubes is because the load to be carried is 350 milliamperes, where the others are 60 and 85 respectively. A greater load means more heat, and the only way the heat can be drawn away from the tube is by means of the glass bulb. The larger the bulb the more cooling surface. Under a normal load the tube should show no color. If overloaded a tiny spot of cherry red will develop. It is not safe to operate it at this heat, for the life will be greatly shortened.

Under proper conditions this tube should deliver a thousand hours of active service, and it will do far more with careful treatment. The most satisfactory load is around 280 mills, for that

point is near the peak of best operation and is also the drain of the average set using eight tubes. A load of less than 200 mills is not desirable, for that is not enough to enable the tube to function properly and power is lost. The power transformer is one that is rated at 200 watts. It has a primary winding for 110 volts, two secondary windings of 350 volts each and a 5-volt winding to supply the filament of the power amplifier.

To prevent undue surges upon starting and damage in case of a short, a resistance of from 10 to 20 ohms is placed in series with the primary. This has a tendency to absorb fluctuations of the line voltage, and also to cut down the input voltage to around 80 volts.

Many of the transformers available have the resistance already mounted and connected. However, if home-made, 50 turn of No. 16 enameled iron wire, wound on a 3-inch asbestos square, will be satisfactory. Two Mazda lamps in parallel will do for a makeshift.

It is very good policy to fuse the primary. Two three ampere plug fuses are the right size. They will blow the instant something goes wrong, often before the trouble would be otherwise detected.

The three high voltage output terminals of the transformer go to a buffer condenser. This instrument is just what the name implies, a shock absorber, that smoothes the wrinkles out of the current before it is rectified. It is a double unit, consisting of two condensers each with a capacity of .2 mfd. They are connected in series, the two 350-volt leads going to the outside terminals, the neutral lead to the middle.

The two outside leads then go to the terminals of the socket marked F— and F+.

An air gap socket is best for this purpose, as there is nothing to it, that is, there is no useless material employed that would tend to obstruct the radiation of heat. The air gap adds insulation and prevents the possibility of deposits of dust forming a path for a short circuit. When one stops to consider that there is 700 volts between the two filament terminals just waiting an excuse to jump over and cause a lot of trouble, one will better

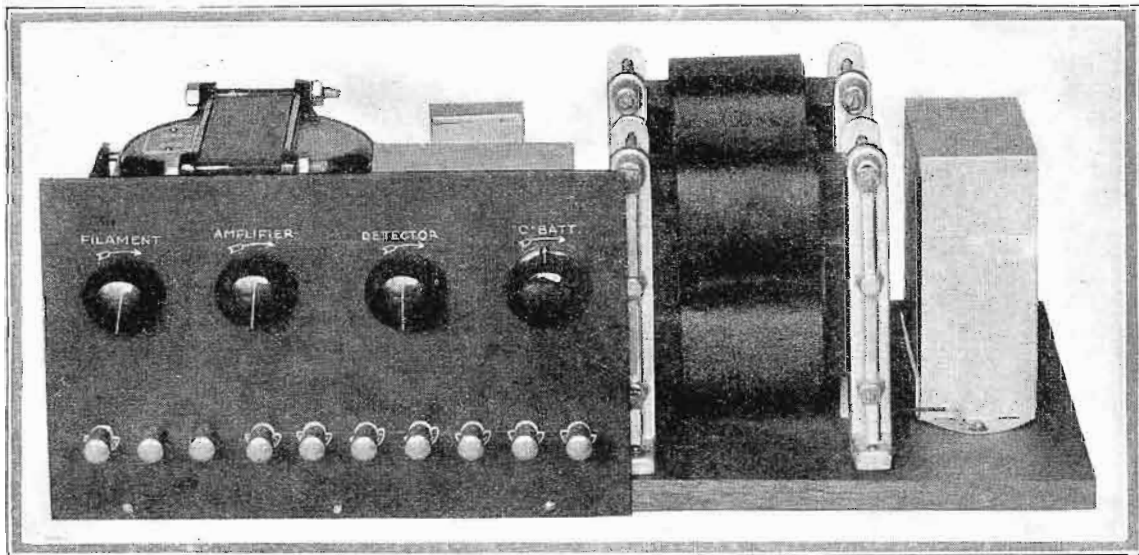


Photo A. Front view of eliminator showing binding posts and controls

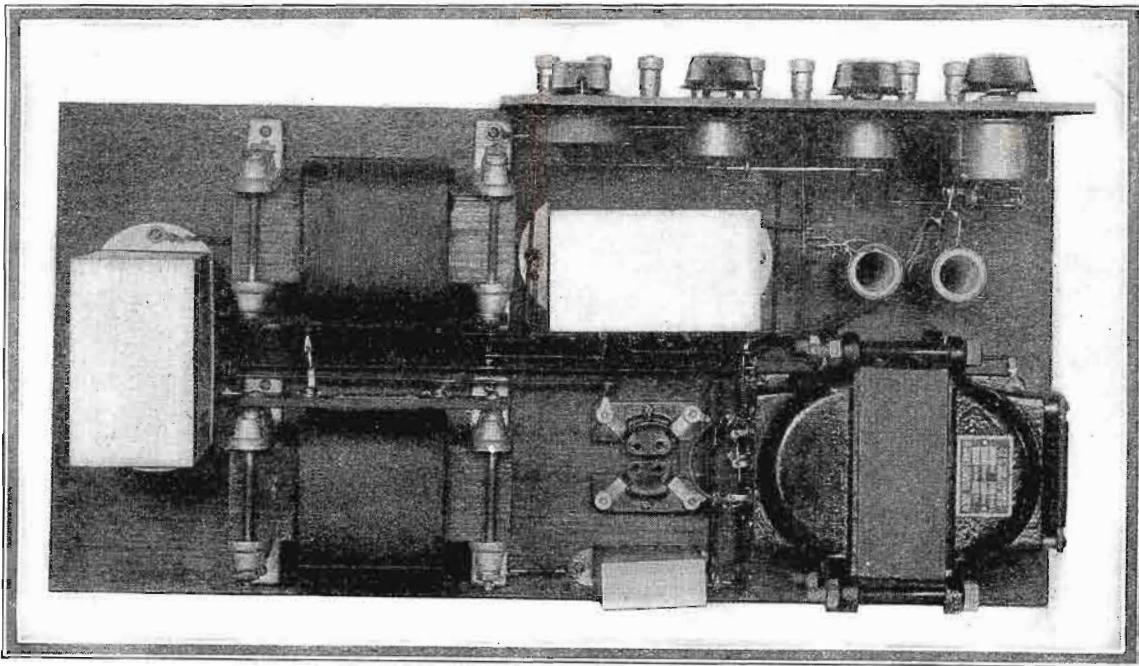


Photo B. Top view of eliminator showing arrangement of parts

appreciate this precaution.

The plate terminal goes to a 10 henry choke. There are two identical chokes employed, connected in series. Be sure that they are rated for 350 mills or over. If they are rated at less than the load to be carried, there is danger of them puncturing or shorting. A short in a choke coil is very hard to detect and it will cause no end of trouble.

The purpose of the choke is to iron out the pulsations in the current. After passing through the Raytheon tube the current is direct, but instead of flowing in a continuous stream like the current from a battery, it is surging in spurts. The choke retards one pulsation till the one behind catches up with it, and the output is a continuous flow, which means a noiseless plate and filament supply.

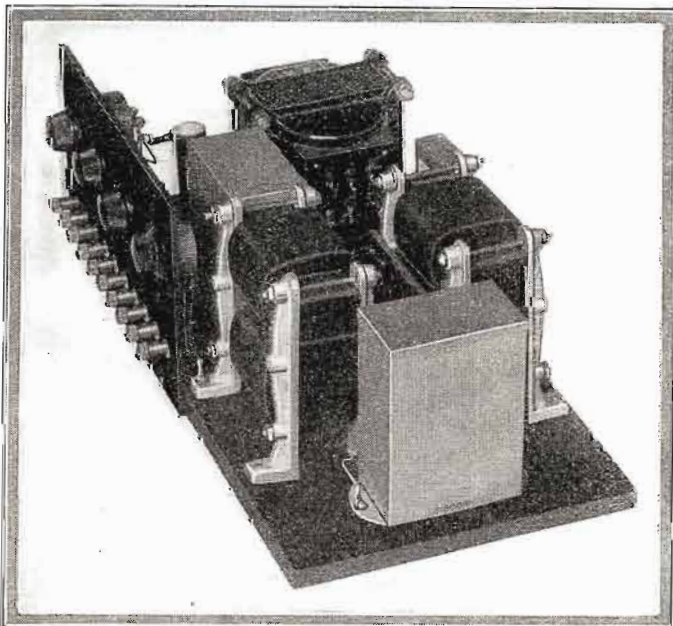


Photo C. End view

Across the first choke is a double unit condenser consisting of two four mfd. blocks. The outer terminals of these are connected to the terminals of the choke, while the center terminal is connected to the center tap of the high voltage winding on the

transformer. To the outer terminal of the second 10 henry choke is attached another multiple unit condenser. This one consists of an eight and three one mfd. units. The eight mfd. tap goes to the choke, the other three to fixed and variable resistances,

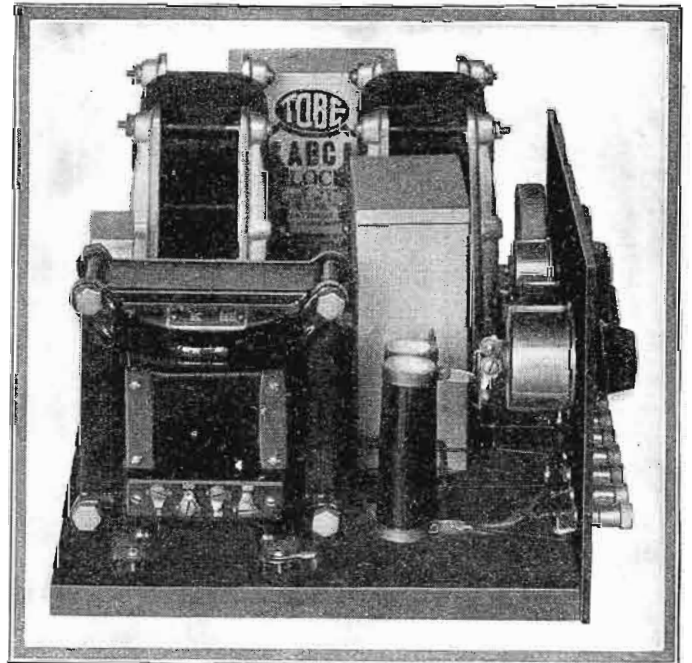


Photo D. End view of eliminator showing placement of resistances and controls

governing the output voltage for the requirements of the different tubes.

The center tap is connected to the center tap of the first condenser and also the center tap of the high voltage winding.

As the B plus terminal for the amplifier requires the full delivered output of the eliminator, there is no resistance needed.

If the intermediate stage amplifier requires a slightly lower voltage, it is connected to the next binding post in line, which will deliver approximately 150 volts. If the whole 180-volt output is too great for the volume desired, the last post may be omitted and this one used instead. To get the exact voltage needed a universal clarostat is inserted in this lead. By means of this, the

voltage may be cut down.

The detector always works best on a lower voltage than the amplifier. If one of the soft tubes is used, the adjustment is somewhat critical and often a distant station may be brought in much better if the voltage is either raised or lowered slightly. To accomplish this, another universal clarostat is used. The voltage may be cut down to around 30, or raised as high as wanted.

The negative A and B and the positive C are all connected to the same terminal. In this lead is inserted a fixed resistance wound on a porcelain tube. This has a resistance of 1000 ohms.

The negative C Battery is connected to the terminal indicated on the multiple unit condenser, and also to the center tap of the 5-volt winding on the transformer.

To obtain the proper grid bias a potentiometer is shunted across the common negative output terminal and the center tap on the high voltage winding. The potentiometer arm is connected to the negative C battery. By rotating this arm the grid bias is altered.

Power tubes perform best if alternating current is fed to the filament. And incidentally, the current consumption of a power tube is so great it would soon ruin the Raytheon tube to supply it as well as the rest of the set. The winding delivers exactly 5 volts, and as the power tube is not critical, working equally well over a range of 2 volts fluctuation, no rheostat is needed.

This set, as designed, is suited only for sets using the 201-A tubes. It can be used for the others, but alterations to suit will have to be made.

Each tube in itself draws 250 mills. The Raytheon tube will

perfectly. Juggle the controls a bit till best results are obtained. Then rest assured that with proper care your power requirements will be taken care of for the life of the tube. That should be two years, the way most sets are run.

LIST OF PARTS

If any of the parts listed below are substituted, care should be taken to see that the exact equivalent is used.

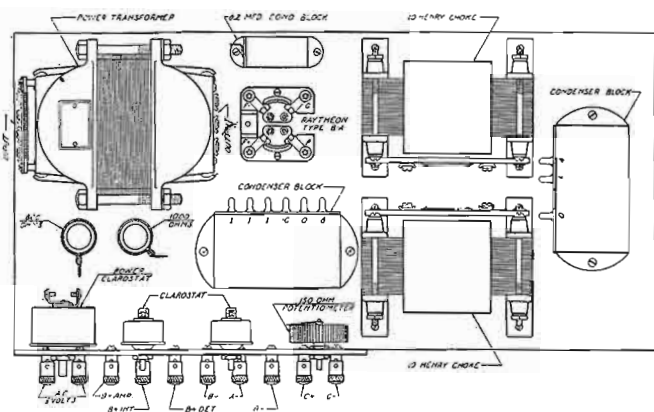


Fig. 1. Baseboard layout

only pass a current of 350\* mills. In that case it seems as if but one tube could be used in the set. It would if the filaments were hooked in parallel, as they usually are. Now if the filaments were hooked in series, the voltage would be the number of tubes in the set times five, the voltage used by each, but the amperage would still be only 250 mills, the same as one tube draws. So that solves that problem.

Hook the filaments in series, all but the high amperage power tube. That means rewiring part of the set. It is not as hard as it sounds. Simply cut the wires from each socket and hook the negative to the positive of the socket next to it. The rheostats on the set are now no longer of any use, so omit them.

Bring the two terminals, one negative, the other positive, out and connect them to the binding posts so marked on the set.

The terminal on the eliminator for the positive A has a larger power clarostat shunted by an 800-ohm resistance. Before turning on the power to the set, be sure that all the resistance is in. That will prevent an overload on the tube filaments. Gradually cut out resistance till the tubes are functioning properly.

The entire eliminator may be mounted on a piece of good substantial wood, or metal, whichever best suits you. It must be able to hold the weight, whichever is used. The finished instrument tips the scale to 40 pounds.

If directions are followed carefully and standard parts used. there is no reason why the eliminator should not function per-

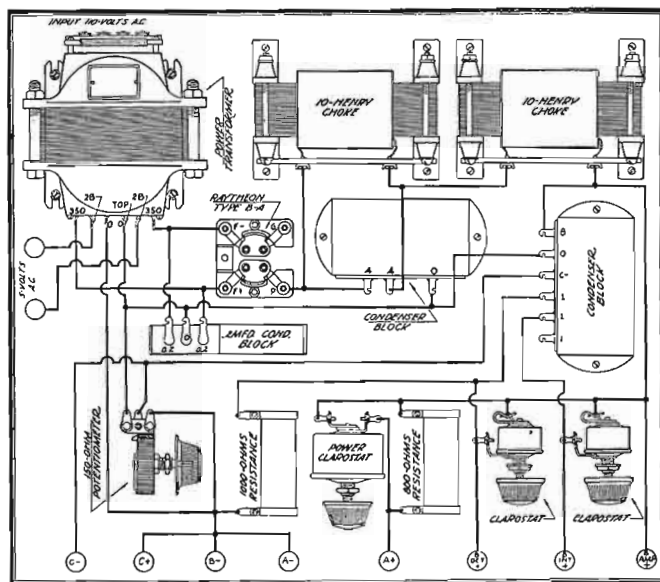


Fig. 2. Graphic wiring diagram

- 1—Acme Power Transformer BA.
- 2—Acme Filter Chokes BA.
- 20—Ft. Acme Celestite Wire.
- 1—Tobe Raytheon A B C Block No. 1.
- 1—Tobe Raytheon A B C Block No. 2.
- 1—Tobe Raytheon A B C Buffer Block.
- 1—Airgap Socket.
- 1—Raytheon 350-mill Tube BA
- 1—Power Clarostat.
- 2—Universal Range Clarostats.
- 1—CRL 150-ohm Potentionmeter.
- 1—Elmenco 1000-ohm Resistance.
- 1—Elmenco 800-ohm Resistance.

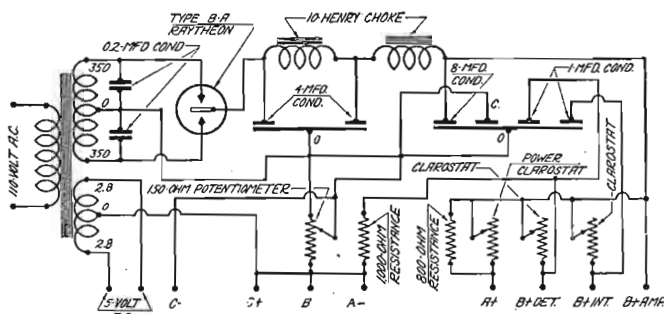


Fig. 3. Schematic wiring diagram

- 10—XL Binding Posts.
- 1—10x20x1/2-inch Baseboard.
- 1—Pkg. Kester Radio Solder.
- 1—7x11x3/16-inch Insuline Drilled Panel.
- Miscellaneous Lugs, Screws, Nuts, etc.

# The Improved Camfield Duoformer Seven

True Tone Quality and Total Absence of Oscillation Brings This Receiver to the Front

This Receiver Was Constructed and All Illustrations Made in the Laboratory of the Citizens Radio Call Book

**T**HE Duoformer Seven is a circuit especially to be recommended as it gives the full advantage of seven tubes and the simplicity of control of a five-tube set.

It is similar to the conventional five-tube, tuned radio frequency circuit in so far as the controls are concerned. The one outstanding difference is that the first tube is untuned and directly coupled to the aerial and ground, making extreme volume possible, still not sacrificing much selectivity.

The other refinement is the push pull amplifier, which rounds out the tones, giving enough volume to satisfy the most discriminating user.

The radio frequency transformers are somewhat different from the usual run, and they gave some outstanding advantages that are worthy of special consideration.

The duoformer is the result of much research in the field of oscillation prevention, while still maintaining the full quota of volume and selectivity. It is well known that when the tendency to oscillate is overcome the resulting tone quality is far superior to any otherwise obtained. Combined with a simplicity of construction this circuit should make a special appeal to the builder who does not care to fuss with the critical adjustments necessary to neutralize or balance the average receiver.

An unusual system of preventing oscillation is embodied in the special construction of the duoformer. The outstanding features are simplicity of construction combined with high efficiency over the full range of broadcast wavelengths. This circuit does not require that its builder be a radio engineer or have the highly complex technical knowledge to successfully prevent oscillation or make the minute adjustments before the set will function properly.

In order to understand the methods used to prevent oscillation we must first make a brief survey of the causes of oscillation in a tuned radio frequency amplifier.

When two circuits are tuned to the same frequency and brought into electrical proximity there is a decided tendency for the current in one circuit to be transferred inductively to the other. There are several channels of transfer, any one or all of which may be the cause of the disturbance.

The first is inductive coupling between the windings of an inter-stage transformer. Here the output of one tube is fed into another tube through two coils of wire wound on the same form, or on forms in close proximity. The degree of current flow may be regulated by varying the coupling between the two coils or throwing one

coil slightly out of resonance with a condenser.

The second is capacity coupling through a condenser. Radio frequency current thinks nothing of walking right through a condenser, and it will never overlook a single opportunity, no matter how slight, to step off the beaten path and go wandering about where it is not wanted.

Certain condensers in a set are to be desired, for they by-pass the radio frequency around coils or between coupled circuits. However, there is one form of condenser in a set that is not only avoidable, but quite detrimental to the welfare of reception. That is the action induced by two wires running parallel. In wires of the same polarity this effect is not noticed, but let a grid and plate lead get within speaking distance and there is trouble right away. The chief cause for this effect is carelessness of construction.

All of the sets designed in our laboratory and described in this publication are designed to minimize coupling of wires. If the builder carefully follows our wiring diagrams there will be small chance of unsatisfactory results from this cause.

The third is the internal capacity of the tubes. This we cannot overcome, for as soon as the tubes are altered in design their other characteristics are also changed.

There are numerous methods of preventing the oscillation due to internal capacity of tubes, all of which work, some better than others, of course.

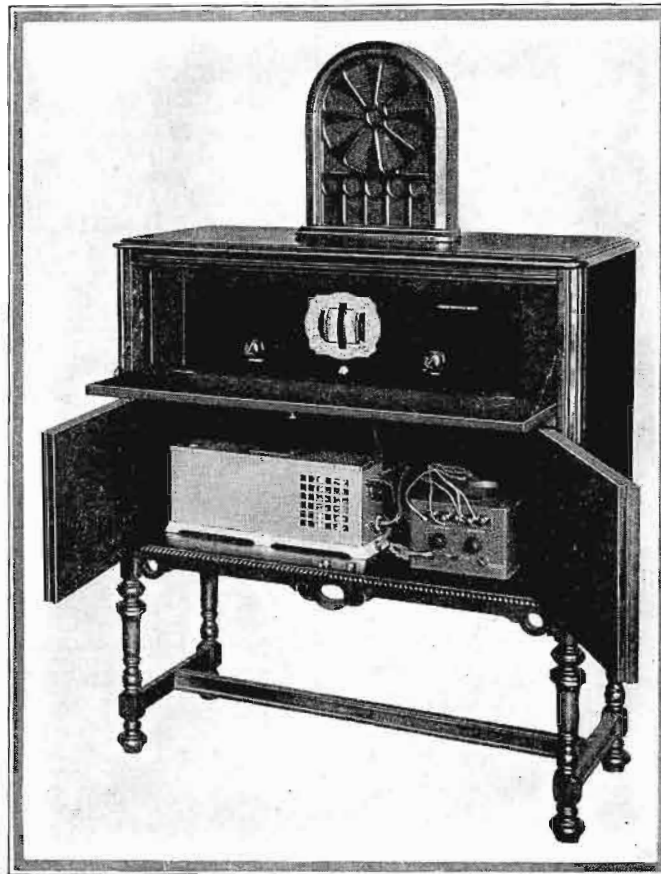
The method employed in the duoformer is unique and quite a step from the usual practice. At first glance it would seem that the internal capacity of a vacuum tube would be so slight as to have no material effect upon the operation of the set. This is far from the truth, for the internal capacity of a tube has a tremendous influence upon its functioning, particularly

at the higher frequencies.

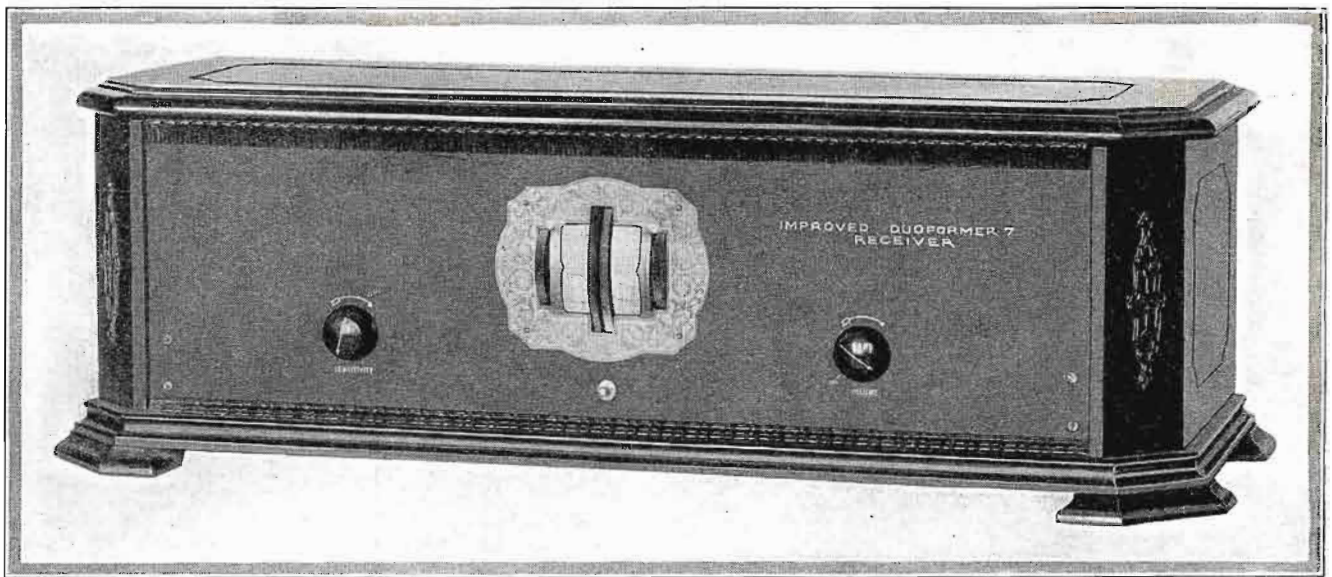
In designing the duoformer the engineers fully recognized the existence of feedback through the tube capacity and the necessity of compensating for it in order to prevent oscillations when all stages of the radio frequency amplifier are tuned to resonance.

Under the usual conditions the current fed back from the plate circuit to the grid circuit through the tube is of such phase as to add to the voltage already existing between the grid and the filament, causing oscillation. If the right phase relation is found oscillation will cease.

All the constants of the duoformer are arranged in relative proportion so that the current fed back from the plate to the grid is in



*View of completed receiver installed in a console with suggested accessories*



Front view of receiver mounted in a Corbett cabinet

the proper relation, and all tendency to oscillate is discouraged.

This feature, combined with the physical design of the duoformer, practically eliminates all electromagnetic coupling between successive stages, and a circuit design embodying the proper use of by-pass condensers makes it possible to build a seven tube receiver that has a high and uniform efficiency over the entire range of broadcast frequencies.

The instruments are mounted on a bakelite subpanel with all wiring and many of the small parts on the under side. The panel contains the two tuning dials, two variable resistances and a filament switch.

The antenna lead is brought directly to the grid of the first radio frequency tube, and the negative filament to the ground. Across the two is a 1000 ohm resistance, which forms a leakage path for the surplus energy and prevents the tube from jamming.

Between the filament and plate leads of all the tubes but the audio amplifiers are .001 mfd. fixed condensers used to by-pass the radio frequency.

The detector tube has a 3 megohm grid leak across a .00025 condenser.

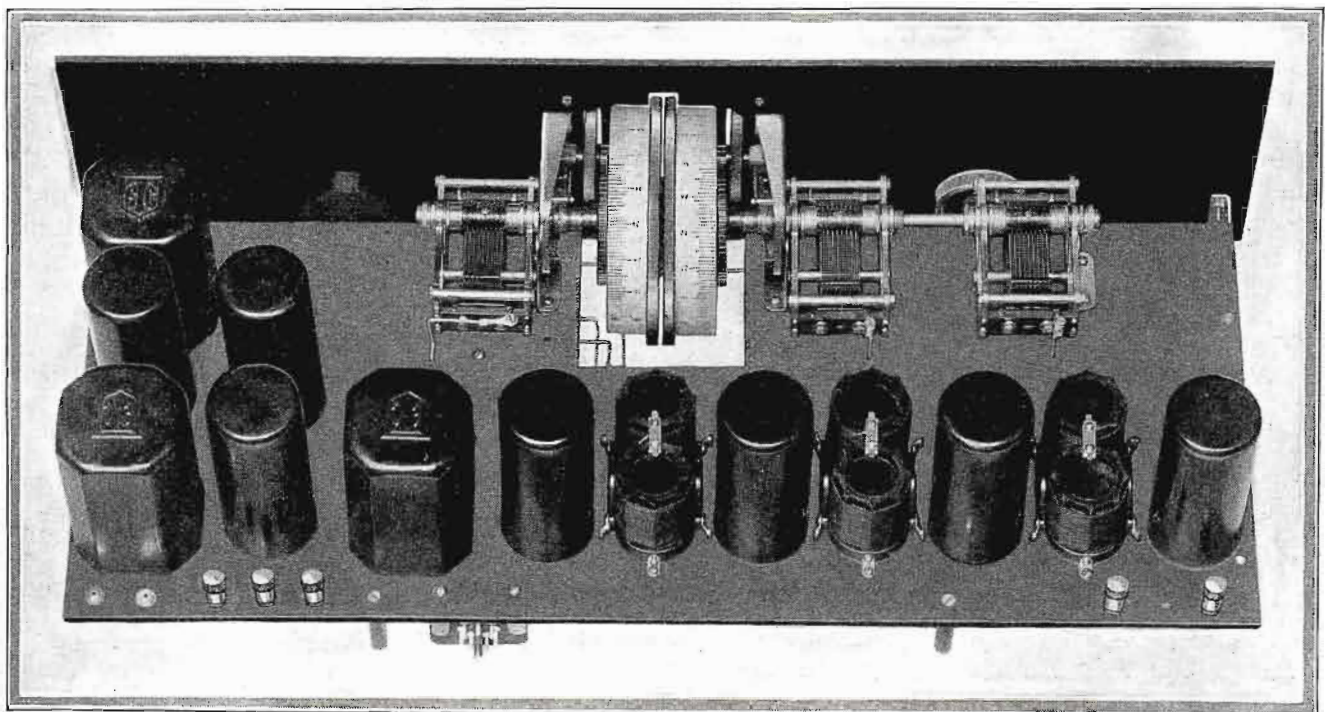
Volume is controlled by a 10,000 ohm variable resistance which connects to the B terminals of all the radio frequency transformers.

A "C" battery is needed, four and one-half volts for the first audio stage and ten and one-half for the second.

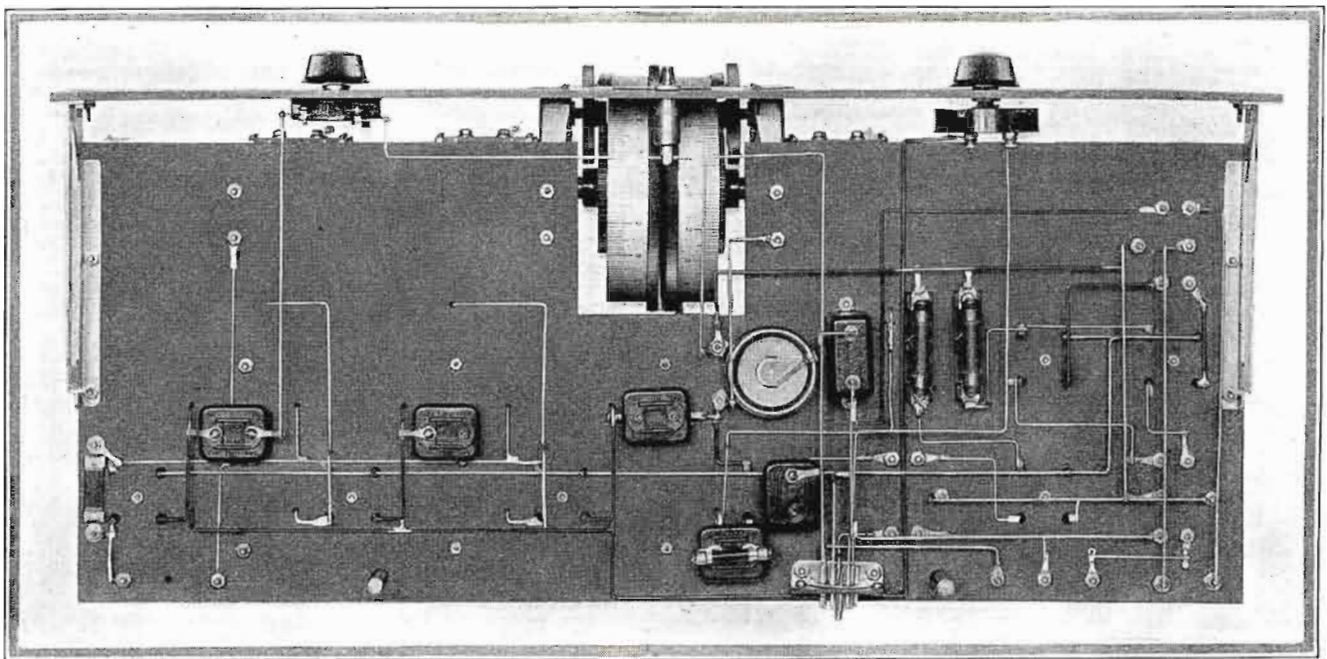
With the push pull system, a transformer with a double secondary is used, one grid connecting to each half. An output transformer of similar construction prevents the direct current from the "B" battery entering the reproducing horn and demagnetizing the windings.

The tuning of the duoformer is similar to most of the other tuned radio frequency sets and anyone who is the least bit familiar will have not the slightest difficulty in bringing in stations. The two dials will read the same or nearly so. It is practically impossible to get them absolutely in unison through the full scale, but one or two degrees off will make no material difference in reception.

If it is found that the gang condensers do not tune sharp enough, a set screw located on the axis of either of them may be loosened and the plates rotated free from the shaft until the spot of sharpest tuning is reached. Due to the fact that the set is home made, no set adjustment can be made on the instruments at the factory. Sometimes a



Rear view. Note neatness of subpanel layout



Bottom view. Note how subpanel is cut away to allow for drum dials

difference of two inches in the connecting wires will be enough to throw the condensers out of harmony.

It is a simple operation to adjust them, and once they are set, they require no further attention.

201-A tubes are used for all but the last stage audio amplifier. As they are all of the same internal capacity, there is no special need of matching them.

**LIST OF PARTS**

These parts of their equivalent will give satisfactory results:

- 1—7x26x3/16-in. Drilled and Engraved Formica Panel.
- 1—10x25x3/16-in. Drilled Formica Subpanel.
- 3—Camfield .00035 mfd. Variable Condensers.
- 1—Centralab 20 ohm rheostat.
- 1—Centralab 6 ohm rheostat.
- 1—Centralab 10,000 ohm Variable Resistance.
- 1—Muter Battery Switch.
- 4—Muter .001 mfd. bakelite fixed condenser.

- 1—Muter .00025 mfd. grid condenser.
- 1—Muter 3 megohm grid leak.
- 1—Lynch Type 4 equalizer.
- 1—Lynch Type 1 equalizer.
- 3—Camfield Duoformers.
- 1—Yaxley No. 660 Cable Connector.
- 5—Binding posts. X-L.
- 2—Amsco Tip Jacks.
- 2—Benjamin No. 8629 Brackets.
- 7—Tyrman Sockets.
- 1—Tyrman audio transformer.
- 1—Tyrman power input transformer.
- 1—Tyrman power output transformer.
- 2—Tyrman drum dials.
- 1—Carter H-1000 resistance.
- 30—Feet Acme Celestite Wire.
- 1—Package Kester Radio Solder.
- 1—Ekko ground clamp.

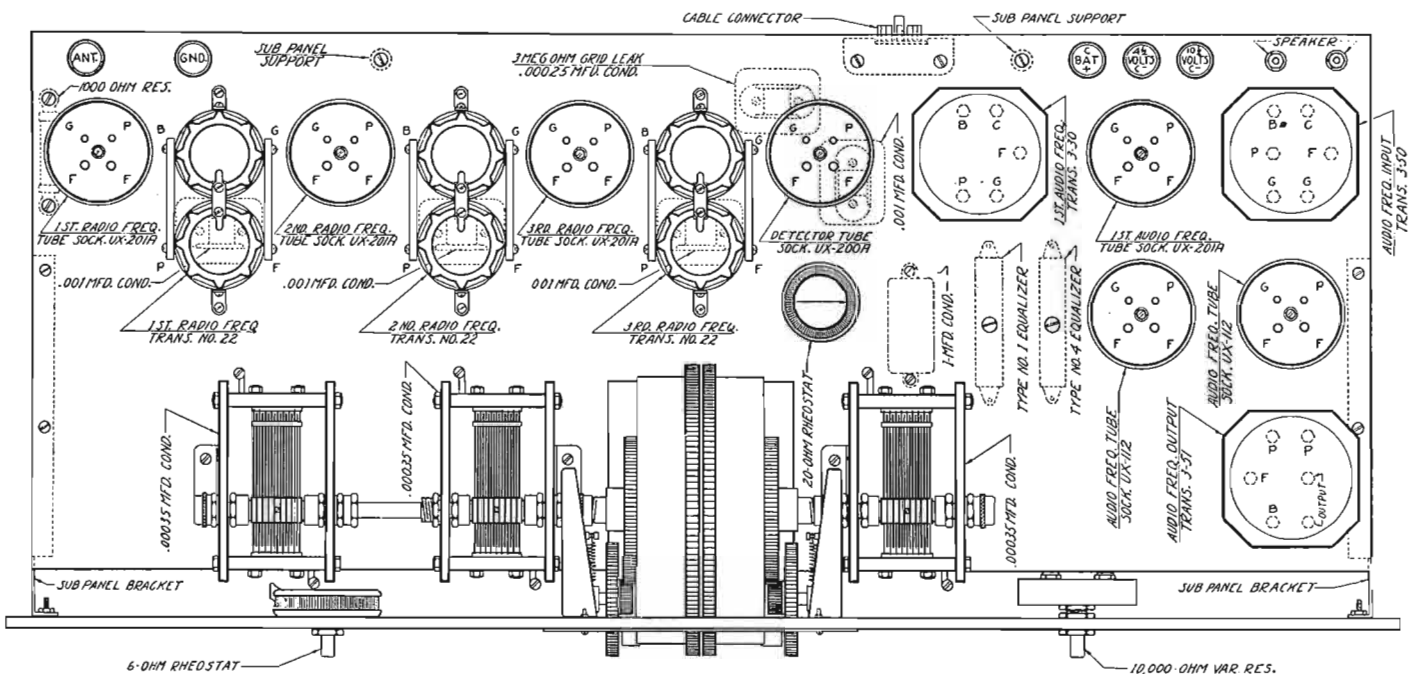


Fig. 1. Baseboard layout

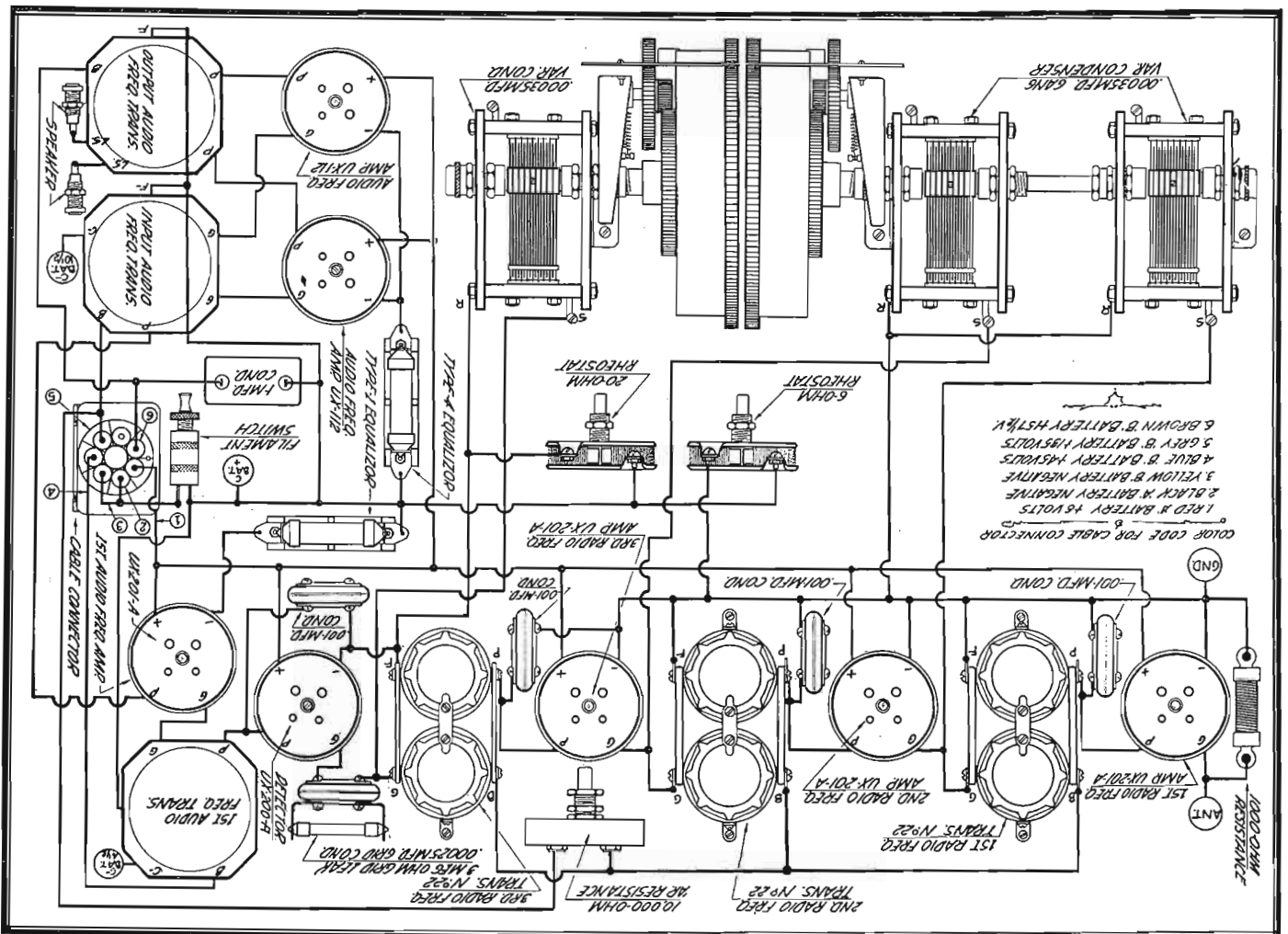


Fig. 2. Graphic illustration showing all connections in entire receiver

- 1—John E. Fast 1 mfd. by-pass condenser.
- Miscellaneous lugs, screws, nuts, etc.
- 2—Ceco Type "F" Tubes.
- 1—Ceco Type "H" Tube.
- 4—Ceco Type "A" Tubes.
- 1—Camfield 10x¼-in. Steel Condenser Shaft.
- 2—Camfield Type 11 Condenser Mounting Brackets.

List of Accessories for Use With the Improved Duoformer Seven Receiver

- 1—Charlotte Type R-10 Console.
- 1—Corbett Type "C-26" Cabinet.
- 1—Silver Beauty "A" Power Supply.
- 1—All-American "B" Power Supply.
- 1—All-American Speaker.

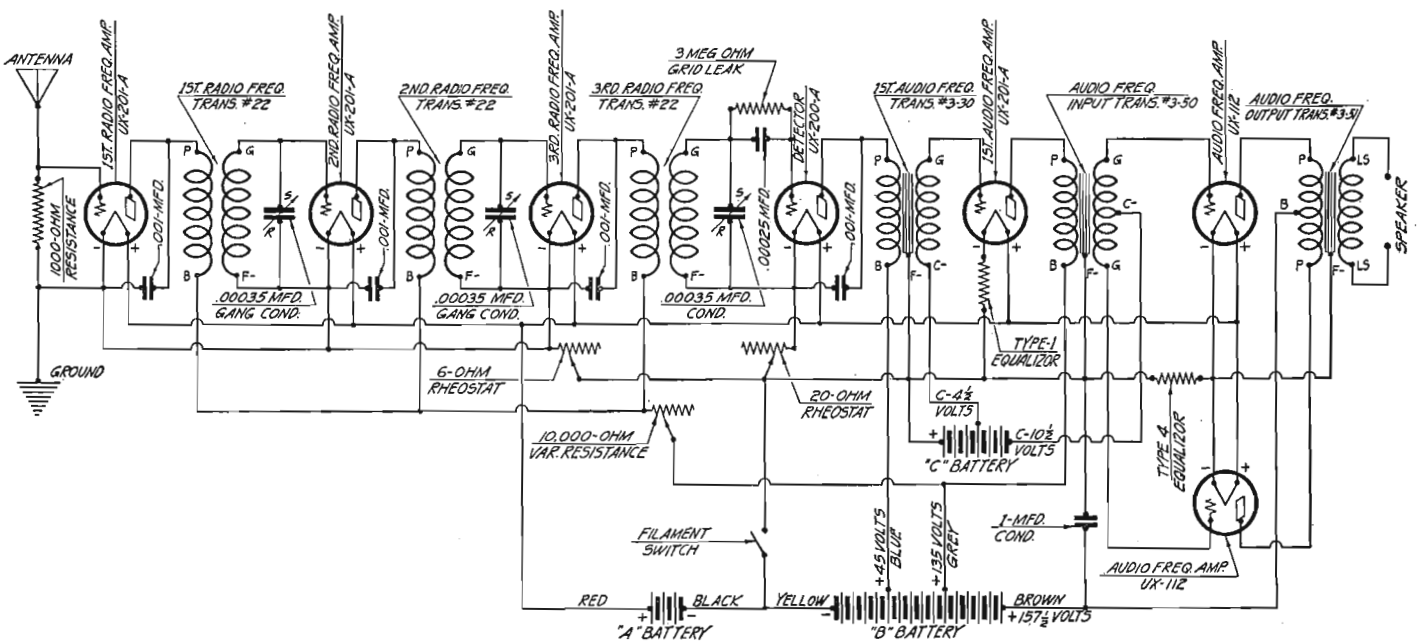


Fig. 3. Schematic wiring diagram

# A Compact Portable "B" Eliminator Test Set Here Is a Handy Adjunct to Service Man's Kit

This Instrument Was Constructed and All Illustrations Made in the  
Laboratory of the Citizens Radio Call Book

**I**N designing a portable tester for field testing of "B" battery eliminators with especial view towards correction of poor design in eliminators, it is necessary to consider the following points:

1. Portability.
2. Ruggedness.
3. Universal application.

The idea of portability requires that all parts shall be contained within a small case. This at once eliminates oscillographs, vacuum tube-voltmeters and other devices especially applicable for "hum" tests. Therefore it is necessary to assume that choke coils and condensers are properly designed and installed. This assumption is reasonable if the eliminator can be made to supply voltages to a sensitive radio set without more than ordinary hum.

The testing is then limited to the taking of voltage-current curves (regulation) on the several taps. It is necessary that the tester contain variable loads to be applied to the several taps of the eliminator, and it is necessary that these loads may be removed in order that a practical test may be applied by actually measuring the input to a radio receiving set.

The idea of portability requires that as few meters as possible be used and that each meter be made to serve the maximum of use by means of switches which throw it into several circuits. Schemes for switching these instruments will be explained fully further on.

The requirements of "ruggedness" are that it shall be portable



Photo A. Top view of completed test set

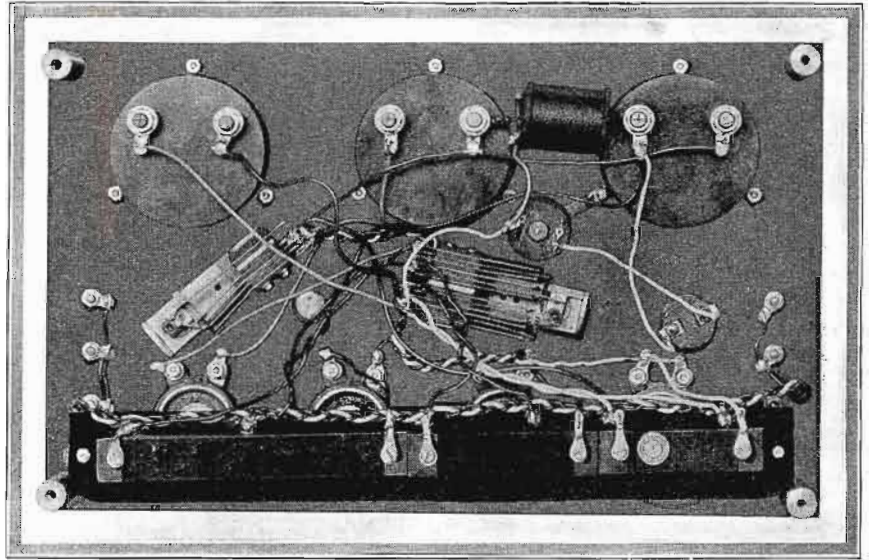


Photo B. Bottom view showing all wiring

without special care as to prevention of knocks and vibration. This demands that very rugged instruments be used throughout, and this ruggedness eliminates such things as galvanometers and microammeters, vacuum tubes, etc.

It is necessary that the test set be as nearly universal in application as possible. Voltages as high as 500 volts must be read and currents to 40 milliamperes must be handled. At least 3 voltage taps must be provided, and the self-contained, variable loads must be capable of simulating any radio set.

The problem of a high resistance voltmeter is an old one with which the public is familiar by now. The reading of the voltages on "B" battery eliminators requires that the voltmeter shall be of such high resistance that the current drawn shall be small in order that it may not add to the load of the eliminator. Commercial voltmeters with a range of 150 volts draw from 15 to 20 milliamperes, and this is sufficient in some cases to badly overload the eliminator.

A milliammeter may be used as a high resistance voltmeter by means of a current limiting series resistor called a multiplier.

If  $E$  is the maximum voltage to be measured and  $I$  is the current range of the milliammeter, then  $R$ , the resistance required to cause full deflection of meter on voltage  $E$  is found through the use of the following formula:

$$R = \frac{E}{I}. \text{ The } I \text{ is in amperes.}$$

Assume a 1 milliampere ammeter with a negligible resistance of about 30 ohms and a voltage of 500 volts, then:

$$R_m = \frac{500}{.001} = 500,000 \text{ ohms.}$$

The  $R_m$  is the resistance of the multiplier. This is a very expensive resistor and money can be saved and other advantages may be obtained by the method as shown in Fig. 1.

The voltmeter, of ordinary range and price, draws entirely too much current for use in measuring voltages of a "B" current supply device. However, it may be used as a standard in cali-



brating a milliammeter for use as a high resistance voltmeter using a high resistance, variable rheostat of the carbon type such as the Carter "Hi-Ohm" for a multiplier. The advantages of such a variable multiplier is that several ranges may be provided on one instrument and each may be checked by means of the standard low resistance voltmeter.

When the proper setting of the No. 5 "Hi-Ohm" is obtained,

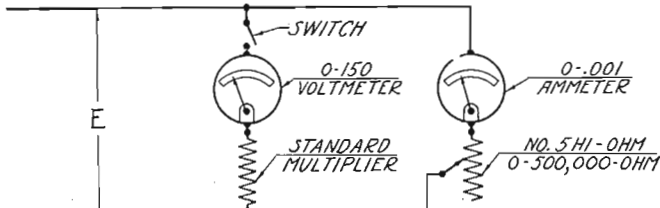


Fig. 1

the switch may be opened to stop the drain caused by the standard voltmeter.

If range of meter is .001 ampere the scale will read from zero to 1 by tenths or every 2 tenths. If "R<sub>m</sub>" is set to cause full scale deflection when standard meter reaches 100 volts, then the voltages of the ammeter will correspondingly be 100 times the milliamper reading.

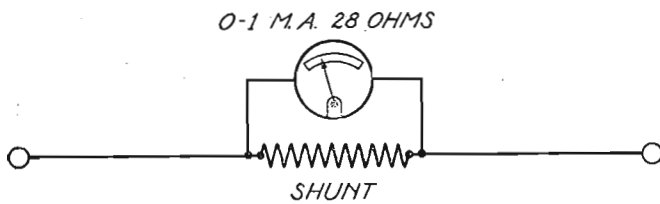


Fig. 2

Correspondingly, a voltage of 500 volts may be measured if a reading of 0.2 milliamper corresponds with a standard voltage reading of 100.

Do not turn "R<sub>m</sub>" to zero, or the milliammeter will be ruined by the excessive current flowing through it. It is well to insert a fixed resistance of about 50,000 ohms in series with "R<sub>m</sub>" to protect the meter.

The simplest method of using one ammeter to measure the currents in several circuits is that of using one shunt in each circuit and by means of switches to apply a milliammeter across each shunt in turn. The theory of the shunted milliammeter for measuring currents is shown in Fig. 2.

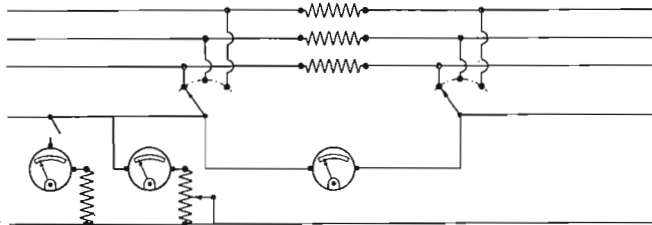


Fig. 3

Range of meter = 0-1 M.A. or 0-.001 Amp.  
 Resistance of meter = 28 ohms.  
 Voltage required to cause full deflection:  
 $E = RI = 28 \times .001 = .028$  volt.  
 This is the voltage across the shunt also.  
 Assume currents up to 10 M.A. are to be measured.

Current through meter = .001 Amp.  
 Current through shunt = .009 Amp.  
 Resistance of shunt =  
 $R = \frac{E}{I} = \frac{0.028}{0.009} = 3.11$  ohms.

Similarly, if:

R<sub>m</sub> = Resistance of meter in ohms.  
 I<sub>m</sub> = Range of meter in ohms.  
 I<sub>t</sub> = Total current (in amperes) to be measured.  
 R<sub>s</sub> = Resistance of shunt in ohms.

$$R_s = \frac{R_m \times I_m}{I_t - I_m}$$

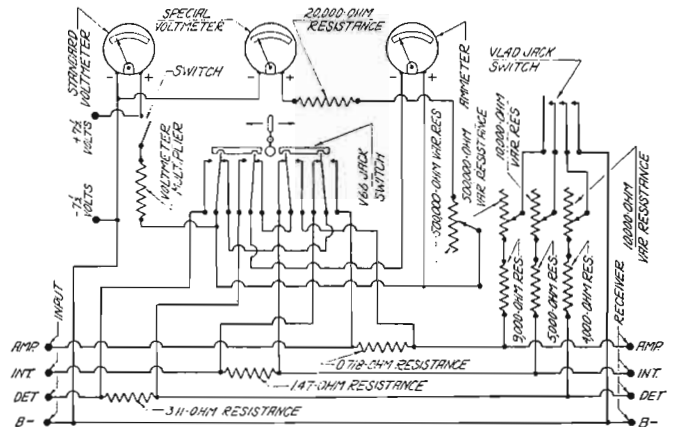


Fig. 4. Schematic wiring diagram

The switching arrangement for applying the milliammeter across several shunts is shown in the Fig. 3.

It will be seen in studying the schematic wiring diagram, Fig. 4, that the voltmeters may be connected to the first triple throw switch and thus be transferred from one circuit to the other at the same time that the milliammeter is transferred. It will be also noted

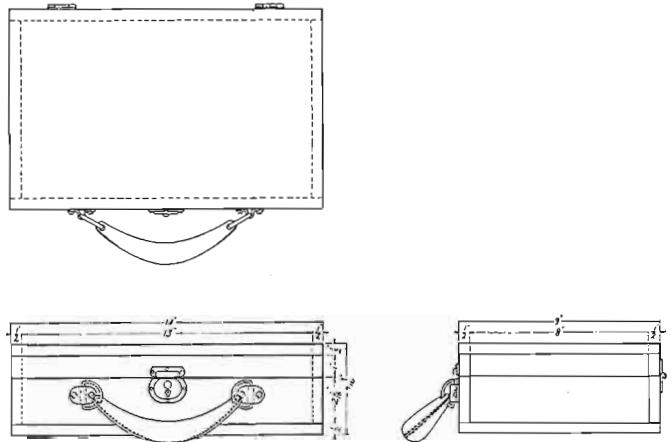


Fig. 7. Details of carrying case

that if the voltmeters are connected on the other triple throw switch, the milliammeter will indicate the voltage alone.

It was desired that the test set could be placed between the eliminator and the radio set in order to measure the current and voltages supplied to the radio set. For this reason a double set of posts is provided. The left-hand set of posts goes to the eliminator and the right-hand set goes to the radio set.

It is also desired that an internal, variable load be supplied to simulate actual load conditions. Each load consists of a fixed and variable resistor in series so that the fixed resistor is equivalent to the lowest resistance that a radio set would be expected

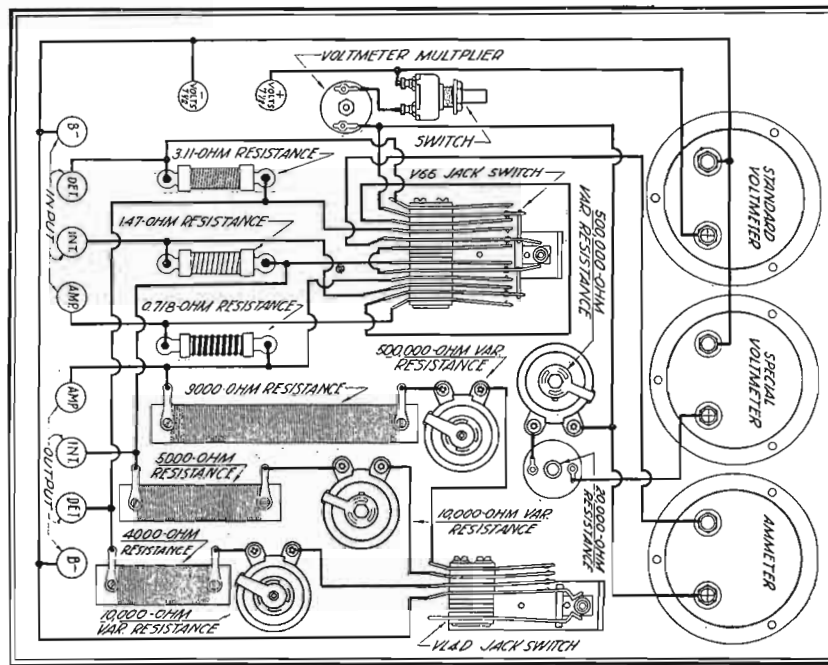


Fig. 5. Graphic illustration

to offer and such that the fixed resistors plus the full value of the variable resistors shall be equivalent to the highest resistance that a radio set would be expected to offer. That is, it should simulate either single-tube or multi-tube sets.

Three such loads are required, one from each of the voltage taps, and these loads must be connected between the voltage taps on the "B" in such a way that they can be instantly removed. Such a provision is supplied in the special jack switch which was designed for this purpose.

This test set has been of much value in the checking of manufacturers' designs and has furnished data for many successful sales arguments relating to regulation and adaptability of "B" battery eliminators.

**List of Parts for "B" Eliminator Test Set**

While the laboratory model of this device was constructed from the exact list of parts given below, the experienced experimenter will find no difficulty in making any reasonable substitution for those parts specified. However, the novice is advised to strictly adhere to the parts given, if satisfactory results are to

be expected.

- 10 Eby Binding Posts.
- 1 Weston 0-7½—0-150 Volts Voltmeter Type 301.
- 2 Weston 0-1 Ammeter Type 301.
- 1 Celeron 8x13x¼-inch Panel.
- 1 Celeron 1½x11¾x3/16-inch Strip.
- 2 Carter 10,000-ohm Hi-Ohms.
- 2 Carter 500,000-ohm Hi-Ohms.
- 1 Carter 9000-ohm Resistance.
- 1 Carter 5000-ohm Resistance.
- 1 Carter 4000-ohm Resistance.
- 1 Carter 0.718-ohm Resistance.
- 1 Carter 1.47-ohm Resistance.
- 1 Carter 3.11-ohm Resistance.
- 1 Carter Imp. Filament Switch.
- 1 Carter V-66 Jack Switch.
- 1 Carter VL-40 Jack Switch.
- 1 Carter H200,000 Resistance.
- 20 feet Acme Flexible Celastic Wire.
- 1 Package Kester Radio Solder.

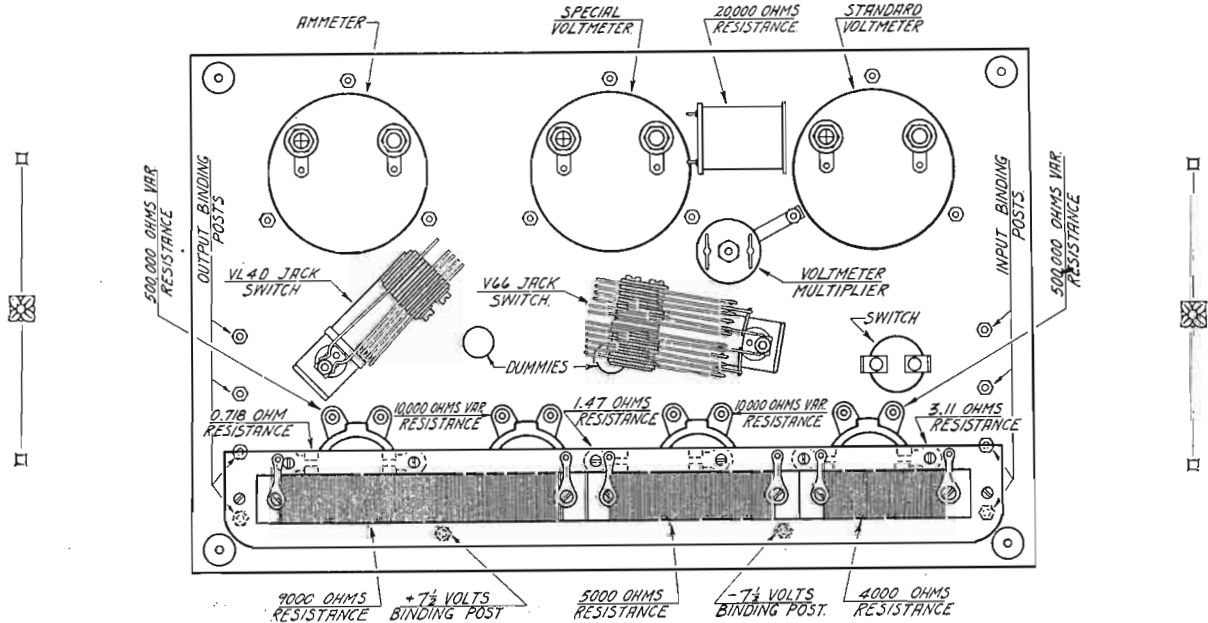


Fig. 6. Panel layout

# The "Hot Spot" Fourteen

This Receiver Is a Combination of Power, Selectivity and Sensitivity

This Receiver Was Constructed and All Illustrations Made in the Laboratory of the Citizens Radio Call Book

**T**HE Melo-Heald Eleven, introduced in our last issue, has met with such favorable comment that the designers have come forth with a big brother. This is the Hot Spot Fourteen. It in no way supplants the Eleven, but may be regarded in the same light as a twelve cylinder car alongside an eight. In automotive terms, it is easier riding, more flexible and the load is distributed through fourteen tubes instead of eleven. Each tube does less, but the total is a tremendous gain with more economical operation, far more selectivity and ability to cut through locals.

This set was designed primarily to meet the almost exasperating conditions in the metropolitan areas where one must dive and wiggle between high powered locals to even get a glimpse of the outside world.

Using a loop in the heart of Chicago, in the middle of the summer we have repeatedly brought in distant stations through high powered locals, on only two meters difference in wavelength.

The conventional three tap loop is used on this receiver. It must be rotated till in line with the station desired and then tuned to exactly that wavelength. Regeneration on the loop is desirable, but oscillation is most certainly not. Very often the reason why reception is not successful is because the loop is oscillating just enough to cause whistling, and the resulting discord is blamed on almost everything else under the sun but the loop. The correct procedure is to bring the loop to regeneration and keep it there. This is done with the midget condenser. The moment a whistle occurs turn back till it ceases, and that is the best point of operation.

The oscillator tube governs the loop and is the means of regulating the incoming signal. In the Hot Spot Fourteen the intermediate frequency is so high that it prevents the loop from crashing and is far enough from the emitted frequency of broadcasting stations to reduce to a minimum the tendency to pick up harmonics. The second harmonic of a local high powered station can be received if one turns the loop exactly to the plane of that station and tunes sharply, but it is not easy, which is quite nice. This reduction of harmonics and the ability to pick up a certain station at but one place on the dial is the reason for choosing the very appropriate name "Hot Spot." Like the thermometer, a certain station reads a certain degree on the scale.

Local stations may be brought in with such tremendous volume as to paralyze the receiver. This causes tremendous distortion and no modulation. While receiving locals, set the loop at an angle and the full tone quality will be obtained with no loss of volume.

The grid coil of the oscillator and the secondary of the mixing coupler are linked together in parallel, shunted by the tuning

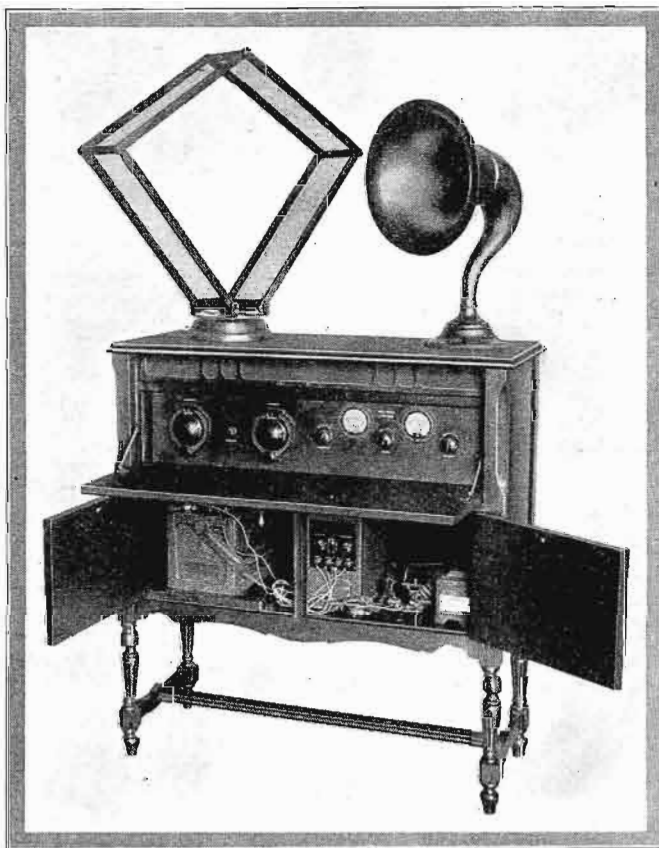


Photo A—View showing "Hot Spot" Fourteen with suggested accessories mounted in Excello console

condenser. The plate coil of the oscillator is entirely out of the argument, further isolated by a radio frequency choke.

The first detector tube is connected to give grid detection for sensitivity while the second detector tube is wired for plate detection, giving quality—a desirable combination.

The Intermediate Frequency amplifier is different from the regular run of transformers in that each transformer was designed for the particular stage in which it was to operate. The fundamental principle is employing a lower amplification constant for each transformer, and more transformers. You will notice by consulting the schematic diagram that each transformer is numbered, and that instead of stopping at the conventional three or four, they keep right on adding up until they make the grand total of eight, just twice as many as common practice dictates.

Everyone knows that an eight cylinder car will not go twice as fast as a four, but it will go faster and it will ride easier. That is the same principle employed here. The individual transformer will not give as great an amplification constant as one designed for a set employing fewer tubes, but while

each one gives less, the total is in the same ratio as the car; much more volume and selectivity. It is well worth the investment of four additional tubes to achieve this, for the results are quite satisfactory, and seeing the transformers are designed to work together with a gradual increase as they go along there is no tendency to crowd or distort.

The transformers are air core and are so stable in operation that the potentiometer may be carried on the negative side of zero. This advantage may be readily seen when one considers the high value of a shunting resistance. When the grid is positive the resistance is lowered and the sharpness of the transformer is reduced considerably. The farther the potentiometer is turned toward the negative the higher the resistance and the sharper the tuning. It is possible to continue farther in this circuit than common practice dictates, removing the troublesome shunt which limits the possibilities of the receiver.

The audio amplifier uses three stages of distortionless transformers. These have a ratio of four to one. Volume is controlled by means of a potentiometer shunted across the second stage. In this manner the output may be controlled from a mere whisper to full volume without throwing the rest of the circuit out of balance, such as would happen if plug and jacks were used.

On this potentiometer is mounted a filament switch. It might just as well be on the rheostat, as both have to be turned to bring the set to the point of maximum sensitivity, the advantage being that with the rheostat it is often desirable to bring the filaments to the correct temperature once and then leave them there, while the poten-

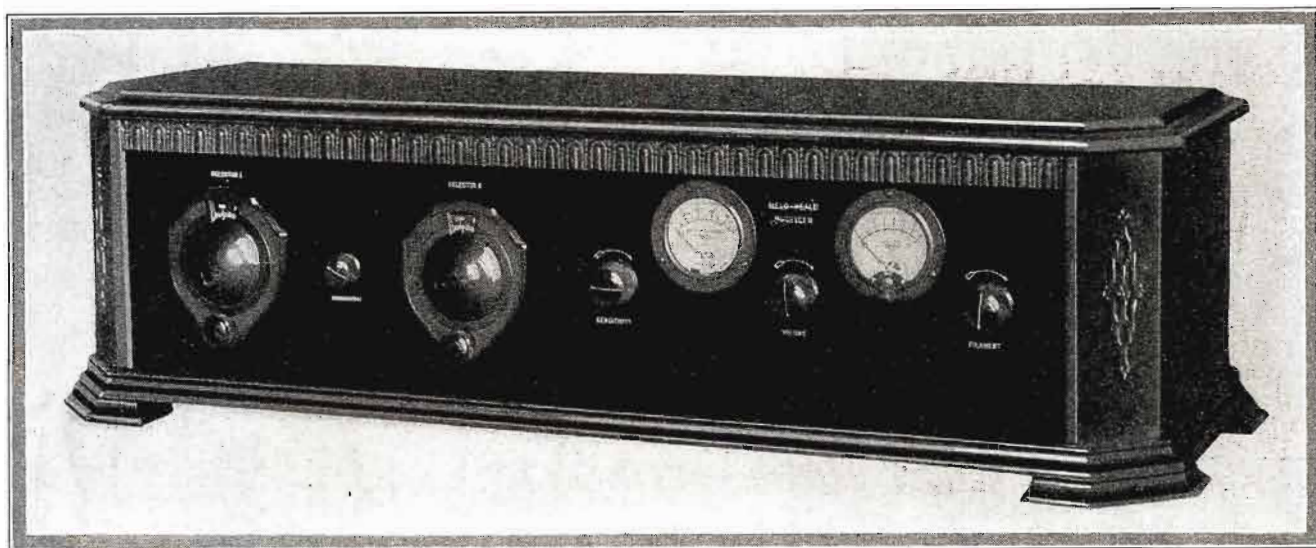


Photo B—Front view of receiver shown installed in a Corbett cabinet

tiometer is changed from station to station. For that reason we chose this unique method of filament control.

For the oscillator, the two detectors and the audio amplifiers we will use 201-A tubes, and for the Intermediate Frequency amplifier 199 tubes. This is a great saver of filament current and the total plate drain is approximately 35 mills. There is nothing materially gained by using the larger tubes in the Intermediate Frequency amplifier, while the low Mu tubes are quite suitable, in fact, superior, for they perform the same work with less current consumption.

In order to avoid burning the 199 tubes at too high a temperature, a fixed 4-ohm resistance is placed in the lead. This never allows the voltage to exceed 3.5 volts. For DX work the tubes should be normally operated at 3 volts. For local stations or extreme selectivity satisfactory results will be obtained by burning the tubes below normal. A combination voltmeter is used, reading either plate voltage in the amplifier circuit or filament voltage on the 199 tubes, at the throw of a switch. Watch this meter closely, for it will tell whether or not your set is being supplied with the correct voltages, and prevents overloading.

The other meter is a milliammeter. The set should ordinarily not draw more than 40 mills, but to provide for power tubes a meter reading up to 100 is recommended.

The 3-ohm rheostat on the panel controls the 199 tubes, the two semi-fixed resistances mounted on the baseboard control the 201-A tubes. The 6-ohm governs the current supplied the oscillator and first detector, while the 3-ohm regulates the second detector and the three audio amplifiers.

One precaution to be observed very closely is to never remove or place in the sockets any of the 199 tubes while the current is turned on. They are controlled in parallel. If only one is in the socket, the current intended for eight tubes will pass through it, and quite likely it will be decidedly worthless in less time than it takes to tell of the decease.

It is well to put in a word in regard to the one mfd. fixed condensers. Look at your diagram and then install them exactly where they are represented. It is not enough that they be in the circuit; to perform correctly they must be in the exact spot indicated.

It is rather difficult to specify exact "B" battery voltages, for everyone has his pet theory as to just what is best. Three blocks of 45 volts each should be used, and taps taken off at wherever the set works best for you.

If a power tube is used in the last stage audio amplifier, an additional "C" battery is needed. Nine volts is correct for a 112 tube, with 135 volts on its plate.

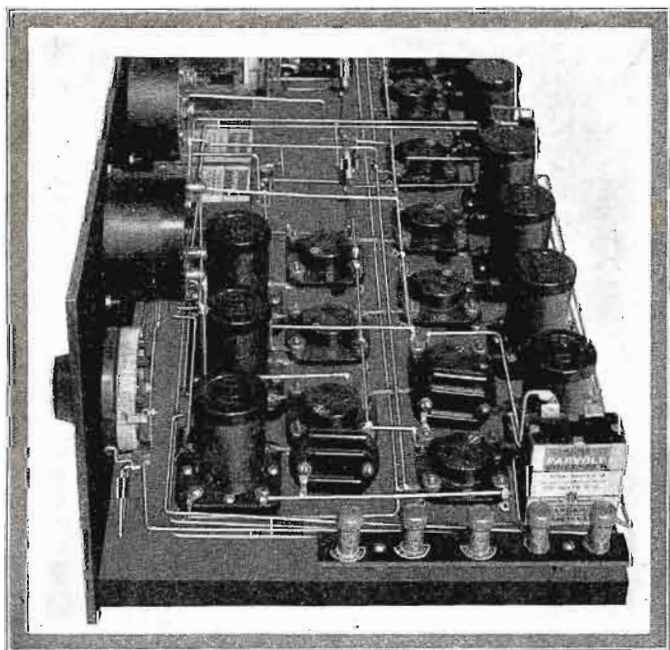


Photo C—End view looking from right end of front panel

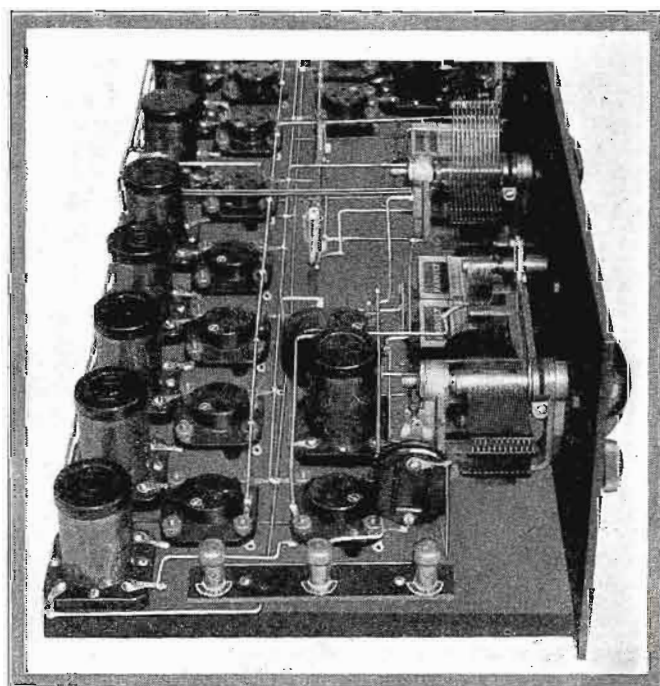


Photo D—End view looking from left end of front panel

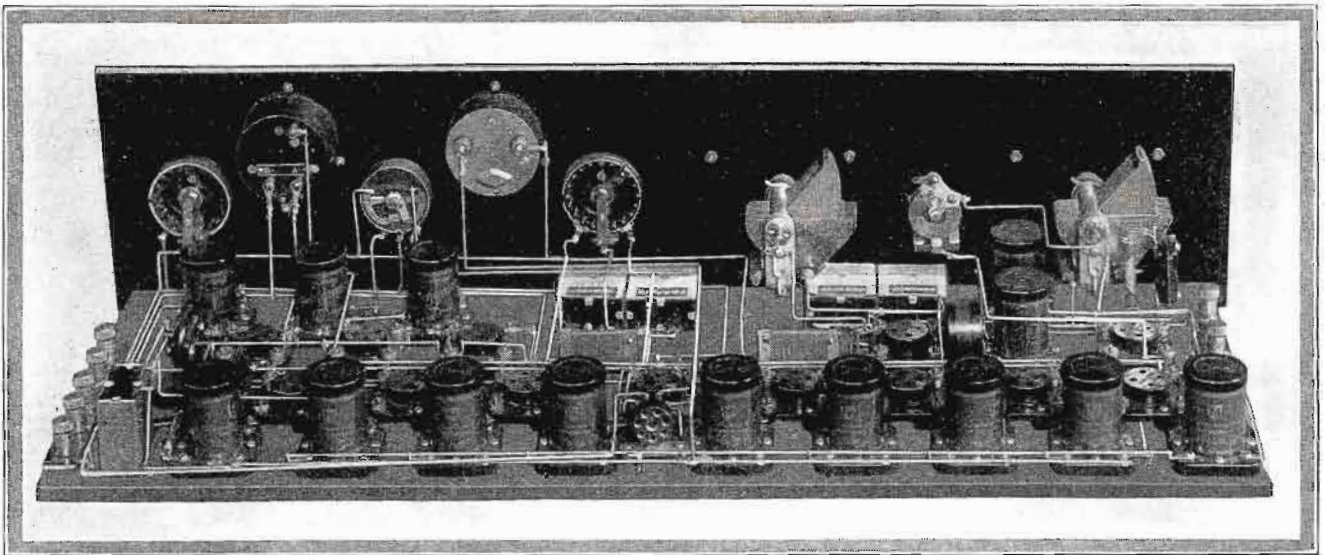


Photo E—Rear view of completely wired receiver

All the connections but the loop, "C" battery and reproducer are brought out to a multi-plug. Binding posts are provided for these.

There is so much to this set that the laying out must be done with great care or one will discover that there is not room for certain parts and others are unduly crowded. The best plan to follow is to measure the baseboard carefully, allowing plenty of room for each

instrument, wiring them as they are screwed down. If one waits till they are all in place before doing the wiring, complications will develop. First mount the transformers and sockets, putting on all the common and connecting wires, then mount the other instruments, and when they are all mounted and connected, assemble the panel and make the connections between it and the baseboard.

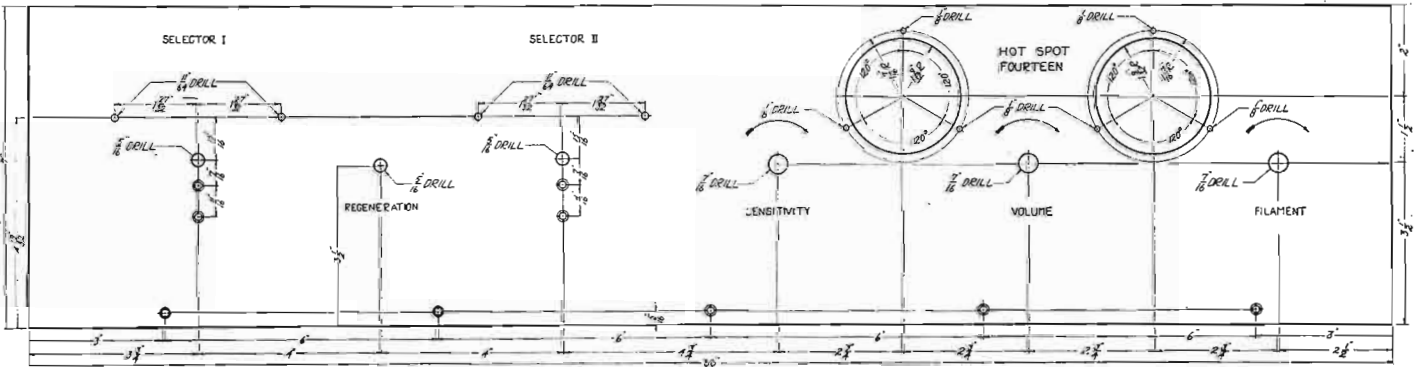


Fig. 1—Panel layout showing location and size of holes

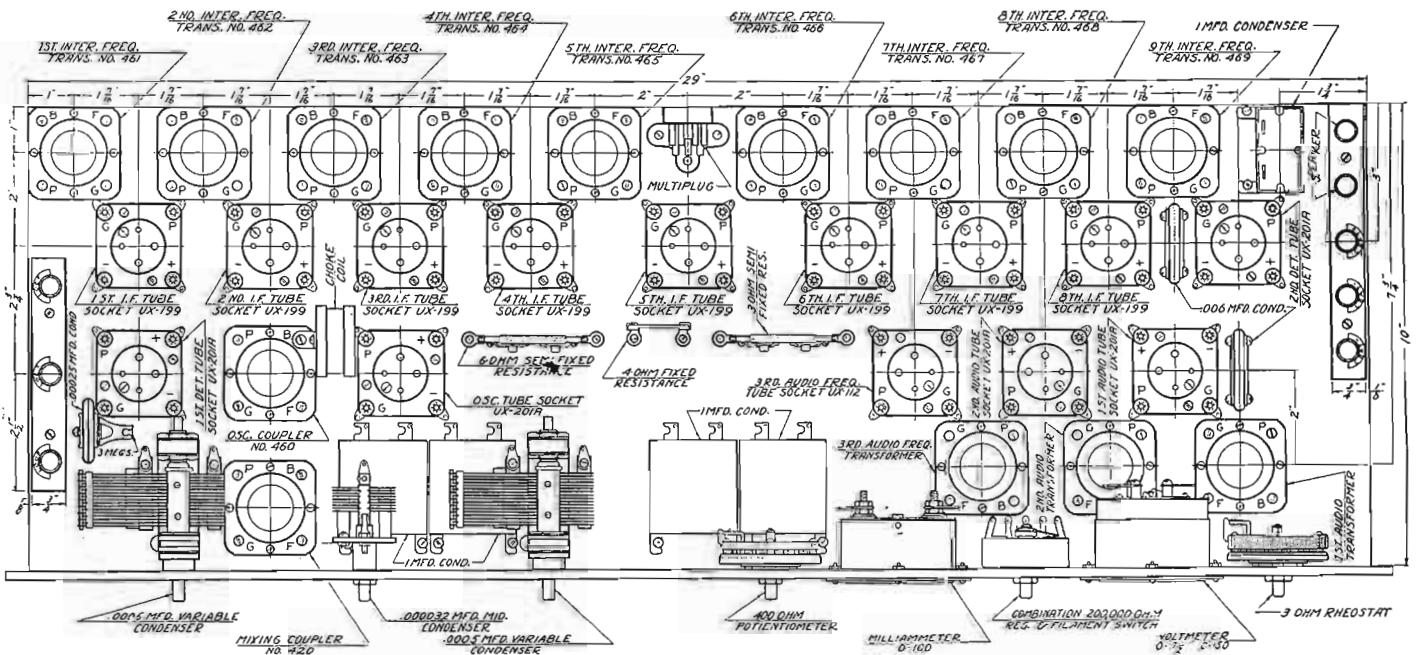


Fig. 2—Baseboard layout showing arrangement of all parts



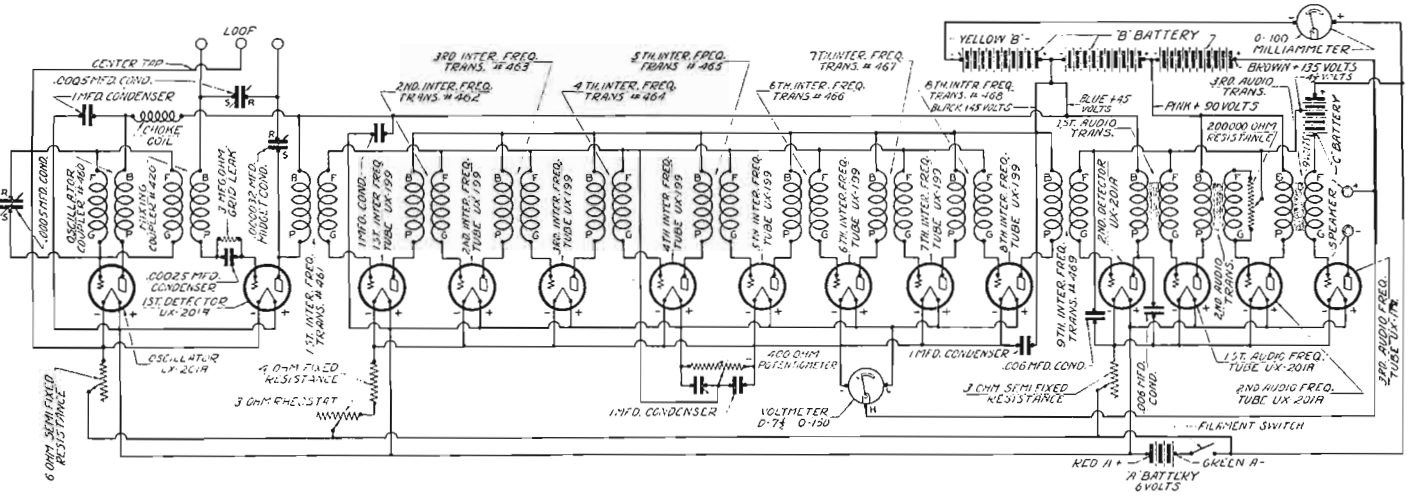


Fig. 4—Schematic wiring diagram for the advanced experimenter

Soldering is an art not fully appreciated by the layman. Because solder adheres to a joint does not mean that the joint is soldered. With a set of this size, one may readily appreciate what it means to have a faulty joint and not be able to find it. Be sure your solder is uniting the joint, not merely coating it.

Volumes have been written on why rosin should be used as a flux, but still it is shunned like the smallpox. If you positively have to use acid, equip yourself with a bottle of alcohol and a No. 6 water color brush. Swab each joint after soldering and then wipe dry with a rag.

Use care in soldering to the lugs of fixed condensers, for if the heat reaches the inside it is liable to melt something and ruin the condenser. It is a good precaution to test a condenser as soon as you buy it to make sure it has not been damaged by rough handling, and again as soon as it is soldered to be certain it is not opened or shorted in soldering.

Be sure to carefully check all wiring before placing the tubes in the sockets.

**LIST OF PARTS FOR "HOT SPOT" FOURTEEN**

The model of this receiver constructed in the laboratory of the CITIZENS RADIO CALL BOOK was built from the exact list of parts appearing herewith. While it is possible for the experienced constructor or experimenter to successfully substitute other reliable parts for those actually specified, it is recommended that the novice strictly adhere to the list of parts as given below.

- 1—Robertson Davis Certified Melocoupler No. 420
- 1—Robertson Davis Certified Melocoupler No. 460
- 1—Robertson Davis Certified Melocoupler No. 461
- 1—Robertson Davis Certified Melocoupler No. 462
- 1—Robertson Davis Certified Melocoupler No. 463
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- 1—Robertson Davis Certified Melocoupler No. 468
- 1—Robertson Davis Certified Melocoupler No. 469
- 1—Robertson Davis Melo-Choke
- 3—Robertson Davis Multistage Meloformers
- 14—Benjamin Spring Sockets
  - 1—Jones Cable Plug, Type BM
  - 8—X-L Binding Posts
  - 2—Sangamo .006 mfd. Fixed Condensers
  - 1—Sangamo .00025 mfd. Grid Condenser with Clips
  - 5—Sangamo 1 mfd. By-pass Condensers
  - 1—Yaxley 4 ohm Fixed Resistance
  - 1—Yaxley 3 ohm Semi-Fixed Double Arm Base Mounting Resistance

- 1—Yaxley 6 ohm Semi-Fixed Double Arm Base Mounting Resistance
- 1—Yaxley 400 ohm Potentiometer
- 1—Yaxley 3 ohm Rheostat
- 2—Hammarlund .0005 mfd. Midline Variable Condensers
- 1—Hammarlund .000032 mfd. Midget Condenser
- 2—Kurz-Kasch Dials
- 1—Frost 200,000 ohm Potentiometer with Filament Switch
- 1—Jewell 0-7½-150 Voltmeter
- 1—Jewell 0-100 Milliammeter
- 1—Formica 7x30x3/16-inch Drilled and Engraved Panel
- 1—10x29x½-inch Wood Baseboard
- 1—Package Kester Radio Solder
- Miscellaneous nuts, screws and solder lugs.

- 1—Durham 4 megohm Grid Leak
  - 30 Feet Acme Celasite Wire
  - 9—UX199 Tubes
  - 1—UX112 Tube
  - 4—UX201-A Tubes
- It is necessary that good accessories be used with this receiver. The "Hot-Spot" Fourteen is not a critical receiver, but it is readily seen that a device as sensitive as this demands care in the selection of accessories.

Any well constructed three tap loop will give satisfaction. "B" battery eliminators may be used, provided they are adequate for its demands and capable of retaining their efficiency over a long period of time.

Choice of speakers is largely a matter of personal preference, and any speaker which satisfies that condition may be used.

The cabinet shown in Photo "B" is a product of the Corbett Manufacturing Company of St. Marys, Pa. It is constructed entirely of walnut and has a beautiful hand-rubbed finish. The top of the cabinet is fastened to the body by means of a continuous piano hinge, while the two corner posts in the front are grooved to fit around the front panel of the receiver. The top rail is provided with screws to securely hold the receiver in place after it has been inserted in the cabinet.

The Hot Spot Fourteen Receiver obtains its "A" power supply from a 100 ampere-hour Willard Storage Battery, manufactured by the Willard Storage Battery Company of Cleveland, Ohio. The battery is contained in a solid rubber case and is provided with a handy carrying handle as well as screws for quickly attaching wires. The battery is kept at full charge by a Sterling "A" Battery Charger, manufactured by the Sterling Manufacturing Company of Cleveland, Ohio. This charger is unique in that it delivers 2½ amperes of fully rectified current and is by far the smallest charger on the market at the present time. No acids or bulbs are used in this type of charger, the rectification being accomplished by the use of two Raytheon Cartridge Rectifiers.

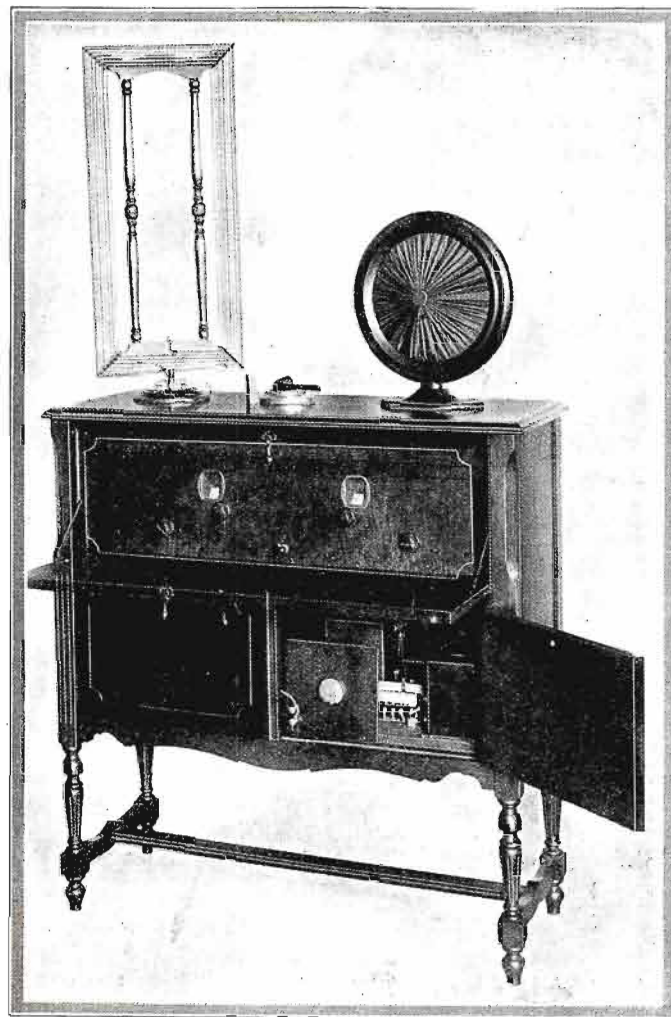
# An Electrically Operated Tuned Radio Frequency Receiver

Herewith Is Described a Complete Receiver and Power Unit Operating Directly From the Light Socket

This Receiver Was Constructed and All Illustrations Made in the Laboratory of the Citizens Radio Call Book

**T**HE trend of evolution in radio is following two parallel, though different channels. Out of the chaos of several years ago, there have evolved two distinct types of receivers that are holding their own due to their superior qualities. Generally speaking, these may be considered as the super-heterodyne group and the tuned radio frequency group. While the super-heterodyne type of receiver has enjoyed great popularity, the tuned radio frequency receiver has not been neglected. This is largely due to the careful research and design given to the apparatus used in that type of receiver. When thought turns to detail rather than generalities, progress is sure to result, and while it is not spectacular, it is always beneficial to those who use the improved product. More care and consideration is being directed towards parts than ever before. It may be truly said that the time has come when one may safely buy all the necessary parts to construct a receiver, with the assurance that it will operate satisfactorily when completed.

One of the outstanding receivers of today is the Bodine AC Six. This set has been designed to operate from an ABC Power Unit and has been wired for such. Batteries cannot be used unless the set is rewired. Full instructions for the construction of the necessary Power Unit are included in this article and are given below. There are several unique phases of construction that are well worth discussion. The first is the radio frequency transformers. These are wound on a pattern closely resembling a figure eight. The primary and secondary coils are closely wound together into a single layer coil. There is no appreciable amount of dielectric in the field of the transformer; the only foreign member being the supporting post which rises through the intersection of the two loops of the figure eight. The coils are "doped" with an insulating compound and are self-supporting. The four terminals of the transformer are brought out, two at the top and two at the base. A



*Photo A. How the Electrically Operated Receiver Looks When Installed in a Console*

bakelite cross piece on each end of the supporting post contains the soldering lugs, making connections readily accessible.

Due to the construction of the coils, the magnetic field is practically limited to the coil itself. This eliminates all of the bother of placing the coils at a non-intercoupling angle, and obviates the necessity of shielding.

Balancing of the radio frequency amplifying circuits is accomplished by the use of Phasatrols. This remarkable instrument fills a long-felt want. It consists of a fixed condenser and a variable resistance sealed in a case and controlled by a slotted screw. An insulated screwdriver is used to vary the resistance in balancing out the circuits. The Phasatrols are mounted on the under side of the bakelite sub-panel and are so constructed that a single hole is all that is necessary for proper mounting. The screw head used for varying the resistance is built within the mounting bushing. This, coupled with the single mounting hole feature, enables the device to be mounted into place with a minimum of effort and effectively keeps the instrument out of sight and still accessible for adjustment.

Two tuning controls are provided, a single condenser for tuning the antenna, and a three gang condenser for tuning the radio frequency circuits. It very often happens that there is a slight difference in the capacity of the condensers constituting a gang, due to one of the plates of a condenser becoming slightly bent. The probabilities of such an occurrence have been overcome by the use of a tiny condenser in parallel with each of the condensers in the gang. This small condenser consists of two circular plates of spring phosphor bronze, the size of a dime, separated by a sheet of mica. A set screw, passing through, then governs the distance between the two plates, which in turn effects the capacity.

The audio amplifying transformers have been designed to register all frequencies over a scale of from thirty to three thousand cycles. They do not accentuate either the bass or high notes,



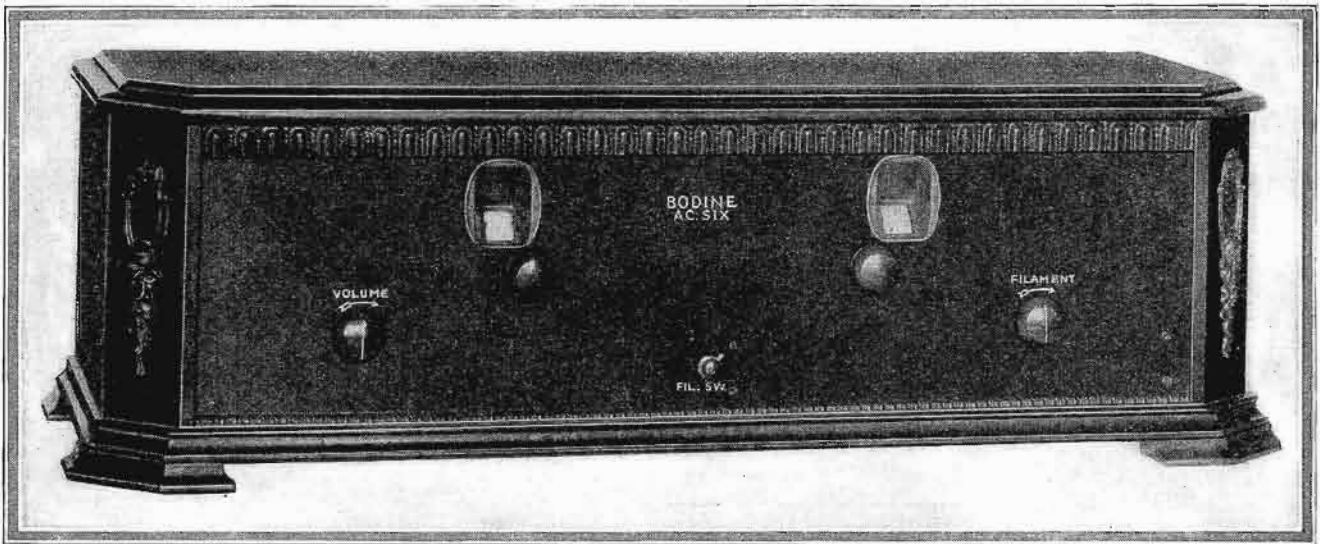


Photo B. Completed receiver installed in a Corbett cabinet

but give practically an even range of amplification over the entire scale. The cores consist of composite punchings instead of laminations. This prevents all "singing" and chattering when the transformers are under a heavy load. An air gap provides for magnetic leakage. The transformers are wound in a ratio of 3 to 1, giving as close to distortionless tone quality as is possible.

Since the filaments of the tubes are heated by a power unit, they are all connected in series, except the last audio stage, which uses a power tube. The filament of this tube is heated directly by raw A.C. current and separate pair of wires are provided for it. The leads from the five-volt terminals of the transformer to the socket of the power tube must be of rubber covered wire and must be twisted if the set is to function properly without A.C. hum.

All the other connections to the eliminator are brought out to a Multiplug. The Multiplug is double ended, since it serves as a coupling between the power unit and the set, and plugs directly into each device.

While the parts specified below have been used in the laboratory model of the receiver, it is possible to make any reasonable substitute without interfering with the all-round efficiency of the receiver. The novice is advised, however, to strictly adhere to the parts given herewith, since he will then be assured that the set will give satisfactory results.

- 1—Amsco .00035 mfd. 3-gang Variable Condenser STL.
- 1—Amsco .00035 mfd. Variable Condenser STL.
- 2—Electrad .002 mfd. Fixed Condensers.
- 2—Electrad .00025 mfd. Fixed Condensers.
- 4—Electrad .5 mfd. By-pass Condensers.
- 1—Electrad 1 mfd. By-pass.
- 1—Electrad 3 megohm Grid Leak.
- 1—Electrad Grid Leak Mounting.
- 3—Electrad Phasatrols.
- 2—Halldorson Audio Transformers.
- 1—Halldorson Output Transformer.
- 1—Bodine Antenna R. F. Transformer T 35.
- 3—Bodine R. F. Transformers T 135.
- 1—Yaxley 100-ohm Rheostat.
- 1—Yaxley 20-ohm Fixed Resistance.
- 1—Yaxley Battery Switch No. 10.
- 1—Yaxley Cable Connector.
- 1—Frost 50,000-ohm Variable Resistance.
- 2—Silver-Marshall Drum Dials.
- 6—Silver-Marshall Sockets Type 511.
- 3—Benjamin Brackets 8629.
- 9—X-L Binding Posts.
- 1—Micarta 7x28x3/16-inch Drilled and Engraved Panel.
- 1—Micarta 9x27x3/16-inch Drilled Sub-Panel.

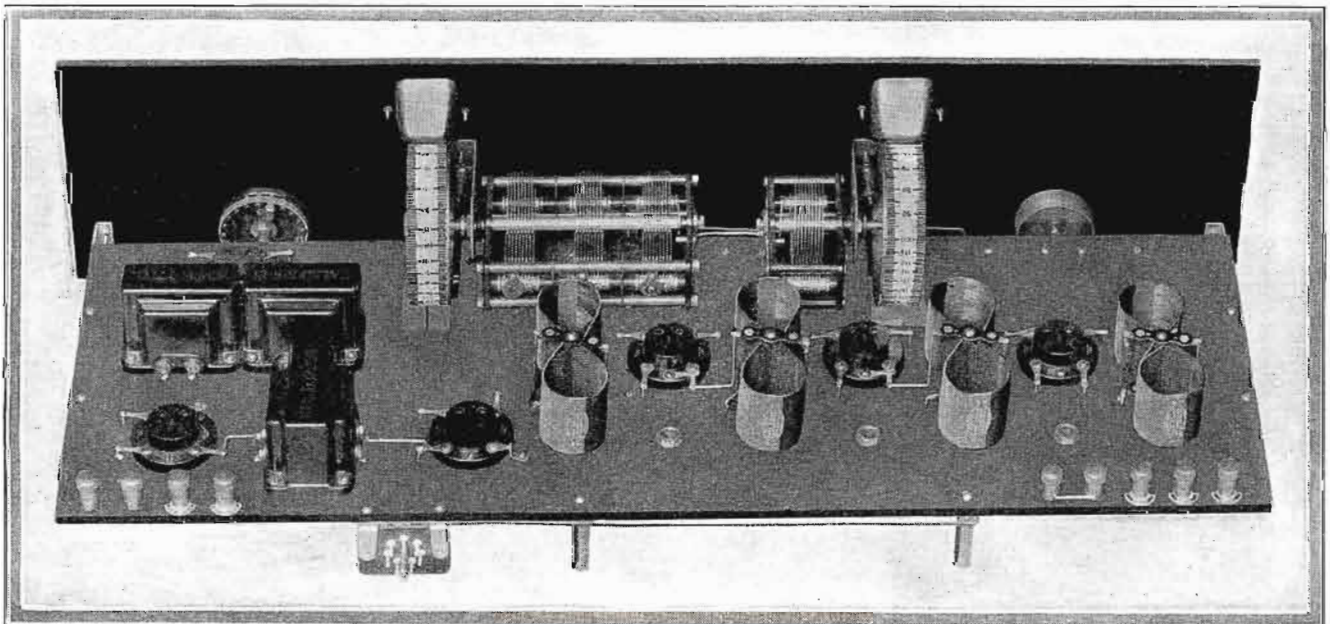


Photo C. Rear view. Notice the absence of unsightly wiring

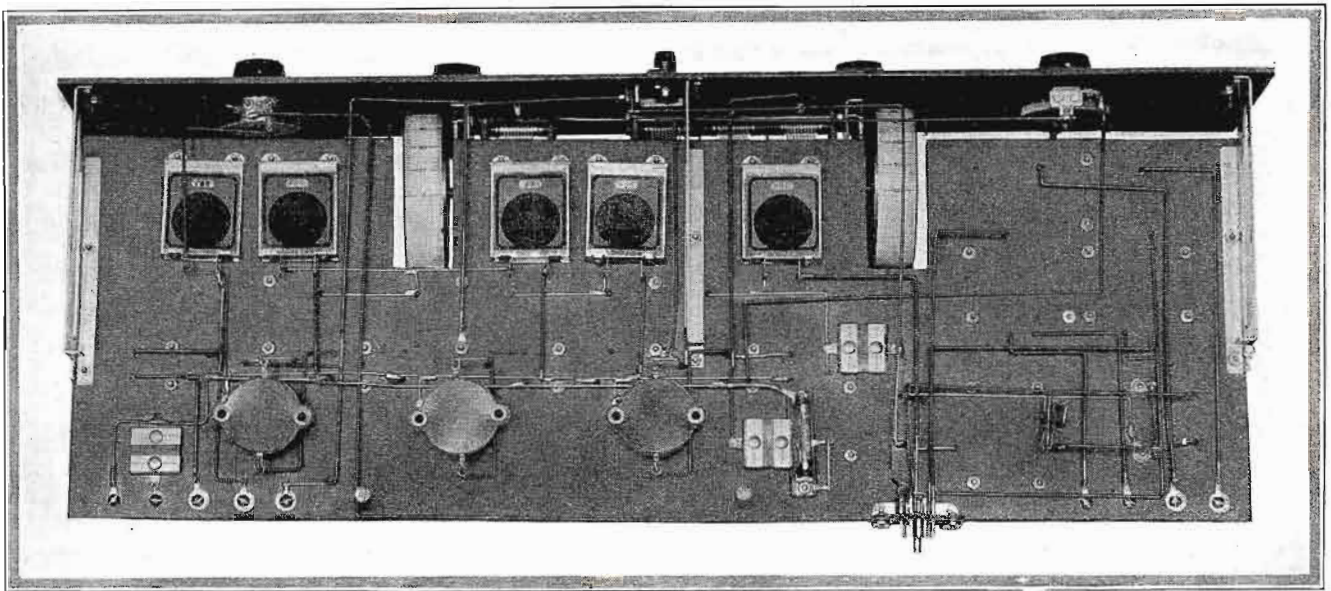


Photo D. Bottom view showing arrangement of Phasatrols and fixed condensers

- 1—Ekko Ground Clamp.
- 1—Pkg. Kester Radio Solder.
- 5—Ceco Type "A" Tubes.
- 1—Ceco Type "J-71" Tubes.
- 30—Feet Acme Celatsite Wire.
- Miscellaneous lugs, screws, nuts, etc.

In tuning, select a station somewhere close to 350 meters, and swing the two condenser dials until the station is brought in as loud and clear as possible without distorting or jamming. Very likely the set will oscillate and squeal most vigorously. Then take a screwdriver and adjust the first Phasatrol until a point is reached where a minimum of oscillation occurs.

Now adjust the second and third Phasatrols while slowly swinging the gang condenser back and forth across the wave of the station. This will clear up the remaining oscillation. For a final check, tune in a distant station and readjust until it is clear and sharp.

The Power Unit uses the QRS 400 mil. tube. It is of ample size and capacity to handle a set twice this size, so there is little danger of overloading with attendant destruction of apparatus.

The only external connections made to the eliminator are a cord plugged into the nearest light socket, or baseboard receptacle, and a cable leading to the radio set. There is no switch provided for the Power Unit in the set proper. It is therefore necessary to either install a switch or pull the plug out of the receptacle each time the set is turned off. If the plug is pulled out, there is an absolute certainty that the current is off. This is the best plan; the next best is to have a pilot light on the same circuit. A reading lamp placed on top of the console makes an ideal pilot.

#### LIST OF PARTS NECESSARY FOR THE CONSTRUCTION OF THE QRS ABC POWER UNIT

These parts or any reasonable substitute will give satisfactory results:

- 1—Thordarson Type 2291 Power Transformer.
- 1—Thordarson Twin 10-henry Choke.
- 1—John E. Fast QRS Condenser Block. Type 1050.
- 1—John E. Fast QRS Buffer Block. Type 1051.
- 1—Airgap Socket.
- 1—Jewell 0-300 Milliammeter, Pattern 135.
- 2—XL Binding Posts.
- 1—7x7x3/16-inch Celeron Panel.
- 1—Carter Resistor Kit No. 401.
- 1—13x14x1/2-inch Wood Baseboard.
- 20—Feet Acme Celatsite Wire.
- 1—QRS 400 mil. Tube.

In construction, the QRS Power Supply consists of an input

transformer, a rectifying tube, the necessary chokes, condensers, resistances and accessories such as a milliammeter, multiplug, etc.

The transformer is enclosed in a crystalline enamel case, and consists of a primary winding which is connected to the 110-volt A.C. lighting circuit, a 600-volt secondary winding with a center tap to supply the 300-volt circuits for rectification, a winding to supply the heater filament of the power tube.

A bank of four 0.1 mfd. fixed condensers is located between the transformer and the choke coil. Two of the condensers are across the high voltage input winding to the tube; the other two are across the low voltage heater winding. From the first two the wires continue direct to the two filament terminals on the socket, the ones on the heater winding connecting to the grid and

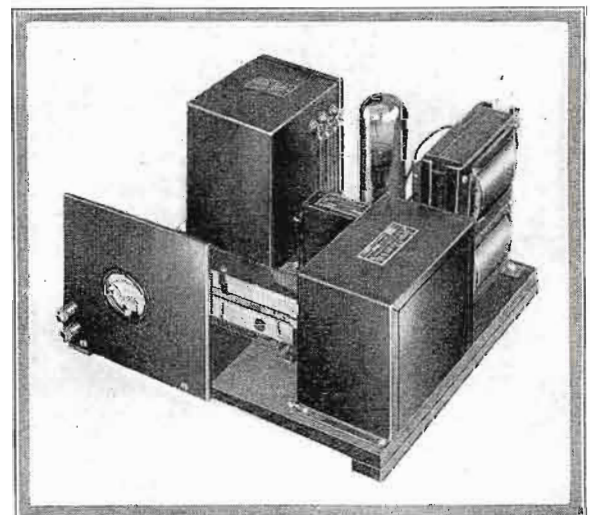


Photo E. Baseboard arrangement of QRS power unit

plate terminals. The plate lead continues to one terminal of the 10-henry choke. The center tap of the heater winding is grounded to the core of the choke coil and transformer.

A large condenser with taps for different capacities is connected across the choke with all leads brought to the indicated terminals. It will be noticed that a section of the condenser is across each portion of the output. These sections are not all of the same capacity and care must be taken in consulting the wiring diagrams to make sure that no mistakes are made.

The bank of resistances consists of three units, with a number

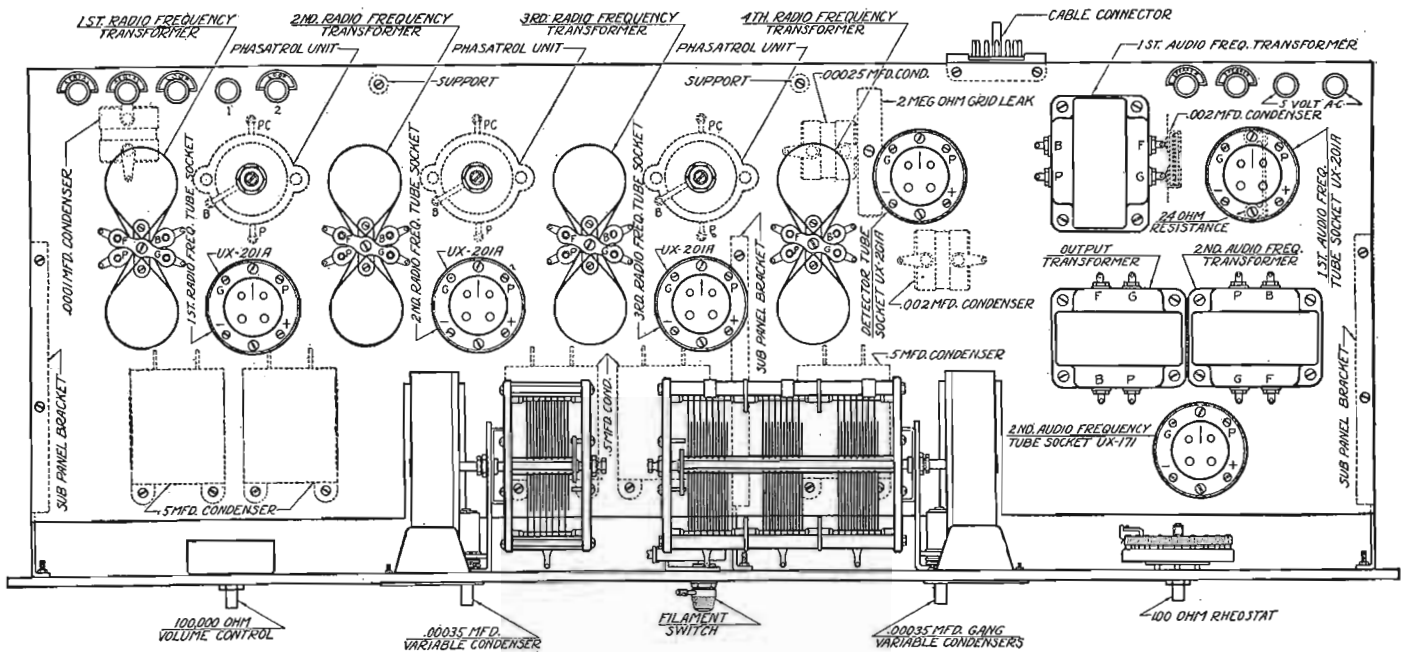


Fig. 1. Baseboard layout

of taps. Each tap is labeled and is connected to the proper terminal on the output Multiplug. When constructing the Power Supply, mount all the heavy instruments first and be sure that they are securely anchored with bolts that pass clear through the baseboard and are secured by washers and nuts on the under side. If ordinary wood screws are used, there is a danger of them pulling out when the unit is handled.

With filaments connected in series there is no need of having a separate rheostat for each tube, or even for each group of tubes. One rheostat, approximately one hundred ohms, will handle all of them nicely.

The tube employed for rectification is the QRS 400 mil. rectifier. The bulb is much larger than any of the receiving tubes, being almost the size of a fifty watt transmitting tube. The reason

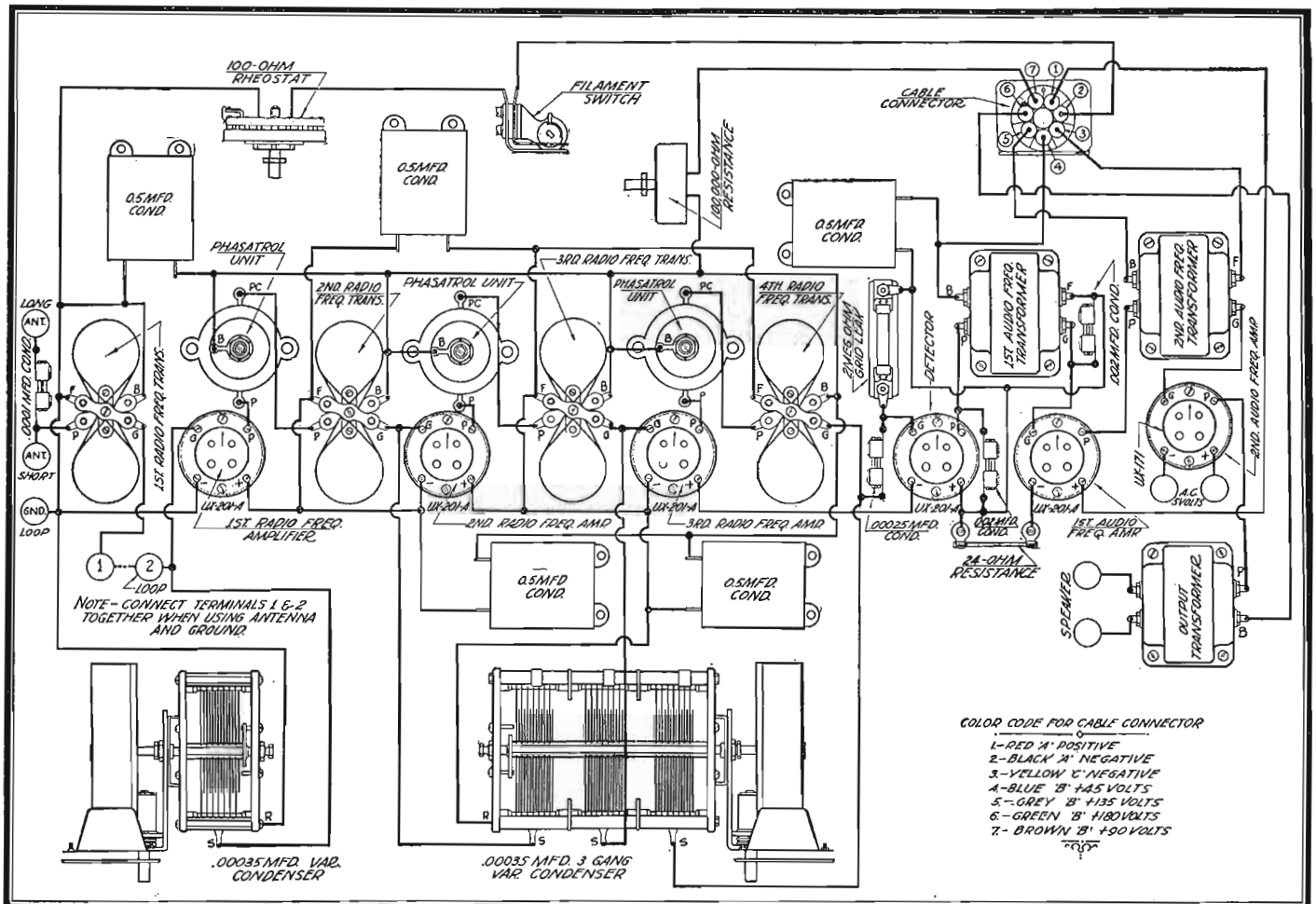


Fig. 2. Graphic illustration

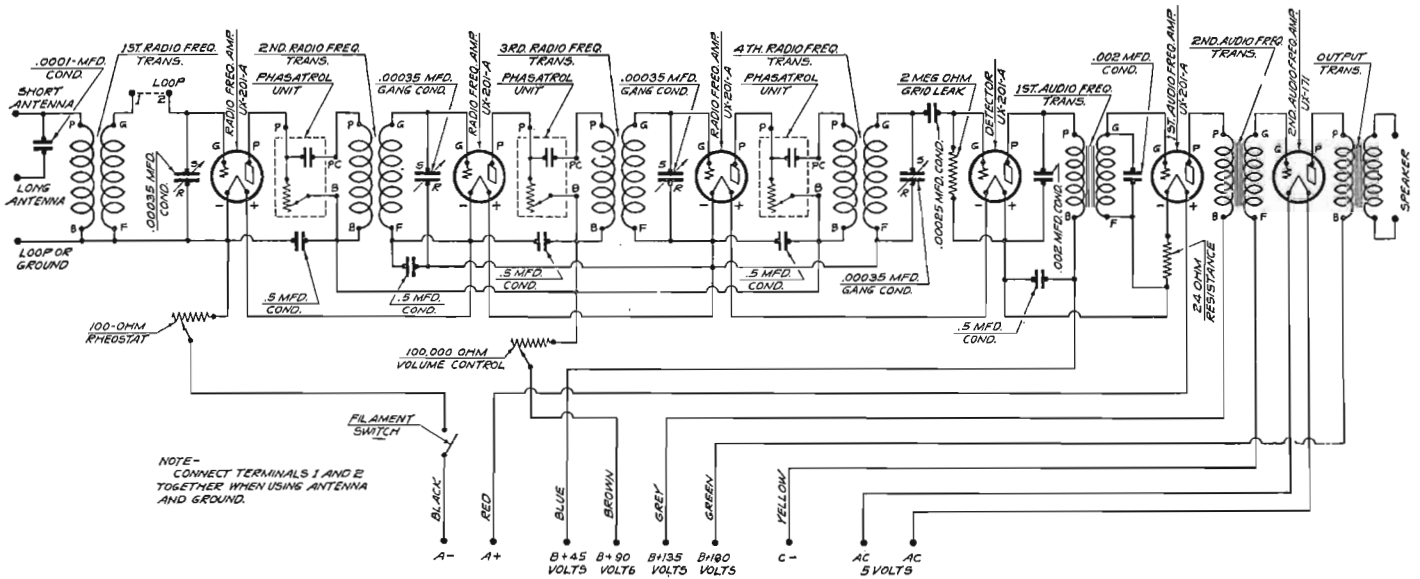


Fig. 3. Schematic wiring diagram

for the generous glass shell is to provide a large cooling surface. The elements are much the same as in the smaller rectifying tubes, but are of more rugged construction. The tube is silent in operation, and when operating normally will glow slightly. It fits any of the standard sockets in use at the present time.

List of Accessories

The following is a list of accessories which have actually been tested with the Electrically Operated Receiver and have been found to operate satisfactorily with it. While these particular accessories are suggested, it is possible to make any reasonable substitution without sacrificing the all around efficiency of the receiver. It is advisable, however, not to attempt a substitution in regard to the "ABC" unit:

- 1—QRS, ABC Power Unit (described above)
- 1—Corbett Model C-28-inch Cabinet
- 1—Excello Model R-22 Walnut Radio Console
- 1—Sonochorde Junior Speaker
- 1—Bodine Model L-350 Loop

Photo "A" shows the Electrically Operated Receiver installed in the Excello Console with the necessary accessories for its proper operation. Photo "B" shows the receiver as it will appear when in-

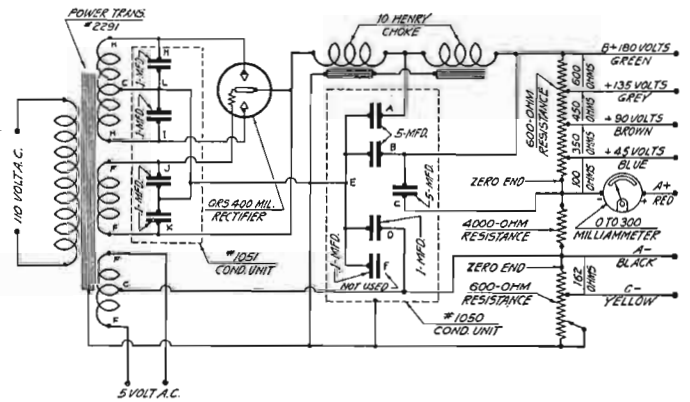


Fig. 5. Schematic wiring diagram of power unit

stalled in a cabinet alone. The Console is manufactured by the Excello Products Company of Chicago, Illinois. It is constructed entirely of solid walnut, the doors being finished in a two-tone effect with a dark panel and lighter trim. Ample space is provided both for the receiver and the accessories. This is of vital importance since the QRS, ABC unit requires ample ventilation due to the heating of the rectifier tube. The Console has the added advantage of a built-in speaker, which when used in conjunction with the Sonochorde speaker will give a fidelity of reproduction which is delightful.

The cabinet is manufactured by the Corbett Manufacturing Company of St. Marys' Pennsylvania. The cabinet is an excellent piece of workmanship, being made entirely of solid walnut and finished in a varnished and hand rubbed finish. The Sonochorde Junior Speaker is manufactured by the Bowdette Manufacturing Company of Chelsea, Massachusetts. It is an actual counter-part of the larger cone speaker known as the Sonochorde Senior Speaker, the only difference being in the actual size. The smaller type is capable of the same excellent reproduction as the larger type of speaker. The front of the cone is covered with a high grade of silk material, which in its pleated condition is quite attractive.

The Bodine Loop shown in this installation is a product of the Bodine Electric Company of Chicago. The wire constituting the loop is bank-wound. A jack arrangement is provided in the base of the loop by which contact is made to the two ends and the center-tap of the loop. This allows the loop to be rotated at will without the possibility of the wires becoming entangled. A further advantage of the loop is that it may be easily adapted for short wave reception by simply withdrawing the loop partly from the base so that only the two upper springs make contact. This will "cut-out" one-half of the loop and will allow the reception of signals as low as 150 meters.

(If further information on any of these accessories is desired, it may be had by writing direct to the manufacturers.)

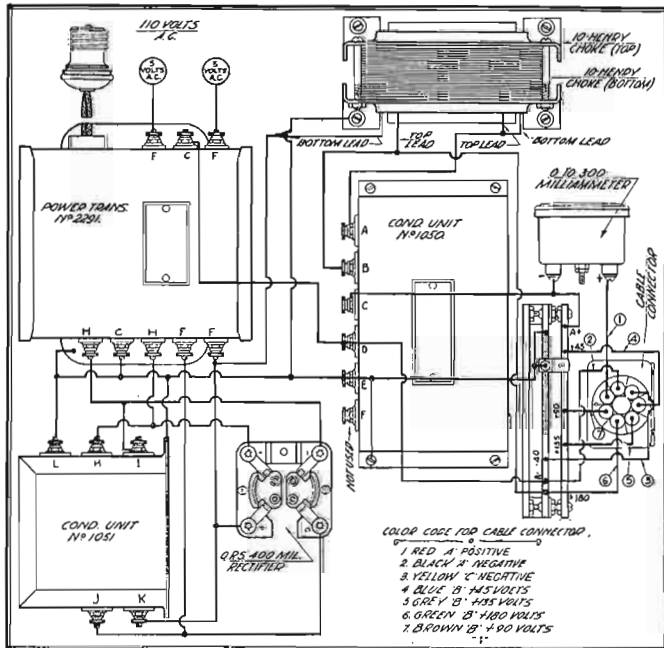


Fig. 4. Graphic arrangement of power unit

# The 1928 Model Infradyne

Complete Details on the Assembly of the New Model of This Popular Ten-Tube Receiver

This Receiver Was Constructed and All Illustrations Made in the Laboratory of the Citizens Radio Call Book

**T**HE 1928 Model Infradyne not only oversteps all of the cut and dried conventionalities of radio set construction, but it also represents a new type of home constructed receiver that is unique in performance, pleasing to the eye, and above all, most satisfactory in operation. The New Infradyne has gone so far as to eliminate cabinet, panel, bus bar wiring and all external capacity effects. Absolutely no wood and only a minimum of bakelite enter into its construction. Like the auto, it can boast of an all metal chassis, body and wheels. Aluminum and pressed copper are the metals employed.

The cabinet is an artistically designed cowl of copper fitting over the entire set like the hood of a sewing machine. The outside is finished in a seal brown crystalline lacquer with embossed panels of a burnt sienna tone. The inside of it is lacquered with a transparent varnish so that the natural copper finish is present. One very important fact is that the back of the hood is just as pleasing to the eye as the front, which certainly obviates the need of pushing the set up against the wall as is usually the case with the home constructed receiver. This will be especially appreciated when one stops to consider that very often one will want the set on the porch, or other place where it is visible on all sides. The hood is not affected by heat or moisture, making it perfectly secure under both the hot rays of the sun or the extremely damp atmosphere along the sea coast or lakes.

The tuning controls are brought out to a dashboard which is located in the center of the front side. This panel is made of copper, etched with acid in a pleasing design of Grecian simplicity. This dashboard is "floating," being secured only by the bushings holding the various instruments. Unsightly screw heads do not mar the front of this receiver. A voltmeter with a full scale deflection of five volts is located in the center of the control panel. This is to indicate the filament voltage of the 199 type tubes in the Infradyne amplifier and in the oscillator.

Two major controls are used to regulate the tuning. The radio frequency control is located on the left side of the voltmeter, while the Infradyne control is located on the right side. A bezel is set in the panel for each control to enable the operator to see the graduations on the illuminated dial. Both controls are of

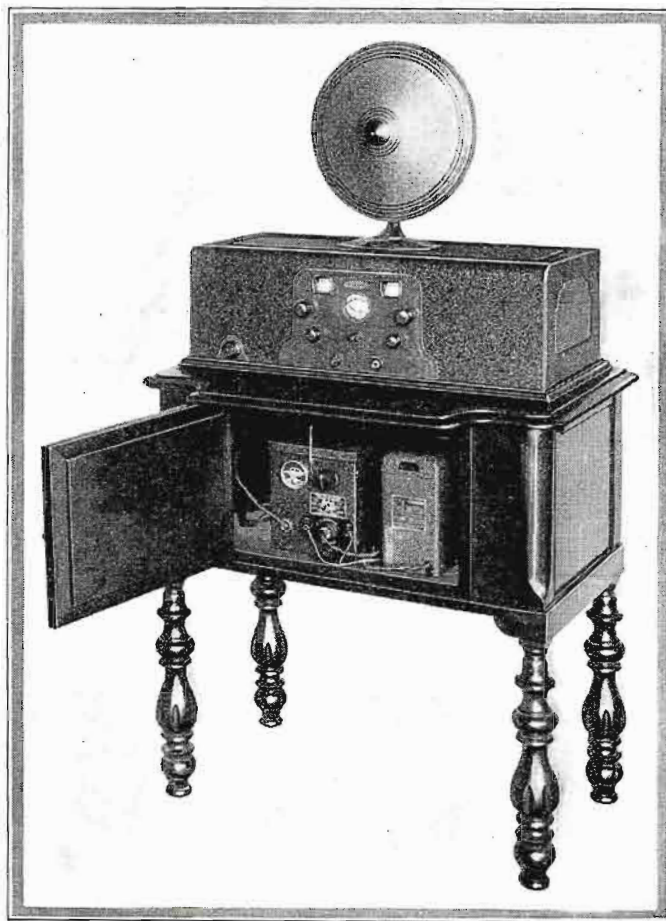


Photo "A." The Infradyne Receiver Installed on a Table with Appropriate Accessories

the drum type and are so placed that they are just flush with the panel.

Directly below the tuning controls are three rheostats labeled "Volume," "Voltage" and "Sensitivity." They control the filament voltage for the different sets of tubes. At the bottom of the panel is a jack for head phones and a three-way switch for shifting from local to DX. reception. For local use, the Infradyne amplifier is cut out of the circuit and the set becomes a single dial two stage tuned radio frequency receiver. This gives ample volume in an average room. In changing from local to distance reception, the switch is turned to the right as far as it will go, which automatically inserts the Infradyne unit into the circuit, lights the tubes and places the set in operation so that the operator may tune in on the other side of the continent.

At the left hand end of the receiver is the two stage tuned radio frequency amplifier. This is entirely enclosed in a pressed copper cabinet with a removable top. The unit includes a three gang variable condenser, three radio frequency transformers, three flush mounted sockets and other miscellaneous parts.

There is an additional shielding partition between each of the three transformers. Tuning with a maximum of efficiency is accomplished in an ingenious manner. As the condenser rotates, an eccentric cam brings pressure upon a spring bar which in turn rotates a shaft. The primaries of the three transformers are fastened to this shaft by means of compound levers. They are pushed up and down inside of the secondary coils, the coupling varying with the frequency tuned. A method of correcting the coupling and bringing all three transformers into resonance is provided in a sliding collar and lock nut fastened to the top end of the secondary. The entire secondary is supported on a rod and if it appears to be a bit out of resonance, it may be moved up or down a fraction of an inch until the difficulty is remedied. The three stage amplifier comes as a unit and is fastened to the main baseboard by means of screws. All wiring is done on the under side, between the two bases.

The Infradyne amplifier is the standard unit with which we are all familiar. It includes the four balancing controls, three flush mounted sockets and all the necessary binding posts. The entire unit is enclosed in a copper cabinet with a bakelite top. It is mounted

on the rear side of the baseboard, reaching from the radio frequency amplifier to the right hand end of the receiver.

In the center of the baseboard directly between the two tuning condensers is the oscillator system. It is flush mounted, all the apparatus being slung on the under side of the panel. To the right and forward are the detector and two stage audio amplifier. An output transformer is included.

For the convenience of the home constructor, the manufacturer has put the set into convenient kits. One distinct advantage of this method is that a set may be built which is not a complete Infradyne receiver and yet will give satisfactory reception. At first one may buy the baseboard, the radio frequency amplifier and detector and enjoy a five-tube receiver until such a day as it is convenient to add the Infradyne amplifier. The wiring is such that none of it need be ripped out when an addition is made. Only one tuning condenser, the three gang, is needed for this simple set.

The baseboard is made of pressed steel and much resembles an inverted baking pan. It is deep enough to allow plenty of room for wiring and instruments. It is supplied by the manufacturer already drilled for all wires and instrument mounting. It is lacquered black on the outside, while the under side is finished in the natural copper.

Near the extreme left end of the receiver, directly under the radio frequency amplifier, is the antenna compensator. It consists of a tiny variometer hooked in series with the antenna, with a three pole rotary switch tapping off different turns on the primary coil. This compensation is used to tune the antenna circuit and for bringing it to resonance.

The wiring of this receiver utilizes a type of harness seldom seen in radio, but one which is quite common in telephone systems and electrical circuits. It uses the bunched cable method, that is, insulated wire, a different color for each circuit, all tied together into a bundle. This method of wiring looks extremely neat and gives the receiver more of the appearance of a delicate instrument than a high tension power plant.

The rheostats are mounted directly on the baseboard with angle brackets and are controlled from the panel by means of extension shafts. Fixed resistances regulate the voltage of the audio amplifier tubes.

The phone jack is inserted in the plate lead of the first audio transformer. The current passing through a two step amplifier is of tremendous volume and is not desirable for headset reception. A jack on the rear of the baseboard is available for the loud speaker. In addition to the speaker jack, a cable for the battery connections and two binding posts for the antenna and ground are provided.

#### LIST OF PARTS NEEDED FOR THE CONSTRUCTION OF THE 1928 MODEL INFRADYNE

The list of parts given below were used in the laboratory model of the receiver. While it is possible for the experienced experimenter to substitute other good apparatus for that actually specified, it is advisable that the novice strictly adhere to the list given below:

- 1—Pressed Steel Base
  - 2—Bronze Control Panels
  - 2—Remler Universal Drum Dials No. 110
  - 1—Remler Condenser No. 659
  - 4—Remler Sockets 50
  - 3—Remler Choke Coils No. 35
  - 1—Remler Special Coil and Spacer
  - 1—Frost 10-ohm Rheostat, Extension Shaft and Bushing
  - 1—Frost 2½-ohm Rheostat, Extension Shaft and Bushing
  - 1—Frost 4-ohm Rheostat
  - 1—Frost 2-ohm Fixed Resistance
  - 1—Frost 4-ohm Fixed Resistance
  - 1—Frost 6-ohm Fixed Resistance
  - 1—Frost Jack No. 953
  - 1—Frost Jack No. 954
  - 1—Electrad .00025 mfd. Fixed Condenser No. GS
  - 1—Electrad .00025 mfd. Fixed Condenser P
  - 1—Electrad .001 mfd. Fixed Condenser
  - 3—Electrad .005 mfd. Fixed Condenser
  - 1—Electrad 4-megohm Grid Leak
  - 1—Yaxley Switch 69
  - 2—Eby Engraving Binding Posts
  - 1—Celeron 4x¼x½-inch Strip
  - 1—Special Adjustable Condenser
  - 2—Special Bakelite Terminal Blocks
  - 1—Acme Battery Cable
- All of the above parts are included in the Infradyne Foundation Kit No. 750
- 1—Remler Infradyne Unit No. 700
  - 1—Remler Radio Frequency Amplifier Unit complete assembled and wired No. 710
  - 1—Remler Infradyne Cabinet No. 760
  - 1—Ekko Ground Clamp
  - 1—Pkg. Kester Radio Solder
  - 4—Ceco Type "BX" Tubes
  - 1—Ceco Type "F" Tubes
  - 5—Ceco Type "A" Tubes
  - 2—Silver-Marshall Audio Transformers No. 220
  - 1—Silver-Marshall Output Transformer No. 221

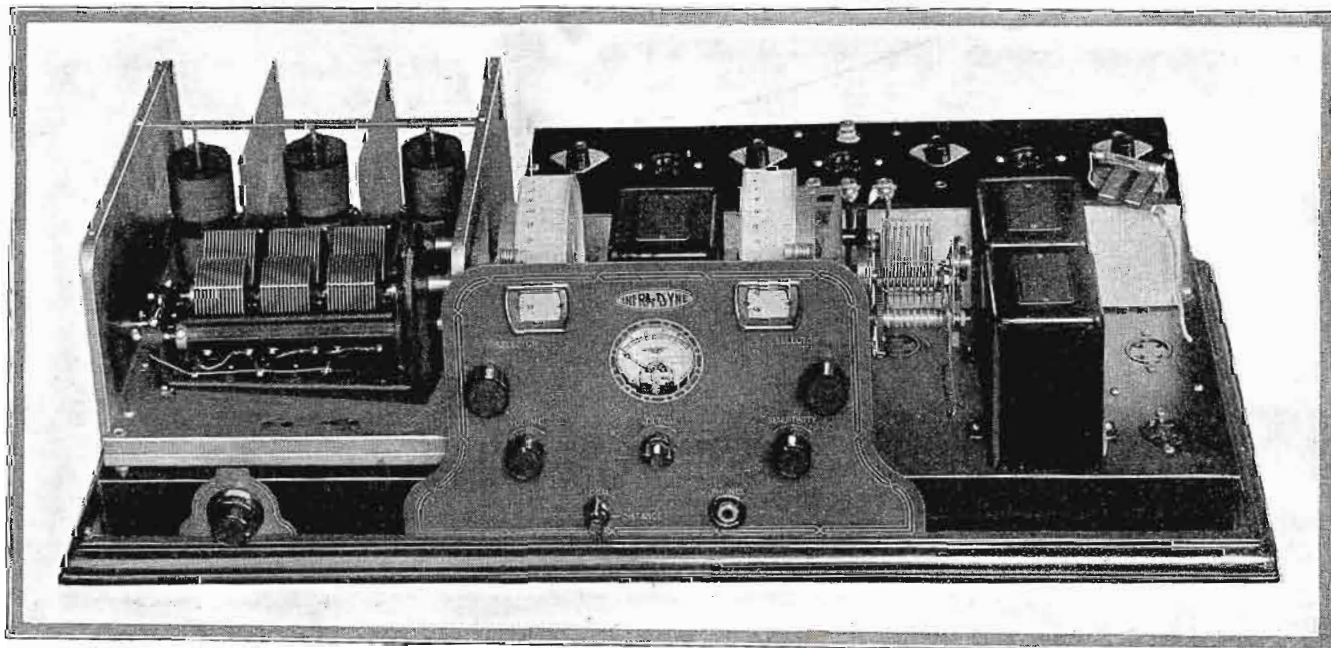


Photo B. View showing arrangement of parts with covers removed

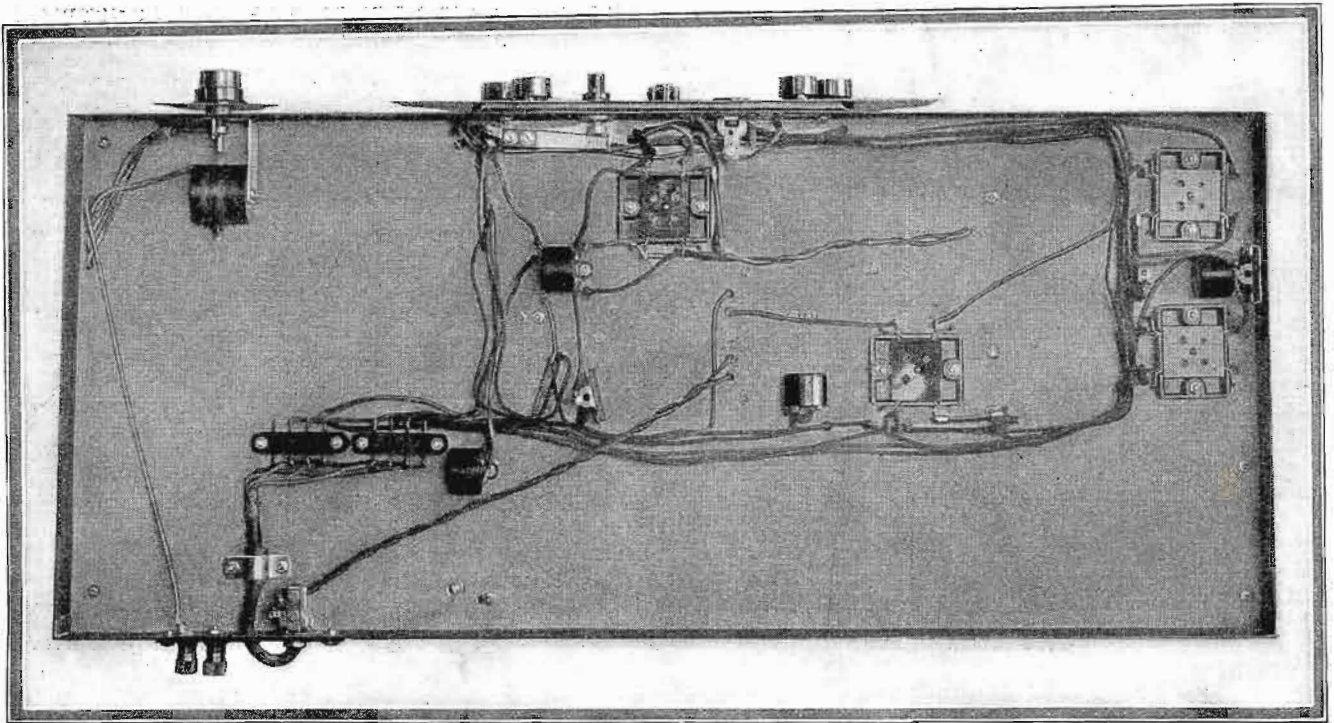


Photo C. Bottom view showing cable harness

1—Jewell 0.5 Voltmeter

Miscellaneous lugs, screws, etc.

The 201-A tubes are used in the radio frequency amplifier, 199 tubes in the Infradyne amplifier and oscillator. Either a 200-A or 201-A tube makes a good detector, a 201-A for the first stage audio amplifier and a 171 power tube for the second stage. Next turn the panel switch from "off" to "local." All the tubes but the oscillator and those in the Infradyne amplifier and second detector should burn. The light on the left tuning dial should also light up. Now turn the switch to "Distance" and all of the tubes will light. The voltmeter reads only on the 199 tubes and it should be kept at exactly three volts.

Now turn the switch back to "Local" position and begin tuning. Set the larger knob of the antenna compensator control knob at No. 3, then adjust the inner knob at approximately 45 degrees. The left hand dial is the only one used for "local" tuning, and at first it should be set at zero. Turn the volume control until a roar is heard in the speaker. Turn back a bit on the volume control and rotate the dial slowly until a signal is picked up.

With a good steady signal proceed to balance the radio frequency amplifier. On a bakelite strip incorporated in the base of the three gang tuning condenser are three midget condensers, regulated by set screws. They have been carefully regulated be-

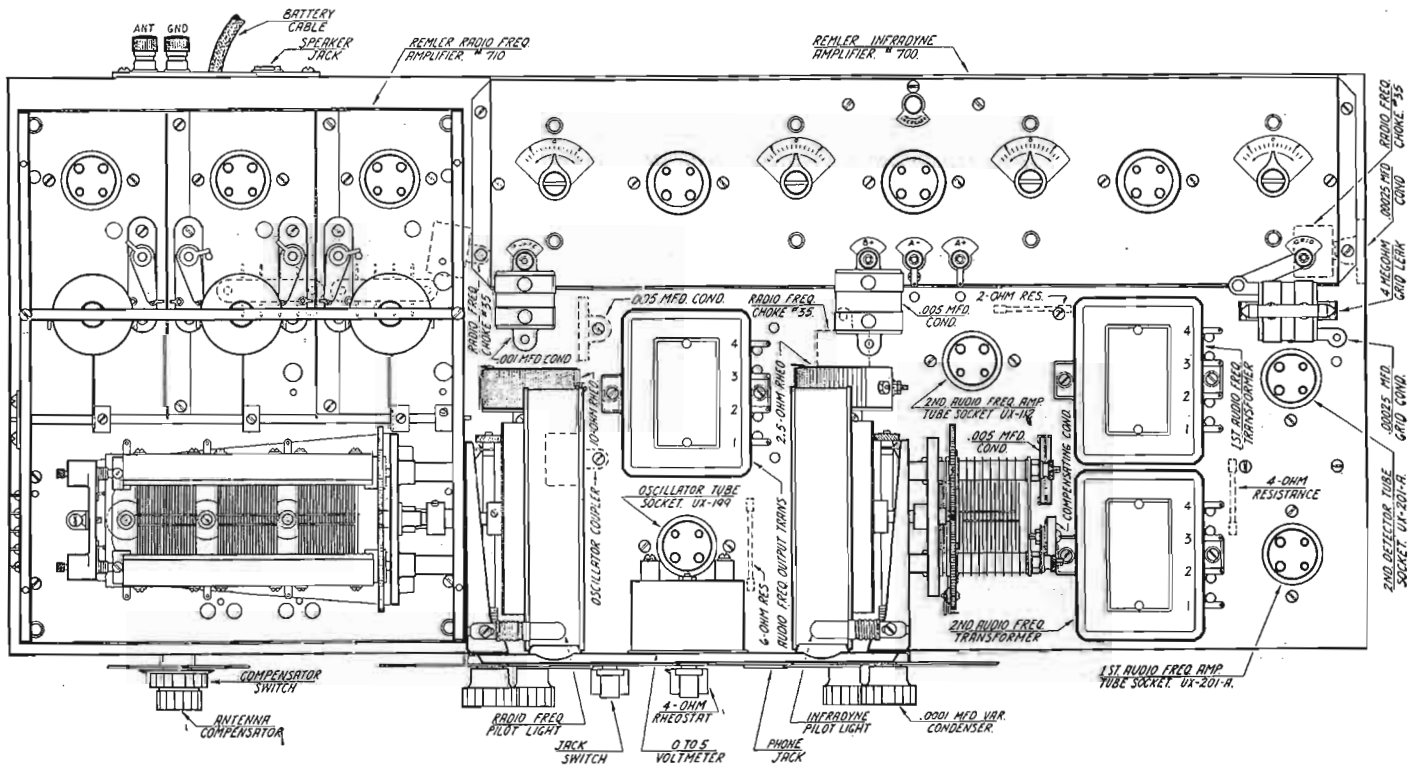


Fig. 1. Baseboard layout showing arrangement of parts

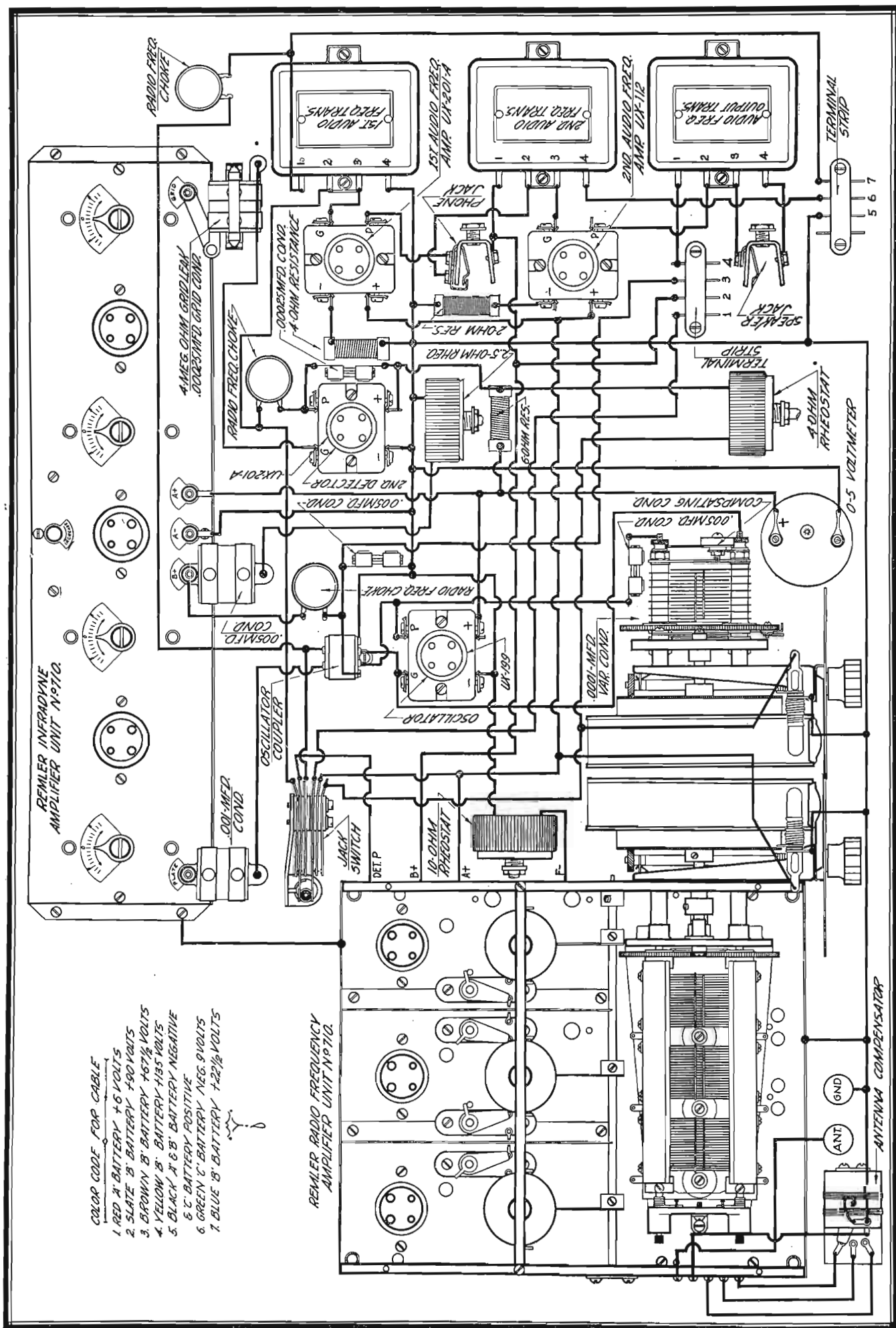


Fig. 2. Graphic illustrations shown all connections



fore leaving the factory, so only a slight turn will be needed. The object in balancing is to narrow the tuning range on the dial to an absolute minimum. When the station comes in with the greatest volume on the sharpest-dial adjustment, with only one peak, the condenser is perfectly balanced. Now as a matter of checking, tune in a station at the high end of the dial. Adjust the antenna compensator till signals are loudest, then vary the balancing condenser and observe if the reception has improved. If the volume of the signals is much greater when the condenser screw is turned, an error has been made in the original adjustment and the whole thing should be readjusted, this time on the high wave station. It takes patience and plenty of time, but the results are well worth the effort, for when once adjusted no more attention need be given it and signals will come in loud and clear over the entire scale with no mushy overtones to spoil the reception.

After one is satisfied that the radio frequency amplifier is working properly, throw the switch over the "Distance." The Infradyne is then connected in the circuit. Set the right hand tuning condenser at zero and then turn the four controls on the Infradyne amplifier to minimum. Next turn the "Increase" screw

1—Utah Cone Junior Speaker

The Ehlert Super Excellent Speaker Console is finished in walnut of the correct height to make operation of the receiver easy. There is an unusually large battery compartment, the door of which swings outward. A screen opening is provided in the door, behind which the speaker may be placed. A shelf is built in the door for the speaker to rest upon. The table has an attractive top with beveled edges. The four supporting legs are short and fluted, making a firm foundation. Holes in the back of the cabinet are provided for the battery connections which go to the receiver.

A Sterling R-96 "A" Power Supply is a highly efficient device using the Raytheon Cartridge units. It is of unusually large capacity and will furnish ample current for a receiver the size of the Infradyne. Because of the special design, the owner will not find his power supply antiquated when high capacity Raytheon Cartridge units are developed. They are mounted on clips on the under side, and may be replaced with others at any time convenient. There is a Sterling meter adjustment which gives voltage control to the actual amount required by the tubes. The instrument is contained in a metal cabinet finished in a dark

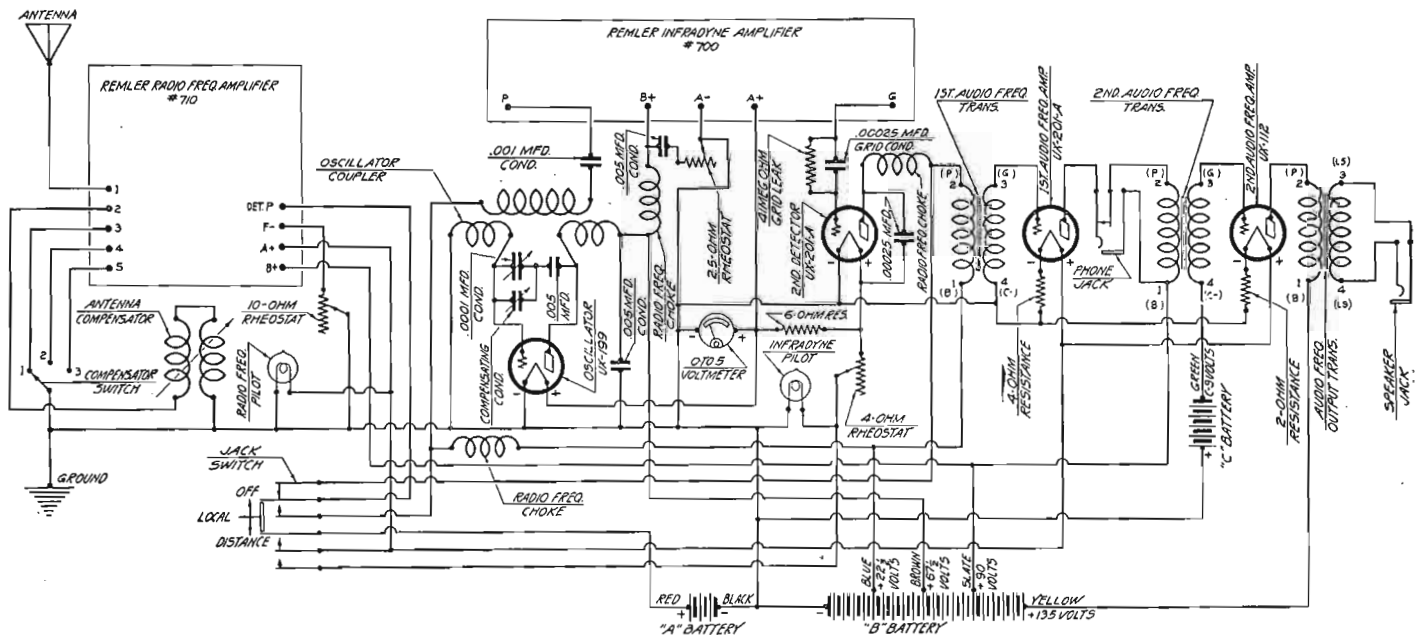


Fig. 3. Schematic wiring diagram

about two-thirds of the way to the right. Use the fingers for this, not pliers. Set the sensitivity control until a series of whistles are heard, then adjust the increase screw till the whistles disappear. Now rotate the right hand tuning control till a station is brought in. It is best to check on the same stations used in tuning the radio frequency amplifier earlier in the balancing.

Now while swinging the right hand control back and forth across the wave of the station being received, adjust the four controls on the Infradyne until the signal clears up and the various circuits in the amplifier are in resonance. If the set breaks into oscillation, turn the sensitivity control back a bit. This final adjustment should be made on a distant station, preferably when one is wearing headphones. Above all else, don't get impatient and don't try to rush. The time spent in delicate adjustment is well worth the effort.

LIST OF ACCESSORIES FOR USE WITH THE INFRADYNE RECEIVER

The following is a list of accessories that have actually demonstrated their ability to properly operate the 1928 Model Infradyne Receiver. While these particular accessories are suggested, it is possible to make any reasonable substitution without decreasing the all-around efficiency of the receiver:

- 1—Ehlert Super Excellent Speaker Console
- 1—Sterling Type R-96 "A" Power Supply
- 1—Fansteel Type B-180 "B" Power Supply

green enamel with nickel trimmings. It operates from 110 volts 60 cycles A.C. and is made by the Sterling Manufacturing Company of Cleveland, Ohio.

The Fansteel "B" Supply Model 180 employs the tantalum and electrolyte rectifier, which has proven itself so successfully in years of actual operation. It is silent and requires very little attention. This model is of ample capacity to supply any set now on the market using a voltage of 180 at 55 milliamperes, maximum output. Taps are provided for the lesser "B" voltages required. The unit is contained in an attractive metal case with a carrying handle at the top. It is supplied also with a flexible rubber covered cord and attachment plug, which is screwed in the nearest light socket. This unit is made by the Fansteel Products Corporation, North Chicago, Illinois.

The Utah Cone Junior is an attractive speaker employing the principle used in the original Nathaniel Baldwin, Mica diaphragm. The unit has been enlarged in proportion to deliver correct volume and tone quality without distortion at power tube operation. The cone is floating, being supported by the driving armature passing through its center. It is of attractive design and is ornamented with a single band of decoration around the outside edge. The base is of ample spread and weight to make tipping and possible damage quite unlikely. This speaker is made by the Utah Radio Products Company of Salt Lake City, Utah.

(If further information on any of the above described accessories is desired, it may be secured by writing direct to the manufacturer.)

# Further Notes on the Camfield Super-Selective 9

Herewith Are Given Additional Notes on the Theory and Operation of This Receiver Together with Complete Constructional Details

**I**N the March, 1927, issue of the CITIZENS RADIO CALL BOOK there appeared a descriptive article on the Camfield Super-Selective 9 Receiver. The immediate popularity attained by this new circuit, which combines the best features of the tuned radio frequency and super-heterodyne circuits together with the incorporation of an accurately designed band pass filter in the intermediate frequency amplifier, warrants our devoting considerable space in this issue to a more detailed explanation of its theory, construction, balancing and operation. Furthermore, several minor changes for the improvement of the circuit have been included in this article.

The circuit used in the Camfield Super-Selective 9 has been developed to fill the requirements for a super-sensitive and super-selective receiver that could be satisfactorily operated in congested broadcasting districts such as the metropolitan areas of New York and Chicago, as well as being sensitive and powerful enough for the reception of distant stations from any location in the United States or Canada.

For several years the super-heterodyne circuit has been very popular whenever extreme sensitivity combined with selectivity has been desired. About three years ago the super-heterodyne was considered to be the most satisfactory circuit for use under any conditions, but with the large number of broadcasting stations now on the air in the metropolitan areas, a serious drawback of this type of circuit has developed. This difficulty is the presence of so-called oscillator harmonics.

Many "supers" that were popular several years ago can be operated today in congested broadcasting districts with the oscillator tube entirely removed from the circuit. A "super" that is designed to operate on an intermediate frequency of 50 kilocycles will receive any local broadcasting station regardless of the oscillator dial setting if there happens to be another local station on the air having a frequency of 50 kilocycles above or below the first station. This condition spoils the selectivity of the Super-Heterodyne Receiver, which is one of its chief advantages, and has resulted in decreased popularity of this type of circuit for use in metropolitan areas.

In the Super 9 Receiver this condition of oscillator-harmonics has been entirely eliminated. This is accomplished by the use of two stages of tuned radio frequency amplification ahead of the first detector tube and also by the choice of an intermediate

frequency of 95 kilocycles. There are no stations in the United States that are exactly 95 kilocycles apart. Furthermore, when the two radio frequency stages are tuned to resonance with the station that it is desired to be received, they will not pass signals from stations broadcasting at a frequency 90 or 100 kilocycles above or below the station being received. Hence, no energy from such stations can get to the first detector tube to heterodyne with the incoming signal and thereby spoil selectivity and cause squeals and howls or heterodyne beat notes in the loud speaker, as would be the case with the previous types of loop operated Super-Heterodyne Receivers.

In any Super-Heterodyne there must be a definite minimum of input energy to the first detector tube before the circuit will function. This factor constitutes one of the most important limits to the sensitivity of the circuit.

Signals so weak that they will not actuate the first detector tube in an ordinary "super" are picked up and amplified through two stages of tuned radio frequency amplification before reaching the first detector tube in the Camfield Super-Selective 9. This makes it possible to get satisfactory reception of distant stations with this new circuit that could not be received at all with the previous types of Super-Heterodynes.

The Super-Selective 9 Receiver is the first radio set made available to radio fans using a band pass filter in the intermediate frequency amplifier. A band pass filter is a network of inductance and capacity designed to pass a particular band of frequencies with uniform amplification and to reject all other frequencies.

The filter used in this receiver has been designed to pass a band of frequencies 10 kilocycles wide between 90 and 100 kilocycles. All frequencies lying within this band are amplified equally by the intermediate stages. The filter is designed to cut-off very sharply on both sides of this band, and the

circuit, therefore, has excellent selectivity.

It must be remembered that the frequency of a broadcasting station on any given wave length is absolutely constant. It is modulated by the frequency of the voice or music being transmitted and, therefore, varies about 5 kilocycles above and below the rated frequency. If a circuit is not designed to give practically uniform amplification over a band of frequencies 5 kilocycles above and below that of the incoming wave some of the voice or music frequencies will not be properly amplified and distortion results. This action and consequent distortion has been



Photo A. Phantom view of receiver installed in Fritts Consolette

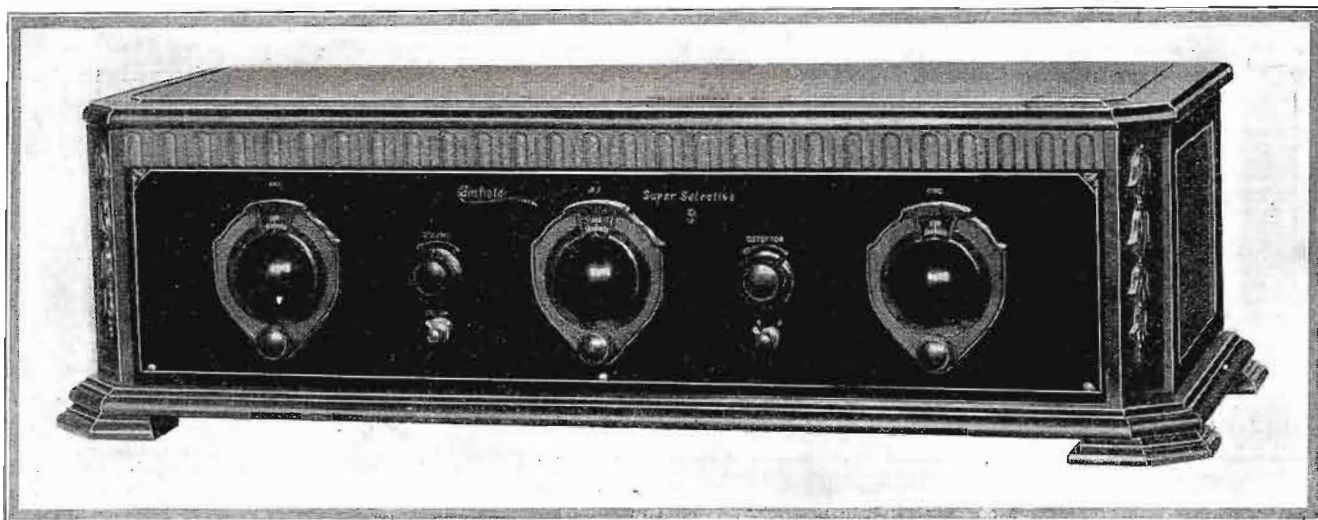


Photo B. Front view of receiver mounted in cabinet

very noticeable in Super-Heterodyne circuits where extreme selectivity is obtained by the use of the so-called peak intermediate frequency transformers. The use of the 10 kilocycle band pass filter eliminates this cause of distortion.

All former Super-Heterodyne circuits have been designed to operate on a loop. It is a well known fact that a loop does not pick up as much energy as a short antenna, and for this reason many experimenters have attempted to couple an antenna to a Super-Heterodyne Receiver. The result has always been the same; the selectivity being utterly destroyed.

In the case of the Camfield Super 9 the use of the band pass filter gives such perfect selectivity that it is possible to not only use an antenna but also to use two stages of radio frequency amplification. This naturally results in greater sensitivity than can be obtained with any other type of circuit.

The Camfield Super 9 may be operated either as a 5 tube two control tuned radio frequency set or as a 9 tube Super-Heterodyne. This transfer from 5 to 9 tubes is accomplished by a jack switch mounted on the front panel as shown in Figure 2. The manner of connecting this switch in the circuit is illustrated in the schematic wiring diagram of Figure 4 and the pictorial wiring diagram of Figure 3. The circuit is so arranged that when the switch is thrown to the left only the two radio frequency tubes, the first detector and the audio amplifier tubes are used. When operated this way the output of the first detector tube is connected directly to the audio frequency amplifier. When the switch is thrown to the right the remaining four tubes are auto-

matically inserted into the proper circuits and the receiver operates as a nine-tube Super-Heterodyne.

This feature provides for the economical operation of the receiver when the reception of local stations only is desired. This is an exclusive feature of the Super-Selective 9 and is not found in any other circuit. Furthermore, this arrangement of the wiring makes it possible to construct the receiver in two units. It fills the requirements of those who at present can only afford a five-tube set but who will want a nine-tube Super-Heterodyne at some later date. The five-tube end of the circuit may be constructed first and the other four tubes added at any later date without changing any of the original wiring.

In the Camfield Super-Selective 9 squeals and whistles due to oscillator harmonics have been eliminated in the manner described above. Further stability is obtained by designing the circuit and the parts used so as to prevent sustained oscillation of the radio frequency amplifier circuits.

The special construction of the radio frequency transformers used in this receiver prevents disturbing oscillations in the radio frequency portion of the circuit.

Oscillation in a tuned radio frequency amplifier is usually caused by coupling between the output and the input circuit of a stage of amplification. One or more of the following forms of coupling are always inherent to a certain degree in tuned radio frequency amplifier circuits.

First—Inductive coupling between the windings of interstage radio frequency transformers.

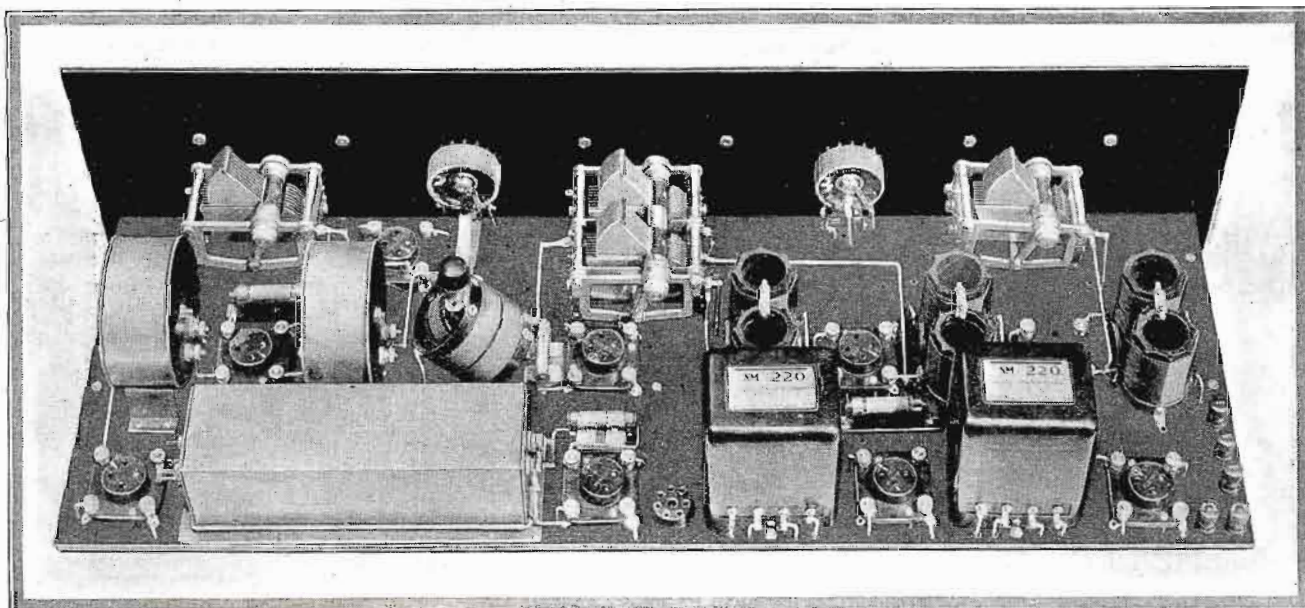


Photo C. Rear view of completed receiver

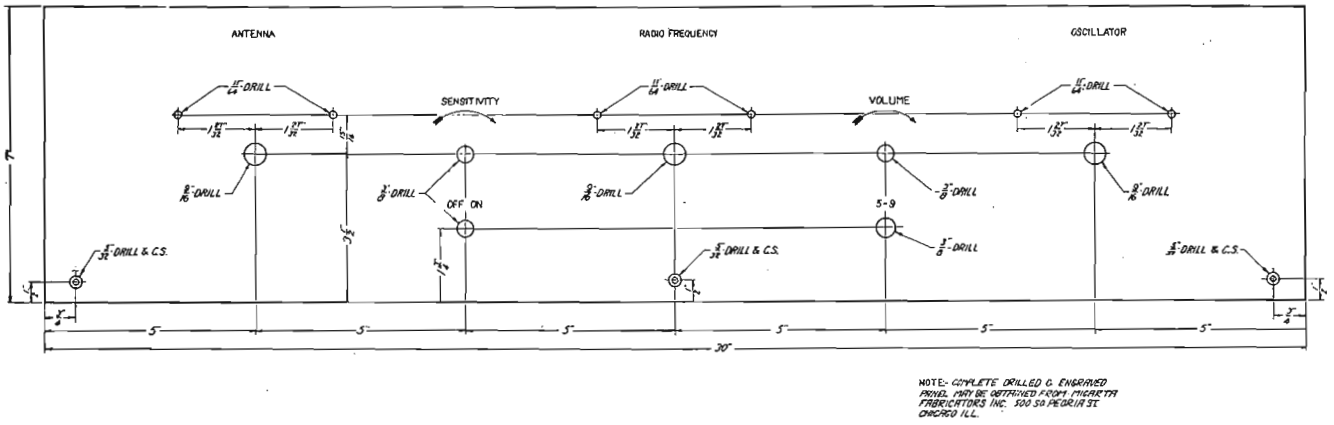


Figure 1. Layout of front panel

Second—Capacity and conductive coupling in the wiring of the receiver.

Third—Capacity coupling between the two circuits due to the capacity between the grid and plate of the vacuum tube.

The first cause is comparatively easy to eliminate. The radio frequency transformers used in this receiver have been so designed that their effective external magnetic field is minimized. Thus, when three of these transformers are used in a set, magnetic coupling between them is negligible.

The second cause of oscillation may be eliminated by the proper arrangement of parts and wires in the receiver and the proper use of by-pass condensers. This has been done in the layout recommended for the Camfield Super-Selective 9 Receiver. It is therefore advocated that the builder of the set follow the detailed instructions as closely as possible for this reason.

The third cause of oscillation, that is, the grid-plate capacity of the vacuum tube, cannot be eliminated without entirely changing the design of the tube itself.

In the past few years, several methods of compensating for the energy fed back from the plate circuit to the grid circuit through the tube capacity have been developed. The most noteworthy of these is the use of some means to feed back additional energy from the plate circuit to the grid circuit in such a manner that it is out of phase with the energy fed back through the tube, thus preventing oscillation. Several different ways of doing this are in use today, and some of them unquestionably have a great deal of merit. However, these systems have several disadvantages. Principal among them is that the means of feeding back compensating energy is often very critical in its adjustment, and that the circuits using such a means of neutralization are not equally efficient over the full range of wave lengths.

Another means of preventing oscillation in general use today is to insert a resistance, or introduce in some other manner a loss in the grid circuit of the tube. It is very easy to prevent oscillations in this manner, but it can be done only at the expense of decreasing the sensitivity of the circuit and broadening its tuning.

Some set and part manufacturers prevent oscillation by using tuned radio frequency transformers of very low efficiency, so that the over-all gain in each stage of the radio frequency amplifier is so low that oscillations are not produced. This is generally accomplished by making the primary inductance so small that the proper degree of coupling between the primary and secondary is not obtained. Practically all transformers that do not necessitate the use of some form of compensating feed-back or resistance in the grid circuit are made in this manner. They usually have the characteristics of being fairly efficient on the low wave lengths and inefficient on the upper range of the broadcasting band.

In support of this comparatively inefficient type of transformer, some manufacturers and technical writers have made the statement that the minute capacity between the grid and plate of a tube does not cause a sufficient transfer of energy to produce oscillation. They claim that oscillations are caused entirely by coupling between transformers and coupling in the wiring, and that it can be overcome by the use of closed-field transformers. This, however, is not the case. Feed-back due to tube capacity does exist in all well designed radio frequency amplifiers and must be compensated for if oscillation of the circuit is to be prevented. To substantiate this we quote the following statement from "Principles of Radio Communications," by J. H. Morecroft, Chapter Six, page 432.

"It would seem as though the capacity (electrostatic) of a vacuum tube is so small as to be negligible, but such is far from

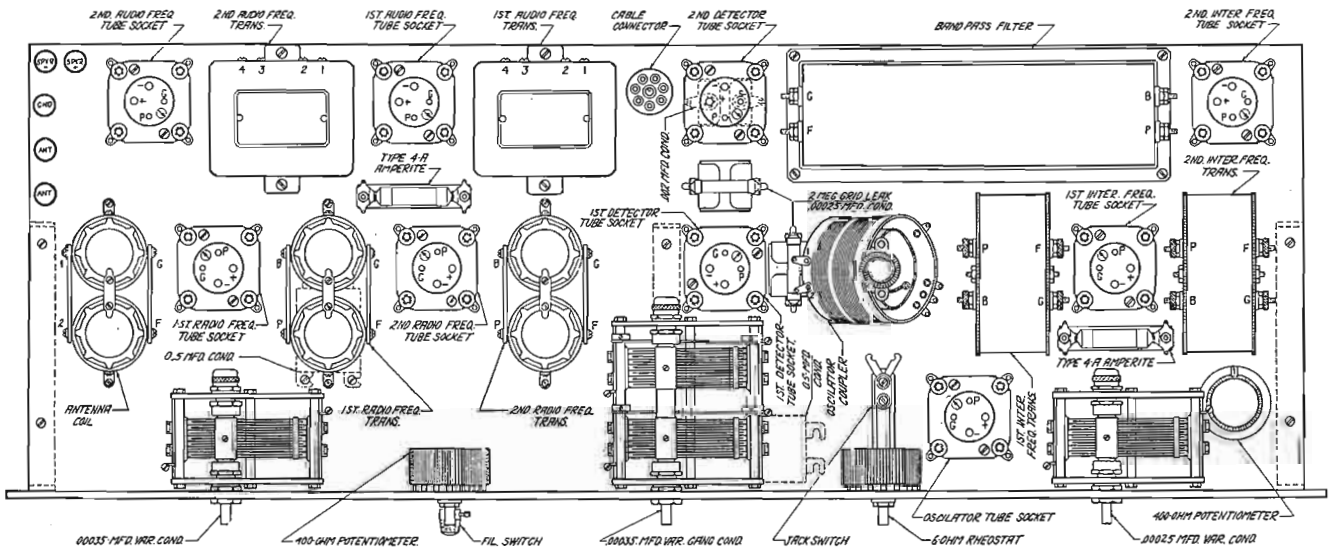


Figure 2. Location of parts on sub-panel and front panel

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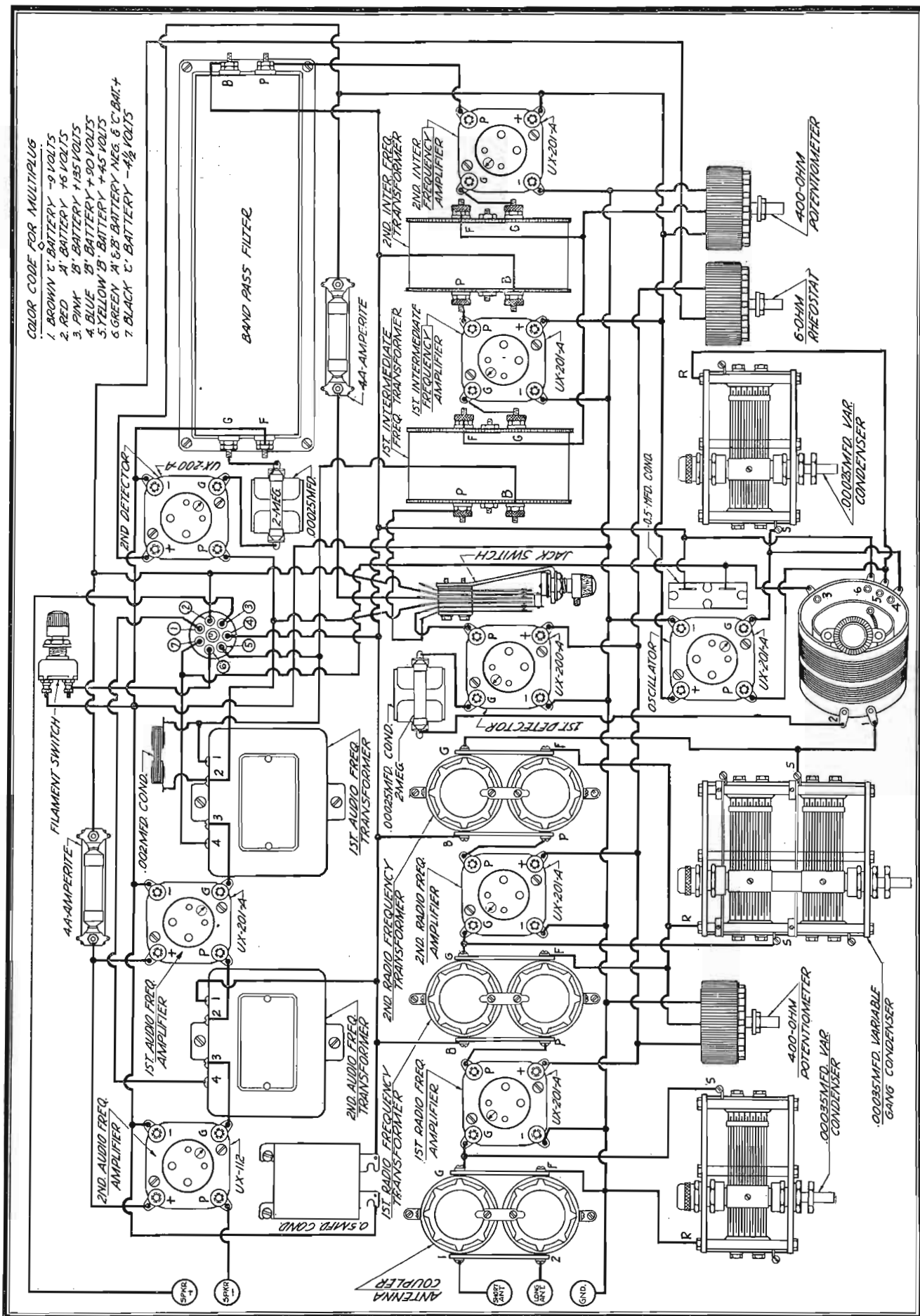


Figure 3. Graphic wiring diagram of Super-Selective 9 Receiver

the truth; the internal capacity of a tube may have very great effect on its operation, especially at high frequencies."

In designing the radio frequency transformers used in this receiver the engineers fully recognized the existence of a feedback through the tube capacity and the necessity of compensating for it in order to prevent oscillations when all stages of the radio frequency amplifiers were tuned to resonance. Not satisfied with the means previously employed, which either resulted in inefficient operation or in the necessity of making critical internal adjustments, they worked along an entirely new line.

Under the usual conditions existing in tuned radio frequency amplifiers, the currents fed back from the plate circuit to the grid circuit, through the tube capacity, is of such phase as to add to the voltage already existing between the grid and filament of the tube, and thereby cause oscillation. It obviously follows that if the right phase relation is obtained between the current fed back through the tube and the current existing in the grid circuit, oscillation would be prevented.

It is well known that the phase relation between current and voltage in any circuit or group of circuits depends upon the relative constants of such circuits, namely, the inductance, the resistance and the capacity. In the case of transformers, the mutual inductance and the distributed capacity between the primary and the secondary must also be taken into consideration.

In designing the transformer, the relative production of all of the constants mentioned above were arranged in such a manner

those actually specified and still get good results from the receiver. However, it is recommended that the novice strictly adhere to the list of parts specified. Successful construction of the receiver will then be assured, since the diagrams will tell him exactly where to drill holes, locate parts and make connections.

In the event that apparatus other than that specified is used, care should be taken that the necessary mounting holes are modified so that the apparatus may be properly mounted.

- 1 Camfield No. 251 .00025 mfd. Equaltune Variable Condenser
- 1 Camfield No. 351 .00035 mfd. Equaltune Variable Condenser
- 1 Camfield No. 352 .00035 mfd. Equaltune Variable Condenser (2-gang)
- 1 Camfield No. 22K Kit of 3 Camfield Duoformers
- 1 Camfield No. 620 Coupling Unit
- 1 Rusco No. 10KC Band Pass Filter
- 2 Rusco No. 95KC I. F. Transformers
- 1 Dubilier No. 601 .002 mfd. Fixed Condenser
- 2 Dubilier No. N.N. 6N01G .00025 mfd. Grid Condensers
- 2 Dubilier 3-megohm Grid Leaks
- 2 Tobe .5 mfd. Condensers
- 2 Silver-Marshall No. 220 Audio Transformers
- 1 Frost No. 806 6-ohm Rheostat
- 2 Frost No. 824 400-ohm Potentiometers
- 3 Kurz-Kasch No. 592 Dials
- 9 Benjamin No. 9040 Sockets
- 3 Karas Sub-Panel Brackets

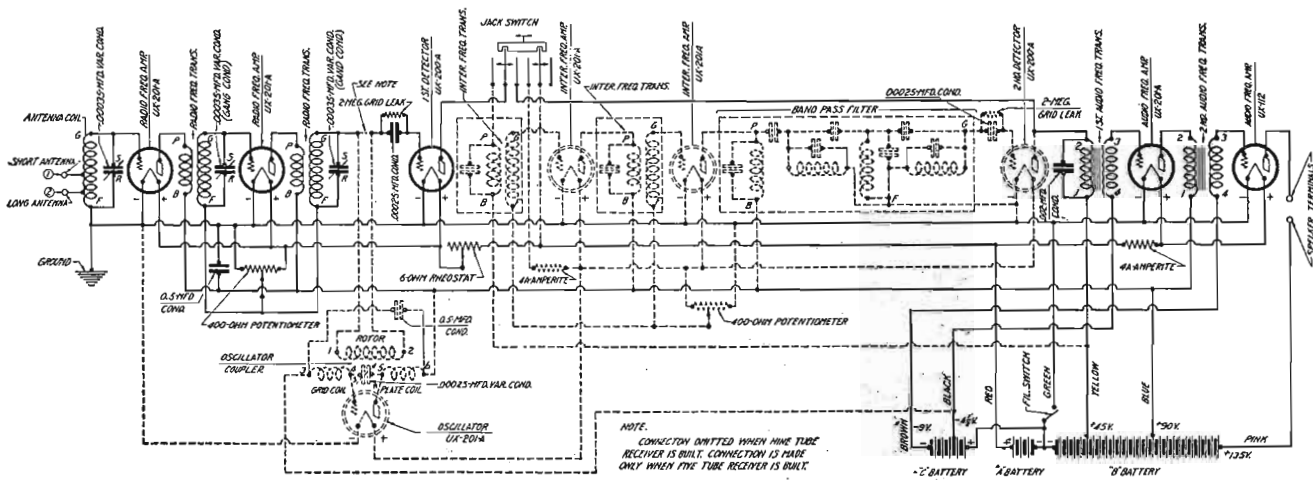


Figure 4. Schematic wiring diagram of complete receiver

that the current fed back from the plate to the grid circuit is of such nature so as to prevent oscillation.

This feature, combined with the physical design of the transformers, which practically eliminates all electro-magnetic coupling between successive stages, and a circuit design embodying the proper use of by-pass condensers, makes it possible to build a five-tube tuned radio frequency set that is extremely simple to construct, and which has a high and uniform efficiency over the entire range of broadcast wave lengths.

In the Camfield Super-Selective 9, three tuning controls are used in order to provide for maximum efficiency in the reception of distant stations. It would be possible to use a 3-gang condenser to tune the three radio frequency coils, but this would result in the loss of some of the efficiency, due to the fact that it is impossible to make the antenna coil tune exactly the same over the full range of wave lengths as the two radio frequency transformers. By providing a separate tuning condenser for the antenna coil greater efficiency is obtained, particularly in the reception of weak signals from distant stations. This gives the circuit two tuning controls when it is operated as a five-tube set and three controls when it is operated as a nine-tube set. However, these three controls are not hard to handle, even by an inexperienced operator, as will be explained later in connection with notes on balancing and tuning.

The laboratory model of this receiver was built from the exact list of parts appearing herewith. The experienced constructor or experimenter can substitute other reliable makes of apparatus for

- 1 Carter Midget Battery Switch
- 1 Carter No. 6 Jack Switch
- 5 Eby Engraved Binding Posts
- 1 Jones Type P. Multiplug
- 2 Amperite No. 4-A
- 1 Micarta or Formica 7x30-inch Drilled and Engraved Panel
- 1 Micarta or Formica 10x29-inch Drilled Sub-Panel
- 40 Feet Acme Celatsite Wire
- 1 Package Kester Radio Solder
- 1 Ekko Ground Clamp
- Miscellaneous lugs, wire, screws, etc.

The 7x30-inch front panel and the 10x29-inch sub-panel may be purchased with all holes drilled. If the builder prefers to do this drilling himself, a complete set of actual size blue prints may be obtained through any of the stores selling complete parts for the Camfield Super-Selective 9 or direct from the CITIZENS RADIO CALL BOOK. Persons not experienced in the construction of radio sets will find it advisable to obtain these blue prints even if drilled front panels and sub-panels are to be used.

The first step in the construction is to mount the sub-panel on the three sub-panel brackets as shown in Figure 2. Next mount all of the parts that are to be secured to the sub-panel. Then fasten the front panel to the sub-panel by means of the sub-panel brackets and next mount the three condensers, the 6-ohm rheostats, one of the 400-ohm potentiometers, the filament switch and the transfer switch to the front panel.

(Continued on Page 168)

# The "Best Lincoln" Nine Super Heterodyne Receiver

An Easily Constructed Receiver of Excellent Design, Capable of Highly Satisfactory Service

This Receiver Was Constructed and All Illustrations Made in the Laboratory of the Citizens Radio Call Book

THE problem of how many many tubes a Super Heterodyne should have has puzzled many a prospective set builder. Some contend that the number should be as high as fourteen, and no doubt the future will bring forth some other experimenter who will advise a greater number. By employing crystal detectors and cutting down on the audio amplification, the number can be reduced till the receiver might be mistaken for a tuned R. F. circuit at first glance, and by employing trick circuits, making one tube do the work of two or more, the number may be still further reduced.

Such is nice for theory and speculation, but it takes a skilled operator to make any of the doubled-up circuits act like one that is straightened out. While crystals will work perfectly as detectors, they are not up to tubes in efficiency, and while they will save dollars for tubes invested, they cut off miles of reception.

Here is a set that will delight both the pocketbook and the ear, as well as the emotion commonly referred to as a "big kick" when long distance reception is discussed.

This set is quite simple in construction, as all unnecessary minor refinements that tend toward confusion have been done away with. When less than ten tubes are used, there is no need of taking elaborate precautions, as the chances of unruly operation are much less than in larger sets. Those following our instructions will have a super which will be a delight to own and will give the owner the satisfaction of knowing it is inexpensive both in original cost and maintenance.

To simplify construction, the set is mounted on a wooden base-board. The panel is only twenty-four inches long and is grained to resemble polished walnut. The holes are already drilled and marked with appropriate labels in gold-filled engraving. The whole lends a subdued tone, further enhanced by a white-faced milliammeter with a gold rim. The controls are all close to the center of the panel, making them readily accessible.

For family use, a jack for the cone reproducer is used. Then, for the convenience of the "boiled owl" who sits up all night tuning for London and Japan, another jack for headphones is convenient. This jack connects to the first audio transformer,

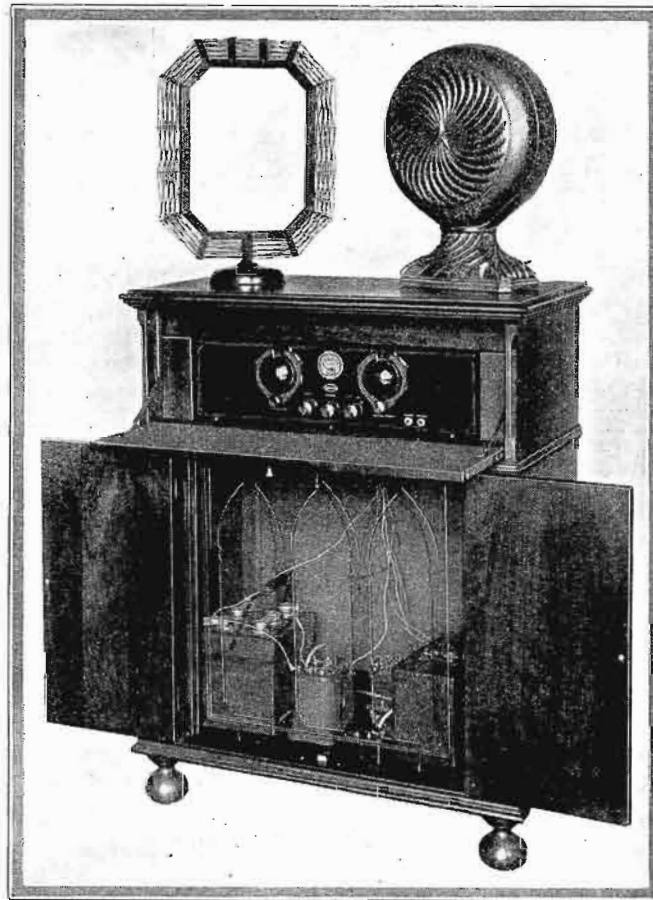


Photo A. Completed receiver mounted in console, with suggested accessories

cutting out the ear-bursting volume, without sacrificing any of the selectivity. This arrangement of the jacks makes it possible to pick up a weak station and tune it in till it reaches loud speaker volume, then switch over to the reproducer. It is not commonly known, but much of the remarkable long distance work boasted of as loud speaker reception was first brought in by the use of headphones. Distant signal logging is an art as fine as watch-making and about as exasperating to the uninitiated, but when one knows how it is so simple it seems ridiculous.

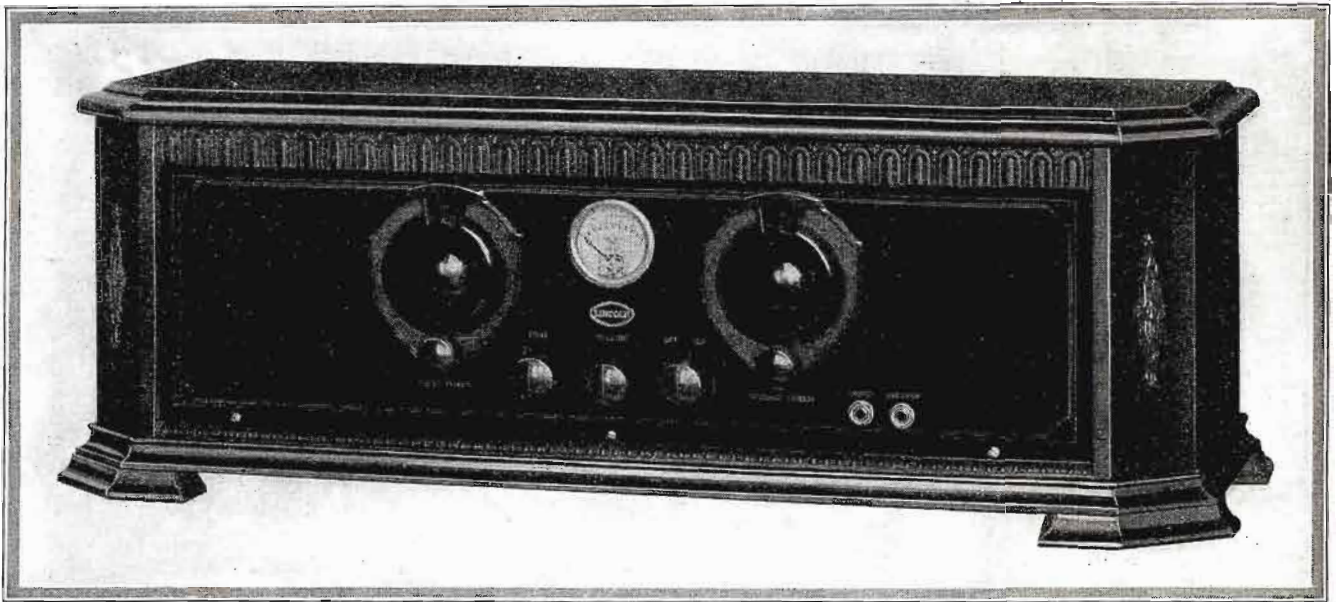
While much of the DX heard depends upon the man who turns the knobs, the set is not to be slighted. Fresh batteries, soldered connections, sensitive reproducers and reliable tubes all contribute their share to the final results. It is very seldom a set of sloppy construction or slipshod maintenance that is a world beater.

Often factors beyond the control of the operator are responsible for poor reception. A set in the heart of a city will never reach as far as one in the country. A set inside a steel building will seldom receive long distance on a loop. The range of a receiver in the summer is about one-fifth as great as in the winter.

And so on, but the purpose of this article is to initiate the reader to the merits and construction of the "Best Lincoln Super."

The conventional loop aerial is used, as most Super Heterodynes work best with a loop. An outside aerial requires additional apparatus and sacrifices the selectivity. Across the loop terminals is a variable condenser, which is one of the major controls. It brings the loop and first detector in resonance with the incoming signal.

A second condenser is across the grid and plate of the oscillator. The adjustment of this is more critical than that of the tuning condenser. It is commonly noted that there will be two beat frequencies on the oscillator condenser while only one on the tuner. Choose the frequency that seems to be the first harmonic and log it as the desired one. It will be found that the tuning and oscillator scale readings will be nearly the same on the correct frequency, while on the second harmonic the scale of the oscillator condenser



*Photo B. View showing panel arrangement and engraving*

will be from ten to thirty divisions off. An evening of experimenting will teach the builder more about handling his set than a volume of reading matter.

A regeneration control is desirable, since it brings the set up to the point of maximum efficiency and prevents much undue howling. A midget condenser of .000045 mfd. capacity is provided for this purpose. As it need be adjusted but once, it is mounted on the baseboard. All tubes are mounted in non-microphonic 1-9x23x $\frac{1}{2}$ -inch Wood Baseboard

The intermediate frequency transformers are mounted in bakelite cases with the terminals brought out at the tops. They are not subject to intensive intercoupling, therefore may be mounted quite close together. They are placed in a line, allowing the shortest connecting leads. A bus connects all the filament terminals but the last intermediate, which goes directly to the positive terminal of the "A" battery.

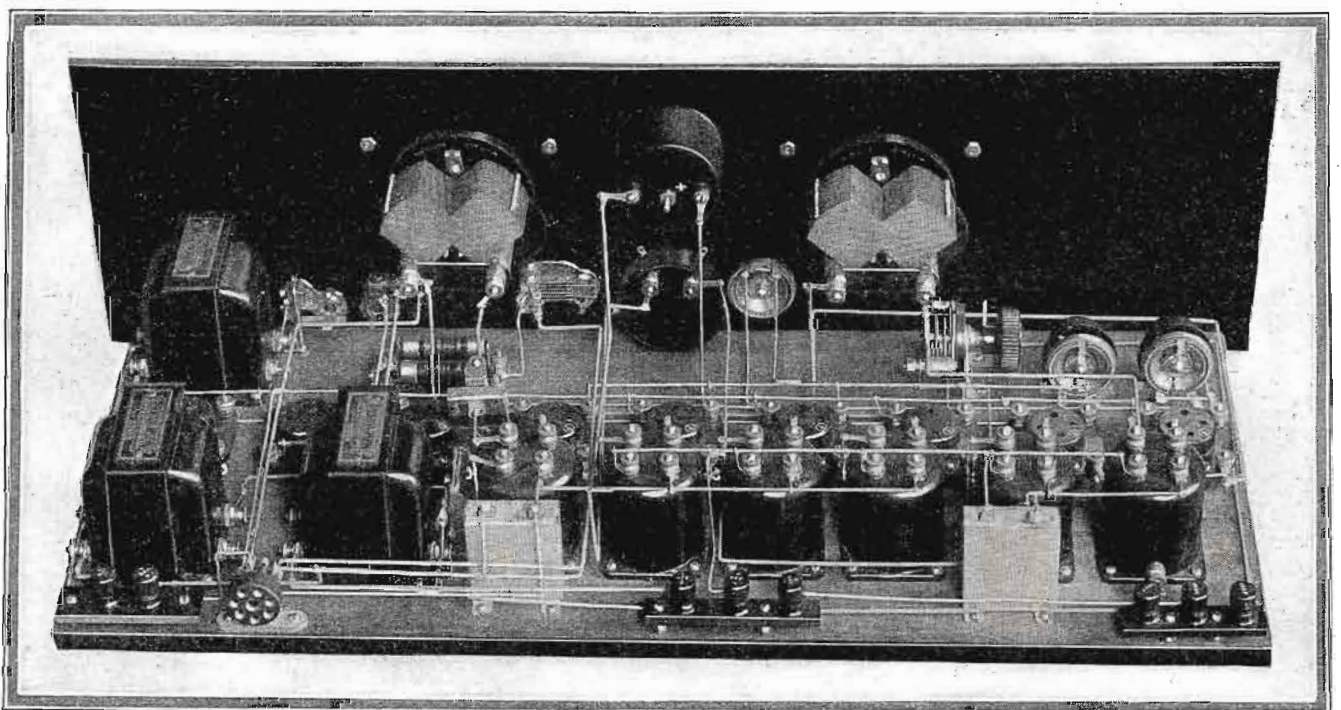
The plate and grid leads go directly to the corresponding sockets. All nine sockets are mounted in a row, an arrangement which not only makes the set look neater and more businesslike,

but tends toward the shortest possible leads as well.

No grid leak or condenser is used in the first detector circuit, but in the second a condenser of .0005 and a 2-megohm grid leak have been found quite suitable for the requirements. The detector tube feeds into an audio transformer across the primary of which is shunted a .0025 by-pass condenser.

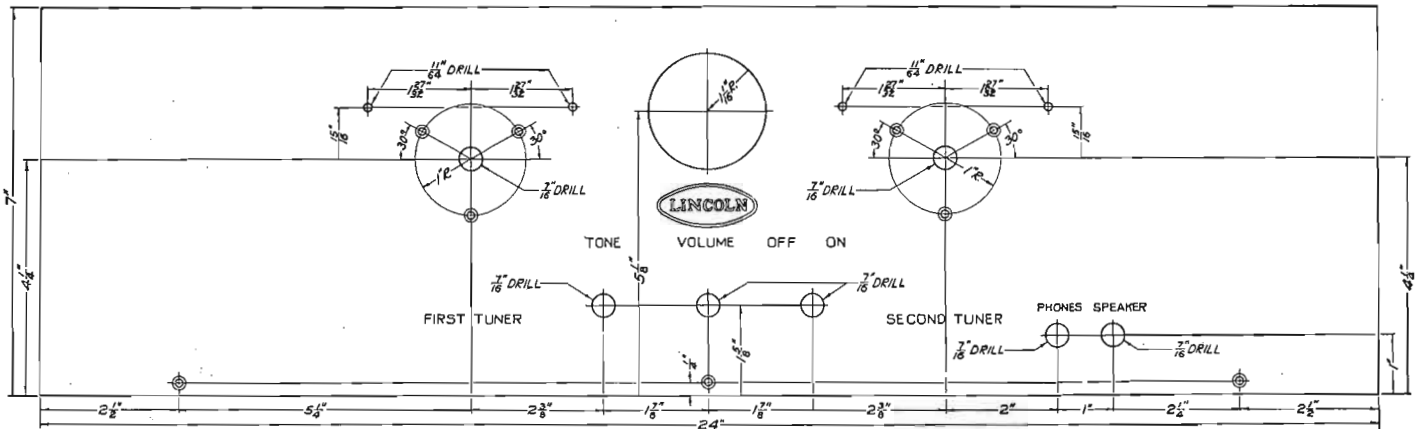
Power tubes are used in both steps of the audio amplifier; for the first a 112 and the second a 171. A bias of nine volts is placed on the grid of the 112 and forty-five on the 171. However, these voltages should be experimented with to find the most suitable value.

The filaments of both audio tubes are controlled by Amperites, the detector by a 20-ohm rheostat and intermediates and first detector by a 3-ohm rheostat. The oscillator is regulated by an additional 20-ohm rheostat. The 3-ohm rheostat is mounted on the panel. The others, which need to be adjusted but seldom, are mounted conveniently on the baseboard. By consulting the wiring diagram one will observe that the intermediate frequency transformers are all numbered. There are five of them, and the



*Photo C. Rear view of completely wired receiver*





NOTE—  
ALL HOLES UNLESS OTHERWISE SPECIFIED  
ARE 3/16" DRILL AND COUNTERSINK.

Fig. 1. Panel layout

designating numerals run from 100 to 500. The scheme employed here is slightly different from standard practice in that numbers 100 and 500 are peaked at 77½ K.C. with a very large amplifying factor; numbers 200, 300 and 400 are very sharply tuned at 155 K.C.

List of Parts

These parts or their equivalent will give satisfactory results:

- 2—Remler .0005 mfd. Variable Condensers
- 9—Benjamin Sockets 9040
- 2—Carter Midget 20-ohm Rheostats
- 1—Carter Midget 3-ohm Rheostat
- 1—CRL 50,000 Variable Resistance
- 1—Yaxley Closed Circuit Jack
- 1—Yaxley Open Circuit Jack
- 1—Yaxley Filament Switch
- 1—Jewell 0-50 Milliammeter—Pat. 135
- 2—Kurz-Kasch Dials—Aristocrat Walnut
- 1—Jones Multiplug BM
- 1—Lincoln Oscillator Coupler
- 5—Lincoln Intermediate Transformers
- 1—Aerovox .0025 mfd. Fixed Condenser
- 2—Aerovox 1 mfd. By-pass Condensers
- 1—Aerovox .0005 mfd. Grid Condenser
- 8—Eby Engraved Binding Posts

- 2—Thordarson Audio R200 Transformers
- 1—Thordarson Output Transformer R-76
- 1—Marco 7 Plate Midget Condenser
- 1—Celeron 7x24x3/16-inch Drilled and Engraved Panel
- 1—9x23x½-inch Wood Baseboard.
- 1—Package Kester Radio Solder
- 30 Feet Acme Celesite Wire
- Miscellaneous lugs, screws, etc.
- 2—3x¾x3/16-inch Celeron Terminal Strips
- 1—2½x¾x3/16-inch Celeron Terminal Strips
- 1—Electrad 3-megohm Grid Leak
- 2—112 Amerpites
- 1—Sonotron Type 112 Tube
- 1—Sonotron Type 171 Tube
- 7—Sonotron Type 201-A Tubes

List of Accessories Required for the "Best Lincoln" Nine Super-Heterodyne Receiver

The following list of accessories have actually been tested with the "Best Lincoln" Nine Super Heterodyne Receiver and have been found to operate very satisfactorily with it. While it is suggested that the accessories specified be used, it is possible to make any reasonable substitution without seriously interfering with the efficiency of the receiver.

- 1 Excello Model R-31 Console.

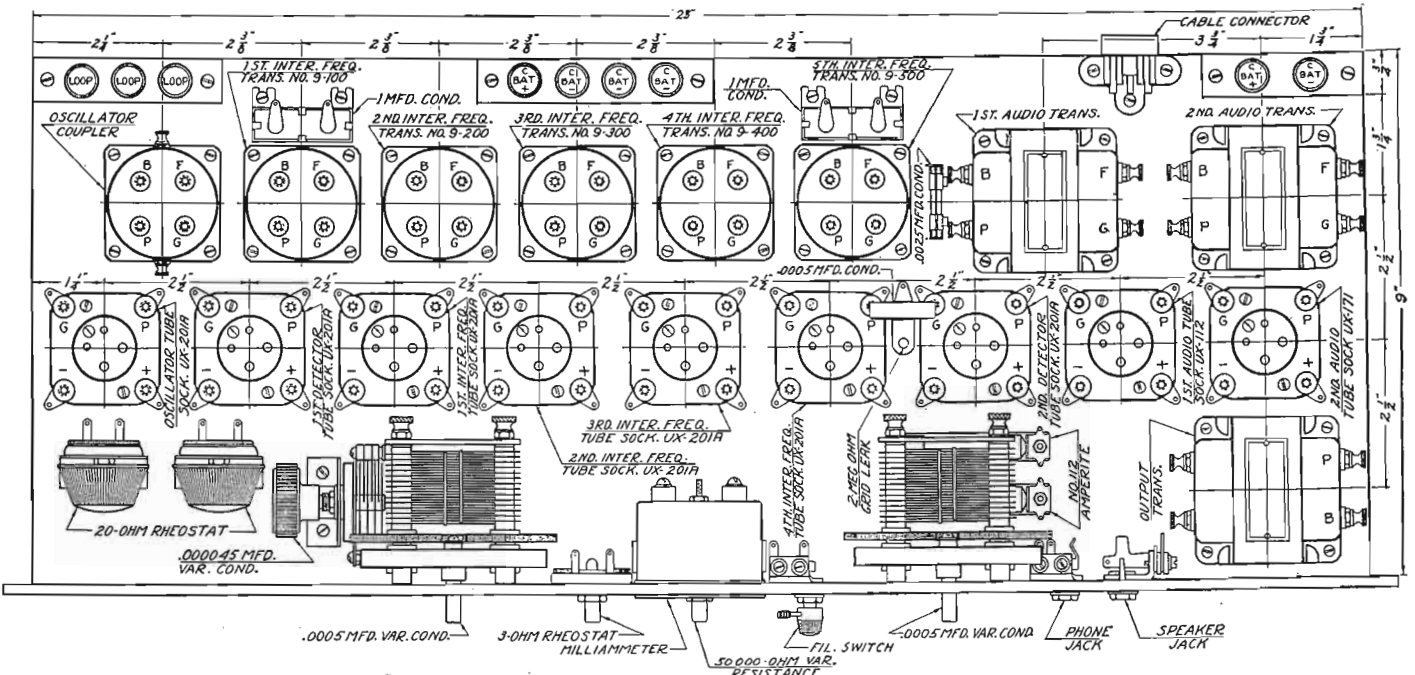


Fig. 2. Baseboard layout showing arrangement of parts

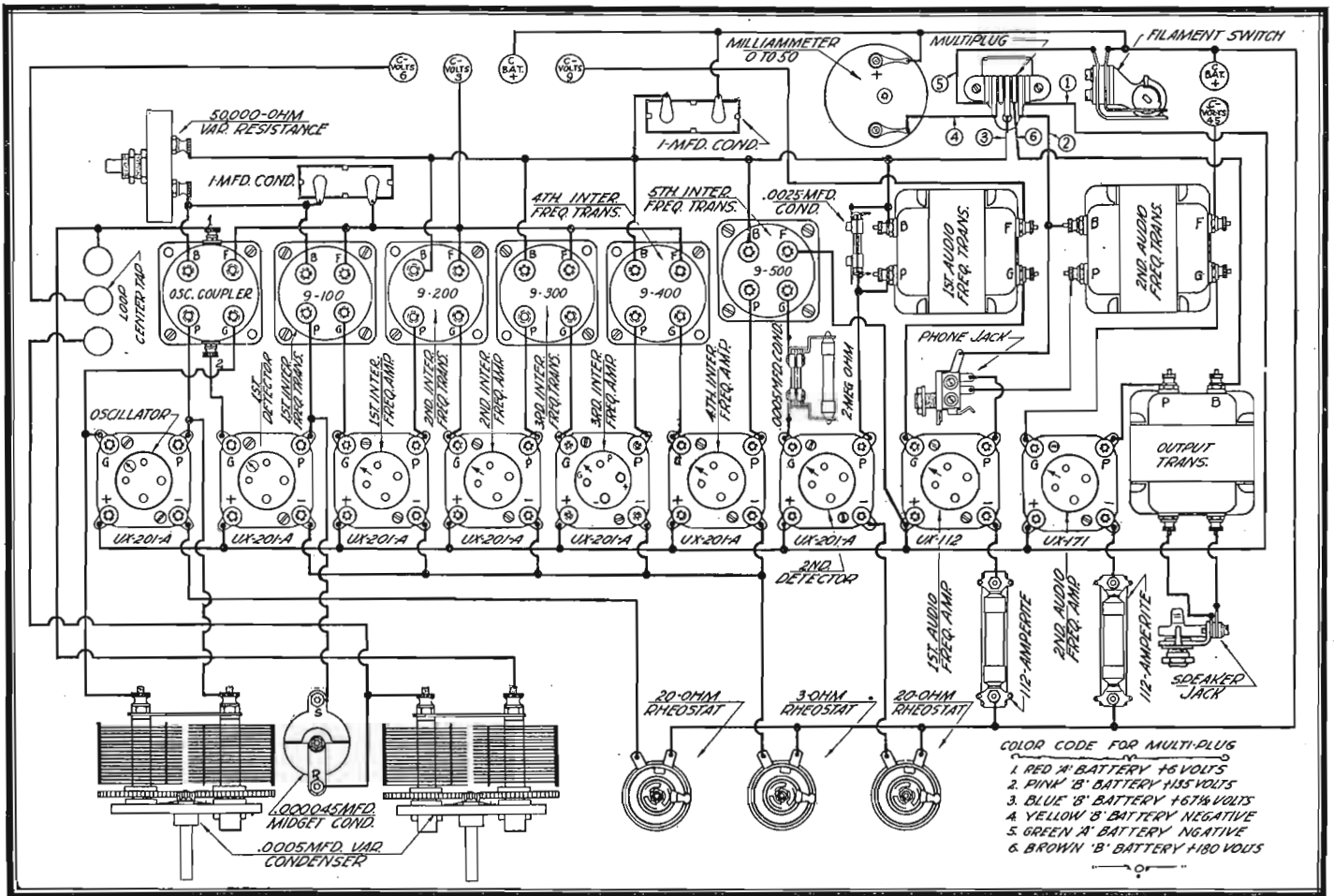


Fig. 3. Graphic illustration showing all connections

- 1 Corbett Model "C" 24-inch Cabinet.
- 1 Rowan "A" Storage Battery.
- 1 Kokomo Electric Co.s Kingston "B" Power Supply.
- 1 Allwood Speaker.
- 1 Balkite Model "N" Charger.
- 1 Zig-Zag Loop.
- 1 Yaxley Model 444 Relay.

The Excello Console style R-31 incorporates an unusually substantial construction and uses a design that will harmonize beautifully with the furnishings enhancing the appearance of the average American drawing room. It is made entirely of American

Walnut with five-ply walnut veneer top and panels. The front doors are made of selected Matched Butt Walnut. There is a remarkably large battery compartment which also contains the reproducing horn used in conjunction with the Allwood speaker. The horn is of special fibre construction which allows true tone quality. The generous sound chamber gives ample volume and freedom from distortion. This sound chamber when used in conjunction with the Allwood speaker gives a reproduction which is more than satisfactory. A screen placed inside the doors of the battery compartment allows the speaker to be heard, but prevents (Continued on Page 166)

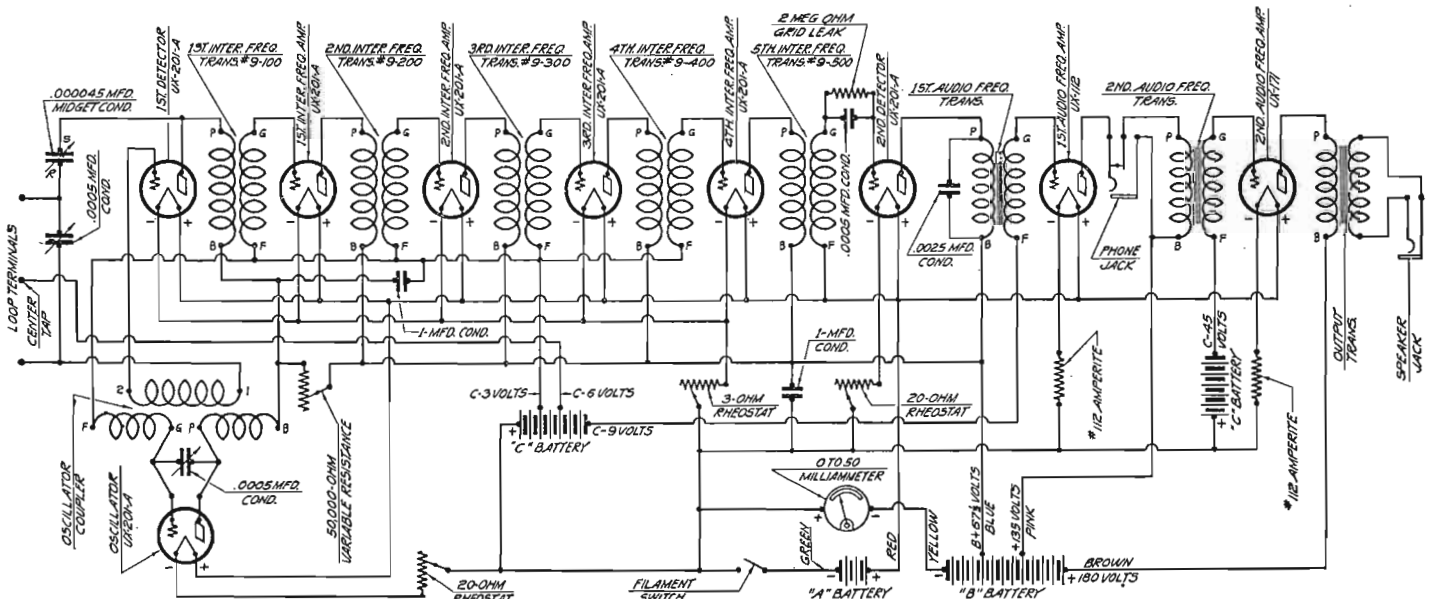


Fig. 4. Schematic wiring diagram

# A High-Amplification Shielded Super-Heterodyne

This Receiver Employs a Laboratory Assembled and Calibrated Amplifier

Assembly and Thorough Test Has Been Made in the Laboratory of the Citizens Radio Call Book

**T**HE performance of any radio receiver is dependent upon the excellence of the design of every individual part of the whole receiver. Particularly is this true of the super-heterodyne circuit, which really consists of three separate circuits, each of which alone may be likened to a whole set.

In the receiver described herewith, this fact has been given most careful consideration, and the design of the entire receiver worked

can be heard with good volume.

In the Improved Laboratory Super-Heterodyne is at last found a receiver free of the almost age-old bugaboo of individually matched long wave transformers, for the long wave amplifier is a sealed, laboratory-calibrated unit that will not vary one kilocycle in operation with standard tubes. Almost ever builder of a super-heterodyne has either been disappointed in his set's not possessing the expected

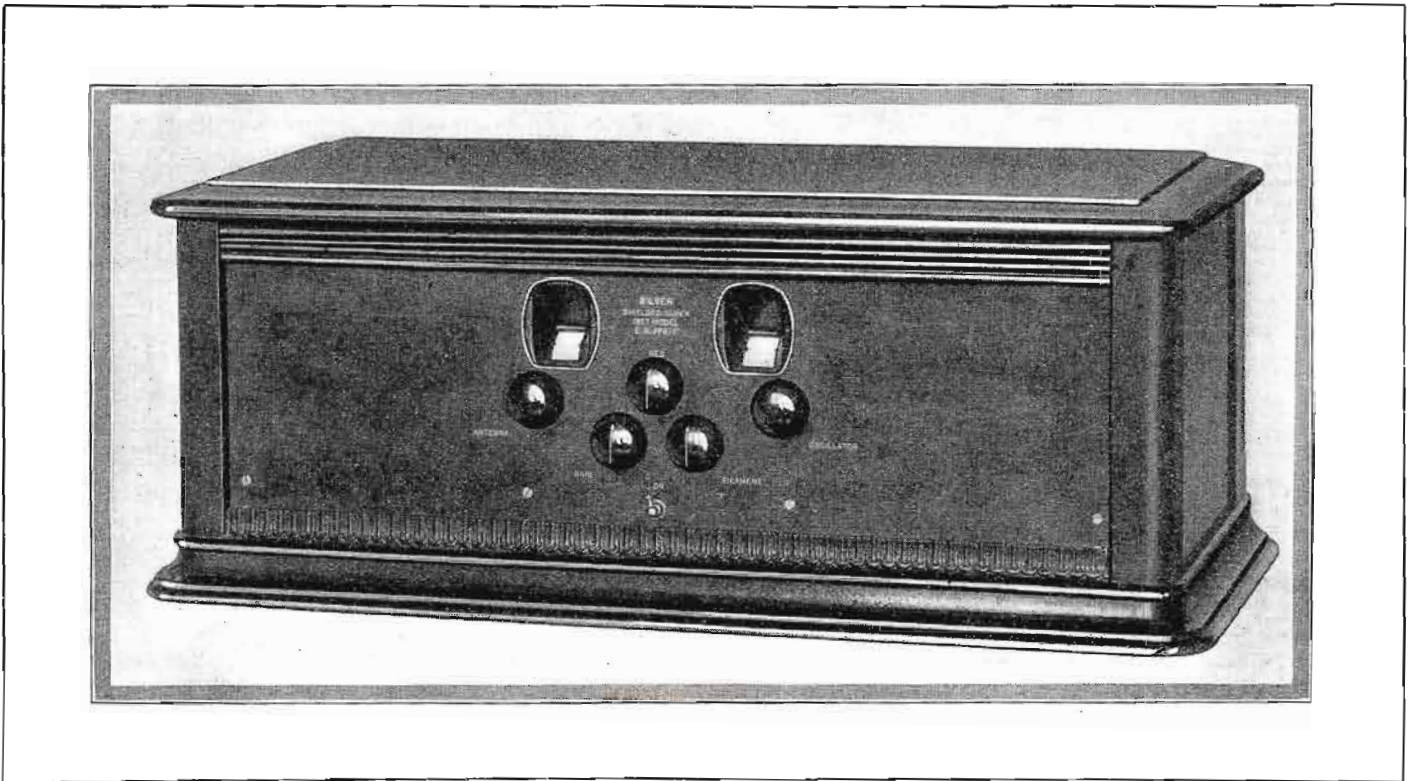


Photo A—Front view of receiver in Ehlert cabinet

out so that each individual section of the set would operate at peak efficiency. As an example, the first detector circuit with but a single tube will give a head-phone range of several hundred to many thousands of miles on short waves. With the two audio stages added, head-phone volume gives way to ample loud-speaker volume, while with all light tubes operating, the performance of the receiver is really remarkable.

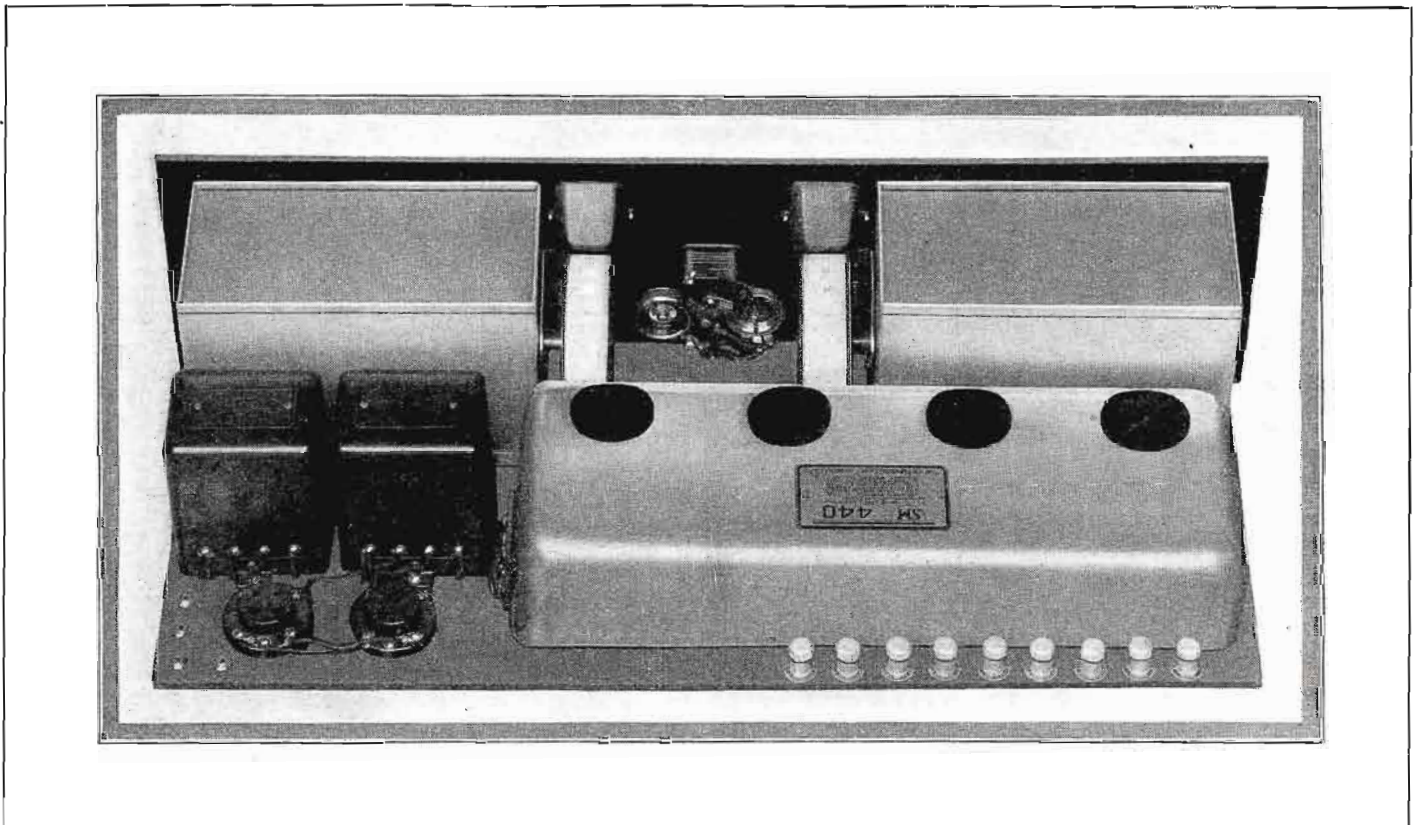
The selectivity of the receiver is equally remarkable, and in Chicago it is quite possible to bring in stations at distant points, with but 10, or in some cases, even 5 to 7, kilocycles separation from powerful local stations. This is made possible through judicious use of shielding of detector, oscillator, and I.F. amplifier. The shielding is so effective that local stations can barely be heard with no antenna connected to the set; but upon the addition of a 24-inch length of wire for an antenna, all the local stations and a number of distant ones

knife-like selectivity, or, if he has employed really sharp, efficient transformers, they only too frequently do not function properly. This condition is not always due to the individual transformers not having been properly matched to begin with, but because individual assembly conditions result in altered circuit capacities and operating conditions which do not duplicate the laboratory conditions under which the transformers were first matched. Then, again, any of the popular iron-core 30, 40, 50 or 60 kilocycle transformers have very low winding capacities for operation with low circuit, and low tube capacities. Since the operating frequency of typical long wave transformers is largely determined by the total circuit capacity, and since winding capacity is generally low, it follows that any small variations in wiring, assembly, or tube capacity will represent a large proportionate change of the total capacity, with the result that individual receiver stages built with accurately laboratory matched transformers may

often be as far as 15 to 20 kilocycles apart. This, of course, means little or no selectivity, even if there still remains fair amplification. The logical way to build an intermediate amplifier is to use not iron-core—air-core transformer combinations, but to follow along the lines of best RF amplifier design practice and use low resistance air-core transformers throughout, tuned with large fixed capacities, so that variations in tube capacities represent such small percentage changes of the whole as to be ineffectual. Exactly this course has been followed in the Laboratory Super, but it has been carried a step farther, and the whole amplifier built into a single, carefully tested unit, so that two causes of variation have been eliminated, and the remaining third—tube capacity—rendered so small a percentage change as not to affect operation. On top of this, the whole amplifier is completely shielded, each of the R.F. stages and detector being housed in individual compartments of a copper-brass catacomb. The amplifier without shielding is remarkably efficient, but when

num so that stations are heard at but one, or, at the most, two dial points. It is grid-tuned with a 350 mmf. condenser with consequent absence of hand capacity effect. Its output at different wavelengths is sufficiently constant for practical requirements, as is its calibration; while the coupling to first detector is variable.

A copper can 15 inches long, 5 inches wide, and 3 inches deep holds the I.F. amplifier and second detector. It contains four individual stage compartments, each holding an R.F. transformer and its tuning capacity, a tube socket, and the necessary wiring and bypass condensers. Three R.F. stages and a detector are employed, with the whole unit tuned to exactly 112 kilocycles. The reason for the selection of this intermediate frequency is that very satisfactory low resistance air-core tuned R.F. transformers may be built for operation there. The 112 kilocycle amplifier frequency results in decreased interference possibilities. Normally, in a super employing, say, 50 kilocycle intermediate frequency, two stations 50 kilocycles away will heterodyne each



*Photo B—View showing receiver ready for operation with shields in place*

the shielding is added the amplification jumps tremendously. Actually, shielding adds at least 50 to 100 per cent in volume on weak stations—exactly as it would intelligently applied to any multi-stage RF amplifier. This is because of the elimination of detrimental feed-backs, always and invariably present with unshielded amplifier stages.

Eight tubes are employed in the Improved Laboratory Model Super-Heterodyne—a first detector, an oscillator, three long wave amplifiers, a second detector, and two audio stages. The first detector circuit is very similar to the conventional short-wave regenerative circuits so popular, a small 75 mmf. midget condenser controlling regeneration; while a .00035 modified SLW-SLF condenser does the tuning. The coil system is a conventional S-M plug-in coil, so connected that both regeneration and tuning condenser are at ground potential, with consequent total absence of hand-capacity effect. No provision is made to use a loop, as it has been found that for extreme selectivity the use of an antenna—the coupling to which is variable—provides for greater flexibility than a loop.

The oscillator circuit is designed to keep harmonics at a mini-

other and be received without the use of the local oscillator at all, selectivity being dependent upon the selectivity of the antenna tuner and the local coil pick-up. As the intermediate frequency is increased, this possibility decreases, since it is far easier for an antenna tuner to discriminate between stations 112 kilocycles apart than between powerful locals 30, 50 or even 60 kilocycles apart. Further, powerful stations are generally spaced on even 10 kilocycle separations, so that the odd 112 kilocycle frequency is a greater aid to selectivity. Coil pick-up is, of course, absent in the shielded amplifier, and wiring pick-up is almost negligible, since all wiring is very close to the grounded metal panel or chassis. Complete shielding of first detector and oscillator sections prevents pick-up of strong local stations on the coil systems themselves, though for receivers to be operated in the country, or in non-congested broadcasting centers, these two shields might be omitted.

The audio amplifier offers a very unusual point of very great value in an ultra-selective receiver. This is the 5,000 cycle cut-off, or decrease in amplification, which aids receiver selectivity. Frequencies above 5,000 cycles do not contribute to realism of re-

production, according to no less an authority than the Bell Telephone Laboratories, while in the range above 5,000 cycles lie practically all parasitic amplifier noises, atmospheric disturbances and the only too prevalent heterodyne squeals. These the 5,000 cycle cut-off tends to decrease very markedly, and almost entirely eliminate.

Parts List

These parts or their equivalent will give satisfactory results:

- 1—Van Doorn Panel and Chassis Unit, pierced, with hardware
- 1—Carter .00015 Condenser with leak clips
- 1—Carter M-200 Potentiometer
- 2—Carter ½ mfd. Condensers
- 1—Carter 3-ohm Rheostat
- 1—Carter Battery Switch
- 4—Carter No. 10 Tipjacks
- 1—Polymet 2-megohm Leak
- 2—S-M 220 Audio Transformers
- 4—S-M 511 Tube Sockets
- 2—S-M 805 Vernier Drum Dials
- 1—S-M 275 R.F. Choke
- 1—S-M 342 .000075 mi. Condenser
- 1—S-M 440 Time Signal Amplifier
- 2—S-M 515 Coil Sockets
- 2—S-M 111A Coils
- 2—S-M 320 .00035 Condensers
- 9—X-L Binding Posts

- 7—Ceco Type "A" Tubes
- 1—Ceco Type "J-71" Tubes

Assembly

Upon the chassis should be mounted the detector and oscillator assemblies, inside the stage shield pans if shields are to be used. The end mounting screw of each 511 tube socket is used to join the A— to the chassis, so a lug should be placed under the screw head, to be soldered to the F— socket terminal, and the under side of the chassis scraped bright for good contact with the fastening nut. One terminal of the .00015 grid condenser should be bent at right angles and fastened directly under the "G" terminal screw. The single long screw holds the 275 choke coil in the detector stage assembly.

The binding posts mount in the nine holes at the rear of the chassis using the insulating washers to positively insulate them from the chassis, as do the four tipjacks. The "Ground" post grounds to the metal chassis, and the fastening screw of this post holds one end of the second ½ mfd. condenser tightly to the chassis, while the free end must be bent up clear and free of the metal chassis.

The A— connection is made to the amplifier through a contact between amplifier shield and chassis to which it is fastened with four screws. The two audio amplifier tube sockets mount using their rear fastening screws to connect the F— posts to the chassis. All possible wiring should be done on the chassis before proceeding further, leaving free the wire ends that will connect to the instruments on the front panel; and to the two audio transformers which mount last. The potentiometer should be mounted as shown, using insulating washers to thoroughly insulate its frame from the panel. The rheostat and the midget condenser

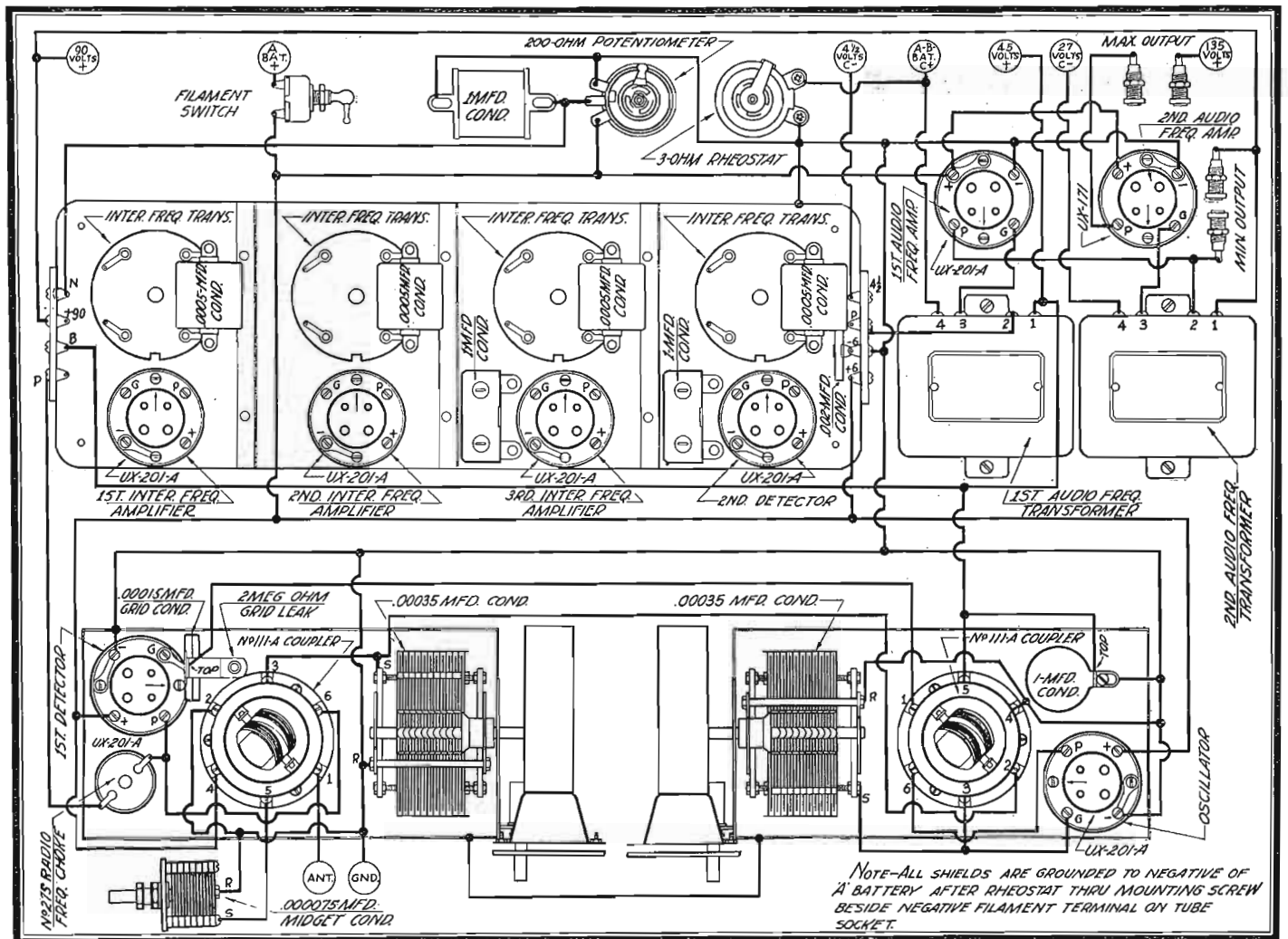


Fig. 2—Graphic illustration showing all connections

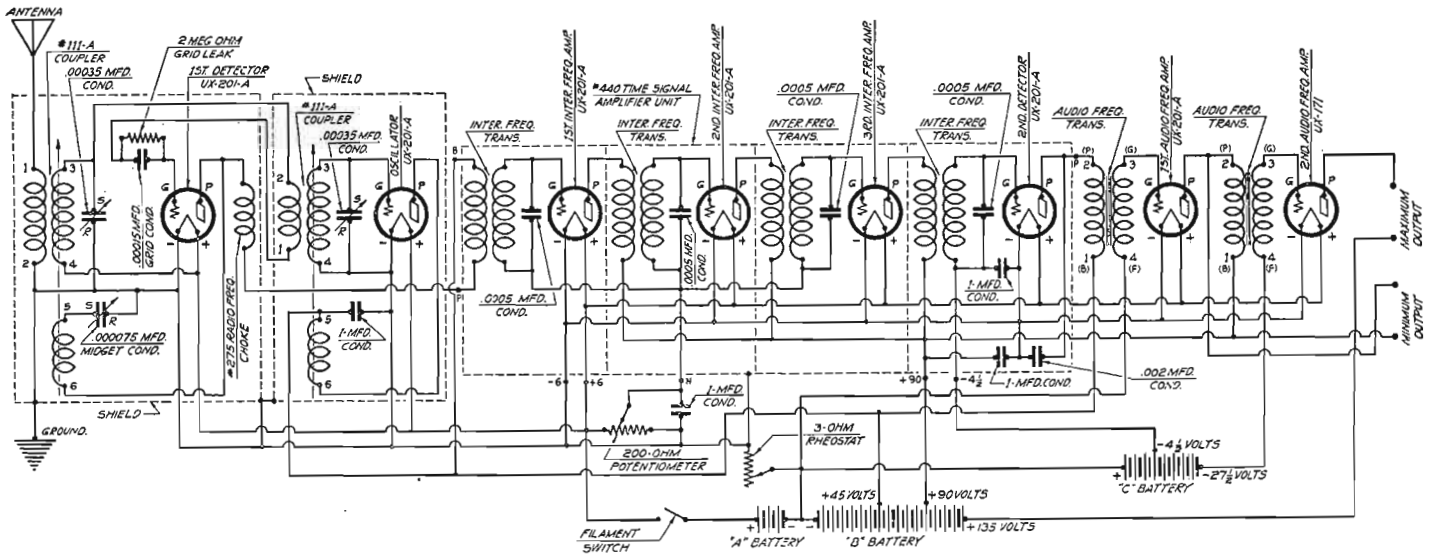


Fig. 3—Schematic wiring diagram

are similarly mounted, except that care is taken to make good contact between them and the panel.

The drive mechanisms of the dials should be dropped into the bracket bearings intended for them, the shafts pushed through the holes in the front panel, and the two brackets bolted to the panel using the screws provided. One variable condenser fastens to either bracket, using the shaft mounting nut provided. A drum should be slipped over each condenser shaft, with set screw loosened, and pushed up until the drum scale edge is just ready to enter the crack in the drive mechanism shaft. With a knife blade this crack should be widened to receive the drum scale edge, and the drum pushed well up on the condenser shaft. The scale should then be adjusted to read 100 degrees against the indicator points in the panel windows, when the condenser plates are entirely disengaged, upon which the set screw in the drum dial hub should be tightened on the condenser shaft. With the knobs fastened on the drive shafts, the condenser dials should rotate if the knobs are turned.

The connections to the condensers, rheostat, and potentiometer should be made before fastening the panel to the chassis. After they have been put in, machine screws and nuts serve to hold panel and chassis together. The on-off switch mounts in the one remaining panel hole, with insulating washers to thoroughly insulate it from the panel and chassis. (It may have been previously connected in circuit, and allowed to hang on the wiring until ready to be mounted.) In wiring, a little slack should be left in each connecting wire, which should be cut to fall about as shown in the bottom view of the chassis. After testing, all wiring may be bunched and laced into neat cables, using very heavy waxed shoemaker's thread. Two leads should not be joined or included in the cable—they are the wires running from the detector stage along the bottom of the chassis and up to posts 1 and 2 of the oscillator coil socket.

**Operation**

To operate the set, all tubes (a total of seven CX301A and one CX371 tubes are needed) should be inserted, except the first detector tube. The CX371 goes in the right rear socket. With the on-off switch on, the rheostat should be turned to within 1/8-inch to 1/4-inch of the full right position. If the potentiometer "GAIN" knob is turned to the right, a "plunk" will be heard at some point. This can be detected by varying the oscillator drum, which should cause a number of shrill whistles to be heard. The "GAIN" knob should always be operated just to the left of the "plunk" point—to the right of which squeals were heard when the "OSCILLATOR" dial was varied. The receiver is least sensitive when the "GAIN" knob is at the left, and the most sensitive when the "GAIN" knob is just to the left of the "plunk" point.

The first detector tube should be inserted, and the midget condenser set all out. The antenna coil rotor should be set at 45 degrees—the oscillator rotor all in. A small antenna 30 to 60 feet long should be used, or even a larger one if the set is not too close to powerful local stations. Stations may be tuned in using the two drum adjustments only. Weak stations may be intensified by turning up the "REGENERATION" condenser on the front panel. This condenser functions similarly to the "GAIN" knob, in that as it is turned to the right to interleave the plates, signal strength on weak stations will increase up to the point where the first detector oscillates, and the signal turns into a squeal. Adjusting the midget condenser will react slightly on the setting of the "ANTENNA" drum. The position of the antenna coil rotor should generally be at about 45 degrees. With a small antenna, it may work best all in; with a large antenna, at nearly right angles. The sharpness of tuning of the antenna dial depends upon the setting of this rotor, as well as that of the midget condenser. The oscillator rotor should be adjusted once on a very weak signal at about 300 to 350 meters, and once set for maximum volume, may be left alone.

**Battery or Power Operation Optional**

The Laboratory Super-Heterodyne may be operated from standard A, B and C battery equipment, or it may be operated from light socket power equipment, either partially or wholly—using the standard CX301A, CX112, and CX371 tubes; either a 6-volt storage A battery with trickle charger known, when both units are combined, as an "A Power Unit"), or from a direct true A power unit such as the new ABOX A supply. As there is considerable variation in B power units, a type employing a glow tube voltage regulator is recommended. Dry C batteries should be used. The receiver may be adapted for use with McCullough, Sovereign, or other A.C. tubes.

**Use of Output Transformer or Power Pack**

It is highly desirable that an output transformer such as Silver-Marshall 221 or 222 be used between the receiver and the loud speaker. This unit has not been included in the set, since the ideal way to build it is to leave out the audio stages entirely and use, instead, a power pack such as the Unipac described elsewhere in this issue—a power amplifier and B supply combined. The first audio tube may be built into the Unipac as a CX326 tube with the first audio transformer in the set itself. In this case, the Unipac would serve beautifully as a phonograph amplifier with a record pick-up connected to the CX326 input tube's grid circuit, or as a two-stage amplifier for the radio set with the secondary of the single audio transformer in the set connected to the Unipac in place of the record pick-up by means of a single phone cord.

# The Two Tube Browning-Drake Receiver With Power Amplifier

Here Is the Popular Browning-Drake Receiver in an Entirely New Form, Equipped with a High Quality Power Amplifier

This Receiver Was Constructed and All Illustrations Made in the Laboratory of the Citizens Radio Call Book

**B**ROWNING-DRAKE is essentially a radio frequency development, and as such, has nothing directly to do with the audio end. The "Official" assembly, recommended by Browning and Drake, uses a combination amplifier which is believed by them to give exceptionally good results. From the point of distance getting ability, there appears to be little to choose between these systems. Tone quality and the inclination of the constructor have governed the choice of which model should be built.

Many things go in cycles, however. Two years ago the fan who wished the utmost in tone quality built a resistance amplifier, or later on an impedance coupled system for greater volume. Transformers then on the market seemed manifestly inferior to either of the later methods of audio amplification. Audio transformer manufacturers have not, however, remained idle. Much research and experimentation has been conducted. Considerable money was spent and a great deal of thought put upon the problem of bringing the audio transformer to the point where it would equal, or possibly, surpass the other systems. These efforts have been far from unsuccessful, and the result is that we now have transformers which will compete with the best resistance coupled systems on tone quality and, of course, give considerably greater volume. It is not meant here to state opinions or draw conclusions as to the relative merits of audio amplifiers. The only conclusion to be reached is that there are several excellent methods at the present time, transformer being one of them. The situation has been still further improved by the recent practice of marketing combination "B" eliminators and audio amplifiers, designed for use with any R.F. and detector unit.

The Browning-Drake development was considered as more likely to be used than any other to precede such an arrangement. A foundation unit has, therefore, been prepared in commercial form by that company, designed particularly for use with external amplifiers. This article, therefore, will describe the two-tube Browning-Drake receiver as preceding the well-known AmerTran Power Pack, an exceptionally high grade eliminator and amplifier, using the best audio transformers available, and designed for a 210 power tube in the output. It is believed by Prof. Browning and by the officials of the AmerTran Company that this combination is almost ideal for present day construction, where distance getting ability, a high degree of



Photo A. View showing receiver and complete power amplifier installed in a console

selectivity, and tone quality with great volume is desired.

Now we are concerned, prior to the input of the last tube, in getting a voltage amplification gain, but at the end of the amplifier we have a unit, our loudspeaker, which requires real physical energy development. A power tube is required to get this, and we cannot get power out of a one-half ampere filament and 180 volts of B power.

To get ample amplification, a power tube of the 210 type must be used which consumes over one ampere for the filament and should operate with from 350 to 450 volts on the plate. On the bass notes alone, many times energy is required to give the same amount of volume as middle or upper-register notes and it is these very bass notes that give a background to the music. A painting without canvas to hold it together would be a sorry mess, and so is music with the bass cut out.

Many experimenters and engineers have worked in radio realizing that more bass was needed. The majority of this development work was done on the audio amplifier, but it does not seem to have been realized that there was little use in building up a bass if the loudspeaker was not energized enough to reproduce it. It is very much like that case of the man who built himself a boat in his cellar and then had to tear down half of the house to get it out.

The semi-power tube does not handle the excellent audio amplifier we now have with the real quality which is to be demanded of the radio of tomorrow, if not of today. The writer feels that by next winter the 210 type of tube will be in extensive use and that anything less will not be considered where the best in quality is desired.

Probably the first concern to realize this need and sell commercial apparatus which made it available to the home builder was the American Transformer Company of Newark, N. J. They have had a high voltage power unit on the market for some time. It supplies 450 volts to the plate of a 210 tube, the filament being lighted from the house lighting current, so that no extra drain is imposed upon the A battery.

The design of a practical commercial unit which would handle this work was not without much grief. When the transformer and choke units had been satisfactorily designed, it was found that no commercial condenser was available which would withstand the high volt-

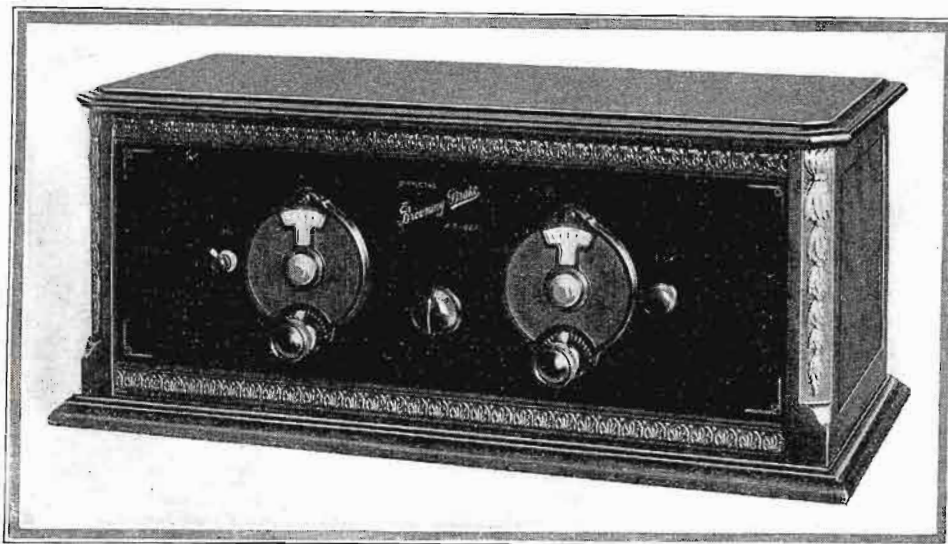


Photo B. Front view of receiver mounted in a cabinet

ages. The Tobe-Deutschmann Company of Cambridge finally developed a special high-voltage condenser for this work, which was then combined with the AmerTran products, and the first successful high-voltage power pack was available.

The complete audio amplifier is built with the pack so that this unit may be connected onto the detector of any of our existing receivers and the finest type of present-day music is then available. The AmerTran Company has developed audio transformers to the point where their quality compares most favorably with the better types of impedance and resistance amplifiers. Two of these, their regular first and second stage De Luxe models, are used in the accompanying amplifier.

Here is real quality. When the signals of a good concert come through this into the 210 power tube, with 450 volts giving it plenty of reserve, a good cone speaker, such as the Western Electric, becomes a real musical instrument. Compared with the ordinary radio type of amplification, it is like the small square piano compared to our present-day grand pianos. Some of the semi-power tube amplifiers approach it, particularly if they are not run very near what may be called the "saturation point," but in the last analysis they do not compare with a 210 tube amplifier.

Many people say, "Why have all this power?" Let us draw an analogy. Today there is less and less opportunity of driving fast on the public highways and yet greater power is a feature of all this year's motor cars, and few salesmen will talk of any speed under 70 miles an hour. This is selling cars. Why? Because it is much more comfortable to drive a 70-mile-an-hour car at 35 miles an hour than to drive a 50-mile-an-hour car at the same speed.

It is the flexibility, the sense of great reserve, the comparative loafing along and easy work of the motor at touring speeds which make the fast and powerful cars desirable. This applies to radio. With the 210 type of tube the reader is literally loafing along even when strong volume is being used. An unusual fortissimo passage finds the tube handling it with ease, like the unexpected climbing curve in a high-powered car. There is enough energy to give the bass notes color and intensity and some to spare.

As may be noted, the foundation unit is equipped with two self-contained sockets for the radio frequency and detector tubes. The regenerative unit and the antenna tuning unit from the Official Kit-Set are to be mounted as shown with the Regenerative to the left of the de-

detector socket and the antenna tuning unit to the left of the radio frequency socket, which is at the center front of the sub-base. Mounting should be accomplished by the use of 6x32 screws inserted through the bottom of the sub-panel into the girder frame condensers. After the Official Kit is mounted, the tuning dials should be removed as well as the drilling templates which are furnished with them. These templates are not to be used, inasmuch as the front panel is already drilled. The dials should be slipped onto the condenser shafts, the dial lights secured by means of the small machine screws which extend from the dial heads through the front panel, and the metal caps should then be replaced over the shaft ends after the dial set screws are made tight.

The 30 ohm filament rheostat should next be mounted at the center of the panel with the tolder tab at the top. Mount the Yaxley

filament switch at the left end of the front panel and insert the 33 ohm resistance cartridge in the clips at the left of the antenna tuning unit. Now mount the antenna and ground binding posts at the left end of the sub-base with the antenna post in the left rear corner. The Precise .0001 variable antenna condenser can next be mounted in the position shown to the rear left of the antenna coil. Now, mount the A+ and A- binding posts to the rear of the regenerative and the B+ amplifier and the input binding posts which is unmarked at the right end of the sub-base. Insert the 8 megohm resistor in the resistor clips just below the regenerative coil. The mechanical assembly of the receiver is now complete and the builder can immediately proceed with the wiring.

The filament circuit should be wired first. Run a wire from the A binding post to the left terminal on the filament switch. Connect the right terminal of the filament switch to one solder tab on each of the dial lights and to the Amperite filament control which should be mounted in the resistor clips at the center of the sub-base. From the other terminal of the Amperite run a wire to the +F filament terminal spring on the detector socket and to the 30 ohm rheostat. From the other terminal of the rheostat connect a wire to the 33 ohm resistance cartridge. Connect the other terminal of the 33 ohm resistance cartridge to the F filament terminal spring on the radio frequency socket. Now, connect the A- binding post to the frame of the regenerative tuning condenser, thence to the free terminals of the dial lights. Next, connect from this same wiring line at the regenerative condenser frame to the ground binding post and to the center tap on the antenna coil. A connection should now be made from this same line to the -F filament terminal spring on each of the sockets.

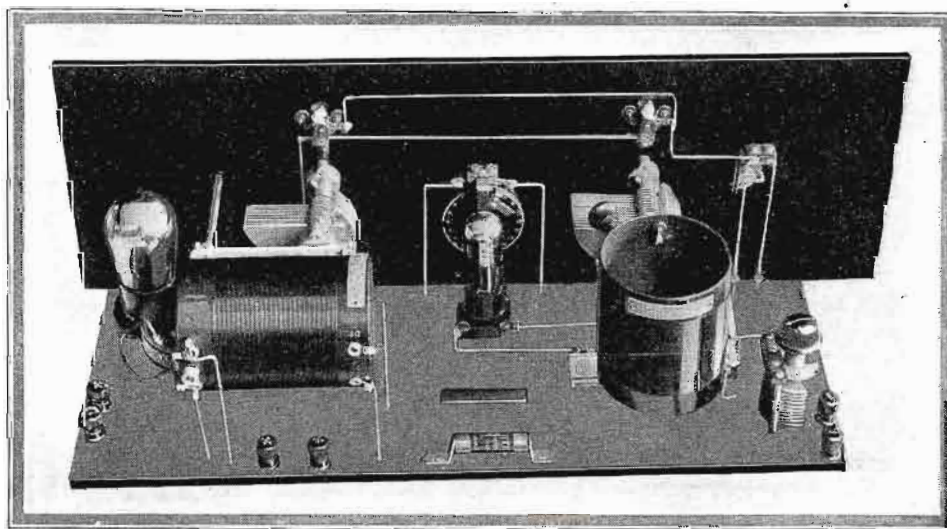


Photo C. Rear view of two tube Browning-Drake receiver



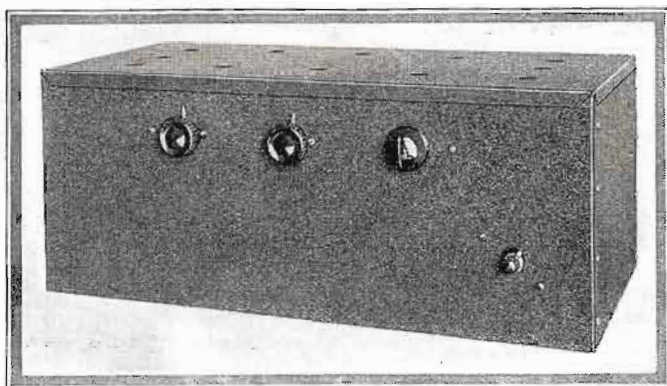


Photo D. Front view of power amplifier showing controls

This completes the filament wiring and the tubes and lights in the dial heads should be illuminated when the filament switch and rheostat are turned on. Now, connect the frame of the antenna tuning condenser to the antenna binding post and the rotating plates to the stationary plates of the antenna tuning condenser. From this same point connect to the grid terminal on the radio frequency socket. This terminal is provided with a solder lug on the top of the base panel. Now, mount the neutralizing condenser on the bakelite strap attached to the back of the antenna tuning condenser frame. Connect a wire from the neutralizer disc to the plate terminal of the radio frequency socket. This wire should go down to the base panel and be attached on the under side, having in series with it a Tinytobe .001 fixed condenser. Above the sub-panel on the plate terminal will be found a solder lug which should be connected to the lower regenerative primary solder lug, marked P. Now, connect a wire from the terminal just above this contact, marked +B, to the binding post, marked B+ amplifier. Solder one terminal of the 1 mfd. Tobe condenser to this B battery binding post and connect the other terminal of the by-pass condenser to the minus filament post, marked A—. Connect a wire from the unmarked binding post up through the panel to either one of the regenerative tickler solder lugs. To this same

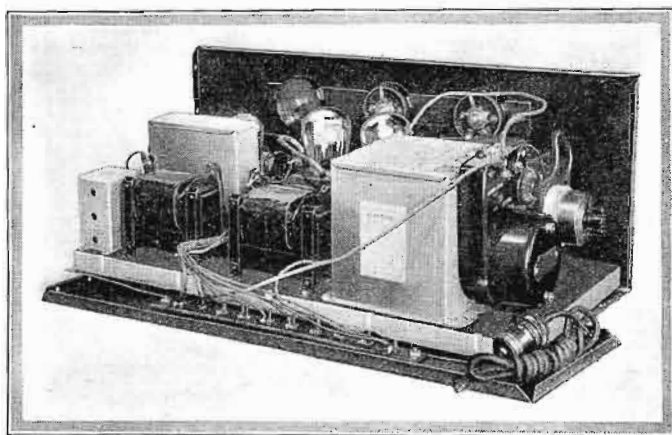


Photo E. Rear view of amplifier with case removed

wire connect one terminal of a Tinytobe .001 by-pass condenser and from the other terminal of the Tinytobe condenser run a wire to the minus filament binding post or any wire connected to this binding post. Next, connect the plate terminal of the detector socket to the unused soldering lug on the regenerative primary. Run a wire from the resistor contact nearest the front panel, at the right end of the base panel, to the grid terminal of the detector socket and to one terminal of a .00007 Tinytobe condenser. Connect the other terminal of this Tinytobe condenser to the opposite grid leak resistor clip and, above the panel, connect this same clip to the fixed plates in the regenerative tuning condenser. The wiring is now completed and after a complete inspection the receiver can be connected to batteries or to the AmerTran power pack.

As a convenient and safe test, place the tubes in their sockets and connect a 6-volt storage battery to the A battery binding posts. The

tubes should light with the rheostat and switch turned on. Now, remove one of the A battery wires with the rheostat and switch in the "on" position and touch it to the unmarked binding post and to the B+ amplifier binding post. The filaments should not light at either of these contacts. If the filaments do light, the B battery wiring is short circuited on the filament line and the error must be corrected.

The construction and placement of parts in the AmerTran power amplifier and B supply is evident from the picture wiring diagram. The 110 volt supply from the house lighting mains is fed into a transformer which steps the voltage up to several hundred volts. This high voltage alternating current is then rectified by a UX 216-B rectifying tube and passed through a filter consisting of two Type 854 AmerTran chokes and three special Tobe filter condensers. The output is pure direct current, such as could be obtained from a sufficient supply of B batteries. This high voltage current is then passed through an AmerTran resistor, Type 400, which makes any desirable voltage available for use in the two-tube circuit.

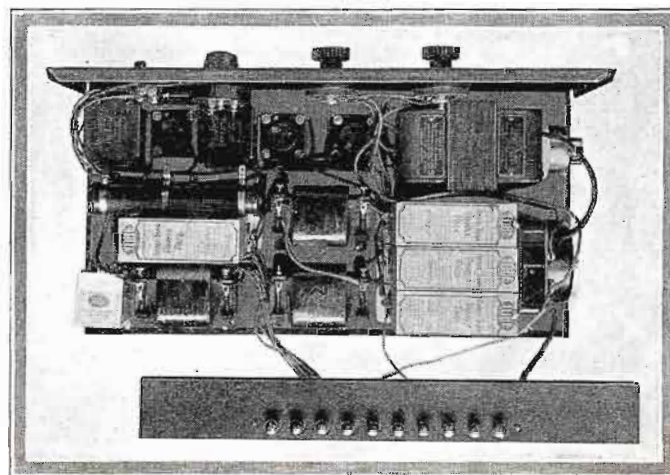


Photo F. Top view showing arrangement of parts on baseboard

The correct voltages are indicated on the instruction sheet which comes packed with the AmerTran resistor, Type 400. The operation of the power pack is automatic from the filament switch on the receiver, due to the control of the 110-volt circuits by the Yaxley automatic switch. The connections of the apparatus are clearly shown in the picture wiring diagram and further details need not be given. The power pack itself should not be grounded inasmuch as a grounding connection is made through the A— connection at the two-tube receiver unit. The UX 216-B rectifier tube should be inserted in the socket nearest the AmerTran power transformer and the UX 210 amplifier tube in the socket to the right of this in the picture diagram. A UX 201-A tube should be used in the socket on the extreme right. The amplifying transformer connections, while not marked in the picture diagram, are self-evident from the connections of the grid

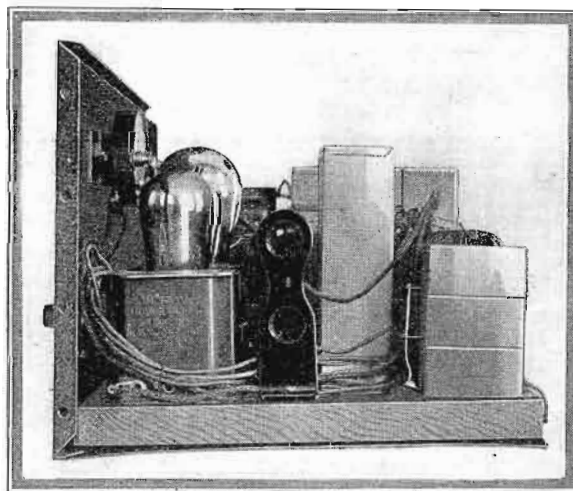


Photo G. End view of power amplifier with metal panel in place

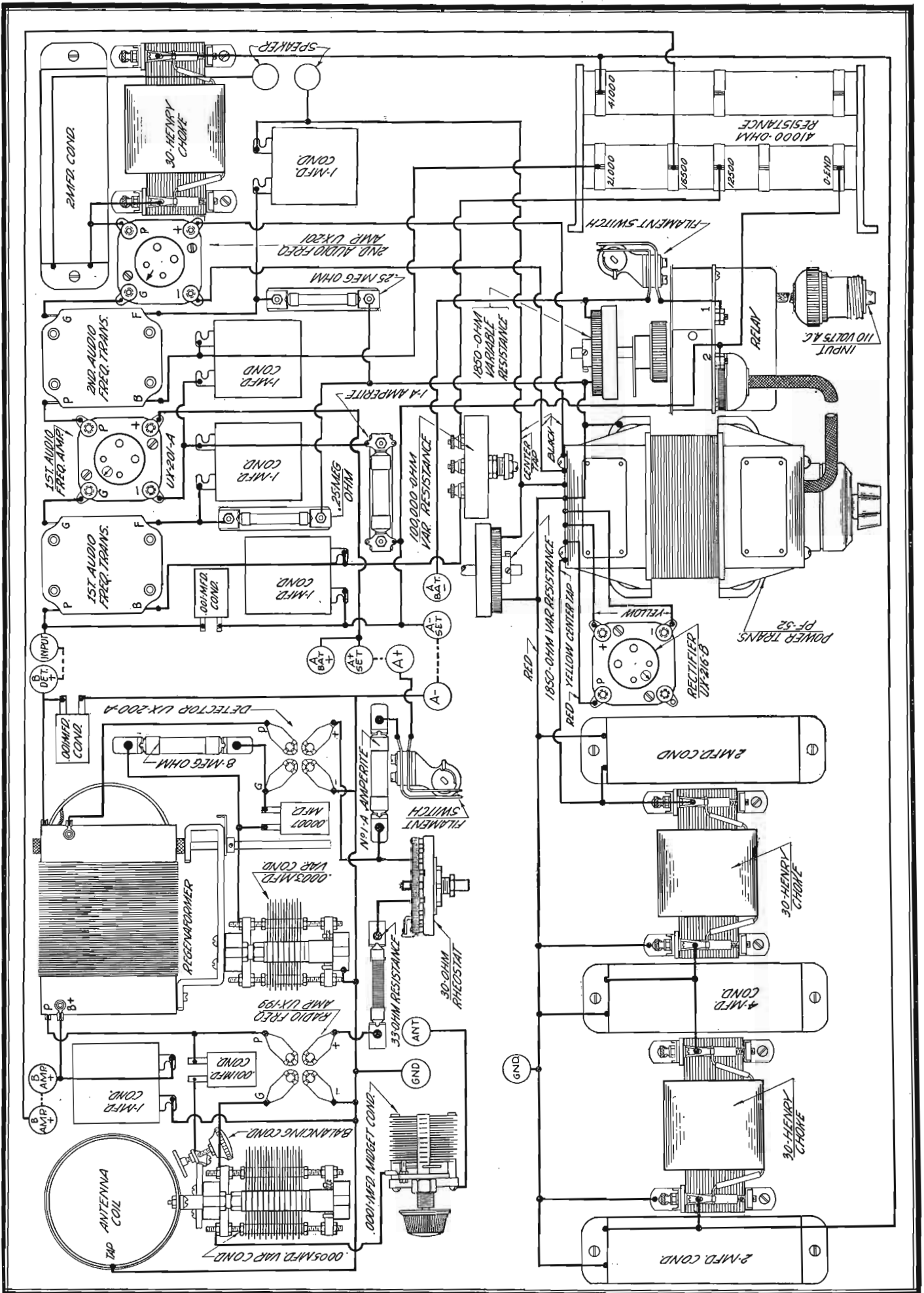


Fig. 1. Graphic illustration of complete assembly

terminals to their respective sockets. With apparatus placed exactly as shown no trouble should be experienced in completing the assembly. Large simplified diagrams on the AmerTran power pack are furnished by the manufacturer and more detailed information on the Official Browning-Drake two-tube unit can be secured on request from the Browning-Drake Corporation.

**LIST OF PARTS**

Any substitution from the following parts should be made with care.

- 1—7x21x3/16 inches Drilled and Engraved Micarta Panel
- 1—7½x18x3/16 inches Drilled Micarta Sub-Panel with Sockets and Clips Attached
- 1—Browning-Drake Neutralizer
- 2—Browning-Drake Tuning Units
- 2—Tobe .001 mfd. Tinytobe Fixed Condensers
- 1—Tobe .00007 mfd. Tinytobe Fixed Condensers

- 1—Tobe 1 mfd. By-Pass Condenser
- 1—Yaxley Filament Switch
- 1—Yaxley 30-ohm Rheostat
- 6—Engraved Eby Binding Posts
- 1—Precise .0001 Midget Condenser
- 1—Browning-Drake 33 ohm Resistance Cartridge
- 1—Dirham 8 megohm Grid Leak
- 1—Type 1-A Amperite and Mounting
- 1—Ekkor Ground Clamp
- 1—Package Kester Radio Solder
- 20—Feet Acme Celesite Wire
- 1—AmerTran De Luxe 1st Stage Transformer
- 1—AmerTran De Luxe 2nd Stage Transformer
- 1—AmerTran Amerchoke No. 854
- 1—Tobe 2 mfd. Type 604 By-Pass Condenser
- 4—Tobe 1 mfd. By-Pass Condensers
- 1—Tobe .001 mfd. Fixed Condenser
- 3—Benjamin No. 9044 Sockets
- 1—AmerTran Power Transformer No. PF52
- 2—Amerchokes No. 854
- 1—AmerTran Resistor Type 400
- 2—Tobe 2 mfd. Type 602 Filter Condensers
- 1—Tobe 4 mfd. Type 604 Filter Condenser
- 1—C. R. L. O. 100,000 ohm Variable Resistance
- 2—Federal No. 25 Potentiometers
- 1—9x31x½ inches Wood Baseboard
- 10—Engraved Eby Binding Posts
- 1—Metal Case
- 1—Yaxley Relay
- 2—Durham ¼ Megohm Grid Leaks and Mountings
- 30—Feet Belden Flexible Rubber Covered Wire
- 1—Sonatron Type X199 Tube
- 1—Sonatron Type 200-A Tube
- 1—Sonatron Type 201-A Tube
- 1—Sonatron Type 210 Tube
- 1—Sonatron Type 216-B Tube

**List of Accessories Used with the Browning-Drake Receiver with Power Amplifier**

The following is a list of accessories which have actually been tested with the Browning-Drake Receiver and have been found to operate satisfactorily with it. While these particular accessories are suggested, it is possible to make any reasonable substitution without sacrificing the all-around efficiency of the receiver:

- 1 Chillicothe Model 405 Console.
- 1 Signal Electric Co. 21-inch Cabinet.

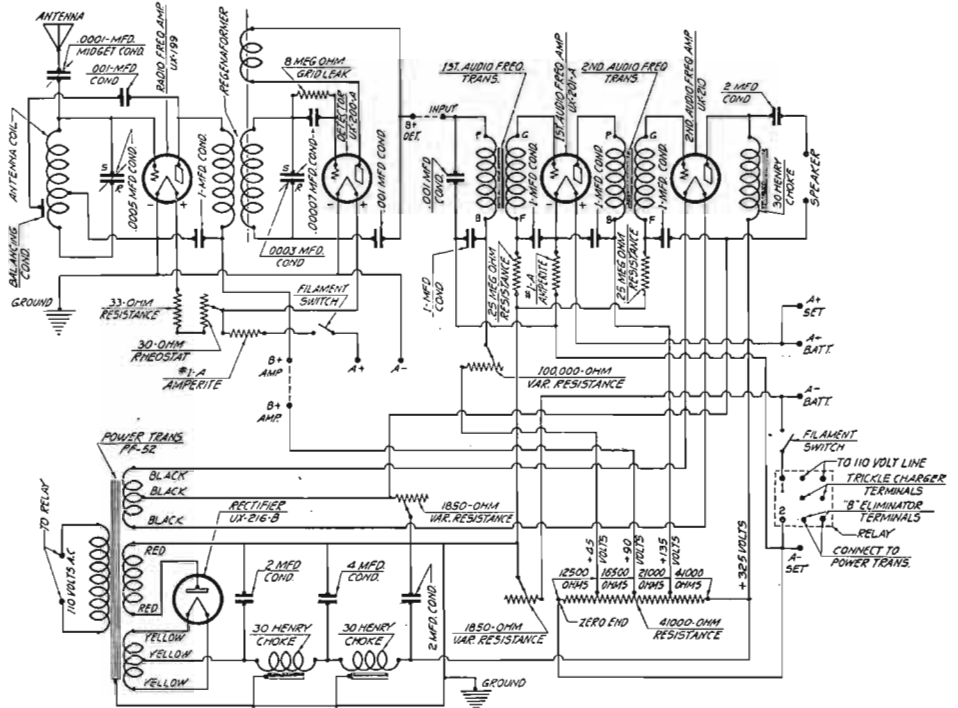


Fig. 2. Schematic wiring diagram of receiver and power amplifier

- 1 Rowan "A" Storage Battery.
- 1 Baker-Smith Model "H" Speaker.

The Chillicothe Model 405 Console is a narrow upright model much resembling a phonograph cabinet. It has a receiver compartment just large enough for the Browning-Drake Receiver, with room for the Amertran "B" Supply and Amplifier in the lower compartment. The panel slides in a channel and is held securely by a stay-bar which fastens to the top. A built-in loud speaker is contained in the cabinet above the receiver compartment. The built-in speaker is attached to the hinged lid, and is out of the way when the lid is turned back when some internal adjustment on the receiver is made. The lower compartment has two hinged doors with attractive door-pulls of brass. The cabinet is finished in an attractive walnut finish, rubbed to a lustrous finish. It is made by the Chillicothe Furniture Co. of Chillicothe, Missouri.

The Signal Cabinet is a small size cabinet, made especially for the Browning-Drake Receiver. It is harmoniously decorated with embossed scroll work and ornaments. The construction is lighter than the larger models of cabinets and it does not appear nearly so massive. It is made of walnut veneer, finished in an attractive brown. The cabinet is made by the Signal Electric Co. of Menominee, Mich.

The necessary "A" supply for the operation of the receiver is obtained from a Rowan 100 amp. hour storage battery. This battery is exceptionally well constructed, and is capable of withstanding overloads, since it has an excellent recuperative power. It is installed in a high-grade rubber case and has handy screw terminals for connecting wires.

The Baker-Smith Model "H" Reproducing Cone is as attractive in physical appearance as it is efficient in satisfactory reproduction. This particular model is fashioned to represent an escutcheon plate of some medieval coat of arms. It makes an attractive ornament for the den and lends an air of solemn grandeur to any room in which it is placed. The reproducing cone floats at the rim, being suspended only from the armature which protrudes through the center. The speaker does not employ power tubes, and is mounted on a weighted base which prevents tipping. It is made by the Baker-Smith Co., Inc., San Francisco, Calif.

(If further information on any of the above described accessories is desired, it may be secured by writing direct to the manufacturer.)

# The New N-28 Nine-in-Line Receiver

Here Is a New Model of a Receiver Which Has Risen to the Peak of Popularity in an Amazingly Short Time

This receiver was constructed and all illustrations were made in the Designing Laboratory of The Citizens Radio Call Book

THE Nine-In-Line Receiver was accepted with such enthusiasm, in two previous issues of this magazine, that several major changes have been made in the layout and the apparatus which are very beneficial to the operation and appearance of the receiver. Those having built previous models of this receiver will find these changes of interest when considering the annual re-vamping of their receiver. Those who have not built previous models should find in this receiver a receiver worthy of considerable attention and thought when considering the construction of a new receiver.

The major changes which are incorporated in the new Model N-28 are: improvements in the Intermediate Frequency Transformers, new Audio Frequency Transformers, the addition of an Output Transformer and Drum Dial Controls which create a very attractive panel.

The improvement in the Intermediate Frequency Transformers is in the winding of the secondary coils. A wire of lower resistance is now used. This permits a sharper tuning transformer, closed matching at the factory and a slightly greater gain per stage, also the "cut off" is much better than in the previous transformers. This improvement, alone, will give considerably better reception.

The new Audio Frequency Transformers were designed to bridge the features of over and under amplification, giving a more true life signal with all intonations and overtones so pleasing to the ear of a connoisseur of fine music. The new transformers are much larger than those in previously described models. Great care was taken in the selection of iron for the cores and the method and compounds used in the impregnation of the coils. The result is that the frequency response curve is almost ideal. They readily respond to the deep notes of 100 cycles and under, and at the same time do not give an ear-splitting shriek to those above 3,500 cycles.

The purpose of the output transformer is to act as a tone filter, removing much of the scratchiness due to interference from nearby sources of disturbances and at the same time keeping the high plate voltage, necessary for the operation of power tubes, out of the loudspeaker windings which might cause undue strain and at times serious damage.

The new drum dials used are the Remler Universal Type 110. These dials are very attractive and have an illuminated dial, which is a great aid in tuning, especially when the receiver is placed in a dark corner of the room. The vernier ratio of these dials is comparatively low and the control knob of the right size and distance from the panel to make them accurate and easy to tune. There is no backlash or wobble, the motion being smooth and continuous. Rem-

ler Twin Rotor tuning condensers are used in conjunction with the drum dials, as these condensers are ideal for use in the super-heterodyne type of receiver, as there is no grounded rotor to cause trouble by being "hot."

The dials tune almost together and the tuning is extremely sharp. Grasp each tuning knob between the thumb and first finger, of each hand, and tune very slowly over a given range. If one tunes rapidly he is quite apt to hear nothing, for he will pass right by a station.

There are three other controls on the panels besides the two drum dials; these are three rheostats, one for each of the two detectors and one for the intermediate frequency amplifiers. The filament switch controlling the filaments of all tubes is mounted on the rheostat in the center of the panel. When this rheostat is tuned all of the way to the left the switch is off and all filaments are turned off. The only other variable control of the receiver is the midget condenser. This is mounted on the end of the sub-panel just in front of the three plug-in jacks for the loop antenna. This condenser is used to control regeneration and needs to be adjusted but rarely and it is therefore unnecessary for it to be mounted on the panel.

The sockets and intermediate frequency transformers are mounted in such fashion as to allow connections without leads, the socket terminal connecting directly to the transformer terminal. The advantage of this method of mounting is self apparent inasmuch as the possibility of capacity coupling is very greatly reduced.

It might be suggested, here, that in laying out the panel and sub-panel great care should be exercised in the correctness of dimensions. It is advisable to use a square and an accurate scale for this work. There are drilling templates furnished with the Benjamin sockets and the Remler Drum Dials. After the panels have been laid out it is suggested that the various parts be laid on the panels as an added precaution to insure perfect fitting of the various mounting screws and holes.

The radio frequency choke is mounted in the same type of case as the intermediate frequency transformers and is placed between the two audio frequency transformers. This is a convenient position, as it is very close to the "B" battery leads at this point.

Five fixed condensers are used, one .005 mfd., two .002 mfd. and two 1. mfd. The smaller condensers are of the moulded bakelite type, sealed into an airtight case. The two 1. mfd. condensers are of the rolled paper and tinfoil type. The three smaller ones are supported directly by their connecting wires and the two large ones are screwed to the sub-panel. The location of these condensers on the sub-panel and in the circuit may be seen in the various diagrams and photo-

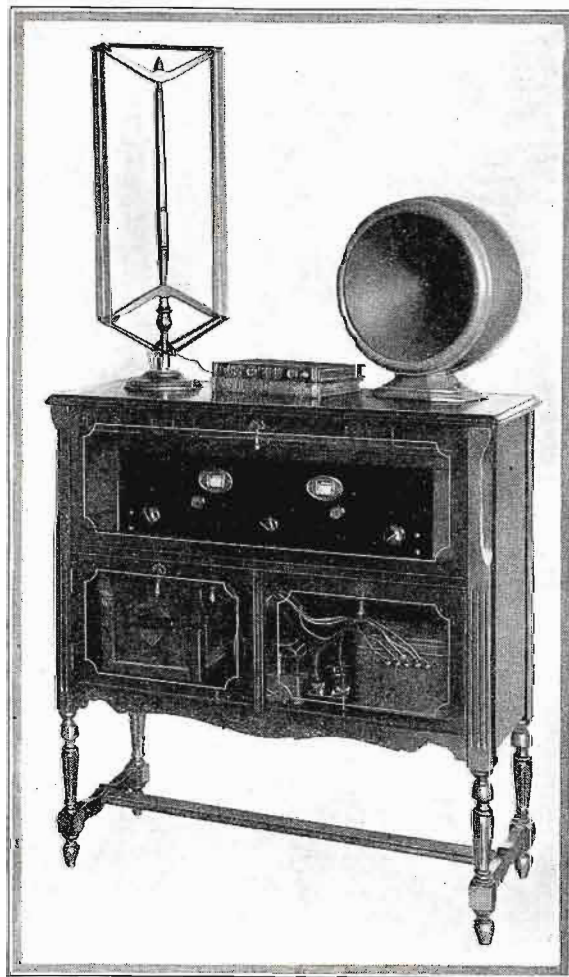


Photo A. Nine in Line in console with suggested accessories

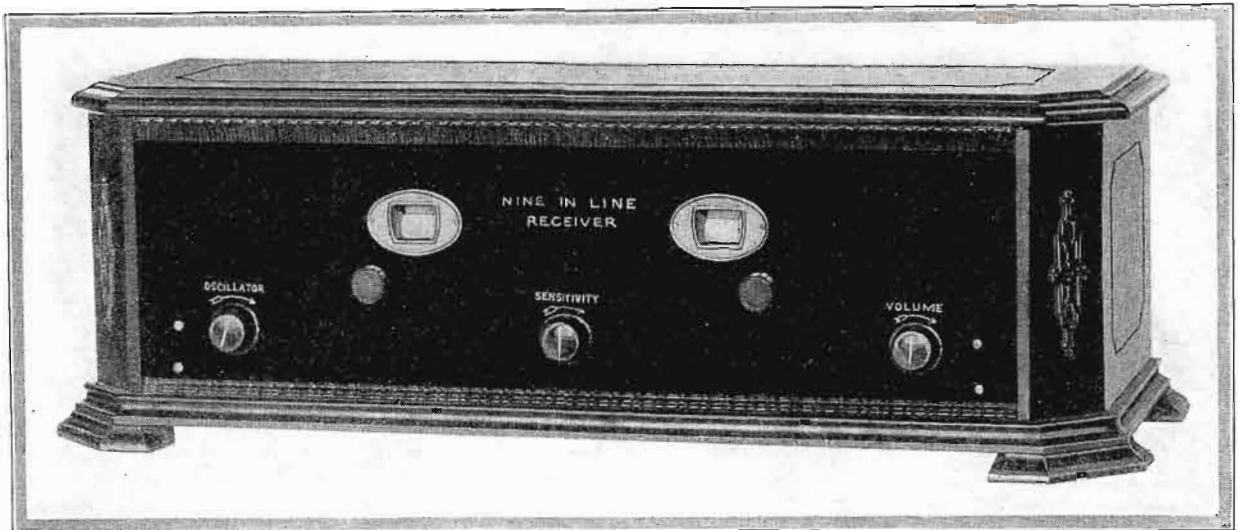


Photo B. Front view of receiver showing panel arrangement and engraving

graphs. Their purpose goes without speaking.

The Amperite resistor which controls the amplifier tubes is slung in a cartridge clip, which is furnished with the Amperite, on the underside of the baseboard directly under the amplifier. The type 3-A is correct for this purpose. The carrying capacity must be three-quarters of an ampere.

In addition to the three jacks for the loop there are five more at the opposite end of the sub-panel. Two of these are for the reproducer and the other three for the "C" battery. These jacks are of the cord tip species, where connection is made by pressure against a spring. These are quite convenient, for the wires may be released by pulling, while it only takes a push of the thumb to drive the wire, or cord tip, in firmly. In addition of this convenience the space occupied by cord-tip jacks is much less than that of binding posts, and as this receiver has been built as small as possible, all available space is at a premium.

**List of Parts Required**

- 3—H. F. L. Transformers No. H210
- 2—H. F. L. Transformers No. H215
- 2—H. F. L. Transformers No. C16
- 1—H. F. L. R. F. Choke L425
- 1—H. F. L. R. F. Transformer L430
- 1—H. F. L. Output Transformer C25
- 9—Benjamin Sockets No. 9044
- 2—Benjamin Brackets No. 8629

- 2—Remler Universal Drum Dials
- 2—Remler .0005 mfd. Variable Condensers
- 2—Carter 1 mfd. By-pass Condensers
- 1—Carter .0005 mfd. Fixed Condenser
- 2—Carter .002 mfd. Fixed Condensers
- 1—Carter 6 ohm Rheostat
- 1—Carter 6 ohm Rheostat with Switch
- 8—Carter Cord tip jacks
- 1—Carter 200,000 ohm "Hi-Ohm"
- 1—Jones Type BM Multiplug
- 1—Celeron 7"x26"x $\frac{1}{8}$ " Drilled and Engraved Panel
- 1—Celeron 8"x24"x $\frac{1}{8}$ " Drilled Sub-Panel
- 1—3-A Amperite
- 30—Feet Acme Celestite Wire
- 1—Package Kester Radio Solder
- Miscellaneous Lugs, Screws, Nuts, etc.

**List of Accessories Used with the New N-28 Nine-in-Line Receiver**

The following is a list of accessories which have proven by an actual test to operate most satisfactorily with the new N-28 Nine-in-Line Receiver. While these particular accessories are suggested, it is possible for any reasonable substitution to be made without seriously decreasing the all around efficiency of the receiver.

- 1—Excello Type R-22 Walnut Radio Table

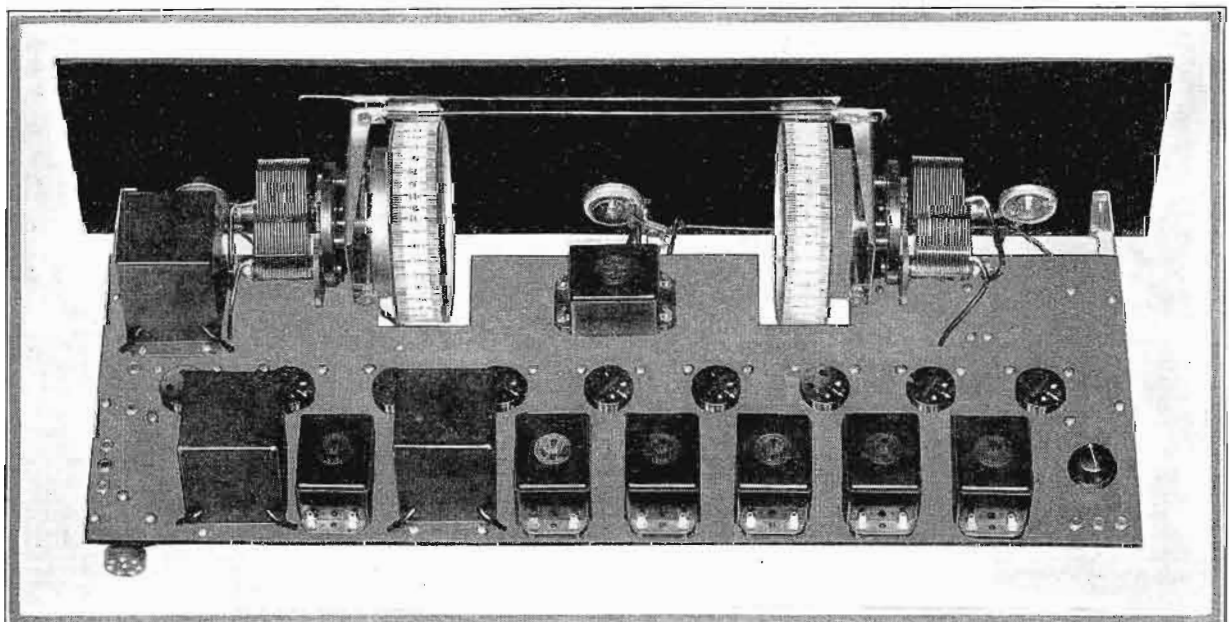


Photo C. Bottom view showing mounting on condensers and multiplug

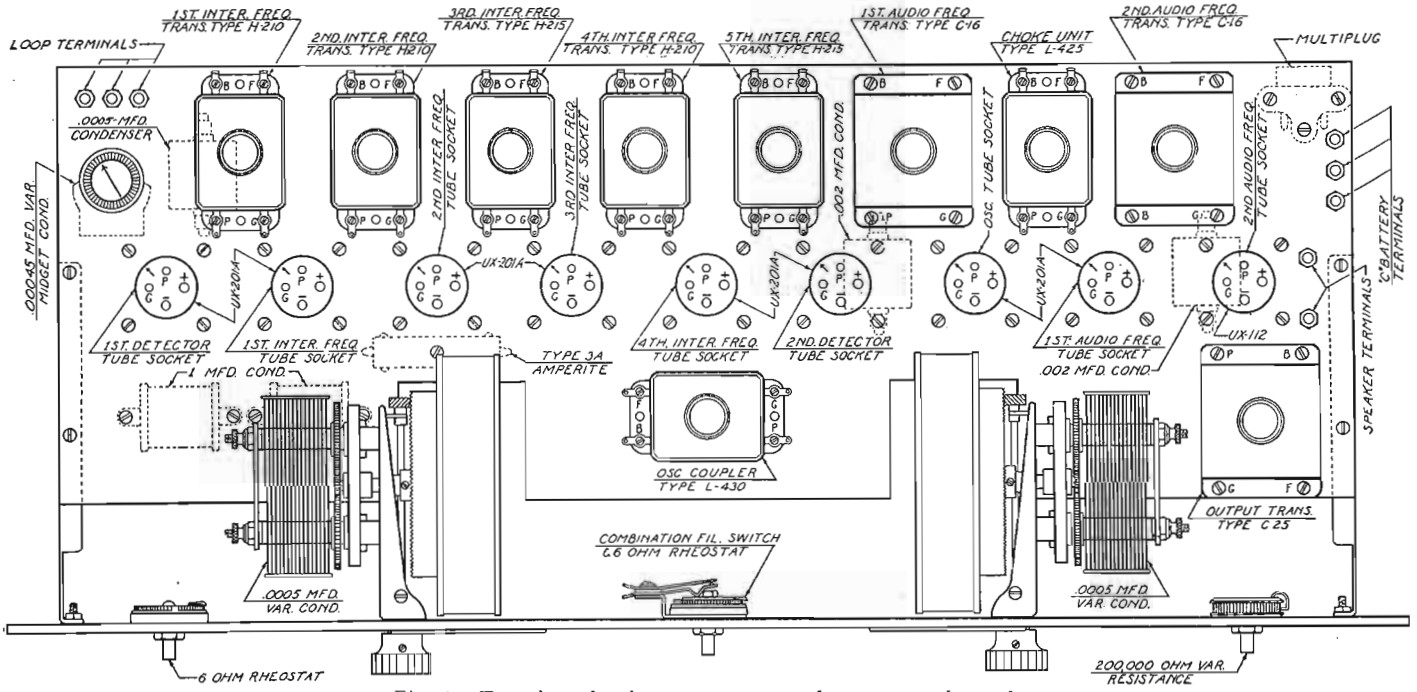


Fig. 1. Top view showing arrangement of parts on sub-panel

- 1—Corbett Model "C 26" Radio Cabinet
- 1—Rowan 100 amp. "A" Grade Radio Battery
- 1—General Radio "B" Power Supply.
- 1—Acme K-1 Loudspeaker
- 1—Acme A-7 Charger
- 1—Qualitone Loop
- 1—Yaxley Type 444 Automatic Power Control

The new N-28 Nine-in-Line Receiver appears in photo A installed in an Excello console with the necessary accessories for its proper operation. The console is manufactured by the Excello Products Co. of Chicago, Illinois, and is constructed entirely of solid walnut, being finished in a two-tone effect. Ample space is provided for both the receiver and the necessary "C" batteries, together with the proper accessories. A slide is provided in the accessory compartment for the "A" battery, so that it may be easily withdrawn for testing and inspection.

"A" supply is obtained from a Rowan "A" battery, manufactured by the Walter Rowan Battery Supply Co. of Chicago, Illinois. This particular battery is exceptionally well made and is housed in a solid rubber case. It is provided with screw terminals for attaching wires and a handy carrying handle. "B" supply is derived from a General Radio "B" power unit, which uses the celebrated Raytheon tube for rectifying purposes. A handy switch is provided on the front of the power supply for turning it on and off, if automatic control is not used. This type of "B" power supply is fully able to supply the necessary voltage for the operation of the Improved Nine-in-Line Receiver, without danger of overloading.

The speaker shown in this installation is one manufactured by the Acme Apparatus Co. of Cambridge, Massachusetts. It is a double free-edge cone, actuated by an adjustable unit. This adjustable feature is very desirable, since this allows the unit to be adjusted to the particular type of receiver being used.

The "A" battery is kept at full charge by an Acme full wave charger which is also manufactured by the Acme Apparatus Co. of Cambridge, Massachusetts. The rectifying device in this charger uses two Raytheon cartridge rectifiers, whose maximum output is 2 1/4 amperes of rectified current. This type of charger is very desirable on account of its extremely small size and compactness.

The loop used in this installation is a new model manufactured by the Duro Metal Products Co. of Chicago, Illinois. It is made entirely of walnut, beautifully finished. A high grade of wire is utilized, which is bank wound.

A Yaxley automatic power control is used in conjunction with the accessories shown herewith, so that an entirely automatic accessory system is obtained. All power accessories are controlled directly from the filament switch of the receiver. In other words, the charger is connected to the battery when the set is turned off and the "B" battery is connected to the receiver and energised when the set is turned on. This makes a highly desirable installation, which is thoroughly automatic in character and will insure a fully charged "A" battery at all times.

(If any further information on any of the above accessories is desired, it may be had by writing to the manufacturers.)

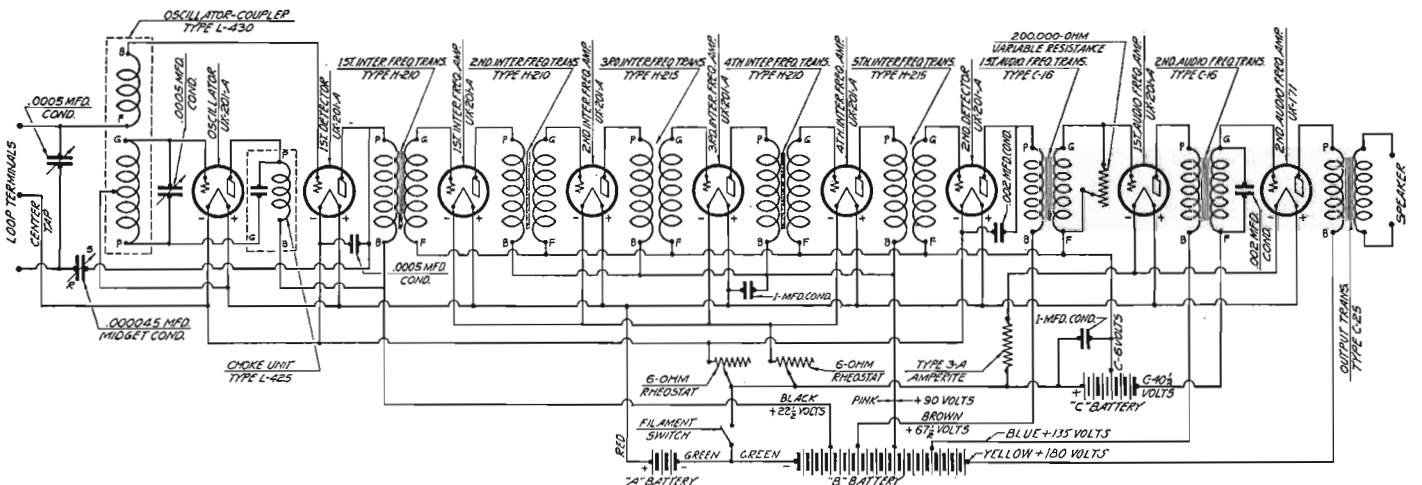


Fig. 2. Schematic wiring diagram



# The Improved Remler 45 K. C. Super-Heterodyne Receiver

Here Is an Up-to-Date and Improved Model of the Remler 45 K.C. Super

This Receiver Was Constructed and All Illustrations Made in the Laboratory of the Citizens Radio Call Book

**I**N retrospective review of the almost phenomenal growth of the Super-Heterodyne in the favor of the radio public, and the tremendous possibilities of the circuit, one can scarcely comprehend the enormous amount of work involved in the painstaking research required in the evolution of the present-day Super-Heterodyne from the monstrous contraption known at the close of the war.

"Old timers" in the radio field will remember that the first super-heterodyne brought to their attention was a twelve-tube affair, mounted on a five-foot pine plank. There was no panel, and the parts were connected with the garden variety of bell wire. The tuning seemingly required the undivided attention of five men, and if one man attempted to tackle the proposition, it took at least a half hour to bring the apparatus to a point of resonance.

Each stage of the intermediate frequency amplifier consisted of a pair of honeycomb coils and two variable condensers, one across each coil. Each stage also had its private and individual "B" battery, in addition to the three "A" batteries which were necessary.

The only tubes available at the time were the ones made for and used by the Navy. Their normal current consumption was anywhere from one to two and a half amperes each. Consider, if you will, one tube of the type then used drawing as much current as eight of the modern ones.

There were no broadcast stations at that time (1919), and all that could be heard were code signals from the boats on the lakes and the long wave transatlantic stations. The set howled like a banshee, each stage contributing a frequency of its own. Distortion of signals was bad, the operator being able to change the note to any frequency desired, once the set was in resonance. Nor did the receiver remain in resonance. It had a heart-breaking manner of suddenly detuning and going into sustained oscillation. The volume was terrific when compared to the volume obtainable with receivers of that time. However, tone quality was totally absent and if a receiver of that type were placed beside one of our present-day eight-tube receivers, it would be very conspicuous by the seeming lack of tone.



Photo A. View of receiver mounted in console, with suggested accessories

To delve into the dim and hoary past is especially appropriate in an article on the Remler 45 K.C. Super-Heterodyne, for the Remler Intermediate can truly be considered as one of the first offerings of that type of apparatus made available to the radio public. The fact that this particular type of apparatus has been used continuously for over a number of years with no radical change in design is ample proof as to the all-round efficiency of the receiver using them.

Readers of this magazine will, no doubt, recall the article which appeared in the Fall, 1925, issue of the Citizens Radio Call Book, describing the 45 K. C. Remler Super-Heterodyne. Incorporating the best practices of receiver design prevalent at that time, it met with instant favor with the radio public. Its popularity has not decreased with the passing of years. This is amply shown by the tremendous correspondence from our readers on the subject. In conjunction with the requests of our readers, the designing laboratory has produced an improved model of the Remler 45 K. C. Super-Heterodyne Receiver and herewith offer it to the radio public.

Perfect co-ordination of tuning and selectivity have been considered paramount features, as well as an ability to work through bad local interference. Physical appearance has been well considered and the panel layout is such as will delight the most discriminating builder. The recognized Remler hookup has been used, but employing parts that in

our estimation would give the most satisfactory service. All of the instruments with the exception of the three variable condensers, rheostats and phone jacks, are mounted on a bakelite sub-panel, with all connecting wires on the under side and out of sight.

The oscillator coupler consists of a plate and grid coil of green silk-covered wire, wound on a bakelite form with the pickup coil placed inside. This much resembles the variocoupler in external appearance and is used for much the same purpose, only in this case, instead of controlling wave length, it controls the degree of pickup of the oscillator. The control is not critical, and there is no need of having the tuning knob on the front of the panel.



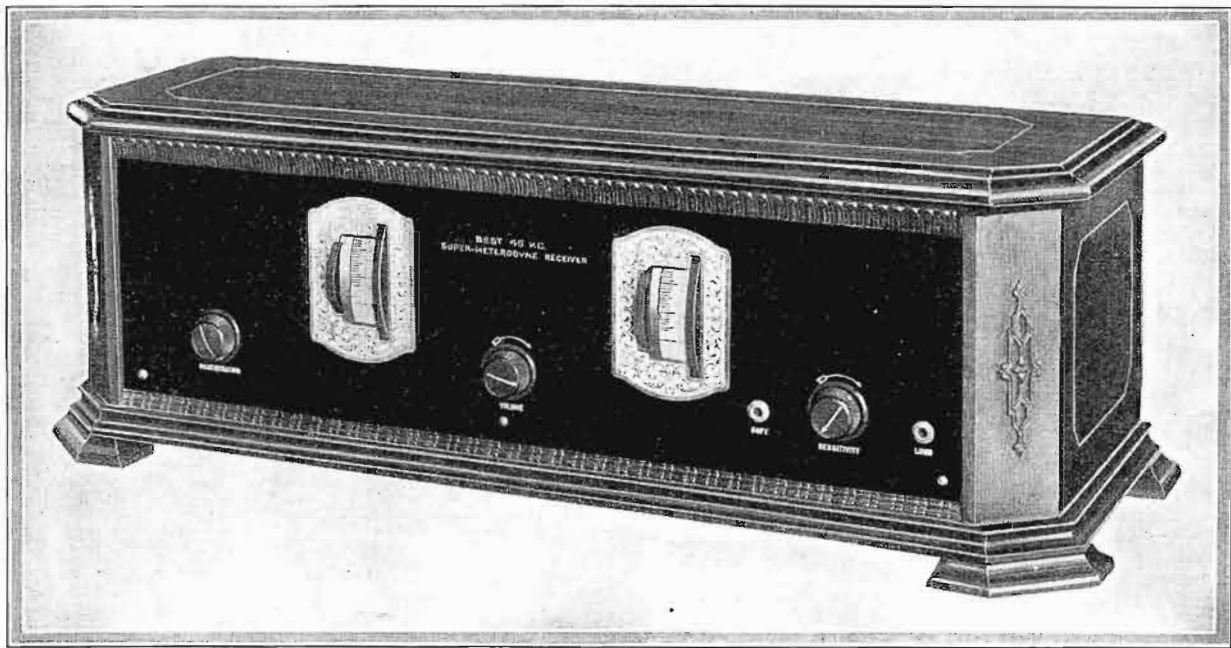


Photo B. Front view of receiver in cabinet

Once the oscillator has been set at the desired coupling, it need not be touched again unless tubes have been changed or some other radical change is made.

Regeneration is controlled by a midge condenser connected between the upper loop terminal and the plate of the first detector tube. This control in this particular set is a bit more sensitive than common, and it is a good plan to have the control knob on the front of the panel. By skillful manipulation one is able to weed out distortion, which would otherwise cause mushy reception.

The two major tuning controls are variable condensers. One tunes the loop circuit and the other regulates the frequency of the oscillator tube. They should tune almost in unison when the set is functioning properly. Drum type dials are used, allowing an unusually low gear ratio. Rapid tuning of a super-heterodyne has never brought satisfactory results. It is well to realize from the first that the only method of obtaining successful operation

is to turn the dials very slowly, stopping at each division to make sure that no station is audible at that spot. Very often a station may be passed over with rapid tuning and not a signal heard, while by being careful it may be received with sufficient volume to be clearly distinguished.

Four intermediate frequency transformers are used in this receiver. Two are known as the Type 600 and the remaining two as the Type 610. The Type 600 are primarily transformers and are wound on an iron core. On the other hand, the Type 610, while similar to the Type 600, has an air core. The secondary windings of the Type 610 are tuned with condensers and act as filters. The combination of air and iron in rotation gives a maximum signal intensity with a degree of sharpness that is exceedingly helpful in tuning in distant stations.

A small variable condenser is shunted across the secondary terminals of the first 610 transformer. It is controlled by a set screw protruding through the top. In order to adjust it a wooden

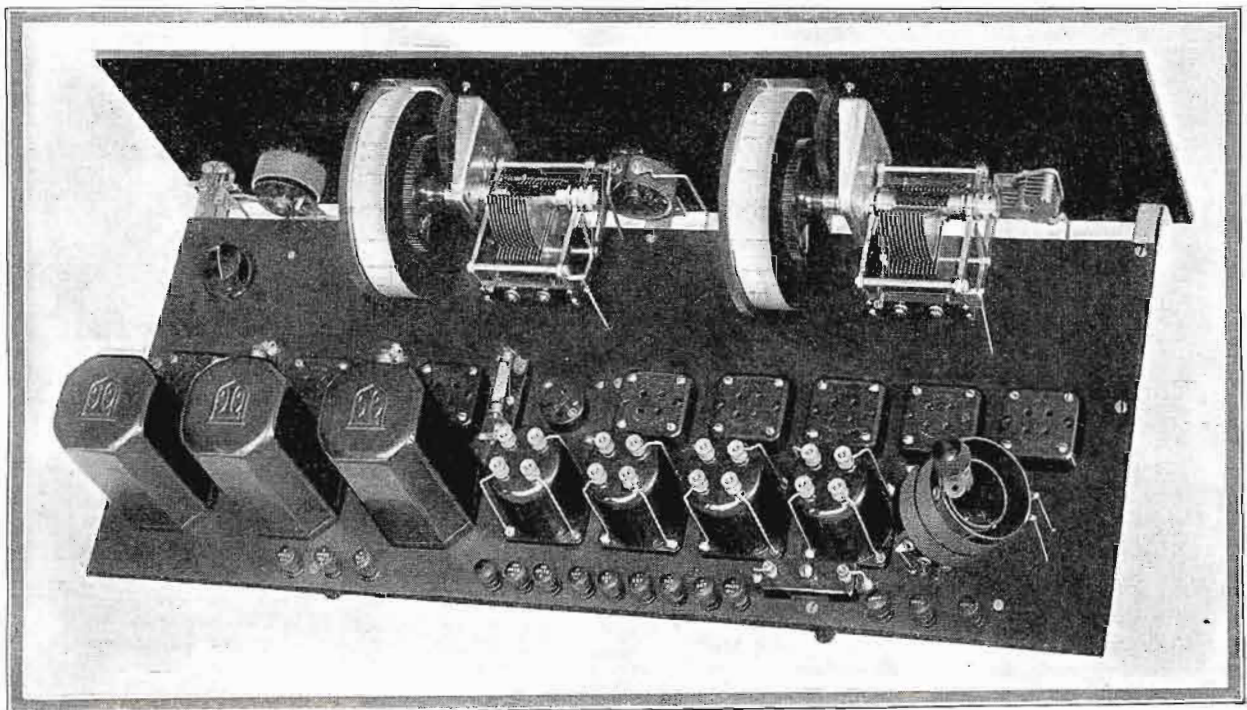


Photo C. Rear view. Note neatness of sub-panel layout

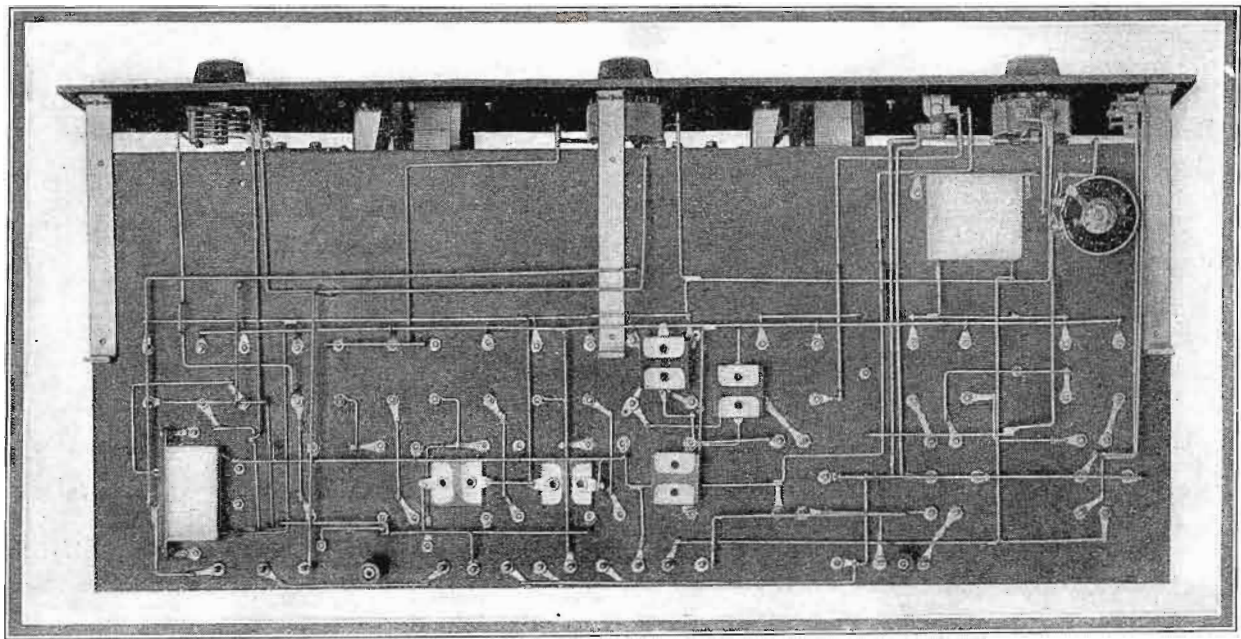


Photo D. Bottom view. The sub-panel does not need to be cut away for the drum dials

wedge must be used. This may be cut from a dowel rod or any piece of wood that may be handy. Do not use a metal screwdriver for this purpose, since body capacity is transferred directly to the condenser through the hand. The purpose of the condenser is to peak the transformers at the proper frequency. There is another condenser of .00025 mfd. capacity across the second 610 transformer, but this one is fixed and requires no adjustment.

A grid condenser or grid leak is not used on the first detector tube. The second detector tube requires a condenser of .0005 mfd. capacity and a two-megohm leak for the most satisfactory results. The plate of the second detector tube is by-passed to the negative filament by a .0025 mfd. fixed condenser. A phone jack is inserted in the plate circuit of the first audio tube for the use of headphones when only one person is using the set and no loud speaker reproduction is wanted. When only one stage of audio is used, the volume is decreased to a point where headphones may be worn with comfort on all but local stations. The sensitivity of the set is not decreased, and some authorities claim that it is increased by cutting out the last audio tubes. This remains to be proven, however, since it is a matter of personal opinion. The main purpose of the jack is to satisfy the cravings of the super DX friend who must sit up all night exploring the ether. A loud speaker in such a case would prove detrimental to his peace of mind, for it would keep the family awake.

The amplifier uses a push-pull system, employing two tubes on the last stage, with their output fed directly to a countertapped output transformer. Mellowness and depth of tone are possible

with a push-pull amplifier that cannot be otherwise obtained.

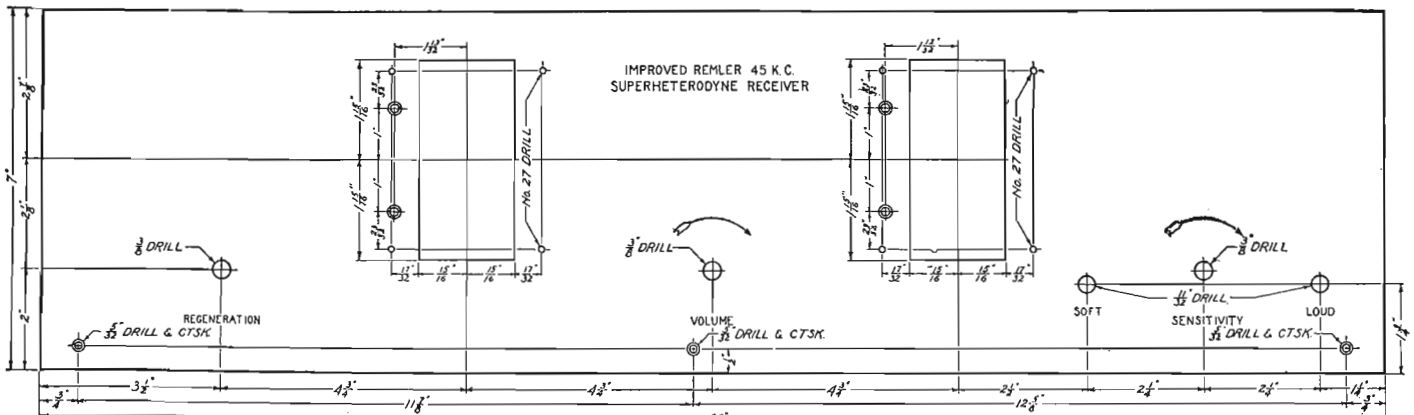
Consulting the diagrams will acquaint one with the proper voltages for the tubes. Three taps must be brought from the positive "B," one for all the tubes before the audio amplifier, one for the first step of audio and the full battery voltage for the second step. Two separate sets of "C" batteries are needed, one for the intermediate amplifier and the other for the audio amplifier. Taps are taken from these batteries and care must be taken to see that they are of correct values. As a "C" battery is generally of small proportions, it may be mounted directly inside the receiver cabinet if desired. Nothing is gained by having long leads, and a considerable amount of efficiency is sacrificed.

The constructor should have no difficulty in building the receiver. Careful examination of the various illustrations shown herewith will, no doubt, clear up any vague understanding in regard to the set. It is highly advisable that the circuit connections in the receiver are checked before the batteries are connected. This will prevent the ruination of the tubes in the receiver if a false connection is made.

List of Parts for Improved Remler 45 K.C. Super-Heterodyne Receiver

These parts or any reasonable substitute will give satisfactory results.

- 2—Camfield .0005 mfd. Variable Condensers
- 2—Remler Transformers No. 600



NOTE: ALL HOLES NOT OTHERWISE SPECIFIED ARE 1/8\"/>

Fig. 1. Panel layout

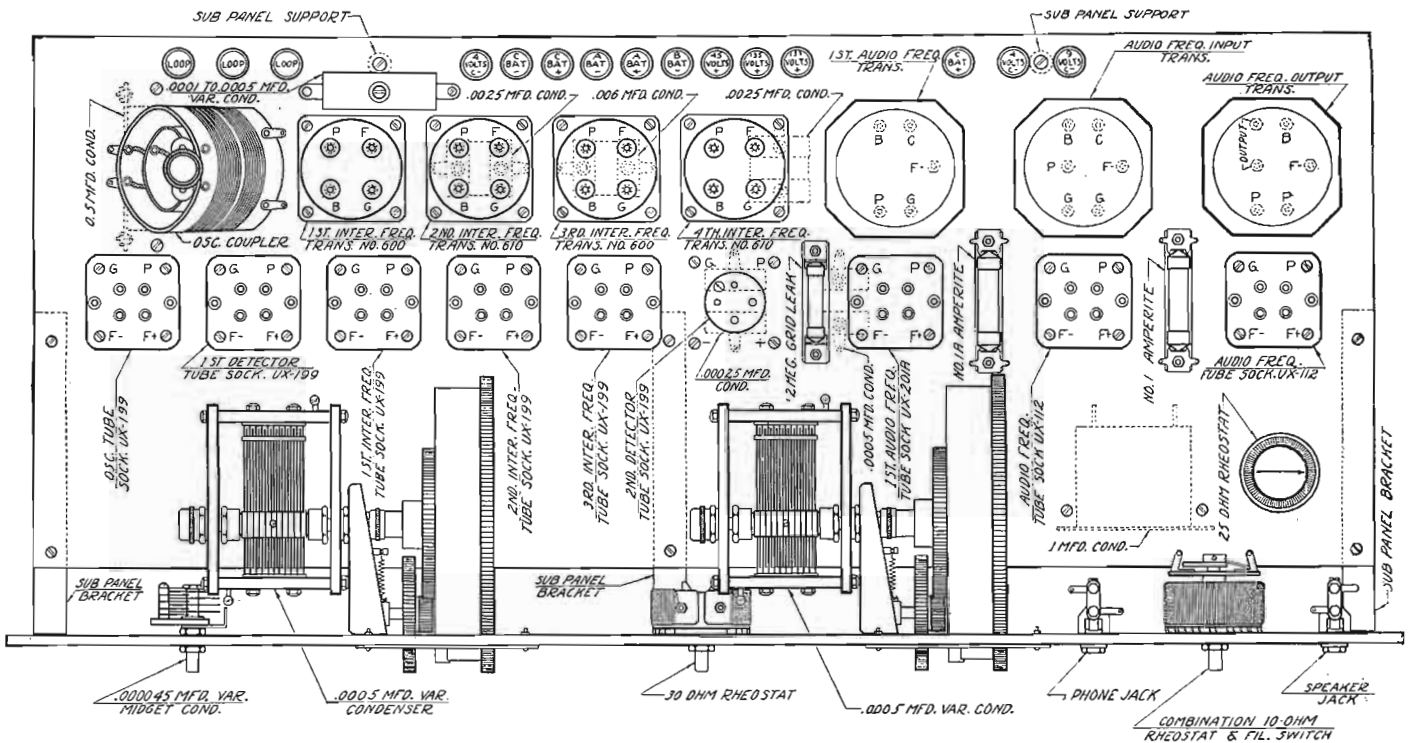


Fig. 2. Baseboard layout

- 2—Remler Transformers No. 610
- 1—Dubilier .006 mfd. Fixed Condenser
- 2—Dubilier .0025 mfd. Fixed Condensers
- 2—Dubilier .0025 mfd. Fixed Condensers
- 1—Dubilier 1 mfd. By-Pass Condenser
- 1—Dubilier .5 mfd. By-Pass Condenser
- 1—Silver Marshall .000025 mfd. Midget Condenser
- 1—Camfield Oscillator Coupler
- 1—Frost 10-ohm Rheostat
- 1—Frost 30-ohm Rheostat with Switch
- 1—Frost 25-ohm Rheostat
- 1—Frost Jack No. 234
- 1—Frost Jack 235
- 8—Frost Sub-panel Sockets No. 531
- 1—Benjamin No. 9044 Socket
- 14—Engraved Eby Binding Posts
- 1—X-L Variodenser
- 2—Tyrman Drum Dials
- 1—Tyrman Audio Frequency Transformer

- 2—Tyrman Push-Pull Transformers
- 3—Karas Sub-Panel Brackets
- 1—Micarta 7x26x3/16-inch Drilled and Engraved Panel
- 1—Micarta 10x25x3/16-inch Drilled Sub-Panel
- 1—Durham 2-megohm Grid Leak
- 1—1-A Amperite
- 1—4-A Amperite
- 2—Sonatron Type 112 Tubes
- 1—Sonatron Type 201-A Tube
- 6—Sonatron Type X-199 Tubes
- 1 Package Kester Radio Solder
- 20 Feet Acme Celesite Wire
- Miscellaneous lugs, screws, nuts, etc.

List of Accessories Used With the Improved Remler 45 K. C. Super-Heterodyne Receiver

The following is a list of parts which have been actually tested with the Improved Remler 45 K. C. Super-heterodyne Receiver and have been found to operate most satisfactorily with it. White

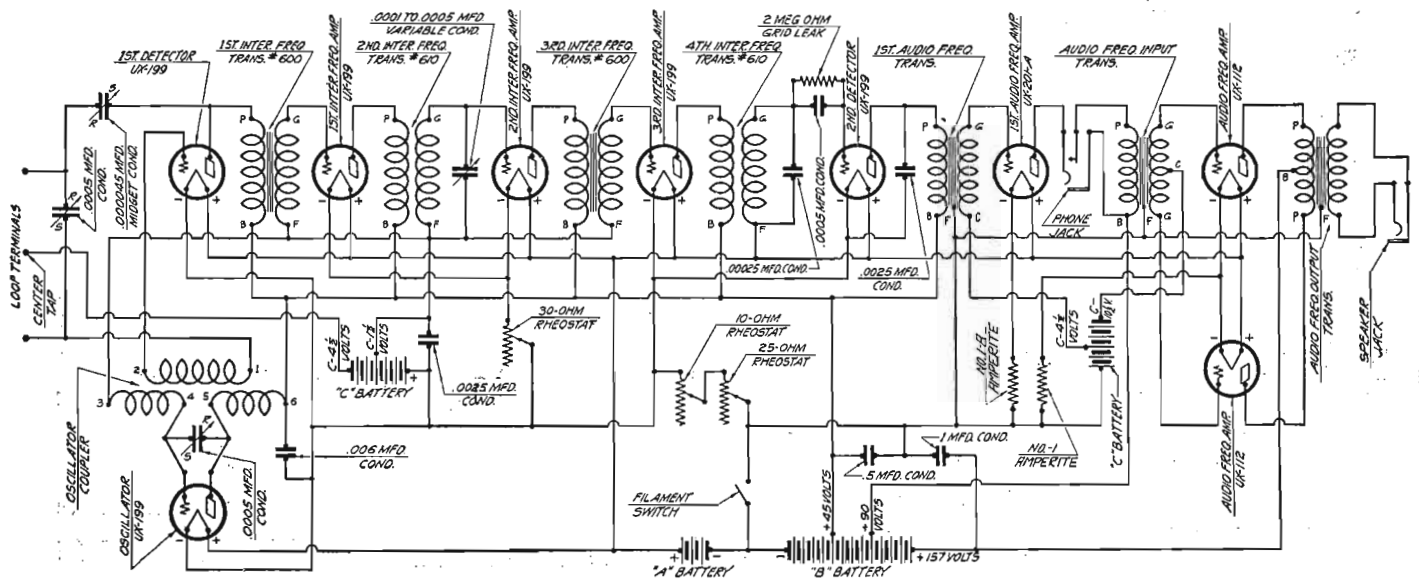


Fig. 3. Schematic wiring diagram

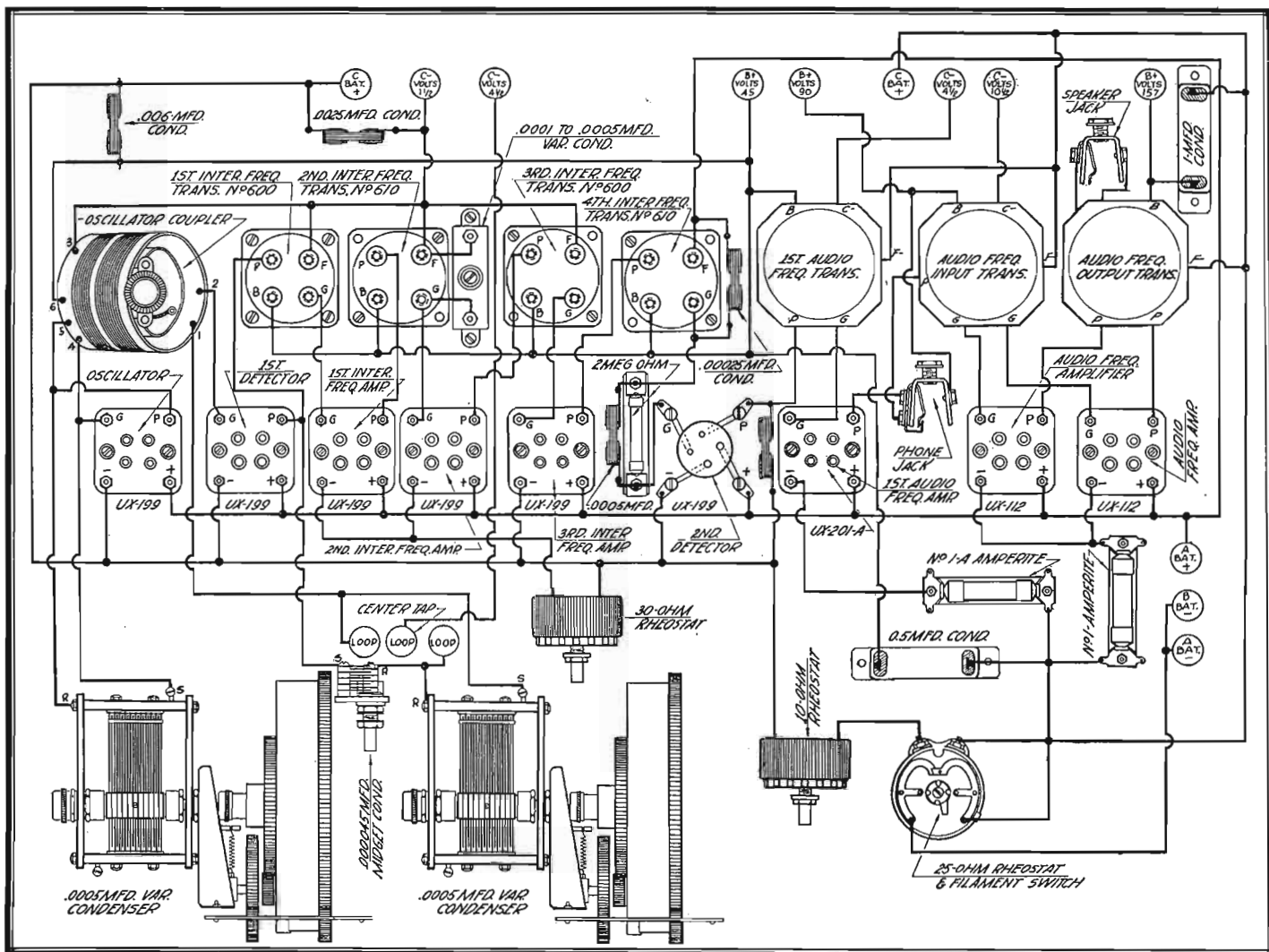


Fig. 4. Pictorial wiring diagram showing all connections

these particular accessories are suggested, it is possible to make any reasonable substitutes without decreasing the all-around efficiency of the receiver:

- 1—Excello Type R-22 Walnut Console
- 1—Corbett Type "C" 26-inch Cabinet
- 1—Rowan 100 amp. "A" Grade Radio Battery
- 1—Acme Type A-7 Charger
- 1—Acme Type K-1 Speaker
- 1—Acme Type E-1 "B" Power Supply
- 1—Fiat Type C Bank-Wound Loop
- 1—Jewel Type 595 A-B Relay

Photo A shows the Improved Remler 45 K. C. Super-heterodyne Receiver installed in a console with the necessary accessories for proper operation. In Photo B the receiver is shown as it appears when installed in a cabinet alone. The cabinet shown in Photo B is a product of the Corbett Cabinet Company, St. Marys, Pennsylvania. It is tastefully finished in a dark walnut hand-rubbed finish and has a very pleasing appearance. The corner posts of the cabinet are set off by polychrome decorations, which add considerably to its all-around appearance. The console is manufactured by the Excello Products Company of Chicago, Illinois. It is entirely constructed of solid walnut and is finished in a two-tone effect. Ample space is provided for both the receiver and necessary "C" batteries, as well as the necessary accessories for proper operation. The storage space for the accessories has an added advantage in that a sliding shelf is provided upon which the "A" battery is placed. This allows the battery to be withdrawn from the accessory compartment with little difficulty, for testing and examination.

The necessary "A" supply for the operation of the receiver is obtained from a Rowan 100 amp. hour storage battery. This battery is exceptionally well constructed, and is capable of withstanding over-

loads, since it has an excellent recuperative power. It is installed in a high-grade rubber case and has handy screw terminals for connecting wires.

The Charger, "B" Supply and Speaker are all products of the Acme Apparatus Company of Cambridge, Massachusetts. The charger is a new departure in design and uses two 2½ amp. Raytheon rectifying cartridges, which make it a full wave charger. Its extremely small size and high efficiency make it a highly desirable device. The speaker is a double free-edge cone type, with an adjustable unit. Its unique construction allows wonderful reproduction with tremendous volume, since it is virtually impossible to "blast" it. The "B" supply is derived from a Raytheon equipped "B" power unit. This particular unit is capable of delivering sufficient "B" battery potential for operating the receiver without danger of overloading. Sufficient controls are provided for varying the voltages of the various "B" circuits.

The loop used in this particular installation is the Fiat loop manufactured by the Radio Appliance Laboratories of Chicago, Illinois. This loop is very unique due to the fact that it is capable of being knocked down and stored in a very small space. An adjustable tension is provided by which the wire may be kept taut at all times. This device is made entirely of solid walnut and is tastefully finished in a varnished and hand-rubbed finish.

A Jewel relay is used in conjunction with the accessories shown herewith. The use of this device makes the entire installation of accessories automatic in character, since they are controlled entirely from the filament switch of the receiver. The relay is inserted in one side of the "A" battery lead. It is entirely automatic in character, turning the "B" battery eliminator and charger on and off as the set is used or turned off.

(If further information on any of these accessories is desired, it may be had by writing direct to the manufacturers.)

# The St. James Upright Eight Super-Heterodyne Receiver

This Receiver Incorporates a Unique Design Which Allows It to Be Used Either as a Portable or Permanent Receiver

This Receiver Was Constructed and All Illustrations Made in the Laboratory of the Citizens Radio Call Book

**H**ERE is a novel type of super-heterodyne receiver which should be warmly welcomed by the dweller of the modern tiny apartment or hotel, where floor space is at a premium.

This receiver has been designed with the idea in mind of getting the most set into the least possible space and yet retaining the high efficiency of the super-heterodyne type of receiver. This receiver is unique in the field of super-heterodynes.

The entire receiver is mounted on two strips of bakelite two and one-half inches wide and eighteen inches long. These strips are placed in a wooden rack. In order to utilize every square inch of the space available, instruments are mounted both upright and inverted.

The entire receiver is only fifteen and one-half inches high, nineteen inches long and three inches deep. As compared to the usual run of bulky receivers, this is quite a saving of space. The inherent advantages of this form of construction are very short leads, portability and mechanical strength. The receiver may be carried quite easily in an automobile, hung on the wall in the home or installed in a motor or sail boat, not to mention taking it on camping trips.

When installed in the home, the St. James Vertical Eight may be mounted in a console or covered with a decorative fabric and suspended from the wall, being scarcely thicker than some of the picture frames in common use.

There are two tuning controls mounted on the small front panel of the receiver. The variable condenser which is used to tune the loop antenna has a small knob on the shaft, similar to the type of knob which is usually used on a rheostat, by means of which the desired frequency may quite easily be tuned. A Karas Micrometric dial is used to turn the variable condenser which tunes the oscillator. This dial is of the friction vernier type and is very well suited to the purpose, as the oscillator condenser is very sharp in its tuning. It might be suggested that the instructions for mounting this dial, which are furnished with same, be followed very closely for the best operation of this type of

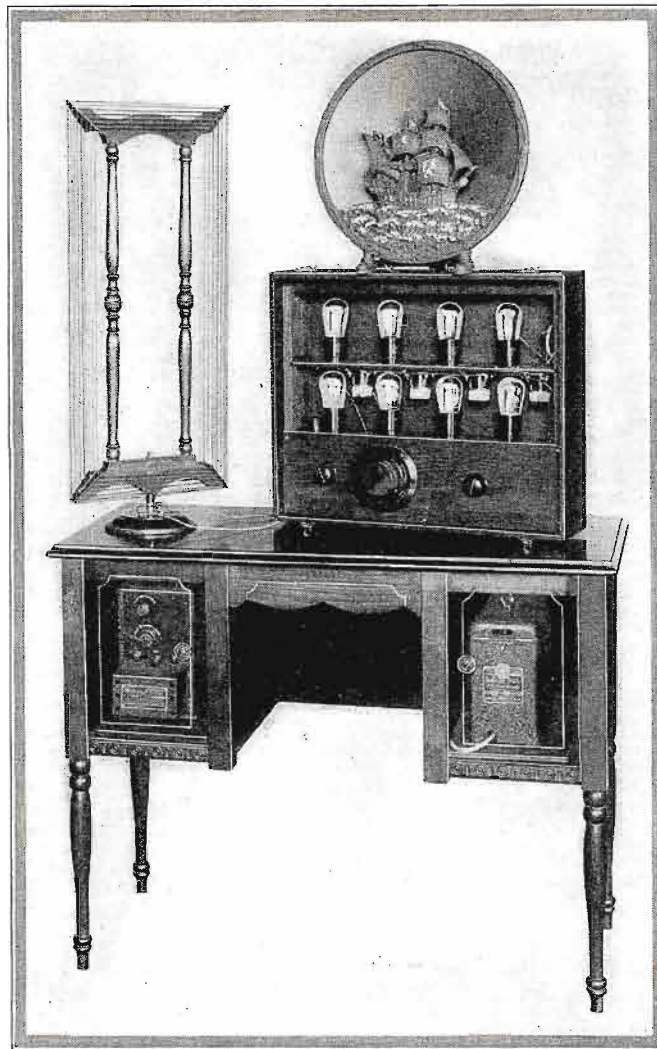


Photo A. View Showing receiver on a Southern Toy table with suggested accessories

dial. There is a potentiometer on the panel also, which controls the grid bias of the intermediate frequency amplifiers. This serves as a very suitable volume control. There is a rheostat placed in the wooden frame having the shaft extending through it. This rheostat has a slotted shaft by which it may be adjusted with a screw driver. As this controls the filaments of all tubes, it is not necessary to adjust it frequently. All connections are brought out of the side of the receiver with a Yaxley cable connector, with the exception of the "C" batteries, which are placed in the bottom of the receiver.

It has been found that by cutting down the amount of wire used in connecting up the various parts in a receiver, that the sharpness of tuning and the selectivity is very materially increased. The explanation for this is that each connecting wire acts as a tiny receiving antenna and the current received is induced in the wrong portion of the receiver. The average super-heterodyne receiver has from twenty to fifty feet of wiring, and in direct contrast the St. James Upright Eight has but ten. From this fact it may easily be seen that the receiver will be much sharper than if it were spread out in such a way that it required two or three times this amount of wire.

Most of us are well enough acquainted with photography to know that all the light, to be usefully registered in making a picture, must be received through the lens. If there is a leak in the bellows, or the plate does not fit tightly, there will be streaks on the finished picture and if it is not entirely worthless, it will be of less value than one of clear definition.

The same rule applies to a radio receiver. If all the induced energy is received at one point, the signal will naturally be of better quality than if it leaks in otherwise. The St. James Upright Eight, as described here, will not pick up a sound unless the loop is connected. All of the energy received comes through the single channel which it is supposed to come through. The result of this is that the signal is very sharp and clear.

There is no mushiness nor background in this receiver. When tuning past a transmitted wave, there will be silence; then the signal will snap in like a rifle shot as the tuning condensers come to the frequency of the transmitted wave, and as they pass, it dies out as abruptly.

Many of the noises in a receiver are induced by the fields of the

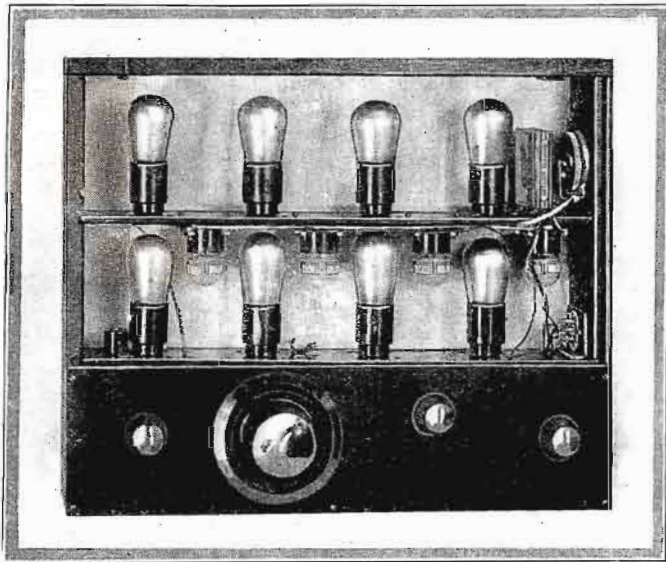


Photo B. View showing receiver without carrying case

coils, and may be heard with aerial disconnected. These disturbing sounds originate in electric motors, high frequency generators, meaning door bells, violet rays, machines and street cars. With coils having a large field, these tiny transmitters are easily picked up, and they cannot be tuned out, for they are on no specific wavelength.

A coil of restricted field is the only really effective way by which this difficulty may be overcome. The St. James intermediate frequency transformer has a coil with a field less than an inch in diameter. The field is so restricted that one may place his hand over the coils and so appreciably alter the tuning. The coils, as a further precaution, are de-hydrated. All of the moisture is removed by vacuum pumps and the glass container is then sealed, which makes the transformer immune to dampness in localities where salt water would ruin the transformer in a short time. The transformers are tuned before leaving the factory to a specific frequency. The kit consists of four transformers that have been matched to the same frequency, which insures maximum sensitivity. In case of accident, where replacement is needed, one of the transformers tuned to the same frequency may be obtained by mentioning the code number, which is on the transformers, when ordering.

A principle analogous to hydraulic phenomena is employed in the hookup. Consider a column of water inside a vertical pipe. If a tap at the bottom of the pipe is opened, the water level goes down, due to the emptying of the water. Now take a pipe and bend it in a U-shape with the open ends upward. If it is filled with water and some is drawn from one leg, the other leg also drops till the level is the same in both. This results in perfect equilibrium.

In the oscillator coupler this practice is carried out electrically. The signal must pass through two parallel channels and of necessity must be of the same strength in each. This results in a uniform signal, well balanced with all harmonics and unwanted interference successfully strained out. This is the first time this method has been used in a commercial receiver and patents have been obtained.

The design and construction of this receiver is so obvious, it is not essential that an elaborate description of the construction process be given. One point that is well to bring out is the method of obtaining regeneration. Instead of using a midge condenser, the two leads are twisted together and tuned by cutting the ends until the correct point is reached. If this is done

while receiving a DX station at the highest end of the tuning scale, the results will hold good for all time and need no further attention. About six inches of insulated Celesite wire twisted together is sufficient to give the desired capacity between the wires.

It is inadvisable to consider putting any annexes on this set. It was designed as an eight-tube set, and as such it works best. The tubes used are 201-A save the last stage of the audio amplifier and that uses 112.

It has been found that a voltage close to 45 is best on the first six tubes, while 90 volts on the first stage amplifier and 135 on the second give ample volume and tone quality.

#### LIST OF PARTS FOR THE ST. JAMES UPRIGHT EIGHT

- 1—St. James Wood Frame.
- 2—Formica  $2\frac{1}{2} \times 18 \times 3/16$ -inch strips.
- 4—St. James Transformers Type 2-40.
- 1—St. James Oscillator Type 2-40.
- 1—St. James Choke Coil Type 2-40.
- 2—Thordarson R-200 Audio Transformers.
- 1—Yaxley Cable Connector.
- 1—Yaxley 2-ohm Rheostat.
- 1—Yaxley 400-ohm Potentiometer.
- 2—Sangamo .005 mfd. Fixed Condensers.
- 1—Parvot 1 mfd. By-Pass Condenser.
- 1—Formica Drilled and Engraved  $5 \times 19 \times 3/16$ -inch Panel.
- 10—Feet Acme Celesite Wire.
- 1—Package Kester Radio Solder.
- 1—Sonatron Type 171 Tube.
- 7—Sonatron Type 201-A Tubes.
- Miscellaneous Screws, Nuts, Lugs, etc.

#### List of Accessories for Use with the St. James Upright Eight Receiver

The following is a list of accessories that have actually demonstrated their ability to properly operate the St. James Upright Eight Receiver. While these particular accessories are suggested, it is possible to make any reasonable substitution without decreasing the all-around efficiency of the receiver:

- 1 Southern Toy Mahogany Radio Table.
- 1 Majestic "A" Current Supply.
- 1 Fansteel Type 135 "B" Power Supply.
- 1 Tower "Pirate Ship" Model Speaker.

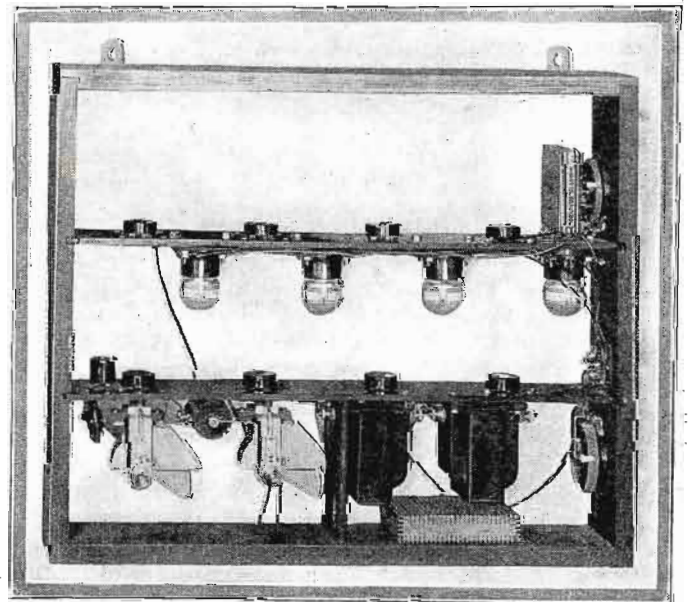


Photo C. View of receiver with front panel removed

The Southern table is an attractive piece of furniture, finished in genuine mahogany, rubbed to an eggshell gloss. It stands at the correct height from the floor to make operation of the set simple and untiresome. There is a compartment provided at each end; one to contain the "A" storage battery, or current

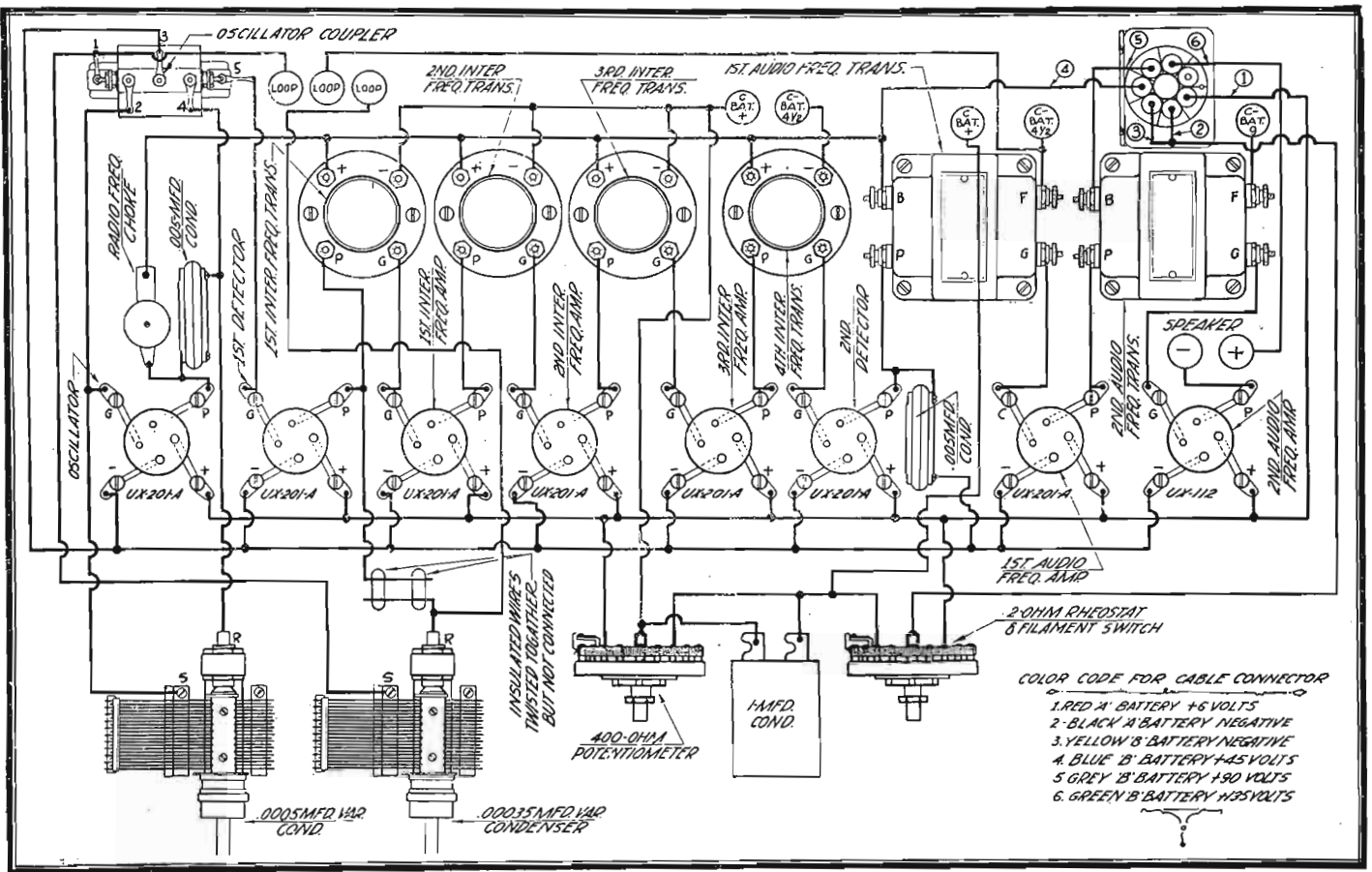


Figure 1. Graphic illustration showing in a pictorial manner all connections to the actual apparatus

supply device, the other the "B" supply and accessories. An open space in the center allows room for the knees. This table is made by the Southern Toy Company, Inc., of Hickory, North Carolina.

The Majestic "A" current supply is for use on 110 volts, 60 cycles, alternating current. It furnishes ample power for an eight-tube set, is stable in operation, and has no liquids or acids to spill. There is a rheostat on the front panel for regulating voltage. It is also equipped with an electro-magnetic cut-out to

prevent excessive voltage from being supplied to the tubes in the receiving set. A receptacle is provided for plugging-in the "B" supply so that both "A" and "B" units are operated with only one light socket connection. There is a convenient switch on the cord of the "A" which controls both sources of power supply. If so desired, the filament switch on the receiver may be left turned on at all times. The switch controlling "A" and "B" units therefore acts also as a control for the set. or, in other words, for the entire radio installation. The case housing the

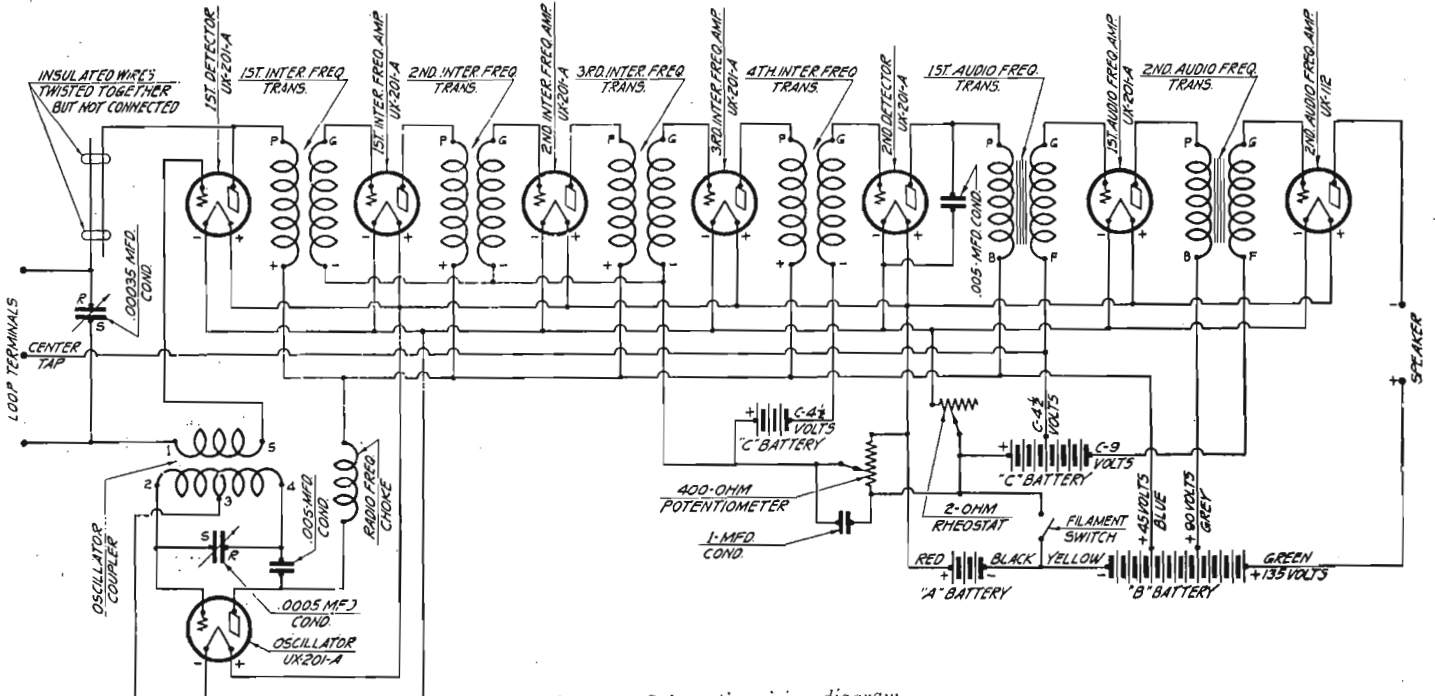


Figure 2. Schematic wiring diagram

power unit is finished in a rich black crystal enamel, bakelite panel, complete with extension cord and attachment plug. This "A" supply is manufactured by the Grigsby-Grunow-Hinds Company of Chicago, Illinois.

The Balkite Power Supply entirely replaces the "B" battery and supplies "B" current direct from the light socket. It uses the celebrated Balkite rectifying principle, and is radically different from any other "B" device. It is entirely noiseless, a permanent piece of equipment with nothing to wear out or replace. It has no tubes to burn out. Once connected to the radio set, it requires no adjustment, giving an output of 40 milliamperes at 135 volts maximum. Taps are provided for the lesser voltages required. The Balkite "B" power supply is made by the Fansteel Products Company of North Chicago, Illinois.

The Tower "Pirate Ship" Speaker is right up to the minute in that it combines a Pirate-ship model with a reproducing horn, making an instrument both useful and highly ornamental. The design is cast metal, finished in bright colors and with a frame to match. The cone behind the ship is tinted to represent a cloudy sky, setting the ship off to good advantage and procuring an optical illusion which gives reality to an already beautiful design. The ship has all sail set and straining, and rides upon a sea of white-capped waves. A specially developed armature driving unit intensifies the delight of the 14-inch cone, producing excellent volume and tone quality. The speaker is provided with a 6-foot cord. It is made by the Tower Manufacturing Company of Brooklyn, New York.

*(If further information on any of the above mentioned accessories is desired, it can be secured by writing direct to the manufacturer.)*

## New Two Control Equamatic Receiver

(Continued from Page 105)

ness of the Puritan period to the more subtle workmanship of the present day. It is built of five-ply walnut, supported by feet of generous proportions. The compartment for the batteries also contains a reproducing horn with a long sound chamber. The accessories and the horn are both screened from view by a panel of cloth of gold, supported by a wooden framework. Two swinging doors open to the lower compartment, the front of the receiver compartment lowers, making a desk-like shelf for an arm rest. This console is made by the Excello Products Corporation, Cicero, Illinois.

The Southern "Blue Ridge" Cabinet is for use when a console is not desired. It is made of Walnut Veneer, decorated with attractive ornamented corners and base. It has a sliding baseboard so that the set may be readily removed from the cabinet for inspection and changes of connections. It is finished in natural tone, highly polished, and is made by the Southern Toy Company, Hickory, North Carolina.

The Fansteel A-6 "A" Supply is a complete batteryless electric radio power unit giving uniform "A" current regardless of the drain. Power is supplied directly from the light socket. The device consists of a rectifier and an electrolytic filter condenser combined in one cell. It is complete in itself and operates only when the set is turned on, and is made by the Fansteel Products Company, Inc., North Chicago, Illinois.

*(If any further information is desired on the above described accessories, it may be had by writing direct to the manufacturer.)*

### New Two Control Equamatic Receiver—List of Parts

These parts or their equivalent will give satisfactory results:

- 3—Karas .00037 Variable Condensers
- 3—Karas Equamatic R. F. Transformers
- 2—Karas Audio Transformers 28
- 2—Karas Micrometric Dials
- 1—Karas Output Filter
- 3—Karas Sub-panel Brackets
- 5—Benjamin Sockets 9040
- 1—Carter 10-ohm Rheostat—Imp.
- 1—Carter 20-ohm Rheostat—Imp.
- 2—Carter 2-ohm Fixed Resistors
- 2—Carter Tip Jacks
- 1—Carter Switch Jack
- 1—Yaxley Cable Connector

- 2—Samson No. 85 R. F. Chokes
- 2—Samson Balancing Condensers
- 1—Karas Link Motion
- 2—Polymet .001 mfd. Fixed Condensers
- 1—Polymet .006 mfd. Fixed Condenser
- 2—Sangamo .0001 mfd. Fixed Condensers
- 1—Sangamo .00025 mfd. Grid Condenser
- 1—X-L Binding Post
- 1—Formica 7x24x3/16-inch Drilled and Engraved Panel
- 1—Formica 9x23x3/16-inch Drilled Sub-panel
- 1—Durham 2-megohm Grid Leak
- 3—Ce Co Type "A" Tubes
- 2—Ce Co Type "F" Tubes
- 20 Feet Acme Celesite Wire
- 1 Package Kester Radio Solder
- 1—Ekko Ground Clamp
- Miscellaneous lugs, screws, nuts, etc.

## "Best Lincoln" Nine Super-Heterodyne Receiver

(Continued from Page 144)

the battery and other accessories from being seen. Another screen in the rear of the battery compartment provides an outlet for sound, preventing the hollow microphone sound so commonly developed when the speaker is mounted in a closed chamber. The doors of the lower compartment swing on hinges, while the door of the upper compartment drops, forming a desk and elbow rest. Generous carvings of walnut constitute the feet of the console, making a sound and jar proof foundation. This console is made by the Excello Products Corporation, Cicero, Illinois.

The Corbett type "C" cabinet is used when a console is not desired. It is finished in attractive scroll work and carved ornaments, much resembling jewel caskets of the period of the Italian Renaissance. It is finished in walnut highly polished. It is manufactured by the Corbett Cabinet Manufacturing Company of St. Marys, Pennsylvania.

The Kingston "B" Power Supply employs the well-known and popular Raytheon tube; is sound in operation and will deliver ample current for a set much larger than the Lincoln. Its steady "B" power keeps the radio at the peak of volume and clear reception. Attach it to the light socket and it is ready for use. It has an excellent record of successful operation since its introduction. Voltage taps allow three different voltages to be obtained at the same time, and each tap is varied over a wide range, it makes possible any desired voltage from 5 to 150 volts. This "B" Power Supply is made by the Kokomo Electric Company of Kokomo, Indiana.

The Allwood Speaker is very much like an old violin in its rich clear tone. A new shape more pleasing to the eye, and a new tone quality more pleasing to the ear, distinguish the Allwood from all other loud speakers. The peculiar construction of the tone chamber, and the use of wood, growing more mellow and sweet with age, mean that every sound is reproduced with acoustic fidelity, as distinct at a distance as near the loud speaker. It is made by the Imperial Carving Company of Allegan, Michigan.

The Model "N" Balkite Charger is a large capacity trickle charger. It was designed especially to serve the large sets employing power tubes. It has two rates, 5/10 and 8/10 amperes. The first rate is sufficient as a trickle charger for a set of five tubes. The second is for sets up to eight tubes, including power tubes. Water capacity is 16 ounces, approximately three times that of the average trickle charger. It requires an addition of water about once a month and operates from 110 volts A.C., 50 or 60 cycles. Special models are provided for localities that are furnished with a 25 or 50 cycle frequency. The unit consists of a transformer contained in a metal case and a glass jar containing an electrolyte with the rectifying strip of metal. A rubber covered cord with an attachment plug is furnished for connections to a power outlet. Binding posts for connection with the "A" battery are on top of the transformer. This trickle charger is made by the Fansteel Products Company, North Chicago, Illinois.



**30  
DAYS  
FREE  
TRIAL**

# 7 Tube Set Single Dial Radio



**Metrodyne  
Radio Sets**  
Are Equipped  
For  
**BATTERY or  
ELECTRIC  
operation**

*The* **Metrodyne**  
**ONLY ONE DIAL TO TUNE**

**RETAIL PRICE**  
**\$75<sup>00</sup>**  
**Completely Assembled**  
**Big Discounts to**  
**Agents and Dealers**

Wonderful offer direct from the factory! The world's greatest radio! A perfect working, single dial control, 7 tube receiver! And just to prove our claims, we will ship it to your home for 30 days' free trial. Test it under all conditions. Test it for distance, volume and tonal quality—and if you are not convinced that it is the best single dial set you ever heard, return it to the factory. We don't want your money unless you are completely satisfied.

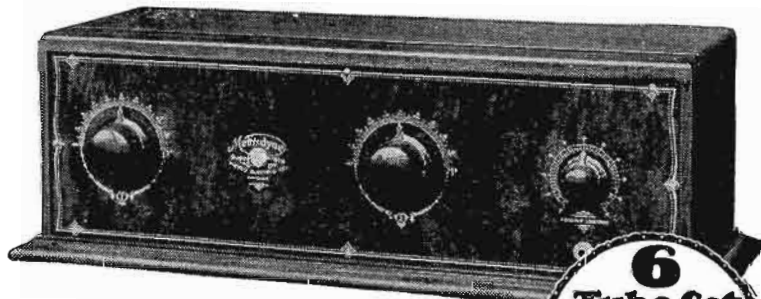
**Three Year Guarantee**

**BIG PROFITS  
TO AGENTS AND DEALERS**  
Our Agents and Dealers make big money selling Metrodyne Sets. You can work all or part time. Demonstrate the superiority of Metrodynes right in your home. Metrodyne Radios have no competition. Lowest wholesale prices. Demonstrating set on 30 days' free trial. Greatest money-making opportunity. Send coupon, a letter or a postal for our agent's proposition.

## Metrodyne Super-Seven Radio

A single dial control, 7 tube, tuned radio frequency set. Tested and approved by Popular Science Institute of Standards, Popular Radio Laboratory, Radio News Laboratory and by America's leading Radio Engineers. Designed and built by radio experts. Only the highest quality low loss parts are used. Magnificent, two-tone walnut cabinet with beautiful, gilt metal trimmings. Very newest 1928 model, embodying all the latest refinements.

Easiest set to operate. Only one small knob tunes in all stations. The dial is electrically lighted so that you can log stations in the dark. The volume control regulates the reception from a faint whisper to thunderous volume, 1,000 to 3,000 miles on loud speaker! The Metrodyne Super-Seven is a beautiful and efficient receiver, and we are so sure that you will be delighted with it, that we make this liberal 30 days' free trial offer. You to be the judge.



**6  
Tube Set**  
**\$48<sup>50</sup>**  
**RETAIL PRICE**  
**Completely  
Assembled**

### MAIL COUPON BELOW

Let us send you proof of Metrodyne quality—our 30 days' free trial offer and 3 year guarantee

Mrs. Wm. Leffingwell, Westfield, N. J., writes: "The Metrodyne Radio I bought of you is a wow! This is as good as any \$225 machine I have ever seen."

N. M. Greene, Maywood, Ill., writes: "My time is up and the Metrodyne works fine. I got Havana, Cuba, Oakland, Calif., Denver, Colo., Toronto, Canada, all on the loud speaker."

J. W. Woods, Leadville, Colo., writes: "Received the 7-tube Metrodyne in fine condition. Had it up and working same day received. Was soon listening to Los Angeles, San Diego, Oakland and other California points; also St. Louis Kansas City and other east and south stations—all comin in fine. Am more than pleased. Sure enjoying it."

We will send you hundreds of similar letters from owners who acclaim the Metrodyne as the greatest radio set in the world. A postal, letter or the coupon brings complete information, testimonials, wholesale prices, and our liberal 30 days' free trial offer.

**METRO ELECTRIC COMPANY**  
2161-71 N. California Ave., Dept. 31  
Chicago, Illinois

Gentlemen:

Send me full particulars about Metrodyne 6 tube and 7 tube sets and your 30 days' free trial offer.

Name \_\_\_\_\_

Address \_\_\_\_\_

If you are interested in AGENT'S proposition, place an "X" in the square

**MAIL THIS COUPON**  
or send a postal or letter. Get our proposition before buying a radio. Deal direct with manufacturer—**SAVE MONEY—WRITE NOW!**

30 Days' Free Trial—3 Year Guarantee

## Metrodyne Super-Six

Another triumph in radio. Here's the new 1928 model Metrodyne 6 tube, two dial, long distance tuned radio frequency receiving set. Approved by leading radio engineers of America. Highest grade low loss parts, completely assembled in a beautiful walnut cabinet. Easy to operate. Dials easily logged. Tune in your favorite station on same dial readings every time—no guessing.

Mr. Howard, of Chicago, said: "While five Chicago broadcasting stations were on the air I tuned in seventeen out-of-town stations, including New York and San Francisco, on my loud speaker horn, very loud and clear, as though they were all in Chicago."

We are one of the pioneers of radio. The success of Metrodyne sets is due to our liberal 30 days' free trial offer, which gives you the opportunity of trying before buying. Thousands of Metrodynes have been bought on our liberal free trial basis.

**METRO ELECTRIC COMPANY**  
2161-71 N. California Ave. • Dept. 31 • Chicago, Illinois

# Beauty /



6C STAGE SHIELDED  
Six Std. Console, \$175  
8C STAGE SHIELDED  
Eight Std. Console, \$225

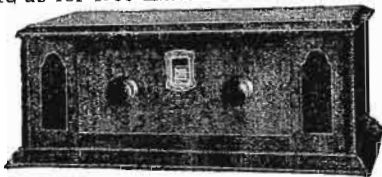
*combined with  
satisfaction in performance*

Stage shielding is used in all Audiola Chassis, each tuned circuit being shielded individually so that a marked gain in selectivity and distance is obtained that cannot be secured in any other way.

Radio engineering skill of the keenest ability assisted in designing the Audiola chassis. Extensive tests of every nature have been applied to it with results exceeding the most enthusiastic expectations.

Both the Audiola six and eight tube console receivers have single dial controls and are incased in the most exquisite piece of furniture. The entire front is of burled walnut with a beautiful grill in the lower compartment covering the loud speaker which is of the long air column type.

Those interested in securing both beauty of design and permanent satisfaction in operation will find it most desirable to secure a demonstration of the Audiola receiver at your local dealer. If he hasn't the Audiola on display, write us for free illustrated booklet.



6T STAGE SHIELDED SIX, Table Model, \$ 75.00  
8T STAGE SHIELDED EIGHT, Table Model, 125.00

The Audiola Cabinet is of genuine walnut. In its simplicity is found its beauty. The artistic design of this cabinet lends itself to any scheme of interior decorating. This set may be had with either the STAGE SHIELDED Six or STAGE SHIELDED Eight Chassis.

Distributors write for open territory

**AUDIOLA RADIO CO.**

430 S. Green St.  
CHICAGO

The set is now ready for wiring. It is advisable to wire the negative filament and ground circuit first. Next make all of the positive filament connections. The rest of the wiring should be completed by starting with the antenna circuit and making all of the connections to the first radio frequency transformer, the antenna tuning condenser and the first tube socket. Next make the grid and plate connections to the second tube and so on throughout the entire circuit, wiring each tube in order. All of the "B" and "C" battery leads from the multi-plug to the various parts of the circuit should be put in finally.

The wiring of the set is very simple and no difficulty will be encountered if the builder will closely follow the schematic wiring diagram of Figure 4 and the pictorial wiring diagram of Figure 3.

After the set has been completely wired the wiring should be checked and rechecked several times to be sure that absolutely no mistakes have been made.

The next step is to hook up the batteries with the Multi-plug using the color code given in the pictorial wiring diagram of Figure 3. After the batteries have been connected insert a tube in the first radio frequency socket. This tube should light up when the filament switch is thrown to the right. It should continue to burn regardless of whether the five and nine tube transfer switch is thrown to right or left. It should also respond to variations of the 6-ohm rheostat on the right of the panel above the transfer switch. If the tube functions properly in the first socket it should be inserted in each succeeding socket in rotation. Its action in the second radio frequency stage and in the first detector should be the same as when in the first socket.

When the tube is inserted in the oscillator socket it should light only when both the filament switch and the transfer switch are thrown to the right. It should not respond to variations of the rheostat on the panel. This action should be the same when the tube is inserted in both intermediate frequency amplifier sockets and the second detector socket.

When the tube is inserted in the audio amplifier sockets it should light when the filament switch is thrown to the right and should continue to burn regardless of the position of the transfer switch, and it should not respond to variations of the 6-ohm rheostat.

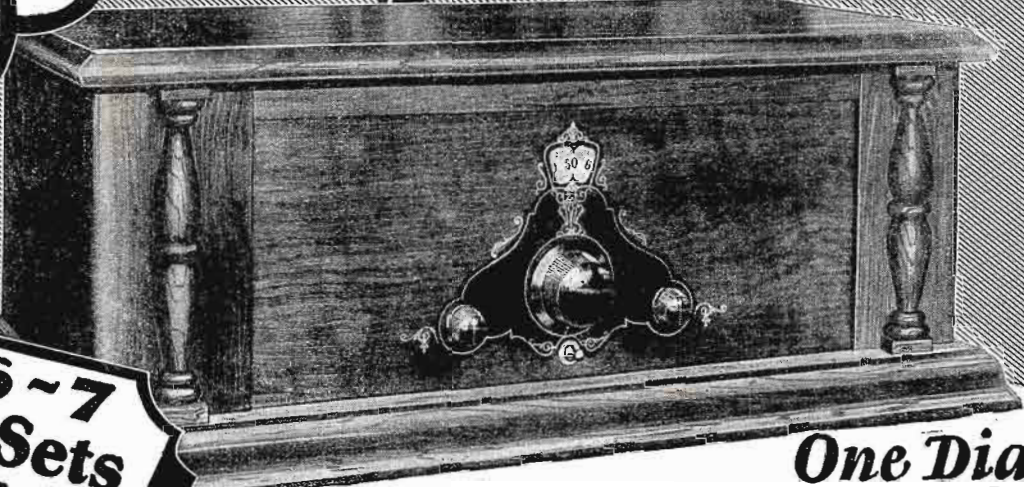
After this checking has been completed the set is ready for an actual test on the air.

#### Notes on Balancing, Tuning and Operation

It is important that the 2-gang condenser be installed exactly as received. Do not try to make any adjustments until after the set is in operation. The condensers and coils are manufactured with a high degree of accuracy and little or no adjustment of the condenser is required.

When the set is completely assembled, wired and ready for test, first attempt to operate only the five-tube set. This part of the circuit should give satisfactory reception on all local stations and outside stations within a radius of two to three hundred miles. After the five-tube receiver is operating satisfactorily on the local stations proceed to balance the 2-gang condenser. To accomplish this, tune in a station on the lowest wave length possible. A weak signal just audible in the loud speaker should be used. When this is obtained tune the second dial, that is, the one on the 2-gang condenser, for maximum volume. Then loosen the set screws on one of the shield plates and move it back and forth, adjusting it for maximum volume. When maximum volume is obtained tighten the set screws and lock the shield plates in place. Next tune in a station on approximately 300 meters. Then take the tool provided with the 2-gang condenser and loosen the nuts on the right-hand side of one of the stator plate sections. Then insert the other end of the tool in the hole between the nuts and move the handle of the tool back and forth, toward and away from the panel. This motion shifts the entire section of stator plates. Make this adjustment for maximum signal strength. Leave the stator plates set in the position for maximum signal strength and lock them in that position by tightening the nuts. Next repeat this operation with the other section of stator plates. Then tune in some high wave length station at about 500 meters,

# 30 Days FREE TRIAL



**5-6-7  
Tube Sets  
\$47.00  
to  
\$72.00  
RETAIL PRICES**

## One Dial Westgale Radio Sets

NOW!—the new 1928 WESTGALE line of Radio Models are ready for you to try. And we stand ready to put any one of our 24 new styles in your home and let you use it to your heart's content on 30 DAYS' TRIAL. Entertain your family and friends, Listen to programs from all over the country. Note the distance, selectivity, and volume. But most of all, hear their amazing deep, mellow tone,—then if you are not convinced that WESTGALE gives you more for your money than you can get elsewhere,—YOU DON'T HAVE TO KEEP IT.

Thousands of Westgale Sets have been sold on this 30 Day Trial Plan. For years we have maintained the reputation of being first with the latest in Radio. These new 1928 models are no exception,—they are the last word in Radio and priced at just about half the usual cost. Why not have the newest Radio? Why pay high prices? Why take chances, when you can test out any Westgale model in your home on 30 Days' Trial.

*The Last Word in Guaranteed Radio Sets and the Biggest Values Ever Offered*

**24 Styles to Choose From—  
Table Styles—Consoles—  
De Luxe Cabinets**

This season Westgale offers you 5 tube—6 tube—and 7 tube models in your choice of a beautiful array of table styles, consoles and period type Walnut cabinets.

Don't buy any radio until you send the coupon for our new catalog which pictures and describes our complete line in almost any size or style you could wish for. Don't wait,—a special introductory discount from retail prices for those who write quick. Mail the coupon today—get posted before you buy.

### Why Not Be Our Agent?

Buy at cost. We want Agents and Dealers in every locality to demonstrate and take orders for these amazing new 1928 Westgale Models. This is your chance to get a Westgale Radio at a big discount and make it pay you big money. Millions of radios will be sold this season. Get a Westgale set on 30 Days' Trial—demonstrate to your neighbors and friends and get your share of these big radio profits.

### Your Own Radio Free

Our new Catalog also explains a plan whereby you can put a Westgale Radio in your home on 30 Days' Trial—demonstrate it to your neighbors and friends in your spare time and get your own set without cost before the trial period is up.

### Special Discount to Agents

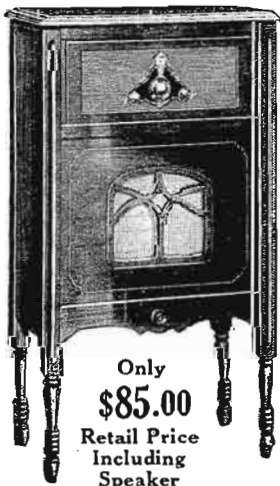
To quickly introduce these wonderful new 1928 models we are offering for a limited time a big reduction, way below retail prices on the FIRST Westgale set placed in each community. So get busy now. Be first in your locality to mail the coupon for our FREE catalog and get full particulars of this special discount offer.

## WESTGALE ELECTRIC COMPANY

(Formerly Westingale Electric Co.)

Dept. 219

1751 Belmont Ave. Chicago, Ill.



Only  
**\$85.00**  
Retail Price  
Including  
Speaker

**Mail Today—Don't Delay**

Westgale Electric Co.,  
Dept. 219, 1751 Belmont Ave.,  
Chicago, Ill.

Please send me your FREE catalog on the new 1928 Westgale Radio Sets. Also full particulars of your Special Discount Offer on the first outfit placed in each community.

Name.....

Address.....

# BIRNBACH Radio Products

## There is a— BIRNBACH BATTERY CABLE for EVERY Circuit and PURPOSE

Made of flexible stranded colored rubber insulation for connecting A, B and C Batteries or eliminator to set. Each conductor of separate solid color in accordance with R. M. A. Standards, and assembled with brass lug terminals, soldered, which prevent loose connections. Made in 5, 6, 7, 8, 9, or 10 Wires.



|  |                                      |
|--|--------------------------------------|
| No. 110- 5..Wires 54 inches.....\$0.50 | No. 114- 5..Wires 10 foot.....\$1.25 |
| 111- 6..Wires 54 inches......60        | 116- 6..Wires 10 foot..... 1.55      |
| 112- 7..Wires 54 inches......70        | 117- 7..Wires 10 foot..... 1.85      |
| 113- 8..Wires 54 inches......85        | 118- 8..Wires 10 foot..... 2.15      |
| 126- 9..Wires 54 inches..... 1.00      | 127- 9..Wires 10 foot..... 2.45      |
| 119-10..Wires 54 inches..... 1.15      | 128-10..Wires 10 foot..... 2.75      |



### Birnbach Riga Battery Cable

These Cables are made of flexible stranded conductors for A, B, and C Batteries. Assembled with storage Battery Clips for the A Battery and soldered brass lug terminals.

|  |                                      |
|--|--------------------------------------|
| No. 100- 5..Wires 60 inches.....\$1.00 | No. 150- 5..Wires 10 foot.....\$1.60 |
| 160- 5..Wires 54 inches......90        | 152- 6..Wires 10 foot..... 1.80      |
| 161- 6..Wires 54 inches..... 1.05      | 153- 7..Wires 10 foot..... 2.25      |
| 162- 7..Wires 54 inches..... 1.20      | 154- 8..Wires 10 foot..... 2.55      |
| 163- 8..Wires 54 inches..... 1.40      | 155- 9..Wires 10 foot..... 2.85      |
| 154- 9..Wires 54 inches..... 1.55      | 156-10..Wires 10 foot..... 3.15      |
| 165-10..Wires 54 inches..... 1.70      |                                      |

### Birnbach Radio Battery Connectors

These Connectors are made of flexible stranded wire with soldered lug terminals for use in connecting Dry Cell Batteries, B, and C Batteries.

|   |  |
|---|--|
| No. RC 3...3-in. Connectors.....each...\$0.04 |  |
| RC 6...6-in. Connectors.....each... .05       |  |
| RC 8...8-in. Connectors.....each... .06       |  |
| RC12...12-in. Connectors.....each... .07      |  |

### Birnbach Loud Speaker Extension Cord Units

You can move your Loud Speaker into any room desired. A BIRNBACH EXTENSION CORD UNIT improves the tone quality when power tubes are used, by placing the Speaker away from the Set. Made in six sizes and furnished complete with Connector.



|  |
|--|
| No. 166...10 foot, complete.....\$0.75 |
| 120...20 foot, complete..... 1.00      |
| 121...30 foot, complete..... 1.40      |
| 122...40 foot, complete..... 1.80      |
| 123...50 foot, complete..... 2.20      |
| 124...100 foot, complete..... 4.20     |

### Birnbach "60" Bakelite 3-Circuit Tuner

This 3-Circuit Tuner is wound on colored Bakelite and will improve any Circuit. A marvel for performance. Use BIRNBACH TUNERS for the best tone quality, long range distance, and volume. For use with .0005 Mfd. Condenser. Tuning range 200 to over 550 meters.



|  |
|--|
| No. 60...Colored Bakelite 3-Circuit Tuner.....\$2.00     |
| No. 60...Colored Bakelite Radio Frequency Coil..... 1.25 |

### Birnbach "180" Bakelite 3-Circuit Tuner

This Tuner is larger in size than our No. 60 and in this form it is the most efficient TUNER ever designed. Distant stations can be tuned in with greater volume and the very best tone quality. For use with .0005 Mfd. Condenser. Tuning range 200 to over 570 meters.



|  |
|--|
| No. 180...BIRNBACH Colored Bakelite 3-Circuit Tuner.....\$3.50     |
| No. 180...BIRNBACH Colored Bakelite Radio Frequency Coil..... 1.50 |



**BIRNBACH RADIO CO.**  
254 West 31st Street  
New York City

or higher, if possible, and repeat the same series of stator plate adjustments, but from the left-hand side of the condenser. After these adjustments have been made the two radio frequency circuits will be practically in perfect balance over the entire broadcast spectrum.

After the five-tube set is operating properly, leave the first two dials tuned in on some station, throw the transfer switch over to the nine-tube position and pick up the station again by tuning the oscillator dial. On all of the lower wave length stations there are two possible settings of the oscillator dial. The correct one to use is the one that occurs lowest on the scale. As soon as this station has been received and tuned for maximum volume, adjust the potentiometer mounted on the sub-panel for the maximum volume consistent with good tone quality. Once this potentiometer is adjusted it may be left fixed for the reception of stations on all wave lengths and the adjustments will not have to be changed until tubes are replaced or until the batteries become considerably discharged. Next adjust the rotor of the coupling unit for maximum volume. This adjustment is not critical, about 50% coupling generally gives best results.

When the receiver is tuned in to any distant station it is sometimes possible to receive another station broadcasting on the next wave length above or below it by merely moving the oscillator dial up or down a degree or two. This interfering station can be eliminated by adjusting the other two dials for maximum volume on the desired station.

#### List of Accessories Used With the Camfield Super-Selective 9 Receiver

The following is a list of accessories which have been actually tested with the Camfield Super-Selective 9 Receiver and have been found to operate most satisfactorily with it. While these particular accessories are suggested, it is possible to make any reasonable substitute without decreasing the all-around efficiency of the receiver:

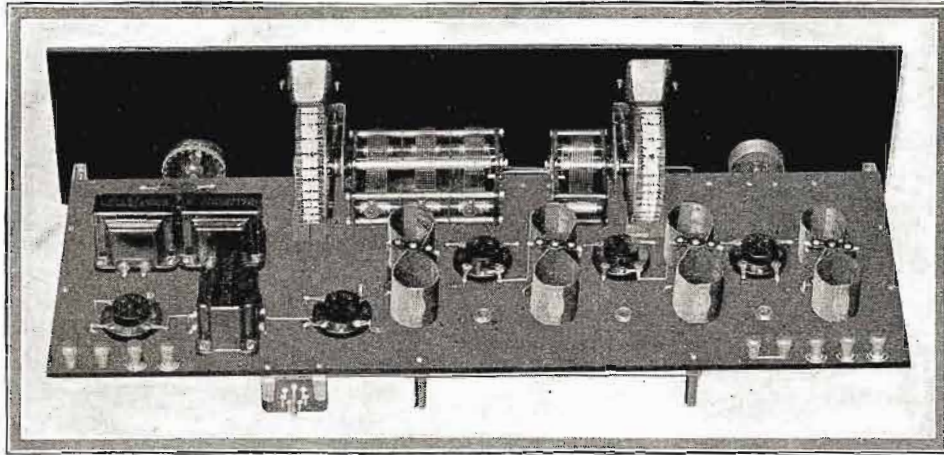
- 1 Fritts "Super" Consolette or 1 Fritts 30-inch Standard "Super" Cabinet
- 1 Sonochorde Senior Speaker
- 1 Type WTAM-5 Willard Storage "A" Battery
- 3 Type 486 Eveready Heavy Duty Layer-Bilt "B" Batteries
- 1 Model "J" Balkite Charger
- 2 Type 771 Eveready 4½-volt "C" Batteries

Photo "A" shows the Camfield Super-Selective 9 Receiver installed in a console with appropriate accessories. The consolette in photo "A" and the cabinet in photo "B" are both manufactured by the D. H. Fritts & Company of Chicago, who specialize in solid walnut radio furniture. Each of these pieces of furniture are beautifully finished in a varnished and water and oil hand-rubbed finish. A four post construction is used exclusively in this furniture, which is patterned after the original types of Italian chests. The decorations are slightly polychromed, with the handles finished in antique brass.

The speaker shown is a product of the Boudette Manufacturing Company of Chelsea, Mass. Its dark finish harmonizes very tastefully with the walnut finish of the consolette and cabinet. This particular model of the speaker, known as the Sonochorde Senior, is capable of very excellent tone quality. It has an adjustable reproducing unit.

"A" supply is obtained from a large capacity storage battery made by the Willard Storage Battery Company of Cleveland, Ohio. The battery is exceptionally well made and is capable of withstanding extensive overloading and rapid discharging. A Model "J" Balkite Charger is used to keep the "A" Battery at full charge at all times. This type of charger uses an electrolyte and a strip of rare tantalum metal for rectifying purposes. It is capable of charging a 6-volt battery at either a 2-ampere or trickle rate charge.

"B" Batteries are used in this particular installation. They are the familiar heavy duty type manufactured by the National Carbon Company. These Eveready Batteries incorporate the layer-bilt type of battery construction and are able to supply a constant "B" current at a high rate of discharge. (If further information on any of these accessories is desired, it may be had by writing direct to the manufacturer.)



# UNRIVALED PERFORMANCE

of CALL BOOK AC SIX RECEIVER

DUE TO **BODINE TWIN-EIGHT** R. F. COILS

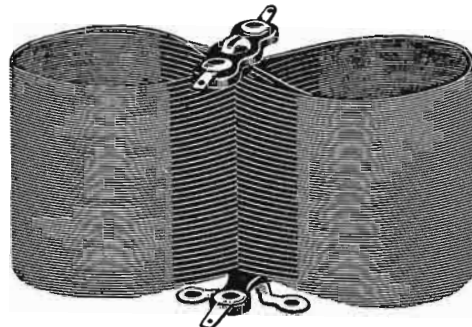
### A Truly Remarkable Receiver

The Call Book AC Six Receiver, described elsewhere in this issue, represents the last word in tuned radio frequency receivers. Three balanced R. F. stages, using Bodine Twin-Eight R. F. Transformers, provide tremendous amplification and extreme selectivity combined with ease of operation and unequalled quality of reproduction. Full AC operation, the latest development in radio, is provided by the A, B and C power supply built into the set itself.

### Efficiency Due to Twin-Eights

The unequalled sharpness and sensitivity of the Call Book AC Six Receiver is accounted for by the use of Bodine Twin-Eight Coils. No other R. F. coils will produce such remarkable results as Twin-Eights. The closely confined fields of these coils, together with exceptionally low R. F. resistance, explain the razor-like selectivity of receivers using them. Tight magnetic coupling between the primary and

secondary, combined with small capacity coupling, provides an amplification per stage which cannot be attained with any other coil. Only by using Twin-Eights can full advantage be taken of three tuned R. F. stages, a fact attested to by the phenomenal performance of the Call Book AC Six Receiver.



### Twin-Eights Will Improve Any T. R. F. Set

Substitution of Twin-Eight Coils for other coils may be easily accomplished and will result in marked improvement of selectivity and sensitivity.

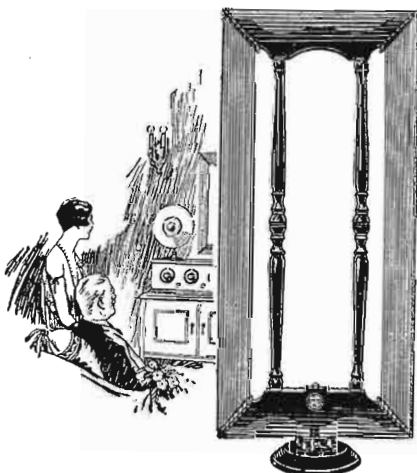
Send for free instructions and wiring diagrams on various Twin-Eight Receivers. All Twin-Eight Coils \$2.00. Specify size of condensers and circuit when ordering.

Full size constructional blue prints of the Call Book AC Six Receiver may be obtained from the Citizens Radio Service Bureau, 508 South Dearborn Street, Chicago. Price,

\$1.50, or they can be obtained from any of the radio jobbers advertising in this publication.

## RADIO'S MOST BEAUTIFUL LOOP

—AND MOST EFFICIENT, TOO!



The Bodine DeLuxe Loop is a graceful bit of solid walnut furniture that enhances the most attractively decorated room. Its surpassing beauty is only equalled by its remarkable signal pick-up ability and high tuning efficiency. Attractive in size and shape. It is only 28 in. high, with 6 in. turning radius. Can be mounted on any radio set and does not appear awkward.

The exclusive plug and jack mounting eliminates trailing connecting wires and the jack may be mounted directly in the cabinet of the set if desired. A unique device keeps the wires always taut.

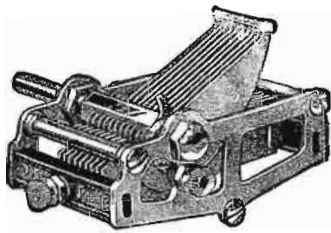
Model L-350 is used on the Call Book AC Six Receiver. Model L-500 will give excellent results on all popular super-heterodynes, as well as other loop receivers. Order Model L-500 for .0005 mfd. and L-350 for .00035 mfd. condensers. Either model \$12.00.

**MAIL THIS COUPON**  
 For free reprints of constructional articles on receivers using Twin-Eight Coils, also complete data on Twin-Eight Coils and the Bodine DeLuxe Loop.  
 Address: Bodine Electric Company,  
 2256 West Ohio Street, Chicago.  
 Name \_\_\_\_\_  
 Address \_\_\_\_\_

Tell 'Em You Saw It in the Citizens Radio Call Book

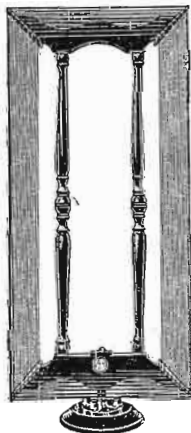
# SIMPLICITY

Simple to Construct **EIGHT-IN-LINE** Simple to Operate



**DE JUR CONDENSERS  
AND RHEOSTAT**

Recommended for the Eight-in-Line  
DE JUR PRODUCTS CORPORATION  
199 LAFAYETTE ST. NEW YORK, N. Y.



**BODINE LOOP**

Recommended for the Eight-in-Line  
The Oscillator Coil in Eight-in-Line Unit is  
wound to match Bodine Loop

**BODINE ELECTRIC CO.**  
2256 W. OHIO ST. CHICAGO, ILL.

## Only Nine Binding Posts to Connect to Front Panel

**Anyone Can Construct This Receiver  
in a Couple Hours Time**

Speaker connects directly to last two binding posts. The set is not sensitive to tubes in any respect. Any standard tubes with a power tube will give perfect results.

Draws only ten to fifteen milliamperes, depending on power tube used. Operates on any recognized B eliminator.

## Amazing Selectivity

To suit the most exacting owners in congested areas where distant reception is impaired by local stations.

## Wonderful Tone Quality

Audio transformers especially designed to meet the requirements of this circuit reproduce faithfully an exquisite roundness of tone with no cutting of side bands. Unequaled in any other commercial receiver on the market.

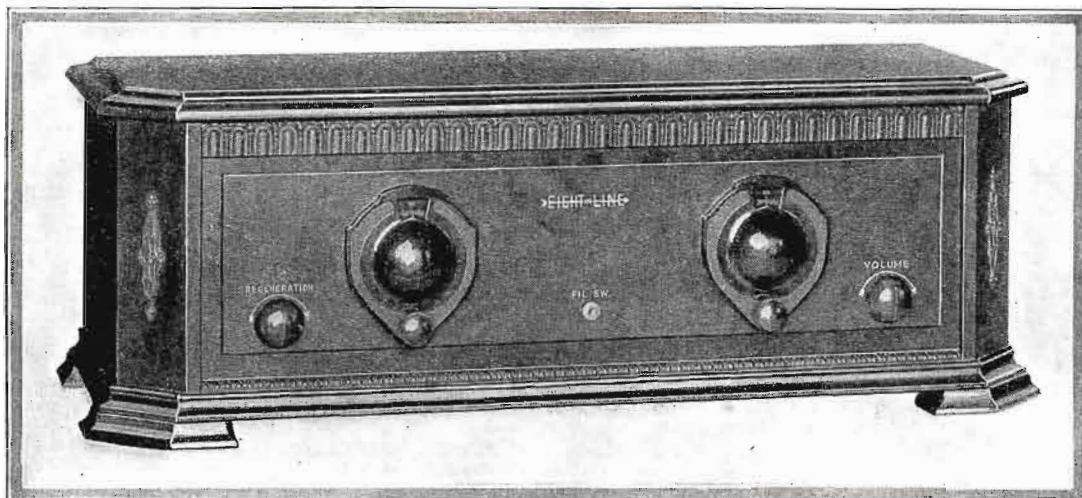
## Power

Due to a unique and original method of balancing not only the intermediate transformers but the entire unit as well, unusual stability is achieved. Intermediate tubes will carry over five volts without going into oscillation. Consequently extreme volume is possible without distortion.

## Adaptability

The unit is small, length of unit over all 20". Height 5", depth 7½". Weighs only 15 lbs. Can be installed anywhere, and can be remote controlled. Ideal for installing in a car.

*Read the Article*



CORBETT CABINET AND SPECIAL LIGNOLE PANEL RECOMMENDED

## Extreme Lack of Unnecessary Controls

### Operation

Two tuning dials, a balancing condenser which is set permanently, a filament switch, and a volume control. The set is not critical in any way, and perfect results may be obtained by the most inexperienced operator. With the balancing condenser properly set the receiver will not go into oscillation even when the volume control is thrown wide open.

### Uniformity

Contrary to the usual method of building kits this unit is actually tested "on the air" receiving distant stations. It is tested for selectivity, tone quality, and ability to bring in distant stations. The result is absolute uniformity.

### Guarantee

Each unit is fully guaranteed against defective material and workmanship.

### Parts Necessary to Complete Eight-in-Line Receiver

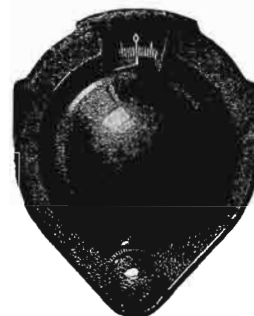
- 1—Eight-in-Line Unit
- 1—Lignole Panel, 24"
- 1—Balancing Condenser (approx. .000045) Marco No. 183
- 1—10-ohm Rheostat (De Jur)
- 1—Filament Switch
- 2—.0005 Variable De Jur Condensers
- 2—Kurz-Kasch Aristocrat Dials
- 1—Corbett Cabinet

LIGNOLE PANEL  
Recommended for Eight-in-Line  
**LIGNOLE CORPORATION**

508 S. Dearborn St.

Chicago, Ill.

*in This Issue*



### KURZ-KASCH DIALS

Recommended for the Eight-in-Line

KURZ-KASCH COMPANY

DAYTON

OHIO

**EIGHT-IN-LINE**  
**UNIT**



National Sales Representatives:

**The Gradergood Company**

1435 Welton St. Denver, Colo.



Trade Mark Reg'd U. S. Pat. Office

# Choice of the Leaders!

Surer than any other test of the quality of a product is its endorsement by men who know.

TOBE CONDENSERS and RESISTORS enjoy the endorsement of every engineer and writer of prominence in the radio field. They not only endorse and recommend TOBE products for YOUR use, but they have also chosen TOBE for use in their laboratories and their homes!

TOBE Condensers and Resistors are constantly specified by:

- James Millen
- Keith Henney
- Volney Hurd
- Zeh Bouck
- Austin Lescarbours
- Jos. Calcaterra
- Milton Sleeper
- Hollis DeNeeffe
- Wilmer S. Trinkle
- Stuart Rogers
- Laurence Cockaday
- McMurdo Silver
- Lloyd C. Greene
- Perry Graffam
- Kendall Clough
- Glen Browning
- Gerald M. Best
- E. M. Sargent
- John B. Brennan
- Herman Bernard

They are standard in the following recent successful power supplies, power amplifiers and radio sets:

- Raytheon A. B. C. 350 MA Rectifier
- QRS A. B. C. 400 MA Rectifier
- Silver-Marshall Unipac Thordarson No. 171 and No. 210 Compacts
- Amertran Power Pack
- Browning-Drake
- R. B. Lab. Receiver L-C 27
- World's Record Super
- Nine-in-Line Super
- Samson Super
- Infradyne
- Hammarlund-Roberts Hi-Q
- Lincoln Super

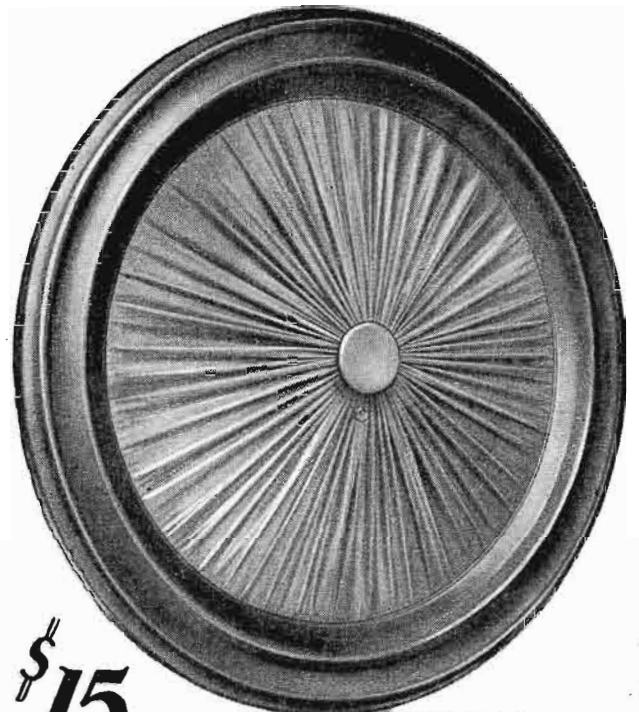
Send for Pamphlet C-9

**Tobe Deutschmann Co.**

Cambridge

Massachusetts

# Announcing



\$15

## The SONOCHORDE Junior

IT'S Here! The Junior Model of the nationally famous—SONOCHORDE—with all the quality—all the exclusive features—even to the beautiful silk front and protected back. The SONOCHORDE line is now complete—two Cone Speakers that actually do what others claim. More dealers were oversold last year on SONOCHORDE Cones than any other speaker made—wherever SONOCHORDE is demonstrated it is sold. You, too, can make faster and better sales with these remarkable Cone Speakers.

Write for details and illustrated circular.

**BOUDETTE MFG. CO.**  
Chelsea, Mass.  
Dept. F



Model A-2 slightly larger. Like the Junior, it has a silk front and protected back—greater volume, more decorative. A. Masterpiece.

Tell 'Em You Saw It in the Citizens Radio Call Book



# CORBETT CABINETS

—that add to the coziness of any home

THE SUPER-CRAFTSMANSHIP that goes into the making of every CORBETT Cabinet is the precise reason why the most exacting women are demanding CORBETT Radio Furniture.

These cabinets are made of the finest walnut and mahogany obtainable and lend themselves to harmonize with any arrangement in the modern home.

## CONSTRUCTION AND MATERIAL

The structural details of Corbett Cabinets are carried out by experienced craftsmen, and are equal to any fine furniture. The plywood paneling making up the sides, top and front is of selected walnut and quartered mahogany. The frames are of select gumwood.

The popular high light or shaded effect finish on Console Models is hand rubbed to an egg shell gloss. The reflected lights give a distinct antique effect.

### D-20-25 Models

are beautifully decorated with vari-colored polychrome pulls and carvings, and the embossed moldings complete the decorative scheme. AN ILLUSTRATION OF THIS CABINET CAN NEVER DO FULL JUSTICE TO THE DISTINCTIVE BEAUTY BROUGHT OUT BY THE HAND PAINTED POLY-CHROME DECORATIONS.

CORBETT Cabinets can be had in any models or sizes, as illustrated

### SPECIFICATIONS FOR MODEL D-20-25

Top 16x34", height 43", Battery Compartment 14" high, 14" deep and 30" long, clearance for dials 1 3/4", depth back of panel 12". The cabinets are in stock with removable fillers to take 7x21" panel size. These fillers may be adjusted to take any panel size up to 7x28". Larger panel sizes up to 9x28", either straight or sloping front, may be had at no extra charge. Panel arrangements for all odd sizes on special orders will be glued in place before cabinet is finished, requiring about two weeks to make delivery. The top is hinged on all models. Shipping weight is 100 lbs.

### MODEL "C"

The ultimate in elaborate and attractive radio furniture is offered in our model "C". It is an adaptation of the old Italian Chests, being designed and decorated in the spirit of the Renaissance period. The top is made of Walnut plywood selected for figure.

### MODELS C-10-20

Either piece may be purchased separately. The top of the table is completely finished and may be used with any cabinet receiver. It makes an excellent combination when used with any model "C" Cabinet up to 26" panel size. SIMILAR TABLES FOR LARGER CABINETS MAY BE HAD ON SPECIAL ORDER.

THE HIGH LIGHT EFFECT FINISH SET OFF WITH ANTIQUE BRONZE PULLS, MOLDINGS AND DECORATIONS MAKES THIS A WELL-APPOINTED PIECE OF FURNITURE.

### SPECIFICATIONS

Model C-20 Table Top 17"x33", overall height 33", Battery compartment 12" high, 15" deep, 30" long.

Model C-10 fits table exactly to make a combination console. Fillers are provided for 7x21" panel and may be adjusted to any size up to 7x26". Depth back of panel 12". Inside height 9". Inside length 29". Clearance for dials 1 5/8". Sides grooved for panel with grooved and removable top rail. Equipped with piano hinge and fancy folding lid stay. Shipping weight 100 lbs.

The ends are made of solid walnut and walnut plywood. The back and base are finished to match. The back is grooved into place, and no nails or screws are used on any exposed surface. The front is grooved for 3/16" panel, the top rail being removable. Fancy folding top stay and piano hinge are applied.

### Price List

| MODEL "TS" CABINETS |             |             |        | MODEL "C" CABINETS |             |        |                 |
|---------------------|-------------|-------------|--------|--------------------|-------------|--------|-----------------|
| Mahogany or Walnut  |             |             |        | Walnut only        |             |        |                 |
| Panel Size          | 10 in. deep | 12 in. deep | Weight | 10 in. deep        | 12 in. deep | Weight | Mounting Boards |
| 7x18                | 11.50       |             | 25     | 15.50              | 17.00       | 26     | .90             |
| 7x21                | 13.00       | 15.00       | 28     | 17.00              | 18.50       | 28     | 1.00            |
| 7x24                | 14.50       | 16.50       | 29     | 19.00              | 20.50       | 31     | 1.10            |
| 7x26                | 15.50       | 17.50       | 31     | 20.50              | 22.00       | 34     | 1.20            |
| 7x28                | 16.50       | 18.50       | 33     | 23.00              | 24.00       | 37     | 1.30            |
| 7x30                |             | 19.50       | 35     | 24.00              |             | 40     | 1.40            |

CORBETT CABINET MANUFACTURING COMPANY  
ST. MARYS, PENN.



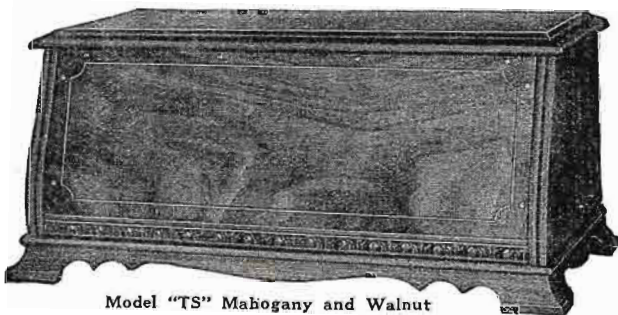
Model D-20 Walnut  
Model D-25 Mahogany

MODEL D-20, Walnut.....\$70.00  
MODEL D-25, Mahogany.... 70.00  
Antique finish with polychrome knobs and decorations



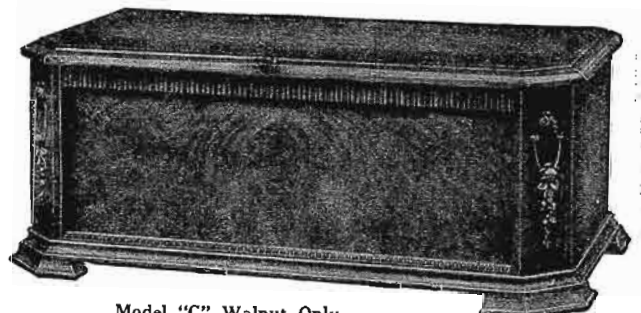
Model C-10 Cabinet Only  
Model C-20 Table Only  
Model C-10-20 Combination

MODEL C-10, Cabinet.....\$30.00  
MODEL C-20, Table..... 40.00  
MODEL C-10-20 Combination ..... 70.00  
Antique bronze knobs and decorations



Model "TS" Mahogany and Walnut

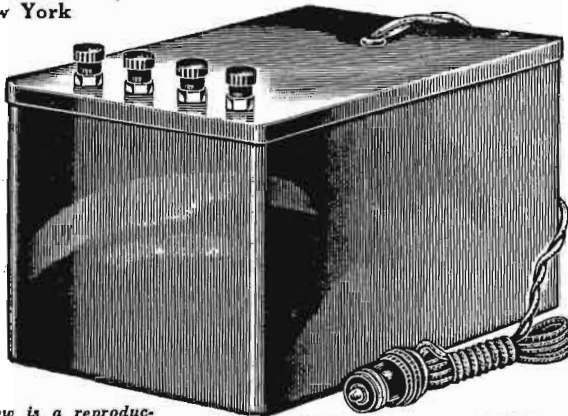
Sloping front—2 1/4" slope. Made in all standard sizes, 7" high, 10" and 12" depth back of panel.



Model "C" Walnut Only

# Townsend "B" Socket Power "Best in World!"

Says A. W. GALE  
of Gloversville,  
New York



Below is a reproduction of Mr. Gale's letter of May 8th, 1927.

COMPLETE

48 W. Fulton St.,  
Gloversville, N. Y.

"Received the Townsend all O. K. It is the best in the World and that is saying some. I have a Radiola 4 tube. Get more stations than ever before. Some of them are CFCF, CKNC, WGY, KDKA, WGZ, WIP, WWJ, KTHS, KOP, KOA, WHAS, WTAM and KSD—besides four in Chicago, all in the East and then some."

A. W. Gale.



## Replaces "B" Batteries

The letter above speaks for itself—proves beyond doubt that the Townsend "B" Socket Power is the most remarkable value in Radio today. Sam E. Fry, of 1415 Holmes St., Kansas City, Mo., writes: "Eliminator works fine. Showed it to a friend and he wants one also. I will say it sure beats batteries. I get stations I never got before on a 6 tube set." Charles Ellis, 88 Jones Ave., Columbus, Ohio, says, "Your Eliminator is working fine. Have had station WJAX and others over 1,000 miles distant. Picked up 22 different stations one evening and around 30 another time. My neighbor has a \$27.50 Eliminator and I don't see that it works any better than yours."

Delivers up to 100 volts on any set, on D. C. or A. C.—any cycle. Full tone, clarity and volume.

Tested and approved by America's leading Radio authorities—Radio News and Popular Radio Laboratories

## ORDER TODAY!

Simply fill out the coupon and slip it into an envelope with only \$1.00 and mail at once. Your Townsend "B" Socket Power Unit will be sent promptly. Deposit only \$5.85 plus postage with the postman. Try out for 10 days—then if not delighted with improvement in reception, return it to us and purchase price will be refunded.

TOWNSEND LABORATORIES  
713 Townsend St. Dept. 26, Chicago, Ill.  
Attach Only \$1.00 to this Coupon!  
SEND TODAY

**10 Days FREE TRIAL**  
You are the Judge!

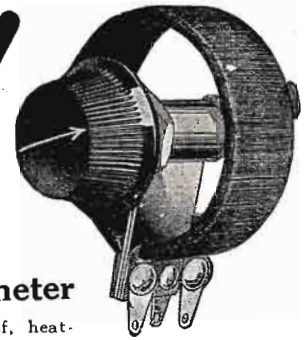
TOWNSEND LABORATORIES  
713 Townsend St., Dept. 26, Chicago, Ill.

Gentlemen: Attached find \$1.00. Kindly send at once Townsend Socket Power Unit, C. O. D., for \$5.85, plus postage, on guaranteed 10-day free trial.

Name.....  
Address.....  
City..... State.....

# New!

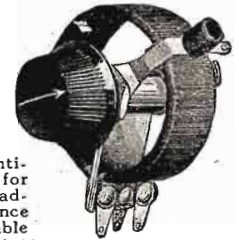
## Centralab Power Rheostat and Potentiometer



This new unit is warp-proof, heat-proof. Constructed without fibre, permitting continuous operation at temperatures of 482° F. and beyond, in socket power circuits. Resistance wire is wound on metal core, asbestos insulated. Core expands with wire insuring smooth action. Narrow resistance strips give small resistance jumps per turn, further assurance of even regulation. Compact 2" diameter, 1" behind panel. Ohms—500, 250, 150, 15, 6, 3, .2, .5—price \$1.25.

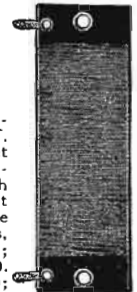
The new Power Potentiometer is identical except for an additional terminal, and is especially suited to obtain variable voltages for detector tube and variable "C" bias in socket power currents. 15, 150, 250 ohms, \$1.50; 2,000, \$1.75; 5,000, \$2.00.

## 4th Terminal Centralab Potentiometer



This new three terminal unit is identical to the above units, except for added semi-variable contact arm, adjustable behind panel to any resistance value. 175 ohm unit gives 2 variable voltages in "A-B-C" power circuits. 250 ohms gives 2 variable taps for 67 volts and intermediate voltage in "B" output of the new Raytheon "A-B-C" power circuit. 2,000 ohms gives 2 variable "C" biases in "B" power circuits. Two 5,000 ohm units in series across "B" eliminator voltage regulation. 175, 250 ohms, \$2; 2,000, 3,000, 5,000, \$2.25.

## Wire Wound Centralab Fixed Resistor



Break-proof under high temperatures, dissipating 50 watts in open air below 480° F. Heavy current capacity for A & B socket power circuits. The wire is wound on asbestos, held firm with heat-proof cement. Length 5", width 1 1/2", 1/16" thick gives ample heat dissipating area. Several resistors can be mounted side by side with same two screws, saving space. Without taps, 50 ohms, \$3.80; 100, 250, \$9.00; 2,000, \$1.10; 4,000, \$1.10. Tapped, 209 ohms, tapped at 57 ohms, \$1.00; 250, tapped at 40 and 100, \$1.10; 350, tapped at 50, 150, 250, \$1.20; 3464, tapped at 864, \$1.40.

## Easy Chair Centralab Modu Plug 20 Feet of Cord



Tune with your dials to maximum strength and clarity of station, then from your easy chair use Modu plug to smooth it down to any degree of tone without changing ratio of high and low notes. No more jumping up to adjust dials for changes in character of program. Also use to connect two speakers in series at a distance from set. Price \$3.00.

At your dealer's, or C. O. D. Send for new A-B-C power circuits

CENTRAL RADIO LABORATORIES  
26 Keefe Ave., Milwaukee, Wis.

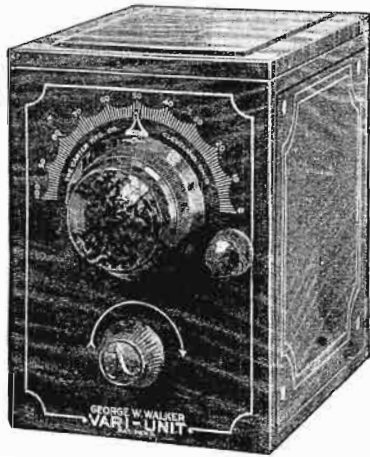


Tell 'Em You Saw It in the Citizens Radio Call Book

# Amazing—Revolutionary!

## Sectional Radio Units Assembled to make many Hook-ups

Multi-point Switch in the Vari-Unit permits many uses. Combining one or more Vari-Units with one Audio Unit gives pleasing and satisfactory results.



### VARI-UNIT

This unit is completely wired and standard in design. The multi-point switch permits great flexibility in uses. Price.....\$20.00

### AUDIO UNIT

*This Unit Is Made in Two Styles*

A 2-tube unit employing two transformer coupled stages. Price.....\$20.00

A 3-tube unit—one transformer coupled stage with a stage of push-pull amplification—using one ordinary tube and two power tubes, if desired. Price.....\$35.00



## Newspaper Article Tells Complete Story

*Reprints of news item which appeared in the "Cleveland Plain Dealer"*

### Sets Built and Rebuilt to Liking With New Vari-Unit

WITH sectional bookcases, filing cabinets, etc., that may be rearranged and expanded as need arises the public is quite familiar, but the sectional radio receiver is something new. True, there were sets built in sections, some years ago, but each section would perform its own particular function and no other. On the contrary, the Vari-Unit pictured here, as made by the Carter Mfg. Co. of Cleveland and introduced by George W. Walker, in its make-up.

By changing the setting of a multi-point switch inside the unit, and altering connections to fourteen binding posts at the back, the Vari-Unit can be made to serve readily as a stage of neutralized radio frequency, detector with or without regeneration, straight radio frequency, oscillator, station selector, super-heterodyne first detector, wavemeter, etc.

One or more of the units used in conjunction with the Walker Audio-Unit, similar in form and external appearance, constitutes a complete receiving set of almost any desired size and type. Concealed bolts ordinarily are used to fasten the several components together, but they may be enclosed in a cabinet if desired.

The lithographed aluminum cases serve also as external and inter-stage shields. A new type socket makes possible the use of most modern tubes, including four-prong types lighted with alternating current, since the filaments can be connected either in series or parallel.

Each Vari-Unit, measuring 7x7x5 inches, contains a .00035 variable condenser, a .000045 midget condenser, rheostat, universal socket, grid leak, fixed condensers, multiple switch and subpanel with mountings for interchangeable coils that cover the wave-band from 80 to 2,600 meters. Those furnished regularly are for the broadcasting range of 200 to 550 meters.

It is anticipated that the Vari-Unit will be used to a considerable extent with standard receivers either to sharpen tuning or to receive very long and very short waves. Use of a loop rather than aerial and ground usually would be recommended, according to Mr. Walker.

The Audio-Unit is available in two styles, one embodying the usual two transformer coupled stages, the other comprising one transformer stage with a stage of push-pull amplification, requiring one ordinary tube and two power tubes.

This reprint from the Cleveland Plain Dealer gives a complete description of these units and how they operate.

### USE LOOP or ANTENNA

Any Type Tube

(A.C.—Storage—Dry Cell)

And the best thing about these wonderful units is their extreme selectivity, volume, and high quality reception.

Write for complete information

### THE CARTER MFG. COMPANY

Manufacturers of Geo. W. Walker Radio Products

6300 Euclid Avenue, Cleveland, Ohio

# The MAGNAFORMER 9-8

We carry in stock the full line of parts as specified by the Citizens Radio Call Book

- |  |  |
|--|--|
| 1 Formica 7x26x3/16" Drilled and Engraved Panel    | 2 Aerovox .00025 mfd. Grid Condensers with Mountings |
| 1 Formica 9x25x3/16" Drilled Sub-Panel             | 1 Aerovox 1 mfd. By-Pass Condenser                   |
| 5 Magnaformer Intermediate Transformers            | 2 Durham 2 megohm Grid Leaks                         |
| 1 Unicoupler                                       | 1 Frost De Luxe 400 ohm Potentiometer                |
| 2 Remler Universal Drum Dials with Control No. 110 | 1 Frost De Luxe 10 ohm Rheostat with switch          |
| 2 Remler .0005 mfd. Variable Condensers            | 1 Frost De Luxe 10 ohm Rheostat                      |
| 9 Benjamin Sockets 8040                            | 1 Frost De Luxe 30 ohm Rheostat                      |
| 2 Benjamin Brackets 8629                           | 4 Frost Tip Jacks                                    |
| 2 Ferranti Audio Frequency Transformers F-3        | 2 Amperites No. 112                                  |
| 1 National Tone Filter                             | 1 Yaxley Cable Connector                             |
| 1 Samson Radio Frequency Choke No. 85              | 1 Yaxley Jack Switch                                 |

**\$129<sup>50</sup>**

**The M & M Co.**

Branch  
131 E. Market St.  
Akron, Ohio

500 Prospect Avenue

Cleveland, Ohio

Branch  
22-24 E. Front St.  
Youngstown, Ohio

Write for Our New Catalog

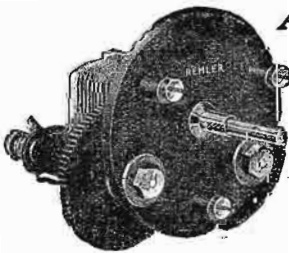
Also HEADQUARTERS for the following well known kits:

- Remler Super-Heterodyne
- Victoreen Super-Heterodyne
- Rex-Lincoln Super-Heterodyne
- Camfield Super "9"
- Karas Equamatic
- Silver-Marshall Unipac
- Silver-Marshall Six
- National Browning-Drake
- Thordarson Power Compact

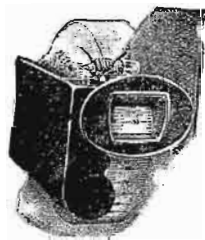
And the Most Complete Stock of Parts in Ohio

Distributors for  
**SPARTON AND A-C DAYTON SETS**

## REMLER Drum DIAL



AND



## Twin Rotor Condenser

Exclusively Specified for the

## Magnaformer

9-8 CIRCUIT

Eight years of radio experience backs every Remler Part. Skill in design and care in manufacture combine to make them leaders in their field. Of course, you will use them in your Magnaformer Circuit.

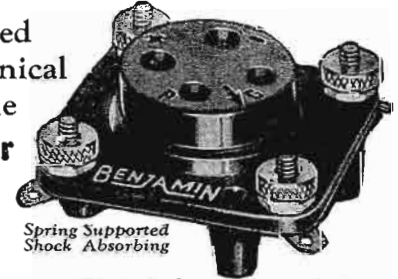
Write for two-color Remler catalog folder

REMLER DIVISION OF  
**GRAY & DANIELSON MFG. COMPANY**  
260 First Street, San Francisco  
New York Chicago

## BENJAMIN

## Cle-Ra-Tone Sockets and Brackets

are specified by the Technical Editor for the Magnaformer 9-8 Circuit



Used the world over by set builders who know and want the best. Stop tube noises. Anti-microphonic. The greatest contribution to the non-noisy operation of the set.

Tube "floats" on finely tempered springs. One-piece terminal to tube connection. Knurled nuts for binding post connection or handy lugs for soldering.

The choice for practically every prominent circuit for several years. Among the most recent hook-ups for which it has been specified are:

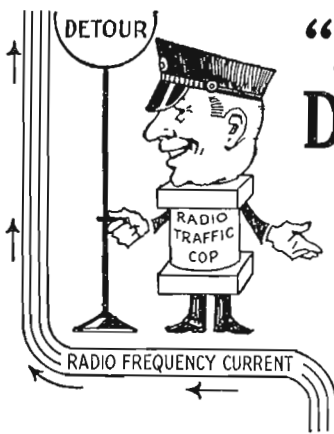
- |                   |                |                   |                    |
|-------------------|----------------|-------------------|--------------------|
| Nine-in-Line Plus | Melo Heald     | Fourteen          | Magnaformer        |
| St. James Super   | Scott Super-10 | World's Record 10 | Two-Dial Equamatic |

At all Radio Jobbers and Dealers

## Benjamin Electric Mfg. Co.

247 W. 17th St. New York  
120-128 S. Sangamon St. Chicago  
448 Bryant St. San Francisco  
Manufactured in Canada by the Benjamin Electric Mfg. Co. of Canada, Ltd., Toronto, Ontario

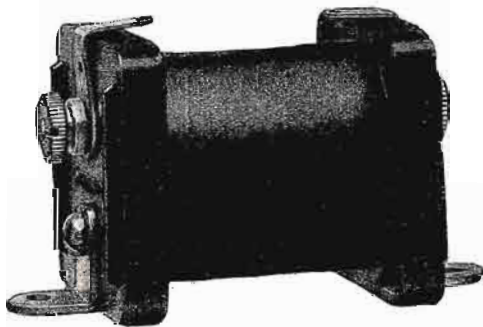
Tell 'Em You Saw It in the Citizens Radio Call Book



# “STOP and DETOUR”

Orders the  
Samson  
R. F. Choke

All R. F. currents are thus kept out of B battery or audio circuits, and prevented from marring the perfect reproduction possible with Samson Chokes and other Samson Parts.



It is easy to put Samson Parts on duty in your set and begin enjoying wonderfully fine radio music today.

Send 5 cents in stamps for the Samson “Make 'em Better Sheet.” This sheet shows how to apply chokes to 17 popular circuits.

## Samson Electric Company

Main Offices at Canton, Mass.

Sales Offices in **RMA** MEMBER Thirty Leading Cities Factories: Canton and Watertown

Manufacturers Since 1882

Specified for the

### Magnaformer

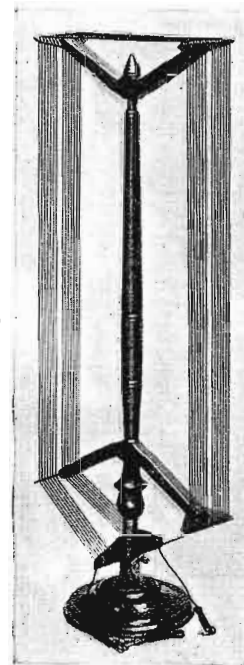
9-8 Circuit

# QUALI-TONE “DELUXE”

Is Exclusively Specified  
for the

## MAGNAFORMER

9-8 CIRCUIT



PATENTED

\$12.50

### RECOMMENDED

By Leading Radio Authorities

And specified for exclusive use with the World's Record Super Receiver, the Nine-in-Line, Melo-Heald, Victoreen, St. James, Popular Mechanics Economy Nine, and many other receivers.

### BECAUSE

The Quali-Tone is the only loop that can claim two world records—brought in stations 8000 miles distant, and most consistent reception of far distant stations. In the Quali-Tone De Luxe, construction is of the highest quality throughout. Woodwork of selected, solid walnut, hand rubbed, natural finish. Only the finest grade of stranded wire, well insulated and covered with brown silk braiding is used. Wire spacers are made of best grade insulating material, reducing losses to a minimum. Every Quali-Tone loop has the special patented Quali-Tone adjustment which keeps the wires taut always. Three leads are furnished, the center tap being removable.

Compare Quali-Tone construction, design and performance, and you will find that it excels in every particular. It incorporates every loop improvement and is flawless throughout. The De Luxe model turns within a radius of 5½ inches, the Quali-Tone, within a radius of 7½ inches. All Quali-Tone Loops are designed for use with .0005 condensers. Try the De Luxe for the finest reception.

THE DELUXE.....\$12.50  
THE QUALI-TONE ..... 10.00

### JOBBER—DEALERS

The Quali-Tone Loop is not an experiment. For two years it has been the fastest selling loop on the market—due entirely to its exceptional merit and the improved results it guarantees.

Order today or write for circulars

## Duro Metal Products Co.

2649 N. KILDARE AVENUE CHICAGO

# Exclusively Specified

FOR THE

## Magnaformer 9-8 Receiver

Specified by the Technical Editor for the MAGNAFORMER 9-8 Circuit



### Permanent Accuracy!

AEROVOX Fixed Mica Condensers stay accurate because they are moulded in genuine Bakelite and are sealed and protected against possible injury, moisture or chemical action.

A special process in the manufacture of the condenser element enables us to manufacture and guarantee them to be within 10% of their marked rating.

# AEROVOX

70 Washington St., Brooklyn, N. Y

# NATIONAL TONE FILTER

Specified in the Magnaformer Set



More stress is being laid in Radio this year on fidelity and tone quality of tone than anything else. Everyone realizes now that higher voltages are required than used to be employed. Everyone is using power tubes, also, because they give better results. But power tubes take more "B" current than other types and if this current at a high voltage is passed direct into the loud speaker it may burn out the delicate windings. It will also, in many cases, put a steady pull on the speaker magnets which makes the performance much less satisfactory.



This new NATIONAL Charger uses one Raytheon "A," charges your radio batteries at a 2 1/2 ampere rate, is light, compact, dependable and uses very little electric current.

Price, complete with cord and plug, rubber-covered leads and terminals..\$11.50

The NATIONAL Tone Filter overcomes these difficulties. It can be attached by anyone to any existing set in less time than it takes to tell about it. It is so connected as to keep all flows of direct current out of the loud speaker, thereby protecting and improving the tone quality. R. C. A. and other power tube manufacturers recommend a device of this kind for use with the 171 and 210 types of power tubes.



The NATIONAL Duo-Range Charger uses two Raytheon "A's" and gives a choice of half-wave charging at 2 1/2 amperes or full-wave at 5 amperes. Now equipped with indicator lamp and fuses and special resistance.

Price, complete with two Raytheon "A's", cord and plug, rubber-covered battery leads and clips..\$19.00

Price, National Tone Filter, complete with 5 foot phone cord for instant attachment to any existing set .....\$7.00

Price without Cord..... 6.50

Write us for Pamphlet C-9

NATIONAL CO., Inc.  
Sherman, Abbott & Jackson Sts.  
MALDEN, MASS.  
W. A. READY, Pres.

Be Sure You Get the Genuine

# NATIONAL RADIO PRODUCTS

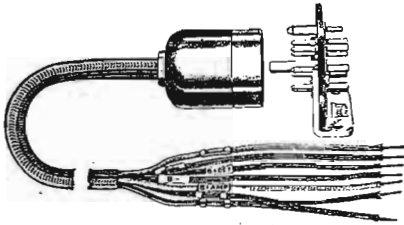
Tell 'Em You Saw It in the Citizens Radio Call Book

## Modernize Your Radio

# YAXLEY

APPROVED RADIO PRODUCTS

Improvements will bring you a new standard of convenience and comfort in radio entertainment.

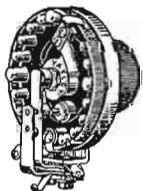


**Cable Connector Plug**

One of the most essential of modern radio conveniences. Provides a neat, quick and absolutely accurate method of completing all battery and receiving set connections. The set may be connected to or disconnected from the batteries just as you would disconnect an electrical appliance with the standard separable attachment plug. Once hooked up, correct connections are assured—you cannot put the Yaxley Cable Connector together improperly. All strands are RMA color code and plainly marked with metal cable markers.

No. 670—Yaxley Cable Connector Plug, for sets with binding posts.....\$3.50

No. 660—Yaxley Cable Connector Plug, with mounting plate on bracket for installation in the set..... 3.00



**Switching Rheostat**

For those who desire to control the switching of the filament with the rheostat, the Yaxley Switching Rheostat offers an ideal combination. The Rheostat proper is the same as the standard Air-Cooled Rheostat. Designed to give correct voltage range and carrying capacity. Large number of turns of special non-rusting resistance wire gives this rheostat a vernier adjustment without vernier attachments, feeding current slowly and evenly. Smooth as silk in operation. The resistance unit is suspended in air to permit ventilation.

Furnished in sizes from 2 to 100 ohms.....\$1.75

**Automatic Power Control**



Automatically switches B eliminator on and trickle charger off when set is turned on. Switches off B eliminator and cuts in trickle charger when set is turned off.

No. 444—Series Type Automatic Power Control—Keeps the voltage drop less than two-tenths (2/10) volt when used with sets having a current draw equivalent to four 199 type of tubes up to eleven 201 type of tubes.....\$5.00

Yaxley also makes Air-Cooled Rheostats, Convenience Outlets, Midget Battery Switches, Potentiometers, Jacks, Jack Switches, Special Switches, Phone Plugs, Midget Jacks and Plugs, Pilot and Panel Lights, Pilot Light Switches, Resistances, Name Plates, etc.

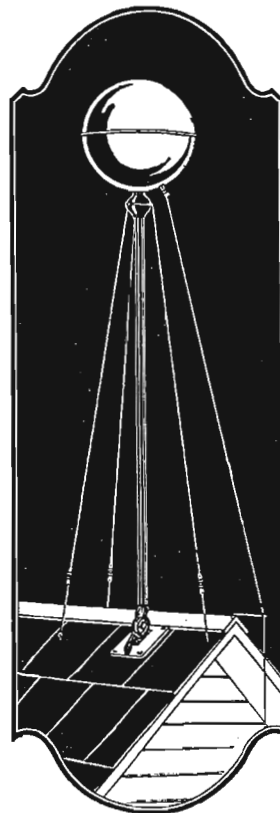
Write for new illustrated and descriptive price list

At your dealer's. If he cannot supply you send his name with your order to

**YAXLEY MFG. COMPANY**  
Dept. C, 9 South Clinton Street, Chicago

# 12 GOOD REASONS why your aerial should be a SUPER-BALL ANTENNA

- 1 Gives any radio greater selectivity, due to its "bunched capacity."
- 2 Non-directional—its unbroken spherical surface has the same antenna effect in all directions.
- 3 Receives all wave lengths with equal efficiency.
- 4 Concentrated conductive surface reduces interference.
- 5 Clarifies tone—built-in condenser acts as a neutralizer for entire antenna system.
- 6 Minimizes static—improves Summer reception.
- 7 Attractive in appearance—10-inch aluminum alloy ball.



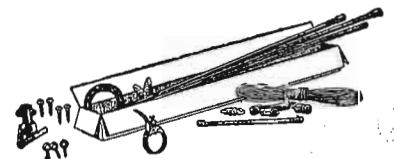
- 8 Sheds ice and snow because of great density of metal used, and because its an "oily" metal.
- 9 Absolutely corrosion-proof—unaffected by moisture.
- 10 Easy to install—and inexpensive.
- 11 Can be placed within 10 feet of another aerial without interference.
- 12 Backed by our 30-day unqualified guarantee!

Ask your dealer about the Super-Ball Antenna—or write us for detailed information.

**DEALERS:** Be prepared to supply your trade with this finest of all antennae. Order from your jobber and write us for Super-Ball Antenna selling helps.

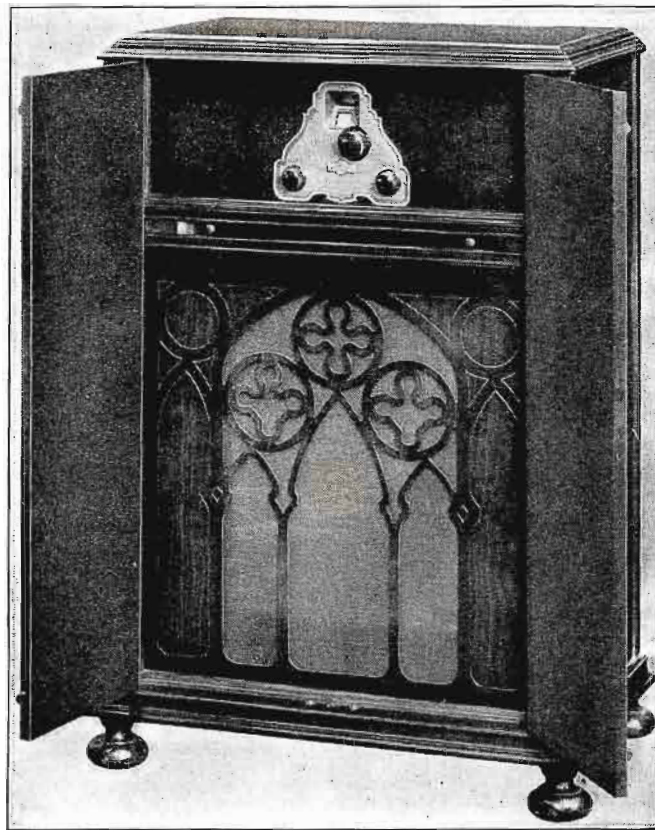
**Super-Ball Antenna Kit**

Contains all materials necessary for complete installation of Super-Ball Antenna, with complete directions for installation.



**YAHRLANGE**  
MILWAUKEE INCORPORATED WISCONSIN

Tell 'Em You Saw It in the Citizens Radio Call Book



## The Newest—the Classic Console

The exquisite beauty of the Chillicothe Radio Console, is creating a sensation among radio owners. Every set owner desires the enhancing artistry, so accurately expressed in this most attractive and convenient cabinet. "The Classic" Console is faultlessly constructed of genuine black walnut, "that master of woods."

A long air column Newcombe-Hawley horn with Baldwin unit,—standard equipment.

Sufficient space in lower compartment for all types of battery and electrical equipment.

A walnut panel which will accommodate all sets up to 26½"x9".

The above are additional advantages of this Chillicothe Console.

Here—in this new creation by the Chillicothe Furniture Company, you will find authentic distinctive design, simplicity and unsurpassed convenience,—truly a pleasant combination.

Interesting booklets on Chillicothe radio cabinets will be cheerfully mailed upon request. A letter to Department C, Chillicothe Furniture Company, Inc., Chillicothe, Missouri, will demonstrate how these cabinets will improve your set.

### CONSTRUCTION

The same ideals which the Chillicothe Furniture Company has at all times expressed in the construction of their genuine Walnut Dining Room Suites, have been carried into this new field of radio cabinets, and built in "the Walnut center of America," by this reliable firm, you are assured of a radio cabinet superb.

*"Built in the Walnut Center of America"*

## CHILLICOTHE RADIO CABINETS

CHILLICOTHE FURNITURE COMPANY  
INCORPORATED  
CHILLICOTHE, MISSOURI


*Tell 'Em You Saw It in the Citizens Radio Call Book*



# Now!

## 2 Radio Magazines for the price of one

Citizens Radio Call Book and "RADIO"— both for the price of "RADIO" alone. A full year subscription to both of these leaders in the radio magazine field for only \$2.50. Copies of both these magazines when purchased from a news dealer over a period of a year would cost you \$5.00. You save exactly \$2.50 by subscribing NOW. The publishers of these two magazines will cooperate to the fullest extent in the future for betterment of the radio parts business—for more extensively popularizing the better class of radio circuits—for giving you the down-to-the-minute ideas in radio just as soon as they are announced. You can hardly afford to pass up this liberal subscription offer. The saving is a big one. Both magazines mailed right to your address for a full year for the price of one. Think it over! Then clip the coupon—attach your check, money order or stamps to it — mail today, before you turn this page. If you are already a subscriber to either magazine you can extend your subscription for another year and get in on this great offer.

**The Coupon Saves  
You \$2<sup>50</sup>. Now  
is the time to  
mail it** 

Citizens Radio Service Bureau  
508 South Dearborn Street,  
Chicago, Ill.

For the enclosed \$2.50 you will immediately enter my subscription for one year to both "Citizens Radio Call Book" and "RADIO"—effective with the next issue. It is understood that there are no further payments of any kind to be made.

Name.....

Address.....

City and State.....

*Tell 'Em You Saw It in the Citizens Radio Call Book*

# and now comes Radio's Most Adaptable COMPACT CIRCUIT

(See index for editorial article, complete diagram, etc.)



Used as a portable set

Showing assembly with tubes and panel

Someone had to do it! And here it is! A most novel, entirely different circuit—an upright assembly. You can do anything with it—frame it, place it in your Victrola, put it in a bookcase, carry it with you wherever you go, on train, boat, auto, or camp, put it in your car, or place it in a neat highboy console in the most sumptuous living room. Its varied uses and its easy portability make it truly the most desired of all radio circuits.

But on top of all this, the St. James Upright-8 is a receiver of exceptional merit. Its clear tones, its great selectivity and its long range put it in a class with any radio set, besides having distinctive qualities and features all its own. For true radio reception, the St. James Upright-8 is an astonishing radio innovation.

## Features of the St. James Upright-“8”

Grid leads and radio frequency carrying conductors are as short as possible and lead directly to the points to be connected.

All of the points dealing with the handling and conservation of signal

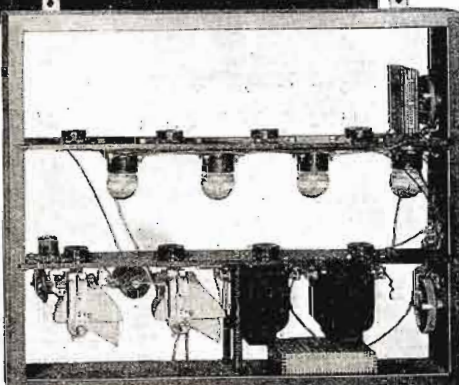
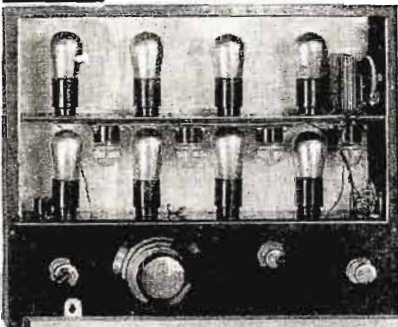
energy have received careful attention.

Due regard is given to interacting effects between the different frequencies employed in the set, by displacing them from each other to minimize such unwanted action.

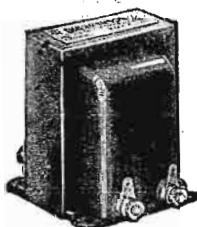
## Radio Receiver Like a Camera

A radio receiver, to be successful, may be compared in its action with a camera. All light received by the plate or film of the camera should enter at the lens, and all parts should be light-proof so that the image passed by the lens will be recorded clearly. If the bellows of the camera be leaky, or the plate holder defective, light will enter at those points and fog the plate, producing an unsuccessful picture.

In a like way, the St. James Upright-8 Receiver is fairly immune to signals and disturbing effects excepting through the proper channel, the loop collector or antenna system. If energy is received directly on the wiring of the set it has the same effect on the music at the speaker, as the light did on the plate of the camera. It fogs the signal, giving it an accompaniment of outside noises, which make the result a poor attempt at music.



Showing simple construction of assembly and parts used. Note supports for hanging in auto or on wall



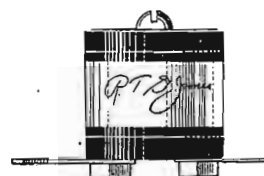
**Thordarson R-200 Amplifying Transformer**  
Brings out each shading of tone, volume, timbre and range. Oversize core and high inductance primary insure smooth amplification. Every layer of wire is carefully insulated. Entire coil is impregnated in a vacuum. Completely shielded. The ideal 2-stage amplifier.

List price, each.....\$ 8.00  
Kit of 2.....16.00

Thordarson Electric Mfg. Co.  
500 W. Huron St.  
Chicago, Ill.



**St. James Oscillator**  
A precision built, laboratory-designed oscillator coupler of proved worth made especially to operate efficiently with the St. James Intermediate Transformer. 1 3/16 in. wide.  
Price, each.....\$5.00



**St. James Choke Coil**  
A special type of choke coil for the St. James circuit, signed by the maker. 3/4-in. wide. A laboratory product.  
Price, each.....\$1.50

## St. James Intermediate Transformers Vacuum Treated and Dehydrated

Glass sealed in laboratory after first being vacuum treated and dehydrated, thus absolutely free forever from absorbing moisture. Small size, 2 1/2 in. high and less than 1 in. diam. No. 2-40 Intermediate Transformer. Each.....\$7.50  
Kit of 4.....\$30.00  
Complete Essential Kit of St. James parts for this circuit.  
Price, Kit.....\$36.50



St. James Laboratories,  
845 W. Washington Boulevard, Chicago, Ill.

# St James "8" Upright

**"If You Want to Get Rid of Mice, Allow Them No Food"**

The problem of obtaining immunity to such disturbing effects has heretofore been attempted by shielding the set by using metallic containers. This has been only partially successful, due to the fact that 100% shielding is not possible. In the St. James Upright-8 we have consistently worked to obtain immunity to disturbing effects by removing as far as possible the elements which would be affected by them. That is, "If you want to get rid of mice, allow them no food."

The St. James Intermediate Transformer was designed with this idea. The coils being less than one inch in diameter provide a very small external field and are affected very little by extraneous signals.

A complete plan for obtaining immunity to disturbing effects has been successfully worked out in the St. James Upright-8 or U 2-40 circuit, upon which patent papers have been filed by R. T. St. James, its designer.

## Balance Secured Through Negative and Positive Wiring System

Comparing the action of a radio receiver to something which we can picture makes it easy to understand. We will consider that the wiring in a set where it progresses from left to right or right to left, is subjected to the same electrical effects as our loop or antenna.

We have approximately 90 feet of wire in the loop or antenna or collector; that is 90 feet in each, so that, with 30 to 50 feet of wire in the set, it represents a considerable portion of that used in the collector. Where the latter is tuned and so constructed that it operates continuously at one rather narrow band, the wiring in the set is exposed to the general effects of all signals and disturb-

ances, and there exists a certain pressure of varying intensity at all times in the circuit which prevents good reception. This would be very much like a column of water enclosed in a pipe placed in perpendicular position. A pressure would be noted throughout. It becomes a simple matter to balance out this pressure by joining the one column with another of equal size in the form of a "U". The pressure in one column has balanced out the other and a state of equilibrium or balance is brought about.

This is accomplished in exactly the same manner in the St. James Upright-8. The wiring of the set is divided into two portions, one in opposition to the other. Whatever energy is picked up on one leg is balanced out by the other, giving a circuit which is sensitive to energy passed through it in the proper channels, but immune to those trying to get in the side or back door.

## Exceptional Results Secured

The various parts of the set are so laid out that two frequencies of widely varying bands are close together, preventing interaction. The results obtained are a revelation from all standpoints. Selectivity, tone and freedom of noise level are all achieved to a degree never before experienced. A simplicity of design which in itself is a major accomplishment also contributes to its application to a variety of uses. The set proper is but 15 inches high, 19 inches long and THREE INCHES deep. It is compact enough to use for a portable, may be mounted in your car without taking up valuable space, installed in the Victrola, in fact a host of uses will suggest themselves.

Instant reception coming in like a rifle shot, and as quickly cleaning itself out with the slightest turn of the tuning dial. Volume enough for a convention hall, which may be shaded to a whisper without a change in its remarkable quality.

### Only 10 Feet of Wiring

In the original descriptive matter that The St. James Laboratories furnished three years ago, a sentence will be recalled. "Consider that bus wire is worth a dollar an inch and use it accordingly."

Ten feet of wire makes all connections in the St. James Upright-8 set, and there are no adjustments to be made.

## Set Builders

Here is radio's latest sensation—a quality receiver with a score of uses—so unique that it will immediately catch the eye and create interest. Be sure to build it. It will render exceptional results.

Standard parts for the complete St. James Upright-8 circuit are made by the reliable manufacturers listed below, and may be purchased from leading jobbers and dealers, but

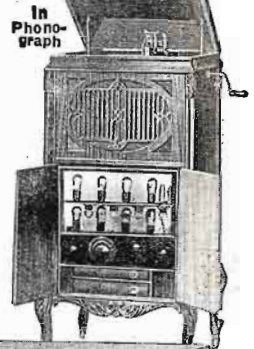
if you cannot get them, write us direct and we will see that you are supplied promptly. Read the article in this issue—then you can build your receiver in quick time and at a price much lower than otherwise, due to the small amount of wiring required. You'll then have something to crow about.

Write for free descriptive literature and astounding testimony from fans the world over.

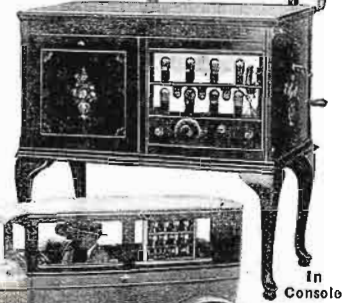
ST. JAMES LABORATORIES, 845 W. Washington Blvd., Dr. A, Chicago, U.S.A.



Robert T. St. James "Bob," as his friends know him, was inoculated with the radio bug during the first Marconi exhibit at Mechanics Hall, Boston, Mass. For several years prior to the World War, he conducted a star amateur radio station. He is a charter member of the A. R. R. L. During the World War "Bob" was one of the first to enlist. His knowledge of radio put him in command of the First Division Naval Radio School at Harvard and later as director of education at Great Lakes. 12,000 men passed through his classes during the war, some of whom are radio bugs even today. Having been identified with radio since the days of wireless, Bob's experience fits in perfectly to carry on the duties of president of the St. James Laboratories, Chicago. He is designer of various radio parts and circuits, a well-known radio author and a member of the Institute of Radio Engineers.



Showing some of the many uses for the St. James Upright-8



**Bodine De Luxe Loop Antenna**  
 New, improved. Beautiful American Walnut, smooth hand-rubbed finish. Well insulated brown silk-braid loop winding and ingenious and convenient mounting on black bakelite spreaders. Smooth-operating, noiseless. Its pick-up ability is exceptional. Small size (12x28-in. on base) makes it very convenient. Adjustable.  
 Model L-500—List price, each.....\$12.00  
 Bodine Electric Co., 2254 W. Ohio St., Chicago, Ill.

**Hammarlund Midline Condensers**  
 Soldered, non-corrosive brass plates with tie-bars; rib reinforced aluminum alloy frame; one small strip of bakelite dielectric; bronze clockspring pig-tail; friction band-brake. Features: Adjustable ball and cone bearings and a full-floating removable rotor shaft.  
 Code No. ML-17, .00035, price.....\$5.25  
 Code No. ML-23, .0005, price..... 6.50  
 Hammarlund Mfg. Co., Inc., 424-438 W. 33rd St., New York City

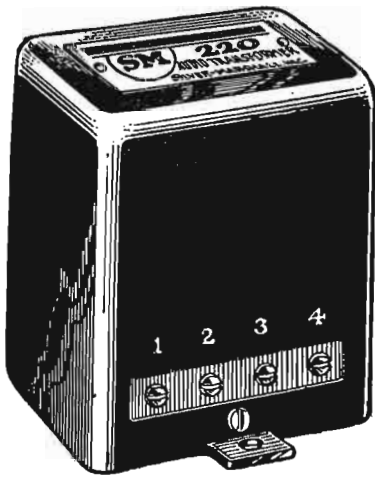
**Benjamin Cle-Ra-Tone Sockets**  
 Shock-absorbing, non-microphonic. Prevent "tube noises." Give longer life to tubes. Positive tube-to-terminal connection.  
 No. 9040—with mounting base. Price, each.....\$0.75  
 Kit of 8..... 6.00  
 Benjamin Electric Mfg. Co., 120-128 S. Sangamon St., Chicago, Ill.

**Yaxley Products**  
 Scientifically designed. Resistance unit suspended in air. Single-hole mounting (7/16-in.). Complete with bakelite knob, 20 ohms. List price.....\$1.35  
**Air-Cooled Potentiometer**  
 Same construction as rheostat. Knob and etched dial plate furnished. 400 ohms. List price, each.....\$1.75  
**Yaxley Cable Plug**  
 Makes hooking up of batteries to set easy, safe and quick. Bakelite, metal cable markers, nickel-plated parts. No. 660. Price, per set.....\$3.00  
 Yaxley Mfg. Co., 9 S. Clinton St., Chicago, Ill.

**Air-Cooled Rheostat**

# SM

## S-M IS READY— For AC Tubes, Super Quality Amplification— Or What Have You?



**A**S the 1927-28 season opens, new Silver-Marshall laboratory developments lead the field, whether it be in ultra-high quality reproduction, parts for electrification of new and old sets, or in the realm of super selectivity.

First and foremost in audio amplification stand the famous S-M 220 transformers. For over a year they have been acknowledged the finest known method of audio amplification. Experienced set designers use S-M audios in over half the season's popular circuits, for they know that a set built with S-M audio equipment is over half sold at the start. Remler depends on them for the new Infradyne, the Camfield Super Selective "9" owes its tone quality to S-M 220's—the Citizens Call Book *OWN* Receiver, the Citizens Super, counts on them. The finest amplifier known—the Unipacs—are built around them.

Broadcasting stations use them—WCAE, WEBH, WBBM, KFCR, WTAQ, KGDJ, WLBF, WCFL, the "Voice of Labor," monitors all transmissions with S-M 220's. Nathaniel Baldwin uses only S-M audios in loud speaker tests. What better recommendation is there?

Remember this—in 1927 many manufacturers having witnessed the phenomenal success of S-M audios, are copying characteristics introduced by S-M a year ago—the rising low frequency characteristic, 5000 cycle cut-off and loud speaker compensation. But no imitation ever equals an original, and no transformer now on the market or about to be introduced has anywhere near the steel or copper found in S-M 220's. And since the merit of an audio transformer is almost proportional to its size, S-M 220's remain the finest you can buy.

*S-M guarantees this unconditionally—and will refund the purchase price for any S-M audio transformer you want to try if it doesn't give the finest quality you've ever heard in your own tests.*

Type 220 is the famous husky four pound audio transformer that has outsold every other type this past year. Its primary impedance, the highest of any known transformer, insures marvelous low frequency reproduction, while its 5000 cycle cut-off cuts out back ground noise and heterodyne squeals. Price \$8.00.

Type 221 output transformer protects loud speakers from power tube plate current, and boosts low note reproduction to compensate all speakers. It is priced at \$7.50, or in type 222 with tip jacks, to improve any factory set, at \$8.00. 221 or 222 cores will not saturate in even 50-watt-tube amplifiers, so generous is their design.

Type 230 push-pull input transformer is for the fan who wants realism of reproduction in the full sense of the word. With two 171 or two 210 power tubes and a 230 and 231 in the last audio stage—well, radio becomes music with a vengeance. Price \$10.00.

Type 231 is a push-pull output transformer, for use with 230. It boosts low note reproduction as no output choke possibly can. Price \$10.00.

### For the New Tubes

For filament lighting for all of the new A. C. tubes—CX226, CX326, UY227, C327, Sovereign, McCullough, etc.—Silver-Marshall offers type 325 filament lighting transformer with one 12 ampere, 1.5 volt and one 12 ampere 2.5 volt secondaries, as well as a center tapped 5 and 7.5 volt secondary. \$8.00.

For ABC supply, S-M type 329A transformer is ideal with CX280, CX380 or Q. R. S. rectifiers and A. C. tubes, with its two 225 volt secondaries, and its three 1.5, 2.5 and 5 volt filament windings. Price \$11.00.

S-M 328 super-power transformer is the huskiest yet—a full-wave type with two 550 volt secondaries, two 7.5 volt secondaries, and one 1.5 volt secondary. It is designed for one or two 216B or new 281 type rectifiers. Price \$18.00.

Type 331 Unichoke is a full B supply choke system for up to 130 milliamperes, priced at the ridiculously low figure of \$8.00. In operation, it requires but 7 to 8 mfd. of filter capacity whereas ordinary filters use two chokes and 8 to 14 mfd. of capacity. 331 Unichoke is not only a filter necessity, but will improve any B supply, for it has no equal.

Type 512 moulded bakelite socket fits all new 5 prong A. C. tubes—UY227, C327, etc. Price 75c.

### A Truly Constant ABC Supply

The 652A, ABC power supply kit, with glow tube voltage regulator, delivers 45 volts at 10 M. A., exactly 90 volts at up to 45 M. A. and 180 volts B, 40 volts C for a 171 power tube—or any intermediate voltages may be obtained if desired. It also furnishes AC at 1.5, 2.5 and 5 volts for complete operation of any receiver using any of the new A. C. tubes. Price, less Q. R. S. 85 M. A. rectifier and CX-374 voltage regulator, \$36.50. Type 652 "Reservoir B" will operate perfectly any receiver described in the Call Book—price \$34.50, less CX374 and CX313 tubes.

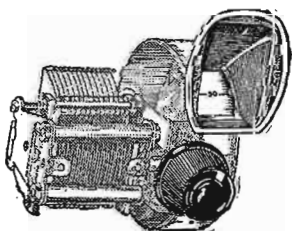
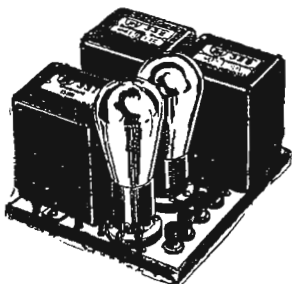
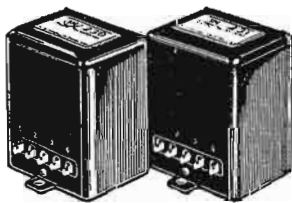
### A Universal Drum Dial

Type 805 is interchangeably right or left hand, for any condenser, clock-wise or anti-clock-wise. Easy to mount, it comes with panel window, knob, and illuminating bracket. Price \$3.00.

## Silver-Marshall, Inc.

836 West Jackson Blvd.

Chicago, U. S. A.



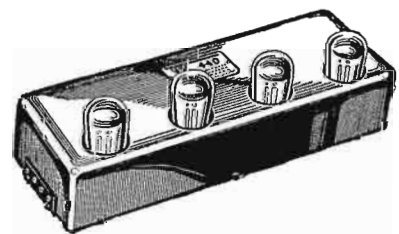
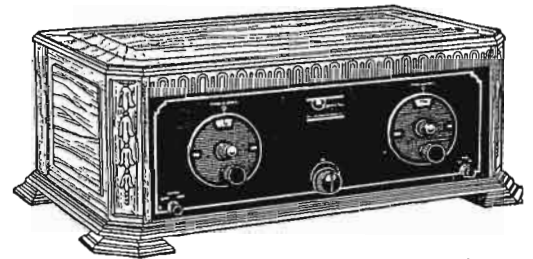
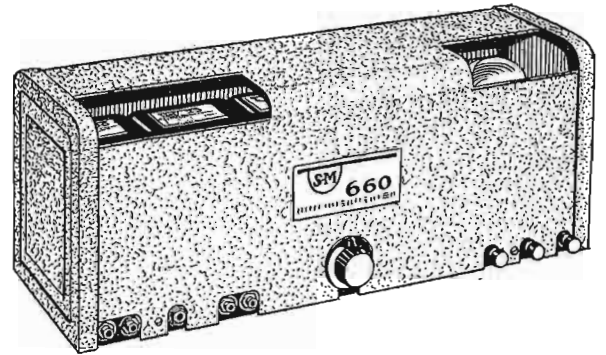


# UNIPACS— Peers of All Power Packs

**F**OR the man who is content only with quality of reproduction truly realistic—as far ahead of any ordinary amplifier as the cone is ahead of a 1920 “loud-speaker”—S-M Unipacs offer positively marvelous realism of sound reproduction. They provide the same fine qualities that have placed S-M audio transformers far in the lead for audio amplification, plus the full advantages of *real* push-pull amplification with 210 or 171 tubes. All are housed in attractive brown crackle-finished steel cases; all will provide receiver B power as well as a stage of truly amazing power amplification. They may be built as phonograph amplifiers, two stage amplifier, ABC supplies—in fact, are of universal application.

Type 660-210 is a push-pull 210 power pack delivering from 4 to 17 times more power than any other 210 packs. Its quality of reproduction is guaranteed unequalled by any other known amplifier. It uses two CX-310 amplifier tubes, two CX316B or CX381 high power rectifiers, and one CX374 glow tube. Price, knock-down, \$83.25, or assembled ready to use, \$93.25.

Type 660-171 is a lower powered unit, especially recommended as a third stage power amplifier for the new Infradyne or similar receivers, to which it will also supply all needed B power. Actually, it is more powerful than average 210 power packs. Price \$64.00 knockdown, or \$74.00 assembled, less two CX-371 amplifier tubes, one CX374 regulator tube and Q. R. S. 85 M. A. rectifier tube. After September 1st, add \$2.00 to above prices for extra filament windings for A. C. tubes, allowing Unipac to operate as complete ABC power supply.



### 'Ever Hear a Real Receiver?

The Shielded Six—unquestionably the finest tuned R. F. receiver ever offered, is now ready in an improved model with hair-splitting selectivity, volume and distance to spare, and that same tone quality that has made practically every builder unreservedly and enthusiastically say—“the Shielded Six is the most wonderful receiver I’ve ever heard or built.”

The Improved Shielded Six may be built for complete light socket operation, or for battery operation. Or for the man who wants the finest at any cost, it may be built with self contained 210 push-pull amplifier with all advantages of the super-power Unipac. Priced at \$95.00 for the receiver kit, including metal chassis, decorated bronze panel, individual stage shields, matched condensers and R. F. transformers, the “Six” is dollar for dollar, radio’s best “buy,” for it makes and holds thousands of *satisfied* users.

### Here Is What Users Say of the Shielded Six

Gentlemen: Ft. Wayne, Ind.  
I have built your Silver Shielded Six and have gotten such extraordinary good results that I wish to take opportunity to congratulate you on this wonderful set. The set is very selective and easy to tune and has the best tone quality I ever heard. The Six is the greatest DX receiver that is made. I've had it only three months and heard 160 stations and all on a Western Cone speaker, never use phones. I've heard CZE, Mexico City, PWX, Havana, KOMO, KFI, KGO, KNX, KLB, WAPI, KFJ, CNRM, CKY, WCOA, WPHH, WOKO, 25 stations from Chicago, 15 from New York state and from all over the country and Canada. And most of my stations from California are verified. I use a 50 ft. aerial. Can get KDKA and Chicago stations without an aerial.  
Yours truly,  
HENRY WITTBBER.

Gentlemen: Drexel Hill, Penna.  
In two weeks' time I have logged 103 stations including four on the Pacific Coast, three locals and at no time have I stayed up later than 12:30 Eastern Standard time. The Pacific Coast stations have been verified as a matter of record. We have seven locals and WJZ and WEAJ practically the same as locals broadcasting simultaneously. I have listened to KFI while the powerful WJZ and WEAJ were on the air and 3 1/2 points away listened to the coast.  
I am operating the set from a second floor apartment aerial including lead amount to 65 feet.  
I have a boy nine years old and he tunes distant stations with ease, showing the set very simple to operate. Again I thank you for placing such a wonderful circuit on the market. Respectfully yours,  
CHARLES L. WALL.

### For Super Selectivity

The S-M 440 Jewelers Time receiver is a copper and brass catacomb housing a three stage tuned R. F. amplifier and detector. Laboratory calibrated and peaked to exactly 112 K.C. Arlington's wavelength, it is so sharp that no interfering stations can be admitted. Large, low resistance tuned air-core transformers in individual shielded stages insure tremendous selectivity and far greater amplification than can possibly be secured from long wave amplifiers built of individual parts. Price \$35.00, assembled, wired and laboratory calibrated.

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We can't tell you the whole story of new S-M developments here, but if you'll just mail in the coupon with 20c for postage and mailing, we'll send you more new “dope” than you could get out of a text-book in a month of Sundays—and it's good money making dope, too.

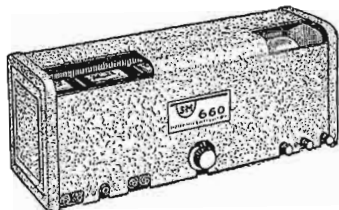
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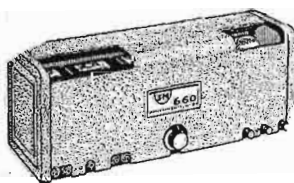
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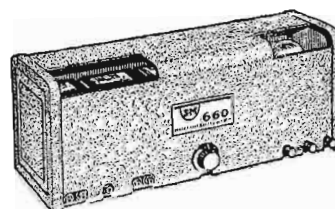
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**If you build sets yourself and do not wish us to build them, write for our PROFESSIONAL SET BUILDERS' CATALOGUE.**

All orders for constructed Sets must be accompanied by Money Order, Cashier's Check or Certified Check, for 25% or more of total.

If you have not had experience in ordering by mail, and are in doubt as to the safety of purchasing in this way, ask your Postmaster or Mail Man and he will tell you.

|   |          |
|---|----------|
| Improved Silver Laboratory Model Super.....         | \$ 89.45 |
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| Camfield Super Selective Nine.....                  | 124.70   |
| Victoreen Standard Dial.....                        | 88.05    |
| Victoreen Single Dial with Victoreen New Audio..... | 114.00   |
| World's Record Super Ten.....                       | 123.58   |

|   |          |
|---|----------|
| Improved Remler 45 K. C. Super.....   | \$109.00 |
| H. F. L. Nine-in-Line Receiver.....   | 125.00   |
| Magnaformer 9-8 Receiver.....   | 121.00   |
| Karas Electric 2 Dial Equamatic.....  | 94.25    |
| Electrically Operated T. R. F. Receiver.....                                | 91.00    |
| The "Best Lincoln" Nine Super-Heterodyne Receiver....                       | 116.75   |
| Melo-Heald Hot Spot Fourteen.....   | 153.00   |
| Aero Seven Receiver.....  | 59.20    |
| An Ultra-Powerful Distortionless Amplifier for Radio Set or Phonograph..... | 83.25    |

In addition to above Kits, we are in position to make Madison-Moore or B. T. Circuits.  
 Account not having new line-up of above Kits we are unable to give prices. All above prices are without Cabinets, and are as the Parts are specified in CALL BOOK.  
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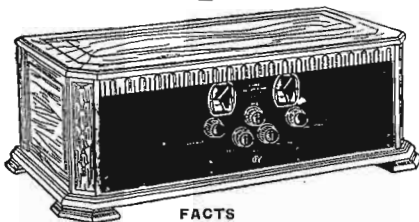
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SUCCESSORS WHOLESALE RADIO CO. OF MISSOURI

## The Improved Shielded Laboratory Receiver



FACTS

**Sensitivity:** The Laboratory Receiver, in direct comparative tests, will bring in with loud speaker volume stations barely audible upon seven and eight tube shielded neutrodyne. Compared to other super-heterodynes, it will give greater volume, and generally bring in more stations, than any other eight or nine tube sets.

**Selectivity:** Located in Chicago, the Laboratory Receiver will allow reception of out-of-town stations within 7 to 10 kilocycles of powerful locals. In comparative tests, it will give greater selectivity than any eight or nine tube super that can be built from standard parts. In fact, the set is so selective that it will take a week's careful combing of the broadcast range to log all stations within range!

**Range:** On short waves below 200 meters, the range is unlimited—5,000 to 12,000 mile reception is not at all unusual. In the 200 to 500 meter broadcast band, the range is 1,000 to 10,000 miles, but is guaranteed equal to or greater than that of any other receiver. Between 500 and 3,000 meters, the range is guaranteed greater than that of any other receiver.

**Volume:** It can only be stated that the volume of the Laboratory Receiver is equal to that of any standard receiver, and is guaranteed equal or greater than that of any eight to ten tube set.

**Wavelength Range:** .30 to 3,000 meters with standard interchangeable plug-in coils.

**Amplification:** The first detector and oscillator give a voltage amplification of 25; the long wave and second detector 10,000 (10x10x10x10 for four tubes) and the audio amplifier, 400 (20x20 for two stages). The overall amplification is thus seen to be 100,000,000—about 80 times that of average eight tube super-heterodynes; about twice that of the best eight tube neutrodyne, and 20 times that of average seven tube shielded neutrodyne. The one hundred million amplification figure for the Laboratory Receiver is without extremely critical adjustment—critically adjusted for a very weak station, it will go up to a billion times or more!

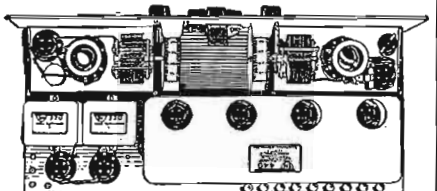
FROM the Setbuilders Supply Co. you can get all parts for the new Laboratory Receiver, each and every item most carefully inspected and checked, and with a guarantee that your set, assembled from these parts, will give you results you've never had before on any set. You can also buy tubes, batteries, cabinets and loud speakers specially approved and tested for the Laboratory Super by McMurdo Silver and Ernest R. Pfaff.

It goes without saying that you want to own the Laboratory Receiver, just as you want the best of anything. And the Laboratory Receiver is the best, for it has features that you won't find in the most expensive factory set you could buy. Take its selectivity for instance—it will tune in out of town stations through local interference that paralyzes ordinary sets. It's so sensitive it brings in these same stations with tremendous punch—when other sets don't even get through.

Then, its appearance is in the three to five hundred dollar class, though you're not handicapped by a factory cabinet—you can put your set in any cabinet or console that suits your taste.

**Guarantee**

The Setbuilders Supply Company unconditionally guarantees the performance of any receiver built from the parts listed above to be superior to that of any other eight-tube receiver.



**TESTED AND GUARANTEED PARTS EXACTLY AS SPECIFIED FOR THE LABORATORY RECEIVER**

|   |         |
|---|---------|
| 1 Van Doorn panel and chassis unit, pierced, with hardware..... | \$ 8.50 |
| 1 Carter .00015 condenser with leak clips                       | .50     |
| 1 Carter M-200 potentiometer.....                               | .75     |
| 2 Carter No. 105, 1/2 mfd. condensers at 90c                    | 1.80    |
| 1 Carter 3 ohm rheostat.....                                    | .50     |
| 1 Carter battery switch.....                                    | .50     |
| 4 Carter No. 10 tipjacks at 10c.....                            | .40     |
| 1 Polymet 2 megohm leak.....                                    | .25     |
| 2 S-M 220 audio transformers at \$8.00.....                     | 16.00   |
| 4 S-M 511 tube sockets at 50c.....                              | 2.00    |
| 2 S-M 805 vernier drum dials at \$8.00.....                     | 6.00    |
| 1 S-M 275 RF choke.....   | .90     |
| 1 S-M 342 condenser.....  | 1.50    |
| 1 S-M 440 tune signal amplifier, 112 K. C.                      | 35.00   |
| 2 S-M 515 coil sockets at \$1.00.....                           | 2.00    |
| 2 S-M 111A coils at \$2.50.....                                 | 5.00    |
| 9 X-L binding posts at 15c.....                                 | 1.35    |
| 2 S-M 320 .00035 condensers at \$3.25.....                      | 6.50    |

\$89.45

(If shielded oscillator and first detector are desired, add \$4.00 for 2 S-M 681 stage shields.)

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 Please send me all data on the Laboratory Receiver, for which I enclose 10c.

**Setbuilders Supply Co.**  
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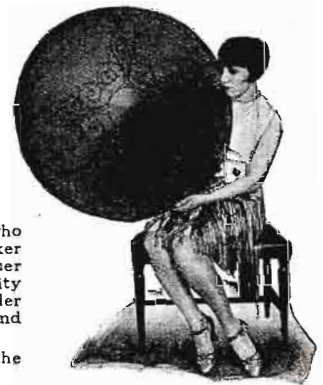
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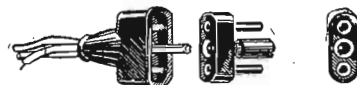
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THE STANDARD SET CONNECTOR



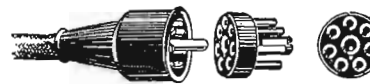
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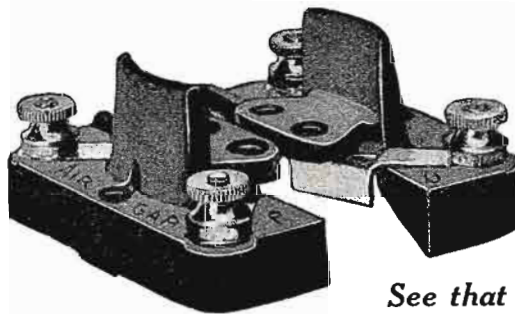
**Your Socket Is Next in Importance to Your Tube. Tube Capacity and Socket Capacity Mean the Same Thing**

When you select tubes on account of their low capacity, so essential in any T.R.F. or regenerative set, don't make the mistake and select a socket which adds to that tube capacity and neutralizes and does away with the advantages derived from the use of those efficient tubes.

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TEST AIRGAPS by replacing your present sockets with AIRGAPS and note the improvement which you will easily detect. You will then appreciate the reason for the gap.

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THE GAP has the same effect as omitting the socket entirely. It creates a higher resistance path between GRID-PLATE terminals; decreases high frequency losses through and over the socket body, reduces undesirable feedback and inter-coupling to a minimum, makes your set more easy to neutralize and control, causes it to go into oscillations more smoothly and not "spill" over until maximum results are had. You get maximum output at plate.

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*Tell 'Em You Saw It in the Citizens Radio Call Book*

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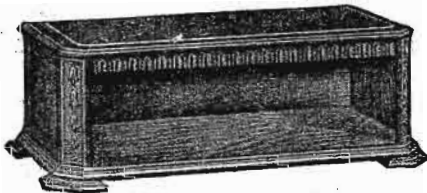
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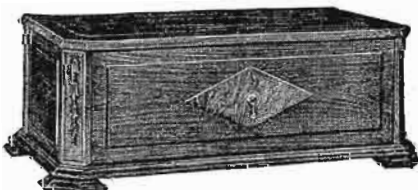
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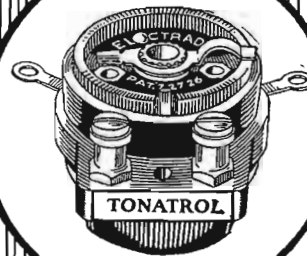
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The schematic wiring diagram shows in a symbolic manner each piece of apparatus and all connections between component parts. It is of exceptional value to the experienced builder in that it allows an instant visualization of the circuit. The graphic wiring diagram is helpful to the less experienced builder, since it illustrates in a pictorial way all connections made between the various parts. Each instrument is carefully drawn to scale, with all terminals plainly marked so that the receiver may be completely assembled and wired with no chance of error even though the person has no knowledge of radio symbols.

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| No. 3  | Qualitone 5 Tube T. R. F. Receiver (5 drawings).....                               | 1.50   | No. 49 | The Victoreen Universal Super-heterodyne Receiver.....                  | 1.40 |
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| No. 5  | General Radio Universal Receiver (5 drawings).....                                 | \$1.50 | No. 52 | The Improved Nine-in-Line Super Using 201-A Tubes (5 drawings).....     | 1.50 |
|        |  |        | No. 53 | A Compact "B" Supply with Voltage Regulator Tube.....                   | 1.40 |
|        |  |        | No. 54 | A Self Modulated Oscillator.....  | 1.40 |
|        |  |        | No. 55 | A 30 K. C. Super-heterodyne Receiver.....                               | 1.40 |
|        |  |        | No. 56 | The Improved Browning-Drake.....  | 1.40 |
|        |  |        | No. 58 | The "World's Record" Super Nine.....                                    | 1.40 |

## Full Size Graphic Wiring Diagrams

|        |  |        |        |   |        |
|--------|--|--------|--------|---|--------|
| No. 77 | The St. James Semi-Portable Receiver.....                              | .60    | No. 27 | 5 Tube Non-Radiating Receiver using Resistance Coupled Amplifier..... | .60    |
| No. 78 | The Silver-Marshall Unipac.....  | .60    | No. 38 | Premier 6 Tube T. R. F. Receiver.....                                 | \$0.60 |
| No. 88 | Two-Tube Browning Drake with Power Supply.....                         | .60    | No. 39 | Unicontrol Nine-in-Line Super-heterodyne Receiver.....                | .60    |
| No. 20 | Silver-Marshall Improved 7 Tube Super-heterodyne Receiver.....         | \$0.60 | No. 40 | Inexpensive 5 Tube T. R. F. Receiver.....                             | .60    |
| No. 21 | All American 5 Tube Toroid Receiver.....                               | .60    | No. 41 | Samson Special T. C. Receiver.....                                    | .60    |
| No. 22 | Premier 5 Tube T. R. F. Receiver.....                                  | .60    | No. 43 | Six Tube T. R. F. Receiver using Alden Localized Control.....         | .60    |
| No. 26 | 4 Tube Non-Radiating Receiver using Audio Frequency Amplification..... | .60    | No. 59 | An Impedance Coupled Super-heterodyne Receiver.....                   | .60    |

Any of the above blue prints will be sent postpaid by return mail upon receipt of the proper amount or they can be obtained from any of the Radio jobbers advertising in this publication

# CITIZENS RADIO SERVICE BUREAU

508 So. Dearborn Street

Room 750

Chicago, Illinois

# SANGAMO

## MICA CONDENSERS

### UNAFFECTED

by

# MOISTURE



When the humidity hovers around 100, the components of your radio receiver are subjected to the equivalent of a water bath!

You can make certain, at least, that the fixed condensers in the circuit will not alter in capacity or efficiency under these conditions.

Use Sangamo Mica Condensers---they are permanently protected from *all* atmospheric action by a solid sheathing of pure bakelite!

**Sangamo Electric Co.**  
Springfield, Illinois

0836-3

## PURCHASE effective voltage rating

# PARVOLT

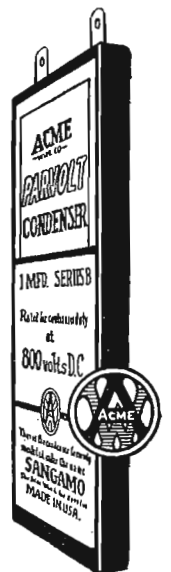
## WOUND CONDENSERS

Wound condensers for use in the filter circuits of current supply units should be rated for continuous duty at their full marked voltage.

"Flash tests" are valueless. Condensers can be made of the cheapest materials which will not break down under a "flash test" of 1500 volts, yet they may fail after 6 hours of continuous duty at 400 volts!

Parvolt Wound Condensers are made in 3 service voltage ratings:

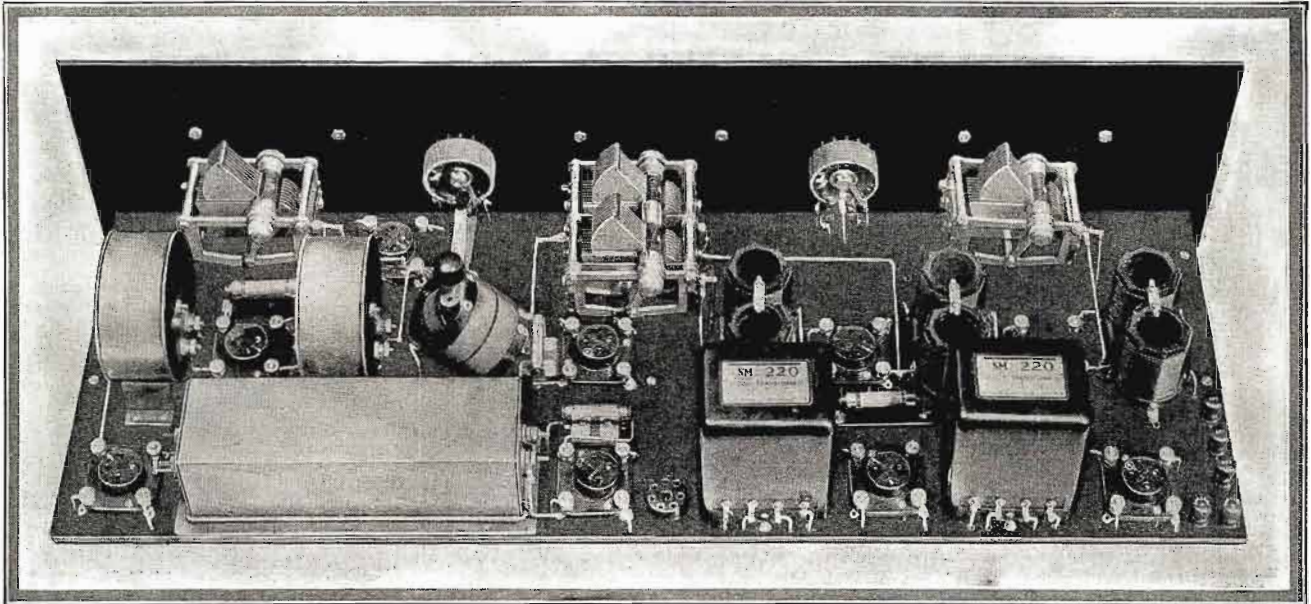
Type A— 400 Volts d.c.  
Type B— 800 Volts d.c.  
Type C—1000 Volts d.c.  
(Continuous Duty)



**ACME WIRE COMPANY**  
New Haven, Connecticut

Tell 'Em You Saw It in the Citizens Radio Call Book

# Camfield Super-Selective "9"



## Using the FAMOUS RUSCO BAND PASS FILTER is the Most Sensitive and Selective Circuit ever developed

The circuit used has many features of proven merit never before incorporated in a radio receiving set. Outstanding among these features is the use of the famous Rusco Band Pass Filter in the intermediate frequency amplifier. This filter is designed to pass a band of frequencies 10 kilocycles wide. The amplification over this band is uniform and the cut-off on either side is extremely sharp. The result is perfect selectivity between wave bands of only 10 kilocycle separation in frequency. The uniform amplification over the band maintains perfect tone quality. The selectivity of this device is so perfect that it permits the use of radio frequency amplification ahead of the Super and the operation of the set on an antenna. This makes the Camfield Super-Selective 9 the most sensitive receiver ever developed. The net result is the simultaneous increasing of both sensitivity and selectivity to a degree heretofore considered impossible.

The turning of a switch on the panel converts this set from a five-tube two control radio frequency receiver for the reception of local stations, to a nine-tube super-selective and super-sensitive circuit capable of tuning through powerful local stations and receiving distant stations from coast to coast on a 10 kilocycle separation of frequencies.

This new circuit is easy to construct and simple to operate and comparatively inexpensive. It is entirely free from disturbing oscillator harmonics and it will out-perform any radio set you have ever used.

Jobbers, Dealers, Set Builders and Set Manufacturers!

Write for Detailed Information

**CAMFIELD RADIO MANUFACTURING COMPANY**  
35 Wacker Drive, Chicago, Illinois

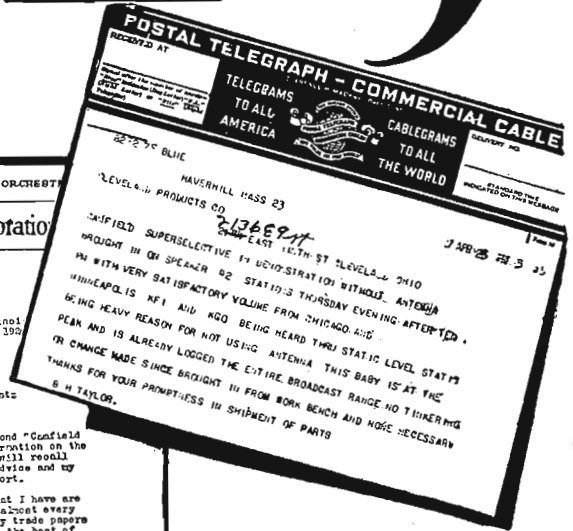
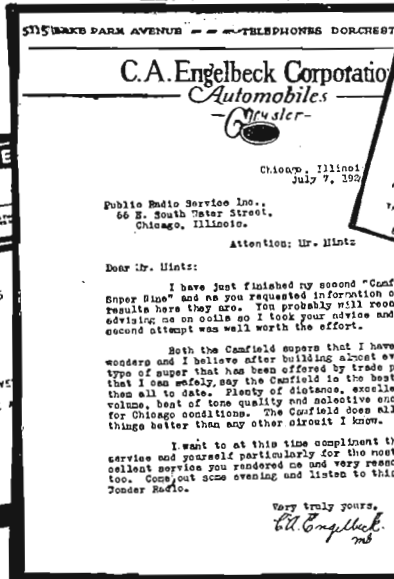
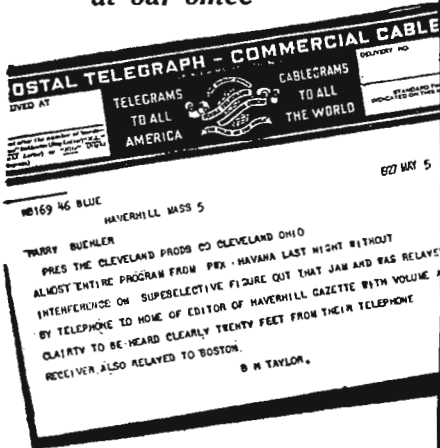


Tell 'Em You Saw It in the Citizens Radio Call Book

# Camfield Super-Selective "9"

## 3 Messages that tell their Own Story

Original copies on file at our office



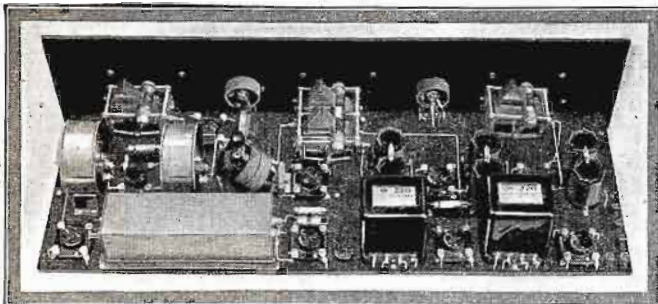
**Mr. Set Builder:  
You can duplicate these astounding results**

Camfield Radio Mfg. Co., 35 E. Wacker Drive, Chicago

SERVICE - PRICE - DELIVERY - INSPECTION - HONESTY - COURTESY ON

## Camfield Super-Selective 9

Using the Famous Rusco Band Pass Filter



### "See Telegrams Above"

We have shipped Complete Parts for CAMFIELD to Portland, Oregon, Hollywood, Calif., San Antonio, Texas, Brooklyn, N. Y., in fact ALL OVER UNITED STATES. There must be a reason why we get these orders from all over the Country. Order NOW—before the RUSH.

COMPLETE KIT OF PARTS FOR \$123.20  
CAMFIELD SUPER-SELECTIVE 9

Set of 6 Actual Size Blue Prints, \$1.50

### ALSO PARTS FOR

The New Camfield Duoformer Seven—Described in this issue

MADISON-MOORE, One Spot, Two Spot and Electric A. C.  
VICTOREEN, Transformers, Rheostats Master Control, etc.  
LINCOLN, Transformers.

REMLER, Transformers, parts, etc.  
THORDARSON, 210 and 171 Compacts, resistances, condensers, etc.  
MAGNATRON, 226 and 227 AC Tubes.  
PENN 36" Cone Parts and Speakers.

Any of these parts sent on receipt of remittance

Complete Stock of Quality—Nationally Known Apparatus.

NO Set Builders or Dealers Inquiries Answered Unless Accompanied by Trade Statement

## THE CLEVELAND PRODUCTS COMPANY

"Radio Distributors Since 1922"

2136-8 East Ninth Street, Cleveland, Ohio

References: The Cleveland Trust Co., R. G. Dun & Co., Radio Manufacturers Above

Tell 'Em You Saw It in the Citizens Radio Call Book

# Camfield Super-Selective "9"

## RUSCO BAND PASS FILTER ASSURES

10 K. C. SEPARATION



Rusco Type 10 Kc. Band Pass Filter, Price \$15.00

You wouldn't use a car like this in 1928  
Then Why Build a Super that  
doesn't use  
**A RUSCO BAND PASS FILTER?**

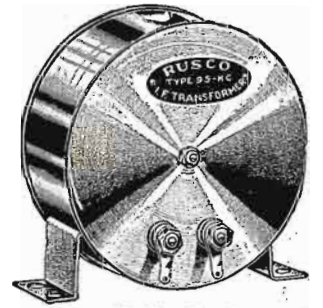


A good Super-Heterodyne is generally considered to be the Rolls Royce of radio receiving sets. If a man spent \$8000 for a Rolls Royce automobile that didn't have a self-starter he would be considered a good prospect for a padded cell. Then why spend good money building a Super-Heterodyne that does not incorporate a Band Pass Filter?

From a technical standpoint the band pass filter is the only satisfactory way to give 10 kilocycle separation of frequency and at the same time to maintain perfect tone quality.

The Rusco Band Pass Filter has been incorporated in the Camfield Super-Selective 9 and its use makes that circuit the most sensitive and selective one ever developed.

If you are interested in better tone quality and better selectivity coupled with more sensitivity than anything that has ever been on the market, build a Camfield Super-Selective 9 using the famous Rusco Band Pass Filter.



Rusco Type 95 Kc. Transformer, designed for use with the Rusco 10 Kc. Band Pass Filter, Price \$6.00

**RUSCO SALES CO., 35 East Wacker Drive, Dept. CB, Chicago**

A POST CARD WILL BRING IT!



*The Catalog every Set Builder should have*

### ALL THE LATEST KITS

In this large complete catalog you will find listed all the latest kits. It shows one of the largest and most complete radio stocks of standard merchandise to be found in the middle west. Indispensable to amateurs, experimenters and set builders. The Harco policy protects you. Don't place your order until you receive a Harco catalog.

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Set builders have been quick to appreciate the many advantages we offer. All standard new merchandise—prompt service and one of the largest stocks in the middle west means that you get what you want when you want it. Write now for your copy and try us out on your next order.

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Hundreds of dealers throughout the country have learned to depend on Harco Service. Our "same day shipment" policy has enabled them to carry small stocks and effect quick turnovers. Complete lines of standard parts, accessories, kits, furniture and sets are on hand for immediate shipment. Drop us a card today.



*The* **HARCO COMPANY**

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CHICAGO

Tell 'Em You Saw It in the Citizens Radio Call Book

# Camfield Super-Selective "9"

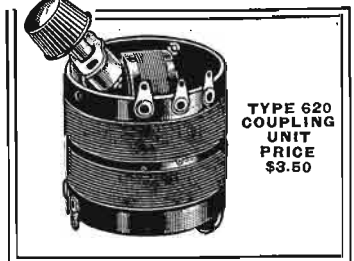
USES THE NON-OSCILLATING

## Camfield Duoformers

The Camfield Super-Selective 9 is stable in operation and entirely free from disturbing squeals and howls. This is because the famous Camfield Non-Oscillating Duoformers are used for the radio frequency transformers.

These Duoformer Coils are a product of the Engineering Department of the Camfield Radio Manufacturing Company and have been so designed that properly constructed radio frequency amplifier circuits using them will be entirely free from disturbing oscillation. This is accomplished without the use of neutralizing condensers of any kind and is an exclusive feature of Camfield Duoformers.

**CAMFIELD RADIO MFG. COMPANY**  
35 East Wacker Drive, Chicago, Ill.



**New** **136 Pages**

**WHOLESALE CATALOG**  
Sets Parts Kits and Everything in RADIO

# WHOLESALE Catalog

**Sent FREE to Dealers** The most complete radio catalog ever published is now ready. Prepared by one of the oldest and largest radio pioneers. All the leading nationally advertised radio sets, accessories, parts and kits are shown. Many of these are featured now in this magazine or will soon be announced to the trade.

**Electric and Non-Electric Set** You will see every style of new six, seven and eight tube electric and non-electric sets listed. The low prices will surprise you.

**New Low Prices on "A" and "B" Eliminators** Never before have such high quality "A" and "B" Eliminators been offered to the trade at these prices. In addition you will find the book full of rare values in loud speakers, chargers, cabinets, consoles, kits, parts and all radio merchandise. Complete information for converting old sets into electric sets.

**Why the Prices are Lower** Our tremendous buying power commands rock bottom prices on raw materials which we use in our own manufacturing. In scores of other cases we buy the entire output from factories. These worth-while savings are passed on to you.

**Send For This Book Today** Take one of your letterheads now and write for this valuable new catalog. All merchandise listed is ready for immediate shipment. Get this book now.

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711 West Lake Street, Dept. 24, Chicago, Ill.

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"The House of Service" Philadelphia, Pa.

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| BEST LINCOLN NINE     | NEW TWO CONTROL EQUA- |
| CITIZENS SUPER NINE   | MATIC RECEIVER        |
| NEW INFRA DYNE        | WORLD'S RECORD SUPER  |
| MELO HEALD FOURTEEN   | TEN                   |
| MAGNAFORMER RECEIVER  | CAMFIELD SUPER SELEC- |
| VICTOREEN             | TIVE NINE             |
| SAMSON SUPER          | RAYTHEON ABC POWER    |
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We carry the largest and most complete stock of QUALITY RADIO PARTS in the East. Check the above list of Kits and you will agree it is a complete one. And we can make 24-Hour Delivery on all lines we distribute—"Making the best better"—that's LEWIS SERVICE.

OUR 1928 CATALOGUE is a "Money-Saver." It is very complete and contains our entire list of Radio Lines. WRITE FOR IT TODAY!

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# SENSATIONAL NEWS!

—for YOU—Mr. Dealer—  
in our Big—New 1928 Catalog

THIS is the Greatest MONEY SAVING Radio Catalog. It describes the best in radio—shows how you can SAVE MONEY. Contains all the latest radio information. Write for your copy today. It's free.

New Kits featured include: Aero—Bodine—Camfield—Citizens—H-F-L—Infra dyne—Karas—Melo—Heald—Scott's—Silver Marshall—St. James—Tyrmat—etc.

Established 1918

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**WHOLESALE ONLY**

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Should first get our free 400 page Radio Catalog, illustrating the products of over 100 radio manufacturers. Parts and accessories for all the latest circuits.

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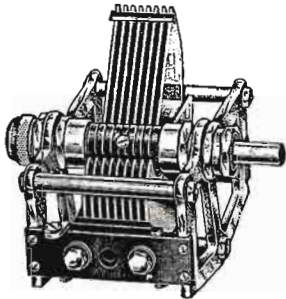
Tell 'Em You Saw It in the Citizens Radio Call Book



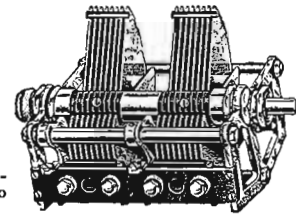
# Camfield Super-Selective "9"

## USES THE FAMOUS CAMFIELD EQUALTUNE CONDENSERS

The following features of the Camfield Equaltune Condensers are not to be found in any other one Condenser on the market:



Manufactured in all popular capacities and in units of one to five gangs.



1. To facilitate sharp tuning and perfect balancing in sets of the unit control type, the Camfield Equaltune Condensers are provided with a special adjustment feature which makes possible the perfect equalization of all circuits after the receiver has been completely wired. This eliminates the necessity for using Vernier or trimmer condensers of any kind. Complete instructions and a special tool for making this adjustment are packed with each double and three-gang condenser.
2. The shaft may be shortened or lengthened or entirely removed without affecting the adjustment of the rotor plates. This provides a simple means for connecting several units together with a single shaft and anywhere from one to six condenser units may be operated with one dial.
3. The Condenser is so designed that it may be mounted from either end. This is accomplished by reversing the shaft cap nut and the panel mounting nut. After the shaft cap nut has been removed the shaft may be extended from the opposite end of the condenser by loosening the set screws on the rotor hub.
4. A variable spring tension is provided and the rotor is mounted on ball bearings which insure extremely smooth running over a long period of operation.
5. Camfield Equaltune Condensers are beautifully finished. The rotor and stator plates are of bright dipped brass. All other parts are hand buffed and nickel plated.
6. A pair of special brackets for mounting the condensers on a base-board or sub-panel can be obtained at a slight additional cost. With the use of these brackets several single condensers may be mounted in a row on a base-board or sub-panel and all operated with a single shaft.

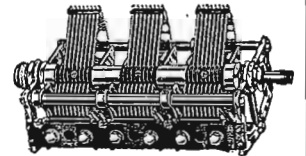
CAMFIELD RADIO MFG. COMPANY

35 E. Wacker Drive

Chicago, U. S. A.

### Sizes and Prices

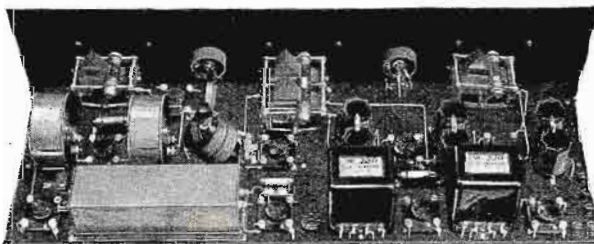
| Type             | Capacity | Price   | Type             | Capacity | Price   | Type                 | Capacity | Price   |
|------------------|----------|---------|------------------|----------|---------|----------------------|----------|---------|
| 151 (Single)     | .00015   | \$ 5.00 | 352 (Two Gang)   | .00035   | \$10.50 | 502 (Two Gang)       | .0005    | \$11.50 |
| 251 (Single)     | .00025   | 5.50    | 353 (Three Gang) | .00035   | 15.00   | 503 (Three Gang)     | .0005    | 16.00   |
| 252 (Two Gang)   | .00025   | 10.00   | 354 (Four Gang)  | .00035   | 18.00   | 11 Mounting Brackets |          | .25     |
| 253 (Three Gang) | .00025   | 14.00   | 355 (Five Gang)  | .00035   | 21.00   |                      |          |         |
| 351 (Single)     | .00035   | 5.75    | 501 (Single)     | .0005    | 6.00    |                      |          |         |



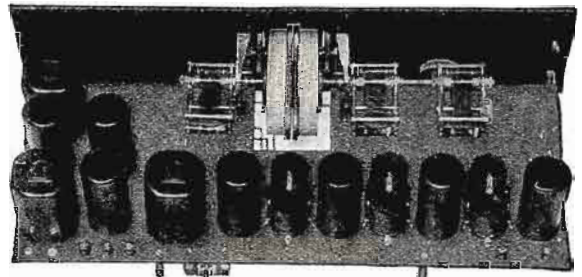
## 24-HOUR MAIL ORDER SERVICE

On the Two Outstanding Kits of the Season

"CAMFIELD SUPER-SELECTIVE 9" "CAMFIELD DUOFORMER 7"



See This Issue for Complete Description



The Camfield Super-Selective 9 using the famous Rusco Band Pass Filter is unquestionably the finest super ever developed. Its combined tone quality, sensitivity and selectivity surpasses that of any other radio set that you can build or buy. Read the complete description of this wonderful circuit in the editorial columns of this issue.

Complete parts for the Camfield Super-Selective 9, including drilled sub-panel and drilled and engraved front panel.....\$123.20  
Blueprints extra..... 1.50

The Camfield Duoformer 7 is a two control radio frequency circuit using two tuned stages and one untuned stage of radio frequency amplification together with push-pull audio frequency amplification. For general performance this circuit is not surpassed by any other seven tube R. F. receiver. Its tone quality is absolutely the finest you have ever heard. Read the complete description of this circuit in the editorial columns of this issue.

Complete parts for the Camfield Duoformer.....\$105.30  
Blueprints, extra..... 1.50

### DEALERS AND SET BUILDERS WRITE FOR OUR 1927-28 CATALOG

Listing all of the leading parts and kits on the market. We carry the most complete stock of radio parts in the state of Ohio, and on all standard equipment we can make shipment within twenty-four hours after your order is received. In addition to the above outstanding kits we also specialize in

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Rex-Lincoln Super-Heterodyne

Magnaformer 9-8  
Karas Equamatic  
Silver-Marshall Unipac

Silver-Marshall Six  
National Browning-Drake  
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Distributors for SPARTON AND A-C DAYTON SETS

SPECIAL NOTICE: Dealer and set builder inquiries and requests for catalogs must be written on business letterhead and accompanied by trade statement.

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Tell 'Em You Saw It in the Citizens Radio Call Book

# Camfield Super-Selective "9"

## MEANS PROFIT TO SET BUILDERS

On actual demonstration the Camfield Super-Selective 9 will out-perform any other receiver.

The circuit used has many features of proven merit never before incorporated in a Radio receiving set. These features result in an outstanding achievement, namely: The simultaneous increasing of selectivity, sensitivity, and tone quality to a point heretofore considered impossible.

The turning of a switch on the panel converts this set from a five-tube 2-control receiver (with low battery consumption) for the reception of local stations to a 9-tube Super-Selective and Super-Sensitive circuit capable of

tuning through powerful local stations and receiving distant stations from coast to coast on a ten kilocycle separation of frequency.

These exclusive features of the Camfield Super-Selective 9 mean quick sales and more profits for you. Do not pass up this wonderful opportunity. Set Builders in all parts of the Country who have built the Camfield Super-Selective 9 are enjoying increased sales.

We stand back of this circuit and are ready to help you in every way. If you have any special questions regarding this circuit we will welcome a personal call or a letter from you. Either will receive our immediate attention.

**CAMFIELD RADIO MFG. CO., 35 EAST WACKER DRIVE, CHICAGO, ILL.**



**STANDARD CLAROSTAT**  
Universal range—  
Carrying capacity  
20 watts.  
List \$2.25

## CLAROSTAT

To an even greater extent than in past seasons, CLAROSTAT, the greatest variable resistor, will be identified with the leaders—in receivers, in B eliminators, in power amplifiers and in A, B, C units.

Write for complete information

American Mechanical Labs., Inc.  
285 N. 6th St., Brooklyn, N. Y.

### CAUTION!

Strong efforts are being made to imitate CLAROSTAT. For your protection look for the name stamped on the shell.

**POWER CLAROSTAT**  
Universal range—  
Carrying capacity  
40 watts.  
List \$3.50

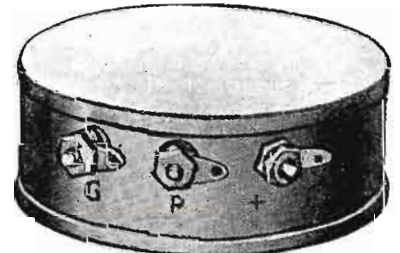


## Diamond-Weave Sickles Coils

(TRADE-MARK REGISTERED Aug. 4, 1925)

(Patented Aug. 21, 1923)

Our No. 30 Shielded Tuned Radio Frequency Transformer is designed on an entirely new scientific principle. It will tune sharply to wave lengths from 200 to 550 meters with a .00035 variable condenser. The shielding prevents intercoupling between coils, and local interference. Dimension of shield 3 in. diameter, 1 1/8 in. high.



No. 30 Shielded Tuned Radio Frequency Transformer.....\$2.00

| OTHER COIL PRICES                | Set    |
|----------------------------------|--------|
| No. 20 Craig Circuit.....        | \$4.50 |
| No. 9 Acme Reflex.....           | 4.50   |
| No. 8 Knockout Reflex.....       | 4.00   |
| No. 21 Hoyt Circuit.....         | 10.00  |
| No. 25 "Aristocrat" Circuit..... | 8.00   |
| No. 18A Roberts Circuit.....     | 8.00   |
| No. 24 Browning-Drake.....       | 7.50   |

Special Coils will be made for other circuits if desired.

Send for descriptive catalog

**THE F. W. SICKLES CO.**  
144 Union Street Springfield, Mass.

## DISTRIBUTORS OF SILVER-MARSHALL RADIO APPARATUS AND OTHER NATIONALLY KNOWN LINES

Dealers Write for

**CO-OP MONTHLY**

Net price catalog of radio and electrical devices and appliances.

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## FILTER CONDENSERS

Manufactured by Dubilier Condenser & Radio Corp.

|  |        |
|--|--------|
| 1 1/4 mfd. 1000 volts rated D. C. Working Voltage, special at, each..... | \$1.35 |
| 7 mfd. 600 volts, rated D. C. Working Voltage, special at, each.....     | 3.50   |

Manufactured by Stromberg-Carlson Tel. Mfg. Co.  
3 1/2 mfd. 600 volts rated D. C. Working Voltage, extra special at, each.....\$1.75

All of these High Quality Filter Condensers, are brand new, and guaranteed as rated. They are excellent for use in your Eliminator or Experimental Work.

**AMERICAN SALES CO.**  
21 Warren Street New York City

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OLDEST EXCLUSIVE RADIO JOBBER IN MIDDLE WEST

# CHI-RAD

## New Equipment for 1927-1928

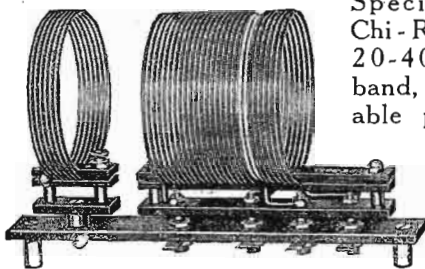
A NEW, complete stock of parts and accessories made by leading manufacturers. Set builders and dealers are urged to write for our special prices on parts to build the following sets:

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- Nine-in-Line
- Scott's World Record
- Tyrman Electric
- Victoreen
- Infradyne

### Transmitting Apparatus

In addition to our regular broadcast apparatus we carry a very good stock of transformers, chokes, grid leaks, high test condensers, etc., for transmitting purposes. All latest 1927-28 equipment.

### New Chi-Rad Short Wave Coils



Specially built by Chi-Rad engineers. 20-40-80 meter band, interchangeable plug-in coils. Including mountings and hardware. Per set, \$10.00.

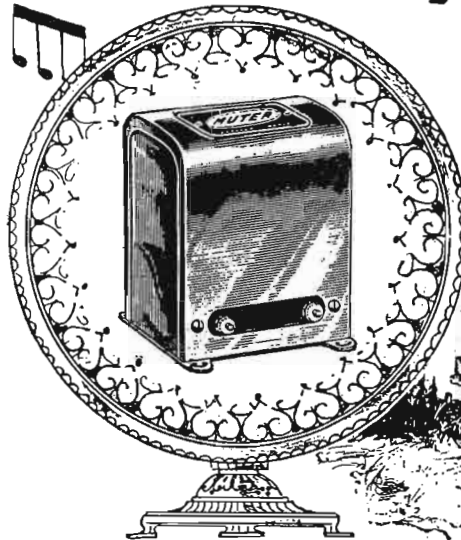
### New Catalog Ready

Dealers and set builders write for our new 1927-1928 catalog and discounts. Please use business letterhead when writing.

### Chicago Radio Apparatus Co.

415 S. Dearborn St., Dept. CB Chicago, Illinois

# What Kind of Voice Has Your Loud Speaker?



Does it S-n-n-arl? Does it Whine?

## or Does it register clear, natural Human Tones? The New Muter Clarifier

(New Output Transformer)

on your set will astonish and delight you by immediate, almost unbelievable improvement in reception. In nine cases out of ten that weak, distorted voice issuing from the speaker unit is suffering paralysis from high "B" Voltage. The Clarifier protects Speaker coils from this shattering current, assuring longer life as well as strong, full tone, clarity and volume.

If your speaker is one of the great majority that fail to respond properly to the output of the set—you need a Muter Clarifier. It's the only thing that will remedy the cause. Easily attached in a few seconds without disturbing set. Try it out to your own satisfaction on our liberal guarantee—you won't recognize your set!

### See Your Dealer—or Send Direct

Dealers can easily secure Muter Products for you from leading Jobbers. If, however, you have any difficulty in obtaining from your dealer, mail coupon direct to us. Prompt shipment will be made upon receipt of price, or C. O. D. if preferred. Give your speaker a chance to produce its utmost. Mail coupon today.

### Leslie F. Muter Company

76th and Greenwood  
Dept. 502-M,  
CHICAGO, ILL.



### Dependable Products

The complete Quality Popular Priced Line  
Send for Comprehensive Catalog



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Chicago, Ill.

- Send Muter Clarifier at once, postage prepaid. \$5.00 is enclosed.  Send C.O.D.
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Tell 'Em You Saw It in the Citizens Radio Call Book

**DEJUR METALIZED DEJUR** **FORMICA PANELS** **SAMSON**  
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**ARE YOU PAYING TOO MUCH**

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**"ENSCO" 3 ft. CONE**  
**The World's Finest Loud Speaker**  
**in Kit Form \$10**  
**Standard Kit With Wall Frame.....\$11**



Thousands of "Enesco" speakers are now in use proving that our guarantee is not overstated. "We guarantee this speaker to be the equal of any manufactured cone speaker at any price."

Now with the new and improved "Enesco" Unit and the more attractive decorated cone, the "Enesco" is an even better buy than ever before.

The leading Radio Engineers, Magazines and Newspapers of America have endorsed this famous speaker. Enthusiastic articles are constantly appearing telling of the marvelous results of the "ENSCO."

Every tone broadcast is faithfully reproduced. The large surface of the cone brings out the bass notes which are usually lost by ordinary speakers. Can be operated from a whisper to full orchestra strength without a trace of distortion or chatter. Materially reduces static, assuring clear reception all summer!

Kit includes "Enesco" Direct-drive unit, designed and patented by Clyde J. Fitch. Beautifully decorated Alhambra FON-O-TEX cone material; Metal Apexes; Extension Pin; and 12 page illustrated Book of Instructions for easy assembly of any of six styles of cone or roll shape, sizes 24, 30 or 36 inches. Wall, Pedestal or Console speaker. You can build it in less than an hour.

Buy without hesitation on our absolute guarantee. **YOUR MONEY BACK** if you are not more than satisfied. Works on any set with ordinary tubes or power output. At your dealer's or direct from any of the offices listed below. Send check, money order or C.O.D. Shipping charges prepaid.

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**RESISTANCE SPECIALISTS**  
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**Power Rheostat for Socket Power Sets**—Designed for large current carrying capacity. Large Bakelite base 2 3/4 inches in diameter. Single-hole mount. Resistance element ranges from 1/2 to 5,000 ohms.

**Combination Switch and Air Cooled Metal Rheostat**—One Hole Mount. Acts as switch and volume control. Sturdy and efficient. Shaft alignment is permanent and contact perfect. Any ohmage, 2 to 50.

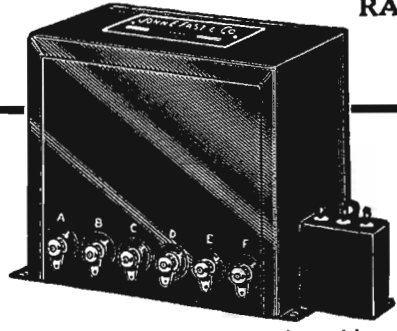
**All-Metal Air Cooled Rheostat**—Bakelite arrow pointer knob, one-hole mount. Filament voltage can be built up slowly and uniformly. Any ohmage, 6 to 50.

**CONDENSERS**  
 Single—Double—Triple In All Capacities  
 Moulded Bakelite insulation outside electrostatic field suspends stator plates which bear only on one point. Condenser frame grounded to rotor, eliminates all hand capacity. End plates of brass, finished in highly polished nickel. Small phase angle difference; low minimum capacity.

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**A-B-C UNIT CONDENSER PACKS**



Fast Hi-Test Filter Condenser Pack, designed especially for use with the A. B. C. current supply, using the Raytheon BA 350 M.A. rectifying tube.

**No. 1230**—Raytheon Condenser Kit, complete, \$22.25.

Fast condensers are the product of long research, and experience. They have been in use since 1919 in millions of radio sets and eliminators. The ones illustrated are exclusively designed, for use with the Q. R. S. and the Raytheon A. B. C. power units, or others of similar character.

The successful operation of all socket power devices depends greatly on the use of proper condensers. Fast condensers more than meet all requirements.

Filter packs mounted in handsome black enameled cases having fixed tinned combination knurled nut, terminal soldering lugs, permitting ready wiring as desired.

Capacities subjected to high potential surges, are constructed to withstand higher voltages than usually required. Short path type of rugged construction, absolutely non-inductive, and of high efficiency.

Fast condensers are designed to operate any A. B. C. current supply unit presented in any of the magazines, whether specified or not. Write us if in doubt. Send for special condenser booklet—free. Dealers and jobbers, write for prices and discounts.

**John E. Fast & Co.**  
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Tell 'Em You Saw It in the Citizens Radio Call Book

**EVERY KIND OF RADIO INSTRUMENT FOR MAKING ALL MEASUREMENTS— FOR LOCATING ALL TROUBLES AND FOR THE MANUFACTURER IN CHECKING HIS PRODUCT**

**A COMPLETE LINE** of Weston Instruments for radio use, distinguished for the same refinements in manufacture and extreme accuracy of performance which have characterized all Weston Measuring Instruments in the electrical field for the past forty years.

There is a model for every requirement—Battery and Battery Eliminator testing, checking Circuit Continuity, Audio Tube and Filament Voltages, locating and correcting all receiving set troubles, and for testing and checking radio equipment during manufacture.

There are instruments for built-in panels in home-constructed or manufactured sets, and for plugging into pin-jacks on manufacturers' models. And in addition to instruments for the set owner are Radio Set Testers, and Tube Testers for dealer repair shops and radio set servicing in the home. All these instruments are the most accurate and durable made.

**A line of A. C. and D. C. testing instruments—**All double range combinations for D. C. filament and battery testing, for battery eliminator testing, and for A. C. testing.

Model 489 D. C. voltmeter—resistance 125 ohms per volt. Model 489 Battery Eliminator Voltmeter—1000 ohms per volt internal resistance. Model 528 A. C. voltmeter—accurate on any commercial frequency, extremely high internal resistance.

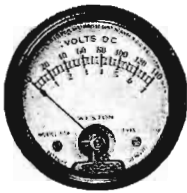


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A. C. and D. C. and Thermo-Couple Types. These instruments are recommended for any and all service where miniature, but extremely accurate and durable instruments are required.

Model 476 A. C. 3 1/4 in. diameter. Model 517 A. C. 2 in. diameter.

Model 506, D. C. Model 425, Thermo-Couple Type.



**Model 506**

**Pin-Jack Voltmeter**

This is a meter especially adapted to the measurement of filament voltage on battery-operated sets. Designed with an internal resistance of 125 ohms per volt, this little instrument draws only 8 milliamperes, a highly desirable feature on dry cell operated sets. Every Radiola, Victor, or Brunswick Set should mount a pin-jack meter to assure ideal operating voltage, conserve tube and battery life, and satisfactory reception.



**Model 519**

**Radio Set Tester**

A self-contained high resistance instrument of 1000 ohms per volt for making battery, battery eliminator, audio tube and filament voltage tests and checking circuits.



**WESTON ELECTRICAL INSTRUMENT CORPORATION**  
1 Weston Avenue Newark, N. J.



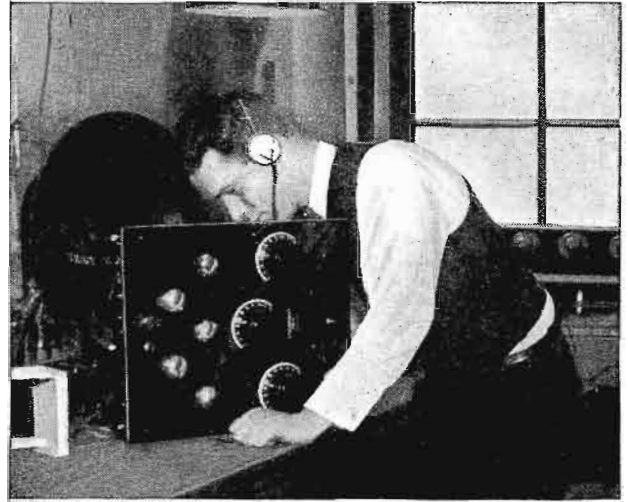
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| <input type="checkbox"/> Gas Engine Operating   | <input type="checkbox"/> Chemistry               |
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| <input type="checkbox"/> Surveying and Mapping  | <input type="checkbox"/> Airplane Engines        |
| <input type="checkbox"/> Metallurgy             | <input type="checkbox"/> Navigation              |
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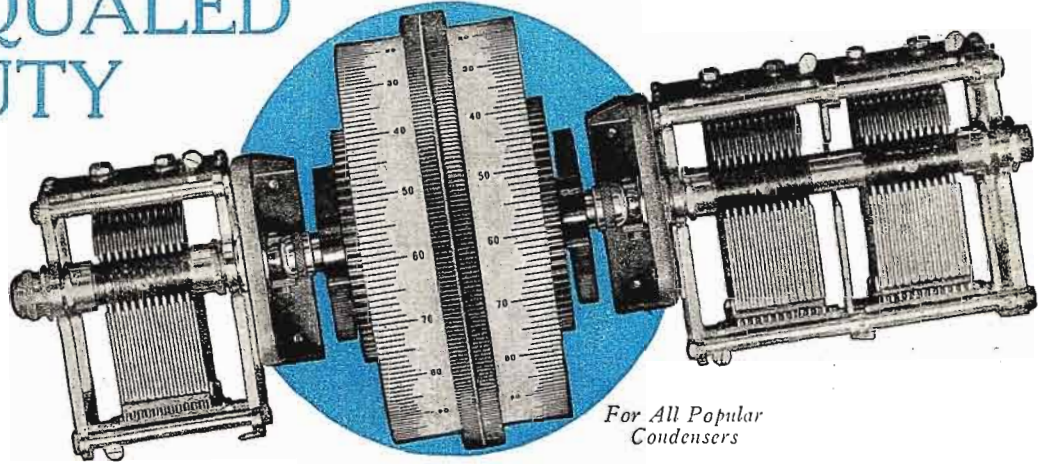
Tell 'Em You Saw It in the Citizens Radio Call Book

# TYRMAN

**LABORATORY TESTED**

*Assure Efficiency - Accuracy.*

**UNEQUALED BEAUTY**



*For All Popular Condensers*

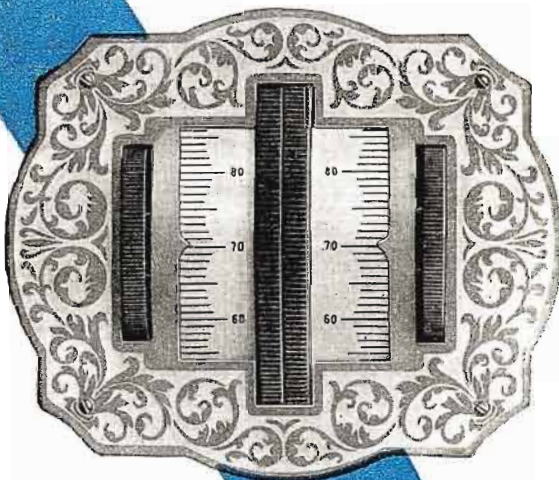
## TYRMAN VERNIER DRUM For All Fine Receivers

Recognized by leading Radio manufacturers and engineers as the most perfect tuning device on the market. It is a new and most artistically designed instrument that assures a vastly improved performance and a beauty of appearance hitherto unknown. A high grade bronze escutcheon encloses the drums and verniers. It combines direct and vernier tuning, with the smoothest action ever obtained in such devices. Graduations are silver etched with raised lines and figures. New clutch arrangement guarantees perfect concentricity of drums and condenser shafts. Vernier held in steady contact with the drum by a flexible spring balanced bearing. Mounting holes for all popular condensers are provided. The beautiful Tyrman Vernier Drum will improve the looks of any receiver.

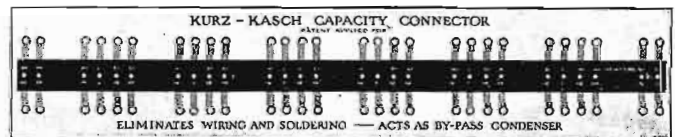
Single control unit.....Price—\$ 5.00  
Double control unit..... 10.00

### SPECIFIED

All Tyrman Products are highly praised and recommended by every leading Radio Engineer. Citizens Radio Call Book specifies Tyrman Parts for use in the Improved Remler 45 K. C. Superheterodyne, the Camfield Duoformer 7, and the Tyrman "10" Receiver. See construction articles on these receivers in this issue.



## Kurz-Kasch Capacity Connector



The Kurz-Kasch Capacity Connector is an entirely new patented device offered to the public for the first time through the TYRMAN ELECTRIC CORPORATION, Exclusive Distributors. This new development eliminates 90% of the wiring and acts as a by-pass condenser between all battery leads. It conforms to the best engineering requirements and is highly praised and recommended by the leading engineers of the country.

Price.....\$7.50

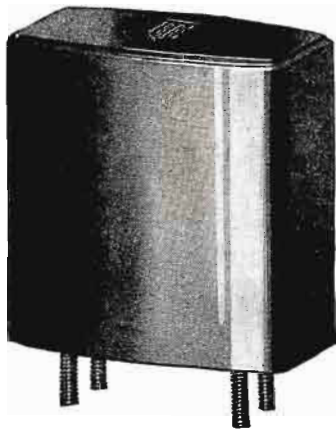


**TYRMAN ELECTRIC CORP.**

*Tell 'Em You Saw It in the Citizens Radio Call Book*

# PRODUCTS

## -Simplicity

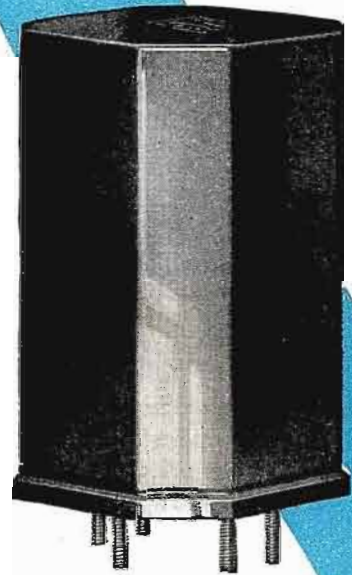


### TYRMAN AUDIO TRANSFORMERS

Designed by Ernst Tyrman to improve reproduction in powerful receivers. They represent a masterpiece of acoustic engineering. Never before has the bass note amplification been accomplished so successfully. The combination of three units is recommended where greatest volume is to be obtained with most faithful reproduction. Complete information on electrical details furnished upon request.

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| Type 3-30 3:1 ratio Transformer .....    | \$ 8.00 |
| Type 3-50 Power Input Transformer .....  | 10.00   |
| Type 3-51 Power Output Transformer ..... | 10.00   |

Tyrman Audio Transformers are designed for the terminals of the Kurz-Kasch Capacity Connector.



### TYRMAN T.R.F. TRANSFORMERS

Have made the name "Tyrman" predominant in the Radio World. These transformers are recommended where more amplification, better selectivity, and superior physical qualities are desired:

- Type 8-70 T.R.F. 200 to 550 meters with .00035 condensers ..... Price—\$4
- Type 8-71 T.R.F. 160 to 360 meters with .00035 condensers ..... 4
- Type 8-80 T.R.F. Transformer 882 Meters.. 7

Tyrman T.R.F. Transformers are designed for terminals of the Kurz-Kasch Capacity Connector.

### THE TYRMAN SHIELDED SOCKET

Is the first practical and successful design of its kind. Assures proper functioning of each tube under the influence of both static and magnetic fields. Shielding is of heavy aluminum—the best heat conductor obtainable, which radiates uniformly and keeps tube temperature constant. Constructed to allow baseboard mounting or subpanel wiring.  
Price.....\$1.25



### JOBBERS—DEALERS

TYRMAN Products all carry an unconditional guarantee of Excellence. They are indeed—Radio's Finest—added to this they are already well-known and extremely popular. A comprehensive, national advertising campaign will assure their continued favor. Get TEC Products. You will find them most profitable. Write us for further particulars.

### SET BUILDERS

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Gentlemen:

Kindly send me, gratis, special information describing T E C Products in detail.

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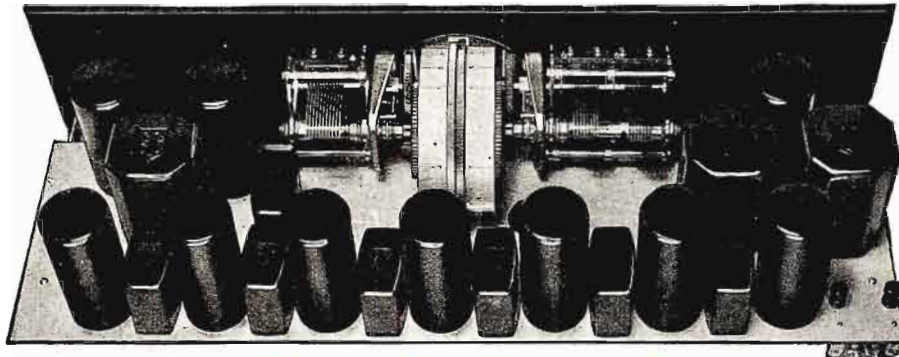
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Tell 'Em You Saw It in the Citizens Radio Call Book

# TYRMAN TEN

Radio's Most Powerful Coast-to-Coast Receiver



Blueprints  
Now  
Ready

All Parts  
in  
Stock

Just As Described In This Issue



This Big Beautiful Catalog

Tested under the most severe conditions, this receiver has outperformed all other existing apparatus and allows a clear 10 K. C. separation with confining of all necessary fields. The tone quality is superb, combined with unsurpassed beauty and truly the most complete Tyrman laboratory tested quality product.

### Kurz-Kasch Capacity Connector

The Tyrman Ten is a masterpiece of radio engineering whereby laboratory functioning of each circuit employed is insured by the use of the Kurz-Kasch Capacity Connector, which not only stabilizes the circuit but also eliminates by-pass condensers and approximately 90% of wiring and soldering.

## Greater-Better Radio Values Are Shown Here

The leading lines of 1928 are all displayed, described and priced right. TYRMAN, Camfield, Silver-Marshall, Cunningham, Burgess, General Radio, Utah, Tobe, Carter, Yaxley, etc. All under one roof. You don't need to look elsewhere. Complete stock carried. Prompt efficient, dependable service. All orders, small or large, filled promptly.

You must have this catalog if you want everything—the best in radio, at a big saving. Contains all the information that you need. Answers all radio questions that you ought to know. It won't cost you a cent. Just drop us a card today.



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OLDEST  
RADIO  
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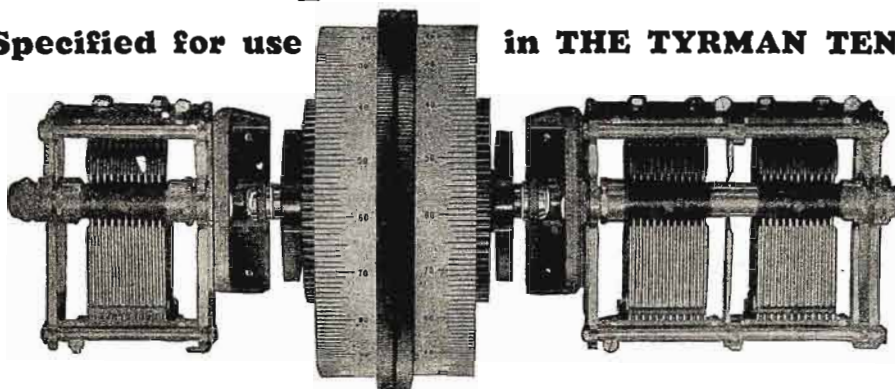
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Tell 'Em You Saw It in the Citizens Radio Call Book



# Camfield Equaltune Condensers

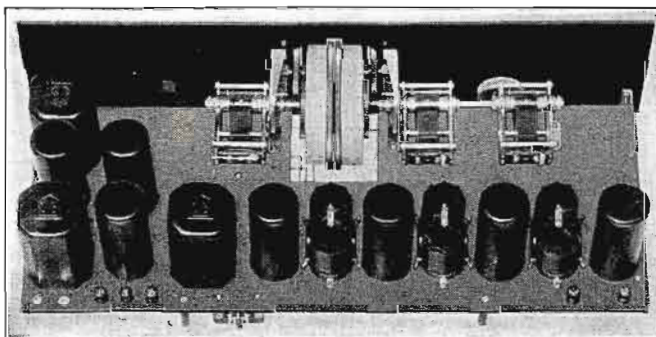
Specified for use in THE TYRMAN TEN



# Camfield Duoformer Seven

**No Distributing Oscillations with Camfield Duoformers**

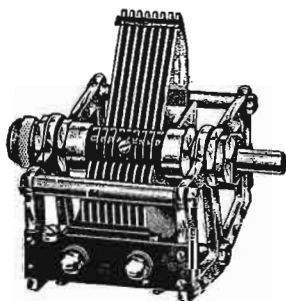
These high quality radio parts make the Camfield Duoformer Seven the season's leading Radio Frequency Circuit.



**Perfect Tone Quality with Tyrman Audio Transformers**

**Approved Recommended Specified**

This year many radio manufacturers are replacing old transformers with the new Tyrman Audios, with vastly improved results. Technical engineers and designers of high-grade receivers all insist now on Tyrman Audio Transformers. Likewise in the popular CAMFIELD DUOFORMER SEVEN the designer, in his search for transformers of surpassing excellence selected Tyrman Audios, and specifies them exclusively. The new Duoformer here pictured far surpasses last year's model. Never before has there been so great an improvement in audio transformers. Tyrman Audios represent a masterpiece of acoustic engineering, and invariably improve the performance of any set in which they are used.



Camfield Type 351 Condensers .....\$5.75



The Camfield type 22 Duoformer is a radio frequency transformer, especially designed to avoid oscillation trouble in tuned radio frequency circuits. Sets built with this transformer are both sensitive and selective, and are entirely free from disturbing oscillations without the necessity of neutralizing.

Camfield Type 22 Duoformer, each .....\$3.50

**CAMFIELD RADIO MFG. CO.**

35 E. Wacker Drive, Chicago

## Construction Article In This Issue

The Camfield Duoformer Seven is a radio frequency receiver employing three stages of tuned R. F. amplification, detector and two stages of audio amplification using the two tube push-pull system in the last stage with the Tyrman input and output power Transformers.

The combination of the famous Camfield non-oscillating Duoformers and the Tyrman audio frequency Transformers make this the finest receiver ever developed from a standpoint of tone quality.

The set is simple to operate, having only two tuning controls, is selective and is sensitive for the reception of distant stations. It is one of the best all around sets you can build, and from a standpoint of tone quality it is unequalled by any other receiver.

### List of Parts—Camfield Duoformer Seven

- 1—7"x26"x3/16" Drilled and Engraved Formica Panel
- 1—10"x25"x3/16" Drilled Formica Sub-panel
- 3—Camfield .00035 mfd. Variable Condensers
- 3—Camfield Duoformers
- 1—Centralab 20-ohm rheostat
- 1—Centralab 6-ohm rheostat
- 1—Centralab 10,000-ohm variable resistance
- 1—Muter Battery Switch
- 1—Muter .001 mfd. bakelite fixed condenser
- 1—Muter .00025 mfd. grid condenser
- 1—Muter 3-megohm grid leak
- 1—Lynch Type 4 equalizer
- 1—Lynch Type 1 equalizer
- 1—Yaxley No. 660 Cable Connector
- 5—Eby Engraved Binding Posts
- 2—Amsco Tip Jacks
- 2—Benjamin No. 8629 Brackets
- 7—Tyrman Sockets
- 1—Tyrman Audio Transformer
- 1—Tyrman Power Input Transformer
- 1—Tyrman Power Output Transformer
- 2—Tyrman Drum Dials
- 1—Carter H-1009 Resistance
- 30—Ft. Acme Celasite
- 1—Pkg. Kester Radio Solder
- 1—Ekko Ground Clamp
- 1—John E. Fast 1 mfd. by-pass condenser

### Tyrman Vernier Drum

This new and artistically designed instrument is acknowledged to be the most perfect tuning device on the market. It is designed in most distinctive fashion and presents a most luxurious appearance. Tyrman Vernier Drums combine direct and vernier tuning with the smoothest action ever obtained in such devices. They improve both the looks and performance of your receiver. A demonstration will convince you.

### Tyrman Shielded Socket

Another Tyrman Product specified for use in the Duoformer. This new socket assures the proper functioning of each tube under the influence of both static and magnetic fields. Constructed to allow baseboard mounting or subpanel wiring.

**TYRMAN ELECTRIC CORP.**

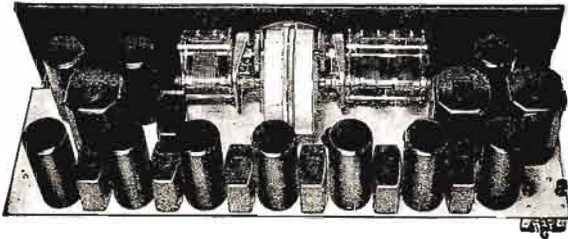
141 W. Austin Ave., Chicago

Tell 'Em You Saw It in the Citizens Radio Call Book

# No matter what radio part you need, you can get it from VAN-ASHE!

Build the circuit you like! Experiment! You can try all the hook-ups now for you can get any part you need from us. That's our specialty—radio parts of every type and kind.

Build the Raytheon ABC Power Unit, the Tyrman Super-heterodyne Receiver (illustrated), the 1928 model INFRADYNE RECEIVER or the VICTOREEN SUPER! Our stock of complete parts for these assemblies is large. Immediate shipment. Send today for catalog and prices. Write us for parts you are needing. Do it now!



Any troubles? Our service department is for your service. Experts find the trouble and correct it. Advice and suggestions are yours for writing.

## Set Builders! Dealers!

**FREE**

Standard parts and equipment at money-saving prices. New AC tubes and transformers—parts for any circuit—power audio equipment—short wave supplies—they are all in our big new 1928 catalogue. Write for it today, with discount sheet. 12-hour shipment guaranteed. Send name and address on a postcard.

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## Guaranteed Service for Set Builders

Build your radio set from the complete instructions and parts furnished by Leonard Lynn, Inc. All circuits endorsed by us are guaranteed to perform satisfactorily.

The Tyrman laboratory-tested apparatus combines the highest grade manufactured parts with Tyrman ingenuity and accurate simplicity. The Tyrman set is guaranteed to please and to completely satisfy. Build your own Tyrman set from the following list of parts:

**LIST OF PARTS—TYRMAN SUPER**

- 2—Tyrman R.F. Transformers 8-70
- 1—Tyrman R.F. Transformer 8-71
- 4—Tyrman R.F. Transformers 8-70
- 1—Tyrman A.F. Transformer
- 1—Tyrman Power Input Transformer
- 1—Tyrman Power Output Transformer
- 1—Double Drum Dial
- 10—Shielded Sockets
- 1—Kurz-Kasch Capacity Connector
- 1—Formica 7"x26"x3/16" Drilled & Engraved Panel
- 1—Formica 7"x26"x3/16" Drilled Ivory Sub-panel
- 2—Benjamin Brackets
- 2—Carter 1 Mfd. By-pass Condensers
- 1—Carter 1/2 Mfd. By-pass Condenser
- 1—Carter .00025 Mfd. Fixed Condenser
- 1—Carter .001 Mfd. Fixed Condenser
- 1—Camfield .00035 Mfd. Condenser

The simplicity of our complete kit service allows the average man to build these sets with ease and confidence.

**COMPLETE KIT SERVICE IS ALSO FURNISHED ON THE FOLLOWING SETS**

Electrically Operated T.R.F. Receiver  
A Portable "B" Eliminator Tester

- 1—Camfield .00035 Mfd. Two-gang Condenser
- 1—Yaxley Cable Connector No. 669
- 1—Yaxley 1 1/2 amp. Resistor
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Write us immediately about our Kit service, or for our free catalog CRB. Be assured of the best in radio service at the maximum savings.

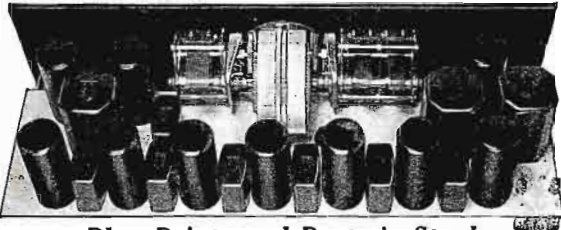
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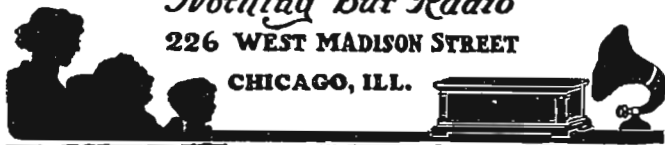
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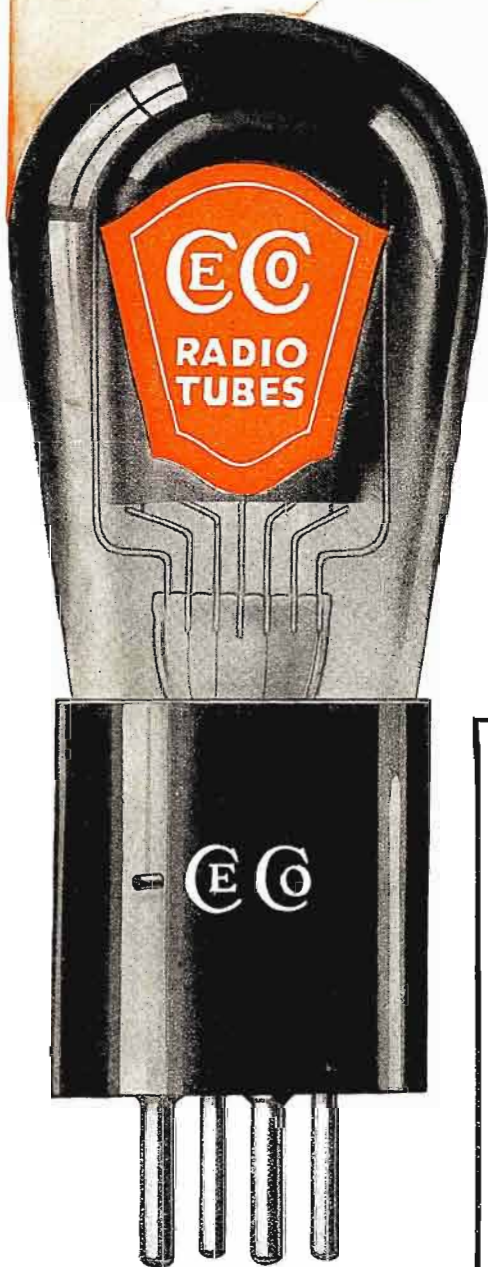
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These tubes are tested in a Standard rectifying circuit using well designed parts. The unit is connected to a ripple test position, and tube checked both by phones and observed on an oscillograph, insuring a perfect tube which will give excellent results in well designed and constructed units.

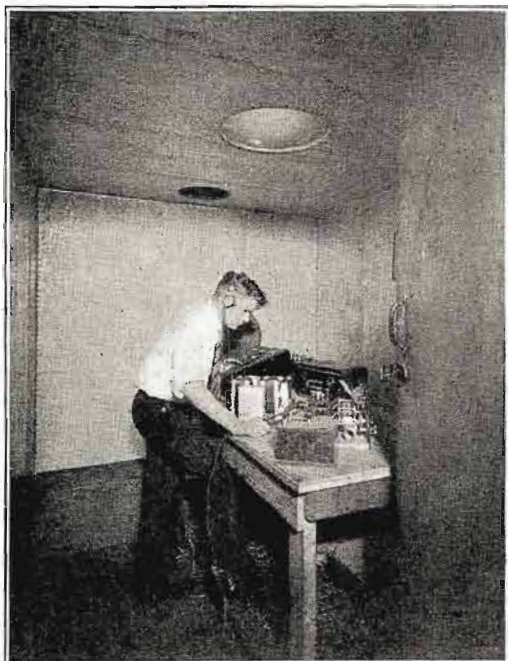
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**Makes a Good "B" Eliminator—BETTER**



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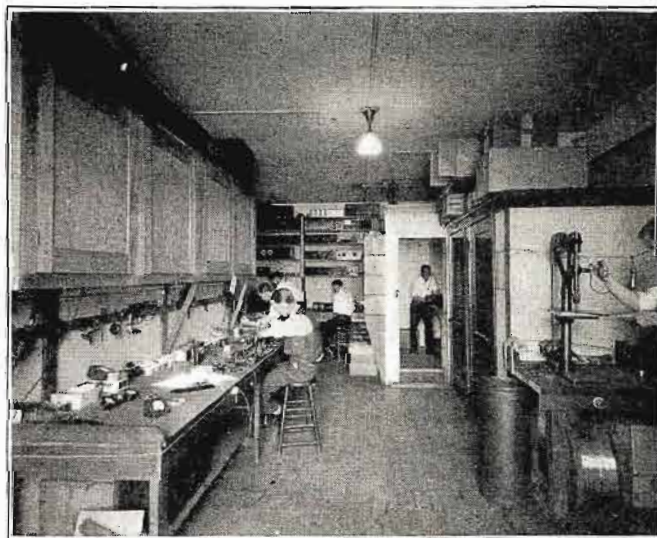
OUR completely equipped service laboratory, with its corps of carefully trained service men is at your service for testing and repairing all types of receivers, battery eliminators and power units. Only the most modern and up-to-date apparatus is used in testing and repairing any device delivered to us for service.

Any receiver or power device repaired by this highly efficient organization is positively guaranteed to **perform** in the same manner claimed by the manufacturer. (*All receivers serviced in this laboratory are given a final test in a completely shielded room where the internal noises are absolutely eliminated.*) This insures noise-free reception which is necessary for satisfactory performance. In addition, complete equipment is available for properly testing all types of power units.

We will repair, test or design any type of receiver you may desire. Being specialists in this field we are in an excellent position to rebuild your present receiver and bring it up to date.

If you are unable to personally deliver the receiver or unit you wish to have serviced, securely pack it in a strong box with plenty of cushioning material, such as excelsior, and ship it to us by American Railway Express, prepaid. It is not necessary to ship cabinet or accessories.

Remember — the confidence of many leading manufacturers has been placed in this laboratory. The Radio Service Laboratories will give to you the same conscientious service that the manufacturer, himself, would give you. It is more practical and wise to bring your problems here than to some irresponsible radio man who is unfamiliar with the merchandise you wish serviced. This is an era of specialized effort and our charges are no more than you would pay for inferior workmanship.



REPAIR DEPARTMENT

## RADIO SERVICE LABORATORIES, INC.

508 So. Dearborn Street, Room 750

Telephone: Harrison 2870

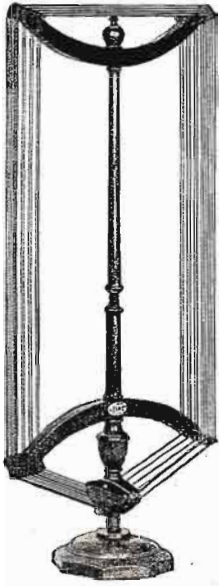
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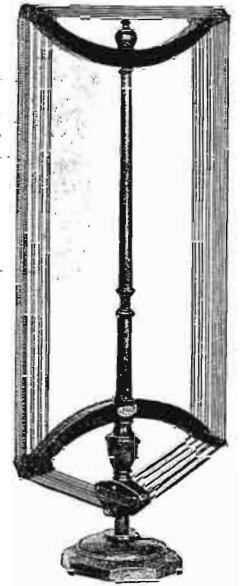
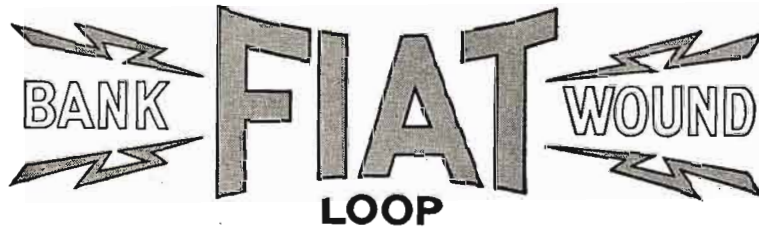
Expert set builders the world over choose the Fiat Bank Wound Loop because of its remarkable efficiency and beauty.

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TYPE "C"

Price \$12.50  
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Dimensions—Erected 18 1/2" wide by 30" high  
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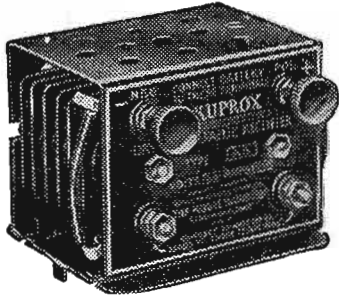
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TYPE "A" KUPROX REPLACEMENT UNIT.....each \$4.50  
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OUR CATALOGUE GIVES FULL INFORMATION ON THE NEW KODEL DRY "A," "B" and "C" Power supply.

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We are also wholesale distributors for the following manufacturers of HIGH-GRADE Radio parts and accessories.

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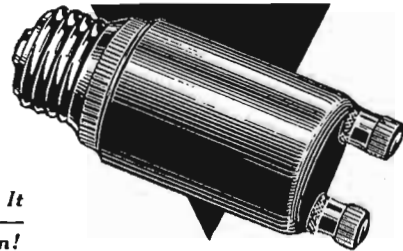
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Just Connect It to Your Set—and Plug In!

List Price \$1.50

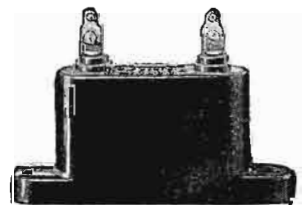
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THERE is a Bee Cee Filter Condenser Compact for use in every type of battery eliminator and power amplifier. Especially designed for its specific work, each Compact may be depended upon to render a pure, even, rectified current, with permanent capacity assured.

Because these units are the most delicate electrical devices used in radio, it is essential that you insist on Bee Cee quality.

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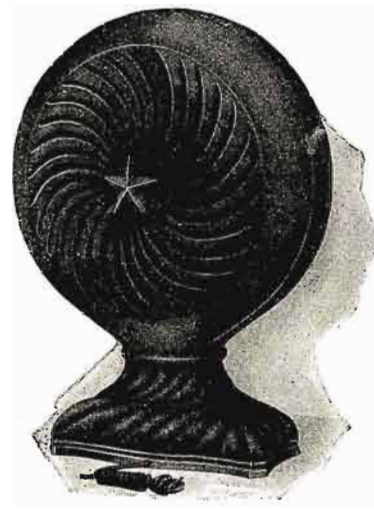
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*The faintest sighing of a violin or the mad yelling of a football crowd comes to you clear as a frosty night.*

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100% increased reception on low wave lengths. Greater distance, volume, clarity, stability, easier, quicker tuning with an X-L VARIO DENSER in your circuit.

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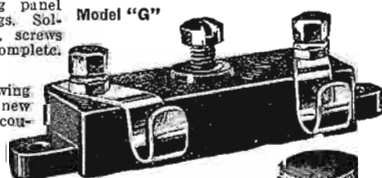
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X-L Push Post Panel



X-L Push Post

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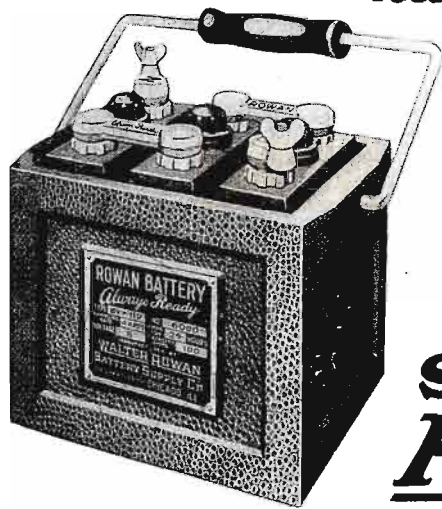
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# The ROWAN BATTERY

## Always Ready



**Call Book Specifies It!**

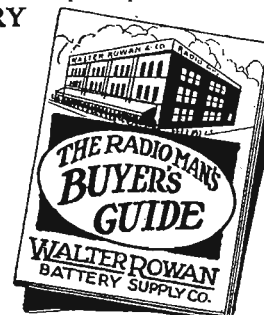
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*Are but three reasons why Halldorson Overtone Audio and Output Transformers were chosen for the Bodine A. C. Receiver described in this issue of the Call Book.*

The new Halldorson Overtone Audio Transformer is the result of several years' research work to develop a transformer that would faithfully reproduce broadcasting with present day loud speakers. With new ideas in design, its ability to amplify the overtones of both music and speech is a revelation.

The Halldorson Overtone Transformer delivers greater power on the low frequencies and falls off gradually in amplification on the higher frequencies. The effect of this is readily apparent to the musical ear, for the overtones are brought to the foreground with a richness that is astonishing. Overtones that give depth and life to all music are amplified with a deep, rich power that can only be found in this new and remarkable unit.

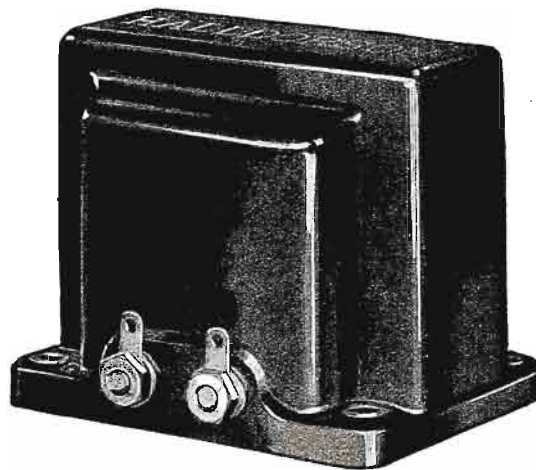
Every part of the unit is made of the finest materials and assembled with the technical skill of master craftsmen. Each transformer is rigidly tested before leaving the factory and is guaranteed to give perfect satisfaction. Made in one type for all circuits and all tubes. Price each, \$6.00.

ing the factory and is guaranteed to give perfect satisfaction. Made in one type for all circuits and all tubes. Price each, \$6.00.

### The Halldorson Overtone Output Transformer

The Halldorson Overtone Output Transformer tends to even up the deficiencies of many present day loud speakers. Regardless of the receiver it is used with, it will improve the quality of reproduction. The greatest power is delivered to the loud speaker on the low frequencies so that bass notes are brought to the foreground with true fidelity.

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## Halldorson Overtone *Audio* Transformer

*Replace your present transformers with Halldorson Overtones. If you use them once you'll use them always.*

### Coming Soon

The new Halldorson Precision Long Wave Transformers.

Laboratory balanced and matched by skilled-craftsmen.

Mounted in same case as audio and output transformer.

Type No. 540 Precision Iron Core Transformers.

Type No. 541 Precision Filter.

Write today for further details of these remarkable units made especially for set builders, and advance data on the new Thompson Super Seven.

THE HALLDORSON COMPANY  
Sales Office—607 Brooks Bldg., Chicago, Ill.

Please send data telling how I can improve the tonal quality of my receiver and obtain Overtone Amplification with the new Overtone Transformers.

Please send me advance information on the new Thompson Super Seven using Halldorson Precision Long Wave Transformers.

Name.....  
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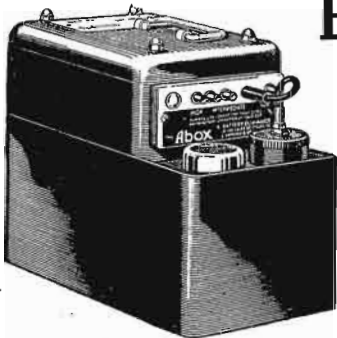
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The Best and Cheapest  
"A" Power

# Abox

## Complete "A" Battery Eliminator



**\$3250**  
Complete

Slightly higher west of Rockies

Licensed by the Andrews - Hammond Corporation under Andrews' condenser and other Andrews and Hammond patents and patent applications.

Contains no battery and operates direct from the light socket

No Changes in Set Necessary

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The Abox contains no battery in any form. It is never charged or discharged. It is fool proof in operation. It regulates against line voltage fluctuations and, regardless of line surges, no damage can be done to tubes. This is accomplished without automatic cut-outs or troublesome relays.

The **ABOX FILTER** is the filter circuit of the complete Abox. If you have a good two or five ampere charger, the Abox Filter can be used to filter its output and make a complete "A" Eliminator. Simply make four connections. Price \$19.50.

Send for Circulars

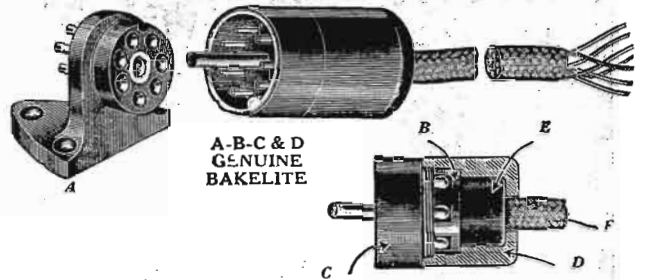


**THE ABOX COMPANY**

215 No. Michigan Ave.

Chicago, Ill.

## HAGEL POWER PLUG & CABLE



- A—Bracket Socket. PINS FIRMLY EMBEDDED IN BAKELITE—WILL NOT LOOSEN IN SOLDERING.
- B—Insulator (Leak-Proof) PROJECTIONS SEPARATE CONTACTS—IMPOSSIBLE FOR STRAY WIRES TO SHORT CIRCUIT.  
This Insulator cannot rotate on soldered heads, consequently NO CIRCULAR FILM OF SOLDER CAN FORM ON IT CONNECTING CONTACT HEADS.
- C—Contact Mounting, Pilot and Key.
- D—Cap.
- E—Soft Rubber Bushing compressed around Braid of Cable. PREVENTS TWISTING OF CONDUCTORS AND RELIEVES SOLDERED CONNECTIONS OF ALL PULL STRAIN.
- F—Seven Conductor Cable. Wires in colored rubber RMA Standard Colors. BROWN BRAID.

In No Other Plug Are These Important Features Combined

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| Plug and Cable Only.....        | \$2.25 |
| Sockets: Bracket Mounting ..... | .75    |
| Flush Mounting .....            | .50    |
| Binding Post .....              | 1.25   |
| Wall Outlet .....               | .75    |

**EUGENE A. HAGEL**

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A REAL BARGAIN

## MAGNAVOX CONE SPEAKERS

These beautiful speakers must be seen and heard to be really appreciated. They cover the complete tonal scale from 50-10,000 cycles without distortion or snary affects.



Stanford Model

They have full floating Cones, (free edge) resiliently mounted to give free movement to the entire Cone, which will stand powerful or weak volume equally well, and reproduce with wonderful clarity.

**STANFORD MODEL**, genuine two-toned Mahogany. List price, \$35.00 each. Special at \$9.75 each.



Cornell Model

**CORNELL MODEL**, artistic non-resonant metal finish. List price, \$22.50 each. Special at \$7.25 each.

Each speaker is brand new and packed in original factory sealed cartons. Complete with standard cord and plug.

**AMERICAN SALES COMPANY**

21 Warren Street New York City

## Amateurs in More Than 75 Countries!

September 1927 Amateur Book Just Out!

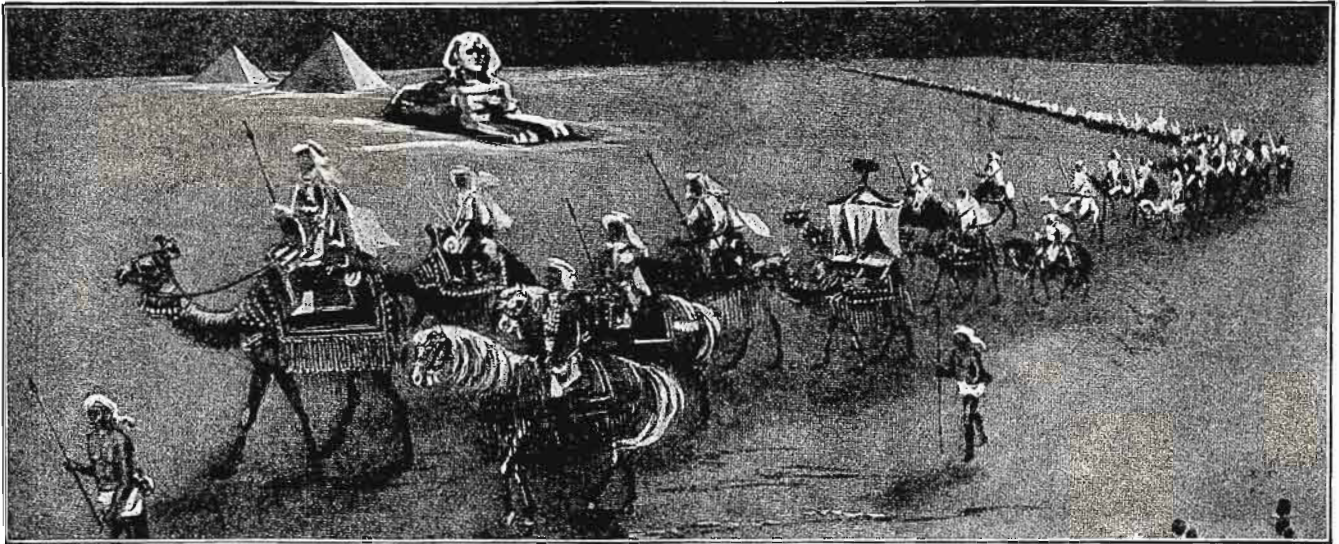
Did you like the MARCH number? Well, you "ain't seen nothin' yet." The new SEPTEMBER edition has all the new stations licensed since the previous book, over 75 countries listed, with 9FO QRA Service now covering the whole world.

The Commercial Land and Ship section is back again, bigger and better than ever, with all calls listed alphabetically AAA to ZZZ.

Other new features include a table of postage rates to foreign countries, and many new operating helps that are of value to operators the world over.

Send 75 cents stamps (U.S.), coins (U.S.), check, money order, for September issue.

**Citizens Radio AMATEUR Call Book**  
508 So. Dearborn Street, Chicago



**Webster "Bone-Dri" A-B-C Socket Power. As dry as the hot sands of the desert  
Perpetual Current as Silent as the Sphinx**

Models A-7—1 3/4 Amp.  
\$37.50; for 6 or 4  
Volt. A-10—2 1/2 Amp.  
\$46.50; with 2 Ray-  
theon cartridges.

AB-7 .....\$61.50  
AB-10 ..... 70.00

**RAYTHEON EQUIPPED**



Webster "Bone-Dri" unit completely electrifies any radio receiver without "revolutionary" rebuilding of the set. Just throw away the batteries—the trouble and expense—and put in the "Bone-Dri" AB unit. It operates automatically from the receiver "on" and "off" switch. Plenty of smooth quiet current from the light socket for the tube filament lighting and plate supply on any set up to 10 tubes with power tube. Always ready the year-round,—Improved reception,—Costs less to operate.

Equip your set with "Bone-Dri" socket-power before you miss an important program. If your dealer cannot supply the Webster "Bone-Dri," write us for the name of nearest distributor and free booklet "How to Eliminate Your Batteries."



**THE WEBSTER COMPANY, 860 Blackhawk, Chicago**

**The Complete LYNCH RESISTORS Resistance Line**



**Leak-Proof Single Mountings**

are made of highly polished genuine Bakelite, thus providing extremely low surface leakage.

Single mounting.....\$0.35



**Type "P", Heavy Duty Resistors, Wire-Wound in Porcelain**

Lynch Type "P" heavy duty resistors are designed for power circuits where the use of high voltages make ordinary resistors impractical.

Sizes range from 2,000 to 100,000 ohms. Prices range from \$1.25 to \$4.00 according to resistance value.



**Filament Equalizers**

are used in the filament circuits to keep the filaments at their best operating points.

Filament Equalizers, all sizes, \$1.00 complete with mountings.



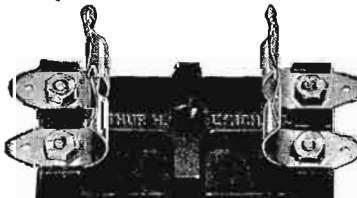
**Resistance-Coupled Amplifier Kit**

Contains essential parts for building a resistance-coupled amplifier.  
Price of complete kit.....\$9.00



**Metallized Resistors**

range in sizes from .25 to 10 megohms at 50 cents each; .012 to .2 megohm at 75 cents each and .0005 to .01 megohm at \$1.00 each. For heavier duty there is a specially designed Type "C" Metallized resistor. Price.....\$1.50



**Leak-Proof Double Mountings**

are similar to single mounting in construction. Double mounting....\$0.50



**Special, Tapped Wire-Wound, Heavy Duty Resistors**

Tapped resistors may be had in any resistance value with any number of taps on special order!  
Lynch AmerTran Tapped Heavy Duty, Wire-Wound Resistor, \$8.50.



**Type "G", Heavy Duty Resistors, Wire-Wound on Glass**

for use in circuits where the ability to withstand high voltages and heavy currents is not important. Also as grid biasing resistors. Price, \$1.00 to \$3.75 according to resistance value.



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Used in tuned radio frequency circuits eliminates oscillation. Furnished complete with mountings in sizes from 100 to 1800 ohms. Price, all sizes, \$1.50 complete with mounting.

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**Arthur H. Lynch, Inc.** General Motors Bldg., New York

Tell 'Em You Saw It in the Citizens Radio Call Book



**Recognized  
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of MUTER Products  
Makes This**

**Standard "B" Power Unit  
Your Best Buy**

**\$24.50**

Until we could produce one standardized, dependable "B" Power Unit for all sets we stayed out of this field.

**Outstanding  
Characteristics**  
*Uniform—Constant  
Power*

Fixed Controls used with separate fixed voltage taps, giving ample range and definite knowledge of voltage gotten.

Capacity ten tubes, or seven with a power tube.  
Rating 40 mills at 150 volts. Will deliver 180 volts for new type 171 power tube.

Condensers. Muter filter condensers of ample capacity and acknowledged quality insure long life and uniform output.

Uses Standard Cunningham or Radio Corp. Full Wave Vacuum Rectifying Tube because of long life and stability. Used on 110 to 120 volt, 60 cycle A. C. current only.

**No Noise—  
No Vibration**



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Products**

The complete quality popular priced line. Send for comprehensive catalog.

**NOW** we have ready for you the best possible "B" Power Unit at one standard popular price. Parts are made and assembled in the Muter factory under a high degree of workmanship, fully assuring exactness in every stage of manufacture.

**Ask Your Dealer—  
or Send Coupon**

Prompt shipment will be made upon receipt of price, and we will pay postage—or C. O. D. plus postage, if you prefer. You will find the Muter "B" Power Unit supremely satisfactory in every way, so see your dealer or mail coupon for yours today.

**LESLIE F. MUTER CO.**

76th & Greenwood Ave.

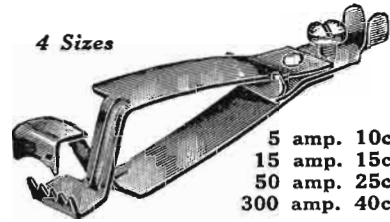
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Grip-tite  
**Battery Clips**

4 Sizes



5 amp. 10c  
15 amp. 15c  
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**S**HANCO Griptite Battery Clips assure free and uninterrupted flow of electrical current. There are no springs to heat up, burn or drop out. Made of powerful-tension, tempered spring steel, solidly riveted together, with all parts electro lead plated before assembly. This uniform lead coating is positive assurance against corrosion at the joints. Acid-resisting. Jaws open wide and are easily applied. The Griptite bulldog teeth are so arranged that the clip cannot fall over and "short" the battery. Terminals are wide and screws amply large for cable connections. No parts of Shanco Clips can be lost or displaced—everything is one compact, solidly built unit. Shanco Clips will last longer and give greater satisfaction.

At all good radio stores and battery stations, or order direct from this advertisement, giving dealer's name. Dealers and jobbers write for discounts and special proposition.

**Shanklin Manufacturing Company**  
Dept. 22, Springfield, Illinois



Radio dealers recommend and use the

**ekko  
Ground Clamp**

because it eliminates the high percentage of radio troubles due to faulty ground

Imperfect ground contacts are responsible for a high percentage of all radio troubles. The ekko Clamp eliminates these troubles by insuring perfect contact. Radio dealers know this. That is why they include an ekko Clamp with radio set installations and instruct their service crews to use it in replacing old faulty grounds.

The hardened steel points of the ekko Clamp bite through paint, rust, dirt, corrosion or any other insulation. Its positive contact insures full signal strength. Easy to use. Ground wire screws to Clamp. Clamp attaches to nearest pipe by a turn of the screw. Non-corrosive, permanent. Finished in white nickel. Fits 1/4 to 1 1/4 inch pipe. At your dealer's.

**25¢**

**Radio Dealers:**

The ekko Clamp is supplied in lots of ten in an attractive counter display that helps you sell this most popular of all ground clamps.



**The Ekko Company**

111 West Monroe Street, Chicago, Ill.

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**5 TUBE NEODYNE**  
 RADIO KIT - COMPLETE

**Only \$16.95**

**FREE!**  
 GENUINE 20 INCH  
 ERLA CONE  
 LOUD SPEAKER &  
 5 TUBES

**Can be built in 2 hours**

**COAST to COAST RECEPTION**

**MAKE MONEY IN YOUR SPARE TIME!**

Latest 5-tube circuit designed by one of the foremost radio engineers in the country. Clear and realistic reception guaranteed. Solid bakelite panel and sub-panel. Panel beautifully engraved. Sub-base marked for all connections. 2-dial control; Kurz-Kasch bakelite indicator knobs. New type UX sockets. Low ratio transformers for improved tone quality. All hook-up wire and colored battery cable included. Tubes are 201-A type, tested and matched. Value \$60.00, our price \$16.95.

Complete Set of Simple Plans and Directions to Build Very easy to build this set with the plans and instruction we furnish. No complicated drawings. Can be built in two hours. Instructions for operation included. Make money by building these sets in your spare time and selling them to your friends.

Tested and Proved—Severe laboratory tests have proved the remarkable efficiency of this set. Owners everywhere are sending us letters praising its wonderful receptive qualities.

**SEND NO MONEY**

Just write your name and address on a post card and ask us to send you this great kit together with the Erla Cone loud speaker and 5 tubes. We will ship them right away. When they arrive, pay only \$16.95, plus a small delivery charge. RADIO EQUIPMENT CO., DEPT. C., 549 S. WELLS ST., CHICAGO, ILL

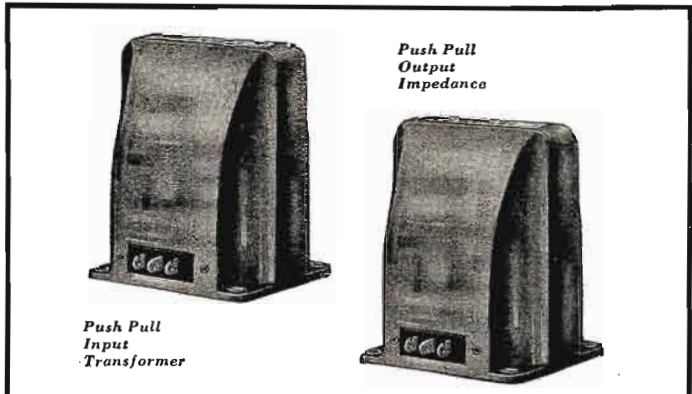
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**IMPROVED NINE-IN-LINE RECEIVER**  
**REMLER**  
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From scores of competing instruments Remler Apparatus is selected. Here is an endorsement that means something. Here is proof that high standards of quality win recognition. Your dealer is ready to supply you Remler Parts.

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REMLER DIVISION OF  
**Gray & Danielson Mfg. Co.**  
 260 First Street, San Francisco  
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The New  
**Symphonic Push Pull**  
 gives great power with quality

You who love rich bass notes and tonal brilliancy will find this beautiful pair of Samson brush-copper-finished audio units — Push Pull Input Transformer and Push Pull Output Impedance have brought back into its own the push pull circuit, which eliminates tube harmonics.

With two type 171-power tubes having but 180 volts on their plates as much undistorted volume can be obtained as with a type 210 tube having 400 volts on its plate in an ordinary amplifying circuit — and two type 210 tubes can be used with these units for dance-hall volume.

The Samson Symphonic Push Pull Input Transformer will satisfactorily work into tubes up to 50 watts capacity. Unfiltered AC current may be used on the filament in push pull circuits without hum in either first and second stages, or both stages. The Push Pull Output Impedance eliminates the distortion always found in any transformer—no matter how well it is made. Price per pair—\$19.50.

For those desiring to use more than one stage of push pull the new Symphonic Inter-stage Push Pull Transformer, Type Y is now available. Price—\$14.00.

This is the first announcement of the availability of these units for public use.

Send for free reprint article on a complete audio amplifier.

Our book—"Audio Amplification"—already accepted as a manual of audio design by many radio engineers—contains much original information of greatest practical value to those interested in bettering the quality of their reproduction. Sent upon receipt of 25c.

Those who desire to know how to get supreme coil efficiency can obtain our new "Inductance Units Bulletin" which will be sent on receipt of 10c to cover cost of mailing.

**Samson Electric Company**



Main Office: Canton, Mass.      Factories at Canton and Watertown, Mass.  
 Manufacturers since 1882

Tell 'Em You Saw It in the Citizens Radio Call Book

# Six New Precision Radio Products

By the Makers of the Famous



(1)

## Illuminated DRUM DIAL

Makes single-control of multiple circuits practicable. Two circuits tuned as one, or individually. Translucent wave length scales illuminated from back. Beautifully embossed, oxidized bronze escutcheon plate gives distinction to panel.



(2)

## Flexible COUPLING

Permits coupling condensers in tandem without exact alignment. Bakelite insulation makes the two sides electrically independent of each other. Tough spring phosphor-bronze with brass bushings and hardened steel set screws.

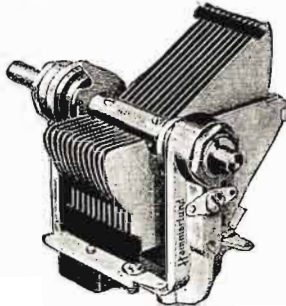


(3)

## EQUALIZER

For neutralizing R. F. circuits or equalizing multiple tuning units. Small size fits limited space. Bakelite base, mica dielectric, phosphor-bronze spring plate.

## HAMMARLUND "Midline" CONDENSER



Write for Folders

## Radio-Frequency CHOKE COIL

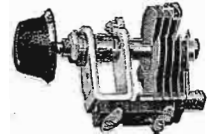
Special winding and impregnating gives minimum distributed capacity for a given inductance and provides extremely high impedance to all broadcast frequencies. Distinctive Bakelite case. Two sizes: 85 and 250 millihenries.



(4)

## The Improved "HAMMARLUND, JR"

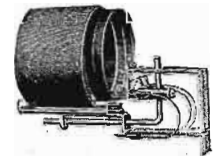
A new, high-ratio midget condenser with all the distinctive Hammarlund features—plus sturdier, simplified construction. Has new locking device for fixing rotor plates in any position. Knob included.



(5)

## New AUTO-COUPLE

Specified for Hammarlund-Roberts HiQ Six Receiver. Essentially the same as previous model, but designed for use with the new Hammarlund Drum Dial.



(6)

HAMMARLUND MANUFACTURING CO.  
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**Hammarlund**  
PRECISION PRODUCTS



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STROBODYNE  
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Compiled exclusively for dealers in radio sets, radio parts and for set builders. An amazing catalog containing the newest things in the world of radio.

Unbeatable values in radio parts, kits and supplies of National fame. A complete array of cabinets and consoles, in all the latest styles, finishes and popular sizes, and at unmatched prices.

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We can supply complete kits for any of the circuits described in this issue of the Call Book; such as, Silver-Marshall Laboratory Model Super, Nine-in-Line, Tyrman 10, and all others.

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**WRITE** Whatever your radio needs may be, you will find them in our **TODAY** 1928 catalog. Write for a copy today. Send your request on your letterhead—but write immediately.

**SHURE RADIO COMPANY**  
335-F MADISON STREET, CHICAGO, ILLINOIS

## The "Power"



### A B and C Unit

(NO BATTERIES)

Licensed by  —A, B, and C for sets using AC tubes. **\$47<sup>50</sup>**

—Super B for any set. includes RCA Tube

*Write for Complete Facts!*

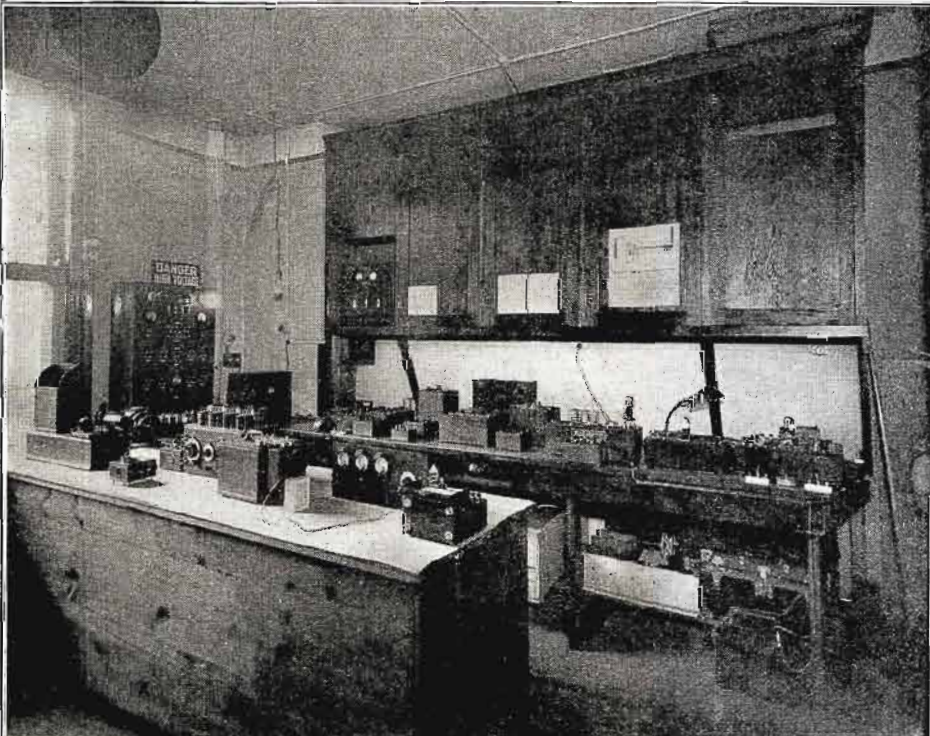
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MEDFORD, MASS.

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**Are Now Open to the Public at Cost Price**

**JOBBERS AND DEALERS**  
Oscillators, wavemeters and condensers calibrated or recalibrated. Accuracy guaranteed.

**Professional Set Builders**  
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**LET US KNOW**  
your problems and we will submit you a price.

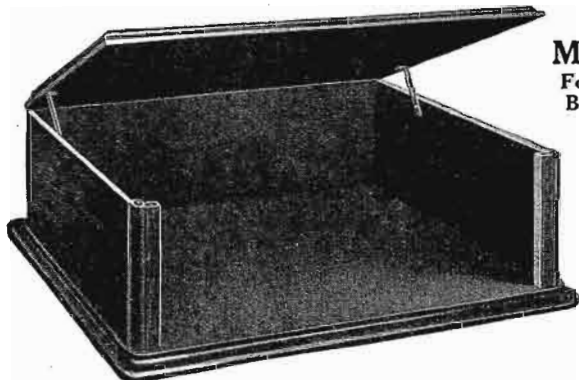
**The Citizens  
Radio Call Book  
Engineering Laboratories**

508 So. Dearborn Street, Dept. "C"  
Chicago Illinois

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# Vee Dee

## All-Metal Cabinet— For 1927-1928 Hook-Ups!



**Model 250**  
For A. C. or  
Battery Sets

Using  
7x18  
7x21  
8x18  
8x21  
Panels

Inside dimensions 25"x14 1/4"x9 1/8". Hinged top—with stay joint. Rigidly formed for strength and appearance. Felt foot rests—rubber lid stops. A welded job doing away with troubles of swelling, shrinking, cracking, splitting and the uncertain fit of wood cabinets.

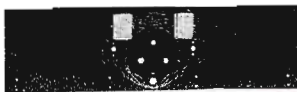
The original beauty of natural wood grains combined with the efficiency of all metal construction! By our photo litho process, we reproduce mahogany and walnut hardwood, and novelty finishes, so gorgeous in their conception that they excite the admiration of all who see them.

Spacious interior dimensions are demanded for housing all the latest hook-ups! Vee Dee metal cabinets are designed for that purpose. 90% of all the 1927-1928 hookups are covered by the dimensions of Vee Dee No. 250 cabinet illustrated above. Beautiful—practical! Low price!



**Metal Panel for Citizens Super Eight**

Constructed in accordance with Citizens Radio Call Book and McMurdo Silver, Remler, Cockaday co-ordinated designing



**Metal Panel and Chassis for Silver-Marshall 1927 Laboratory Model Super-Heterodyne**

Complete assembly consisting of panel and chassis, fully drilled, beautiful wood finish with special two-color decoration, all fibre bushings and washers included, also screws, bolts and hardware accessories.

**S. C. 2 Assembly Unit**

Complete panel, chassis, 7x18—fully drilled. Wood grain finish, beautifully decorated. Kit includes all necessary bushings, washers and accessories.



**Unipac Housing**

Especially designed and provided for Silver-Marshall Power Hook-ups—including cabinet and chassis, drilled and with all small hardware. Inside dimensions, 17 1/2" long, 5 3/4" high.

Metal Panels and Chassis in All Standard Sizes

JOBBERS, DEALERS—WRITE FOR PRICES

Set Builders—If your dealer cannot supply you, write direct

## The Van Doorn Company

160 North La Salle Street Chicago, Illinois  
Factory, Quincy, Illinois

# KINGSTON



## For Perfect Reception

THE KINGSTON will maintain the radio set always at its perfection peak. It contains no acid or solution, operates without vibration or noise and will not heat. There are provided three different voltage terminals, each adjustable over a wide range, making possible any desired voltage from 5 to 200. A fourth variable voltage may be easily had, if desired, by connecting a separate variable resistor to one of the terminals. The primary or main current supply is controlled by a rheostat, making it possible to reduce the current entering the unit to the amount actually required for any individual set, thus protecting the set against overload.

Handsomely finished in satin black. Size: 9 inches long, 5 1/4 inches wide, 8 1/4 inches high. The Raytheon 85 milliamperere type BH tube is used as rectifier. Fully guaranteed.

### PRICES

Type 2, for 110-120 Volt A. C. 50 or 60 Cycle Current, \$35.00

For receiving sets having not more than eight tubes and not having type UX171 power tube or equivalent.

Type 2A, for 110-120 Volt A. C. 50 or 60 Cycle Current, \$42.50

For all sets using type UX171 power tube or equivalent and for all large sets having nine or more tubes.

Type 2C, for 110-120 Volt A. C. 25, 30 or 40 Cycle Current, \$47.50

Prices include type BH Raytheon tube.

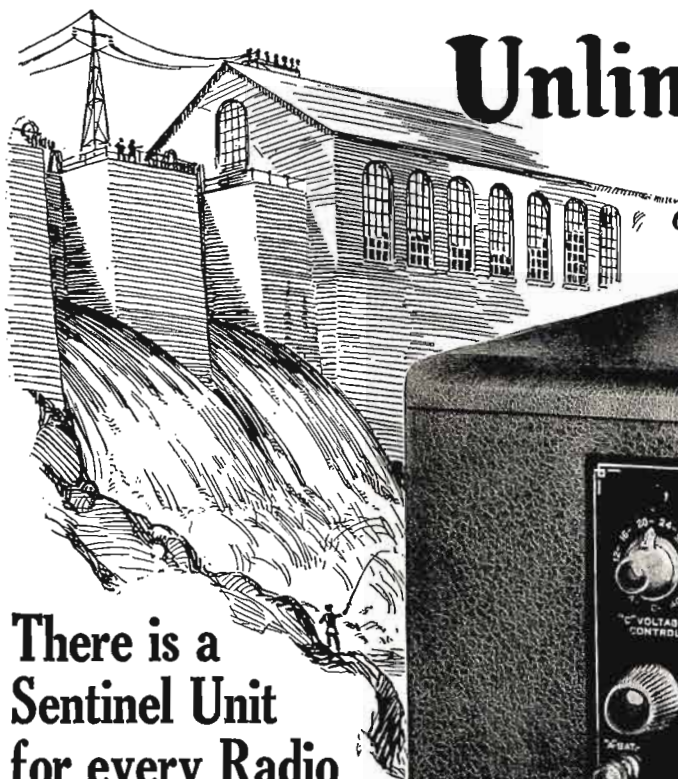
Any of these models will be furnished with an automatic control switch built in the unit for \$2.50 additional. With this the B unit is automatically switched on or off when switch on the radio set panel is turned.

**KOKOMO ELECTRIC COMPANY**  
KOKOMO INDIANA

Tell 'Em You Saw It in the Citizens Radio Call Book



# Unlimited Power for your Radio!



There is a  
Sentinel Unit  
for every Radio  
Power Need—



Sentinel  
"Dry-A"  
and  
Sentinel  
"Dry-A-B-C"

are absolutely new units,  
operating without batteries,  
direct from house current.  
No acids, no refilling, no  
bother. Prices slightly  
higher.

## Sentinel Completely Automatic! A-B-C Power Units



Know the joy of perfect radio reception by eliminating the cause of most of your troubles—your batteries.

Sentinel Radio Power Units provide steady, easily controlled current for all radio purposes. Select the unit or units your set needs, attach to receiver, plug in light socket and your battery worries are ended. Sentinel units are guaranteed. Your radio set switch controls their operation—keeps your power up to "par" all the time.

Write today for complete descriptions of all Sentinel Units and name of nearest dealer. We will arrange for a demonstration without obligation of any kind.

**SENTINEL MANUFACTURING COMPANY**  
9705 Cottage Grove Avenue Chicago, U. S. A.



Sentinel A-B-C (Completely automatic) Unit supplies every Power requirement of radio. Regular model, large picture at top priced at \$79.50. Beverly Model (metered as shown), \$98.50.



Sentinel Automatic Control, makes your "A" Battery and Charger completely automatic. Price \$15.00.



Sentinel Automatic Control and Charger makes any "A" battery a completely automatic power unit. Price \$29.50.



Sentinel "A" Completely Automatic power unit is a combination battery, relay and charger. Price \$40.00.



Sentinel "B-C" unit furnishes "B" current for ANY radio set—80 mil. drain at 180 volts with ample reserve power. Price \$44.50.



Sentinel B-C unit (Beverly Model) is metered to allow positive control of all plate voltages. Price \$65.00.

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512 Market Street, Philadelphia, Pa.

**"The Largest Radio Kit House in the Country"**

We Can Furnish Complete Specified Parts for Any of the Popular Circuits Described in This Magazine

**ALL PARTS FURNISHED ARE CAREFULLY MATCHED AND TESTED**

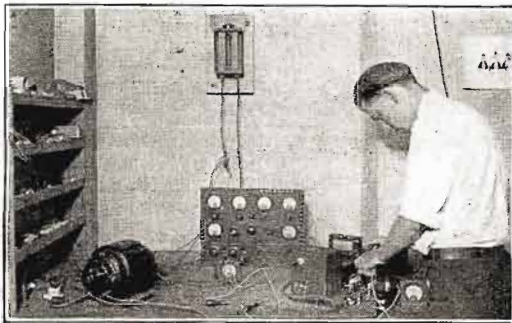
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WE CATER PARTICULARLY TO SET BUILDERS AND DEALERS

*Mail Orders Filled Promptly*

*Thirty Years Efficient Service*

We are equipped to test all types of Power Amplifiers, "B" Eliminators and Receivers



**Radio Service Laboratories, Inc.**

508 South Dearborn Street  
Chicago, Ill.

HARRISON 2870

## The Resistor Handbook



Price 25c

Written by Zeh Bouck for the experimenter interested in resistance coupled amplification and B and C eliminators.

Twenty-four pages of tables, circuits and diagrams.

AMSCO PRODUCTS, Inc., 416 Broome St., N. Y. C.

## New Models of World Record Supers

This receiver has brought in coast to coast reception consistently for thousands of fans. You, too, can secure these marvelous results. Get complete parts and build this receiver according to the Call Book layout. Simple to build. Write for our big catalog describing this and other popular hookups. All parts in stock—ready for shipment.

**THOR RADIO CO.**

35 South Dearborn Street

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**SET BUILDERS!**  
A Complete Line of  
The Very Latest KITS and PARTS  
STANDARD APPLIANCES  
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Get the Lowest Prices

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ELECTRICAL SUPPLY COMPANY  
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**BIG** Write for THIS FREE BOOK

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Tell 'Em You Saw It in the Citizens Radio Call Book

U. J. HERRMAN  
MANAGING DIRECTOR

G. CLAYTON IRWIN Jr.  
GENERAL MANAGER

# RADIO MANUFACTURERS SHOW ASSOCIATION

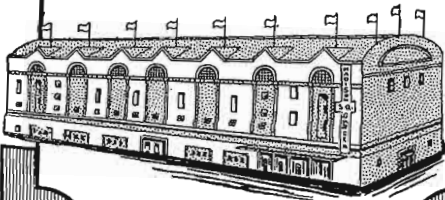
Presents



## FOURTH ANNUAL RADIO WORLDS FAIR

MADISON  
SQUARE GARDEN  
NEW YORK CITY

SEPT. 19~24  
1927 *Incl.*



THE exhibits of new inventions and developments in radio receivers, parts and accessories will be of great interest to all amateurs, professionals and radio fans.

You will also meet radio's most popular entertainers and announcers. Among the many new innovations will be "The Theatre of Wonders," a storehouse of magical and practical inventions you can't afford to miss.

*Special business sessions for the trade*

Radio shows open daily from 1:00 P.M. until 11:00 P.M.

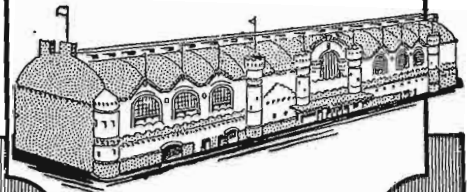
National Radio Day  
September 21



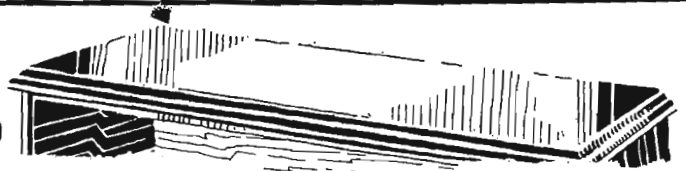
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# \$5.50 buys



# SYD

LIFE LONG  
"B" BATTERY

UNCONDITIONAL 2-YEAR GUARANTEE

It's Quality—Not Price—That Makes a Real Battery

Type B2  
100 Volts  
with a  
Charger,  
**\$15.50**



145 Volts  
with a  
Charger,  
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The SYD Battery pictured above is a storage "B" Battery made of Edison Elements, which have nickel and iron in their construction. The solution used is a preserver of nickel and iron, thereby giving the battery practically unlimited life. SYD Batteries are built to give the user real value for every dollar he invests. Only the finest materials are used in their construction. Remember that the quality of the battery and not the price determines its worth. That's why SYD Batteries are preferred and used by thousands.

TESTED AND FOUND SATISFACTORY BY THE CHICAGO DAILY NEWS RADIO LABORATORY. ALSO BY POPULAR RADIO LABORATORIES, NEW YORK CITY

Manufactured and Sold Exclusively by  
**SYD STORAGE "B" BATTERY CO.**  
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MAIL ORDERS FILLED

FOR RADIO DEALERS ONLY

# ROCK BOTTOM PRICES

## *on everything in Radio*

Only the newest and latest (1927-1928) radio goods; no obsolete products; no "seconds" or sub-standards. All goods of tested and proved quality and established reputation—absolutely guaranteed.



### Get This Wonderful New Price Guide

Compare its money-saving values. Test our "Minute-Man" shipping service with a trial Rush order. Write NOW for your copy of Harry Alter's new "Radio Book."

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### To Set Builders and Dealers

Write today for this big new Catalog. Its about obligation. Con



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Let me show


## FREE The Greatest RADIO CATALOG

Every set builder needs this book. Every live dealer in radio sets, parts, accessories, supplies, etc., should have a copy of this bargain catalog. You will be amazed at the thousands of money saving radio items illustrated and listed in this storehouse of everything you could possibly need in radio. The book contains all the latest and most popular kits—all the famous, nationally known radio parts, accessories and supplies—the very newest types and designs of table cabinets and consoles—everything at prices that mean bigger profits for you.

**Citizens Call Book Kits—** We can supply complete kits for any of the circuits described in this issue of the Call Book: such as, Silver-Marshall Laboratory Model Super, Nine-in-Line, Tyrman 10, and all others.

**SHORT WAVE SECTION—**Our catalog contains a section devoted to a showing of the highest grade short wave receiving and transmitting apparatus. Also the finest electrical appliances for use in the home.

**DEALERS! MAKE MORE MONEY** Tie up with a house that carries large, complete stocks—that gives you the highest quality radio parts—that insures speedy shipments and 100% satisfactory service. Tie up with Shure. Our wholesale vest pocket price list and discount sheet, together with the 1928 bargain catalog will be sent to you on request. Write on your business stationery—but write quickly.



**1928 WHOLESALE CATALOG of RADIO Sets, Kits and Everything in Radio**

WHOLESALE VEST POCKET PRICE LIST AND DISCOUNT SHEET

**Real Bargains to Dealers**

**SHURE RADIO COMPANY**  
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## EIGHT-IN-LINE



**THE GREATEST SET IN RADIO TODAY**

We are headquarters for the Eight-in-Line parts, furnished complete as specified in the Citizens Radio Call Book.

**Largest Stock of Parts and Kits in the West**

All Call Book Circuits Carried in Stock

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**WE SAVE TIME AND MONEY**

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## The famous AALCO LOOP for that SUPER-Het

The ONLY LOOP that, due to its patented construction has TIGHT WIRE whether OPEN or FOLDED. Ever increasing sales prove its efficiency and popularity. Designed to completely cover the broadcast band in a most efficient manner.

Approved by the leading engineers for the following receivers:  
Remler—Nine In Line—Eight IN LINE—VIC-TOREEN—Selectone—Wetly Super—Thompson Super 7—Robertson-Davis—SILVER-MARSHALL—MADISON-MOORE—and other high grade sets.

Also special type for T. R. F. receivers.

Highest grade material and beauty of finish, genuine walnut, all metal parts, statuary bronze, hard rubber insulators. Hollow spindle enables leads to be run directly into cabinet through its base. Three quick detachable leads furnished with each loop.



TRADE MARK REGISTERED U.S. PATENT OFFICE

Dial matching simple due to variable inductance  
**Price \$12.50**

If your dealer cannot supply you, order direct  
**Manufactured and Guaranteed for Life**

By  
**A. C. RADIO ENGINEERING, Inc.**  
Successors to Aalco Radio Lab.  
1912 South Wabash Ave.      Chicago, Ill.

## SENSATIONAL!

**Prices Reduced Continental Standard Meter Test RADIO TUBES**

Formerly **\$1.75** Now **\$1.00** Only →



The greatest and most sensational price reduction ever offered in high quality standard meter test guaranteed radio tubes. No job lot or old style base tubes but genuine CONTINENTAL tubes, "firsts" of our very best grade. Increased production and large volume business enables us to offer CONTINENTAL quality tubes at the now established standard price of only \$1.00.

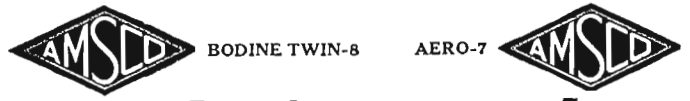
Never before has a standard quality radio tube been offered to the public at this low price. Take advantage of this opportunity now to get your radio tubes at a real saving. Each tube packed in individual box, carefully tested and marked perfect and unconditionally guaranteed in the 201A type to show an emission reading of 55-60 at 45 volts or 65-70 at 90 volts and in the 199 type a reading of 20-25. That's real quality!

**Look at These New Low Prices**

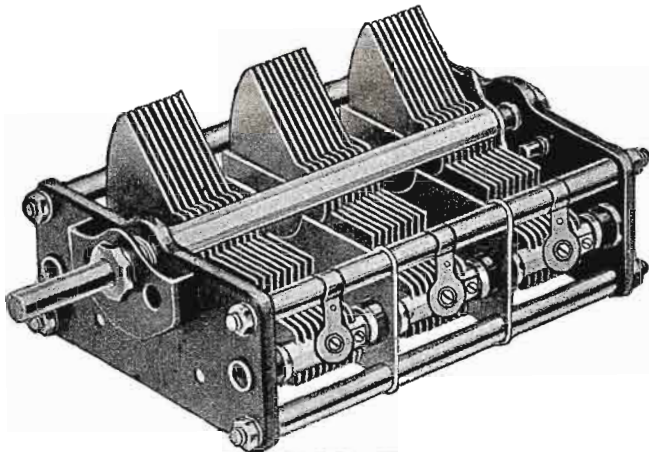
Types UX 201A, \$1.00; 199 (UV, UX and standard base), \$1.25; Types X-120 Power, X-112 Power with adapter base, Type X-112 Power, X-171 Power and 200A Power Detector, \$2.50.

**Dealers and Jobbers: Write for special offer**  
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Tell 'Em You Saw It in the Citizens Radio Call Book



# A truly fine product



## THE AMSCO COMPENSATED TRIPLET CONDENSER

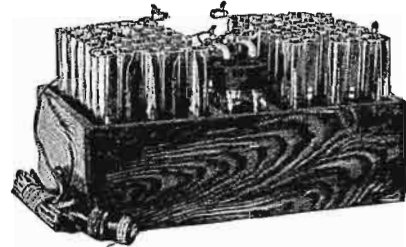
Engineering precision, from the formula for the curve of the tuning line to the final adjustment of the equalizing condensers, justifies the quiet commendation of engineers.

The two outstanding receiver developments of 1927, the Bodine Twin-8 and the Aero-7, use this condenser. We shall be pleased to send literature on these circuits.

The inclusion of Amsco Products—rheostats, sockets, resistors and condensers,—adds to any receiver a touch of real beauty and the assurance of electrical efficiency.

Amsco Products, Inc., Broome & Lafayette Sts., N. Y. C.

# 90 Volt Power Unit :: \$12.75



Hums, line noises, etc., positively impossible with this new advanced unit. Plug in and forget. Non-acid and noiseless. All detector and intermediate voltages plainly marked. Simpler to hook up than dry cells. Operates any type set, 1 to 12 tubes.

Greater volume and clearness guaranteed. If not thoroughly satisfied return after using 30 days for complete refund. Guaranteed further 2 years. For 110-120 volts A. C., 25 to 60 cycle current. 90 volts, \$12.75; 112½, \$15.25; 135, \$17.50; 157½, \$19.50; 180, \$24.00; 202½, \$26.00.

Also built for D. C. current 110 and 32 volts at only \$3.00 additional, any size above. Ample stock—same day shipments. Simply say—ship C. O. D. or write for my interesting literature, testimonials, etc.

**B. HAWLEY SMITH**

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# MORE "B" BATTERY POWER

THE "CHICAGO" HEAVY DUTY



### With a Six Months' Guarantee

Think of a B Battery that gives six months' efficient service! Thousands of these powerful batteries are making better receivers out of thousands of radios. This type of "B" Battery is what you need for your trade. Sold on absolute guarantee to give six months' service or we replace with new battery.

### We Ship Direct from Our Factory

No "Chicago" Battery is more than seven days old when shipped. You will build up your trade and good will of your customers by selling fresh-from-factory "Chicago" Batteries, guaranteed to give maximum efficiency and power.

Here is the "Chicago" Heavy Duty. The Most Powerful "B" Battery made. Retail Price—\$5.00 Liberal Discount to Dealers on our Direct-From-Factory to Dealer Policy.

### Shipped on Approval Direct from Factory

Approved by the Radio Institute of Standards. Contains 30 Double Capacity Cells. Size of battery 8 3/16 x 4 1/4 x 7 3/16. Weight 13 3/4 lbs. **SEND NO MONEY.** We are perfectly willing to ship you one case on approval. If after examining batteries you are not absolutely satisfied return them and we will refund your money. This approval offer is additional to our six months' guarantee.

**DEALERS AGENTS** Write Today for discounts and details of our exclusive selling franchise. We make a complete line of Dry Cell Batteries for Radio and Flashlights.

**AUSTIN ACCESSORIES MFG. COMPANY**  
12 South Clinton St. Chicago, Ill.

# KROBLAK RESISTANCES

M-210 KIT—Contains all necessary resistances for Thordarson R-210 Power Compact. Price.....\$4.50

SM-I KIT—Contains all necessary resistances for the Silver-Marshall Reservoir "B" Compact. Price .....\$3.00

These kits can be used in the circuits described in the March, 1927, issue of Citizens Radio Call Book. If your dealer cannot supply you with these kits, write us direct.



R-508-I—This Kroblak Resistance is made especially for Thordarson R-71 Power Compact. Price..\$2.15

Kroblak Resistances are dependable, sturdy, wire wound units permanent of resistance and rugged in construction. Rated according to continuous duty wattage. Kroblaks are available in types to meet all ordinary resistance requirements and are also made to special specifications.

*Kroblak Resistances are sold by all good dealers Write for circular showing complete line*

**C.E.MOUNTFORD**

30-32 SULLIVAN ST.

NEW YORK CITY

Tell 'Em You Saw It in the Citizens Radio Call Book

# There is a Vitrohm Radio Resistor for EVERY power unit

More than 90 standard Vitrohm Resistors and Rheostats cover the resistance need of every socket power circuit now on the market.

Resistance is the heart of power circuits. Make sure of quiet, permanent, and unfailing service by insisting on Vitrohms for radio.

Vitrohm Resistors and Rheostats are guaranteed unconditionally for continuous-duty in any circuit where they operate within their watts dissipation rating—Vitrohm Resistors have the highest continuous-duty rating without resistance change of any resistor.

## New Vitrohms

The list below of new resistors and rheostats is partial. A full description of new Vitrohms for Radio is available without charge. *Send for it.*

### RAYTHEON 350 M. A. UNITS

Vitrohm Resistor 507-70.....\$7.50  
Vitrohm Rheostat 507-59.....5.50

### QRS 400 M. A. CIRCUITS

Vitrohm Resistor 507-62.....\$7.50  
Vitrohm Rheostat 507-59.....5.50

### SILVER-MARSHALL UNITS

Vitrohm Resistor S-M 653.....\$2.50  
Vitrohm Resistor S-M 655.....2.50  
Vitrohm Resistor S-M 657.....5.00

### THORDARSON POWER PACKS

Vitrohm Resistor for R-171.....\$2.15  
Vitrohm Resistor for R-210.....2.65  
Vitrohm Resistor for R-210.....4.90  
with UX874 Regulator Tube

## The Adjustat

A new Vitrohm Rheostat, dissipating 20 watts, having 15 steps of resistance. The Adjustat is priced at \$3.00.

11 types are available in the following resistances and current capacities:

507-79, 1 ohm, 4 amp.—507-71, 2 ohms, 3 amp.—507-72, 6 ohms, 1.5 amp.—507-73, 20 ohms, 1.0 amp.—507-74, 30 ohms, 0.75 amp.—507-80, 50 ohms, 650 m.a.—507-81, 600 ohms, 180 m.a.—507-75, 1000 ohms, 125 m.a.—507-76, 2250 ohms, 90 m.a.—507-77, 10,000 ohms, 40 m.a.—507-78, 25,000 ohms, 10 m.a.

**WARD LEONARD**  
ELECTRIC COMPANY  
MOUNT VERNON, N. Y.



## A New Standard of Speaker Performance!

Designed on unique acoustic principles, the Yar True-Tone Speaker establishes new standards of radio speaker performance!

Broadcast programs are reproduced with the utmost naturalness, without artificial vibrations or overtones, and in full, clear volume. This is due not only to the revolutionary design of this speaker, but also to the great density of the materials used. The entire speaker is made of cast aluminum. The reproducing unit will handle any voltage up to 200 volts without "blasting" or oscillation.

And it's a beautiful home ornament as well as a wonderfully efficient speaker. Its graceful lines and attractive finish harmonize with any home setting. It is supplied with 20 ft. of power cord—may be placed anywhere in a room, to balance furniture groupings, or for best acoustic effect.

**PRICE, COMPLETE, \$35.** If your dealer cannot supply you, order from us direct.

**DEALERS:** Ask your jobber about the Yar True-Tone Speaker or write us for further information.

**YAHRLANGE**  
MILWAUKEE INCORPORATED WISCONSIN

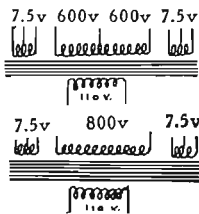
# URCO PRODUCTS



## GRIDLEAKS

15,000 ohm, tapped 5000 and 10,000 as shown.....\$1.50  
 20,000 ohm, for UX852..... 1.50  
 5,000 ohm, for UV203A, etc..... 1.00  
 5,000 ohm, for 1-UX210 only..... .75

## TRANSFORMERS



**200 Watt**  
**\$12.50**  
**Wgt. 14 lbs.**

**100 Watt**  
**\$9.50**  
**Wgt. 11 lbs.**

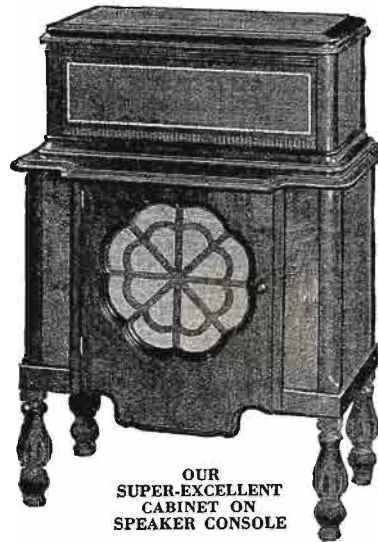
## FILTER CHOKES

50 Henry, 100 milliamper, 4 lbs.....\$5.50  
 100 Henry, 50 milliamper, 5 lbs..... 5.00  
 Add Postage

## UTILITY RADIO COMPANY

80 Leslie Street East Orange, N. J.

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OUR  
 SUPER-EXCELLENT  
 CABINET ON  
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This cut shows our Super-Excellent Table Cabinet on our Super-Excellent Speaker Console. This is only one of our 10 latest conceptions of Radio Furniture. We have an unusual display of Furniture designed and built exclusively as Radio Furniture.

Send for catalog and descriptions and you will find that we are listing and carrying, ready for immediate shipment, a very beautiful line. From all forecasts it is apparent that Radio Furniture will be the dominating factor in radio sales this coming season. Sets in our Cabinets will make sales. Special Cabinets built to order in quantities.

## Ehlert Radio Furniture Co.

2468 Lincoln Avenue, Chicago, Ill.

Show Rooms and Large Stock Carried in Chicago

Manufacturers of: RADIO CABINETS, RADIO DESKS, RADIO CONSOLES, RADIO TABLES

## Changes Your Set Into a Short Wave Receiver

Sent postpaid anywhere in U. S. upon receipt of \$15.00 M. O. or C. O. D. plus postage upon receipt of \$1.00 to guarantee carrying charges.

When ordering state kind of set so that detailed directions for use may be given if necessary. Also state type of tubes, such as UX199, UV199, WD11 or 201A.



# The SUBMARINER

Regardless of the kind of set you have, this device will permit you to listen to short wave stations between 30 and 75 meters. Operates with sets such as T R F, Neutrodyne, Super-Heterodyne, regenerative sets and all other types. No additional tubes or batteries required. No changes to the wiring of the set. A short aerial and ground is connected to the "Submariner," and a cable and plug attaches it to the set. Requires less than a minute to attach or detach. Operates as a wave changer with Super-Heterodynes, and as a detector unit with others.

## SHORT WAVE RECEPTION

is practical because they penetrate better, and there is less static. There are several powerful stations using the wave band covered by the "Submariner" for broadcasting programs. You may also learn code by listening to amateurs from all parts of the world. Get a thrill by tuning in a station your friends cannot get. You will have a highly efficient short wave receiver when the "Submariner" is attached to your set. Nothing else like it on the market. Take a trip in the low waves on board the "Submariner."

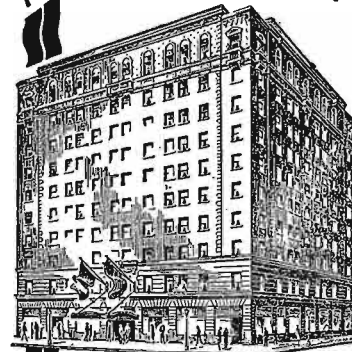
## ORDER TODAY

We guarantee to refund if the "Submariner" fails to operate

ADDRESS  
 J-M-P Manufacturing Co., Dept. 111X, Milwaukee, Wis.

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## AUDITORIUM HOTEL



EAST 6TH AND ST. CLAIR AVE.

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Are you wondering why we have built "Auditorium" Hotel in Cleveland. One must have a good reason for spending nearly two million dollars. We have a reason worth far more than that:

Every hotel operator gives "His best efforts for your comfort." We have centered our efforts around one ideal desire. "To make you happy."

There must be something back of that desire. You can easily prove it by coming here just once.

Sincerely yours,  
*James L. Smith*  
 Manager

Tell 'Em You Saw It in the Citizens Radio Call Book



Get these Remarkable  
New Transformers  
for Your Set. . . .



**MODERN**  
Type M Transformers  
*Establish New Standard  
of Perfection*

Seldom is such an advance made in one step as the improvement in reception made possible with the development of the Modern Type M Transformers.

Low impedance, large core and wire sizes, and careful proportioning of windings result in uniform amplification over entire broadcast range and the elimination of harmonics and over-amplification of high notes.

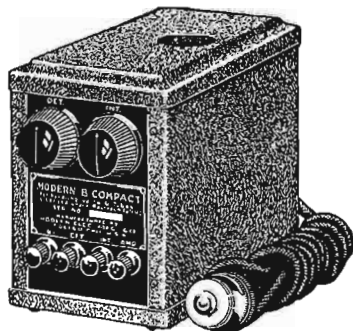
First and second stage audio transformers, \$8.50 each—Push-pull transformers, \$10.00 each—Output transformer, \$8.00. Satisfactory performance guaranteed.

If your dealer cannot supply you,  
your order will be shipped direct,  
postage paid, on receipt of list price.

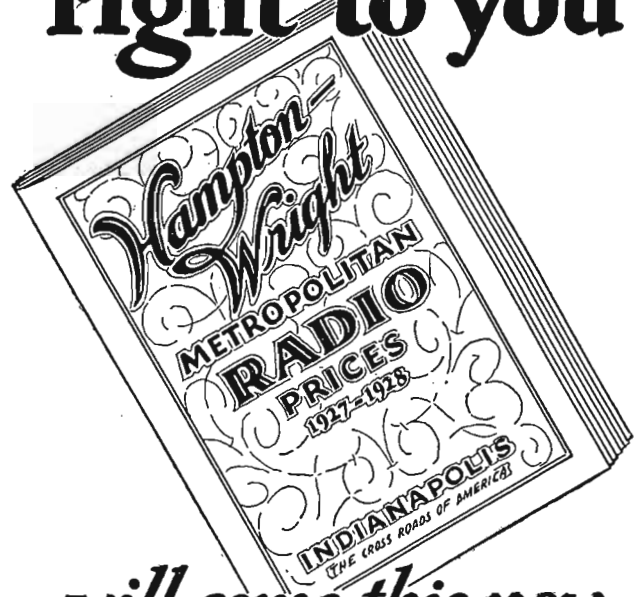
**The Modern Electric Mfg. Co.**  
Dept. A9, Toledo, Ohio

**MODERN**  
**"B" Compact**  
*(Proven Dependable)*  
**\$26.50**

(Designed for use  
with Raytheon Type  
B Tube which is not  
included.)



**Write to us**  
*and then*  
**right to you**



*will come this new*  
**FREE**  
**CATALOG**  
*of unusual radio bargains*

**WHETHER** you're an enthusiastic fan, a set-builder or a dealer, you'll want to have this "Book of a Thousand Radio Bargains." In it you'll find values that are rapidly marking Hampton-Wright as outstanding in the radio world. This new 1927-28 catalog is filled with the best merchandise of well-known manufacturers. This is Hampton-Wright's greatest year—take advantage of it.

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Dear Sirs: I want this new "Book of a Thousand Radio Bargains."  
Please mail one today to:

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City \_\_\_\_\_ State \_\_\_\_\_

"KEEPING PACE WITH RADIO"

**HAMPTON-WRIGHT**  
RADIO PARTS AND ACCESSORIES  
DARMODY BUILDING ✚ ✚ ✚ INDIANAPOLIS

Tell 'Em You Saw It in the Citizens Radio Call Book



# Notice



The Rex Laboratories, Incorporated, of Cleveland, Ohio, have acquired all patents, trade marks, etc., under which LINCOLN LONG WAVE TRANSFORMERS have been manufactured.

Due to the fact that the word LINCOLN cannot be copyrighted in connection with radio apparatus, there are now several companies and individuals engaged in manufacturing a long wave transformer, which they are merchandising under the name LINCOLN in some form.

Each genuine LINCOLN transformer will, in the future, bear the shield which appears at the head of this ad, and which is the registered trade mark under which this transformer is sold.

(NOTE: A complete construction article and diagrams will appear on THE NEW LINCOLN QUALITY CIRCUIT "THE STANDARD OF COMPARISON" in the November issue of this periodical.)

**THE REX LABORATORIES, Inc.**  
 341 The Arcade, Cleveland, Ohio  
 Successors to  
**THE LINCOLN QUALITY PROD. CO.**



# 1928 -

## Wholesale RADIO Catalogue

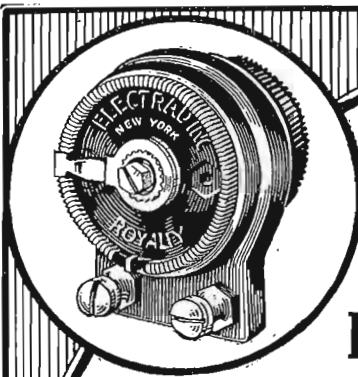
**FREE**

**136 Pages of Illustrated Wholesale Bargains**

Just off the press—our new **wholesale catalog** of everything in Radio. The most complete illustrated catalog of quality Radio merchandise ever found in one book. It comprises the entire line of all the popular **Nationally advertised** radio sets, accessories, parts and kits—particularly all the latest features shown in this and previous issues of this magazine. Rock-bottom prices on each item. **Electric Sets—6, 7 and 8 tube; also non-electric sets.** Astonishing values in "A" Eliminators, "B" Eliminators, loud speakers, chargers, cabinets, consoles, kits and parts. For immediate shipment.

**Values That Will Astonish You—The Latest Kits, Power Packs, Parts and Accessories**  
**Also how to make your old sets electrically operated at very low cost.** Here's quality radio merchandise at extraordinary low prices. No dealer can afford to be without this book—a veritable clearing house for radio needs. Be sure and get your copy! **We are pioneers in radio and deal in radio exclusively.** Only our tremendous purchasing power makes these extraordinary values possible. Write for this **FREE** catalog **NOW.**

**HAMILTON-CARR CORPORATION**  
 711 West Lake St., Dept. 22 • Chicago, Ill.



Exclusively Licensed by Technidyne Corporation under U. S. Patent No. 1593658, July 27, 1926.

## Quality Unsurpassed ELECTRAD

### Royalty Variable High Resistances

Frequent and repeated tests by radio authorities have proven these resistances to be unapproached in accuracy and reliability. Note these quality features:

- 1—Contact made positive by metallic arm on wire wound strip.
- 2—Same resistance always obtained at the same point.
- 3—Resistance element not exposed to mechanical wear.

A range for every purpose—11 in all  
 Type E—\$2.00. All other types, \$1.50

At your dealer's  
 Write for hook-up circular  
 Dept. 73, 175 Varick Street, New York, N. Y.

# ELECTRAD

# ELKAY

TRADE MARK REG.

## EQUALIZORS

Take the place of the old variable rheostat on all but the first R. F. stage. Space-saving, quiet, efficient. Adjust themselves automatically to working voltage of the tube. With Elkay Equalizers you can

**Change Instantly to Any Combination of Tubes in the Same Set**

Simply insert the correct Equalizer for each tube. There is one for every tube made. No rewiring. Simple as slipping a shell into a gun. Mounted, 75c; unmounted, 50c.

**Elkay Suppressors**, in cartridge form, suppress regeneration noises and squeals. Best little stabilizers you ever used. Mounted, \$1.00; unmounted, 75c. Order from us if not at your dealers.

**The Langbein-Kaufman Radio Co.**

Dept. C  
 62 Franklin St.  
 New Haven, Conn.



Tell 'Em You Saw It in the Citizens Radio Call Book

# POTTER MANUFACTURING COMPANY, INC.

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CANADA  
214 Graham Ave.  
CHICAGO, ILL.  
2529 Ashland Ave.  
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## Potter By-Pass Condenser (Model A-101, A-102 and A-103)

This by-pass condenser is a 1927 Model of the highest type. It is compact, has full capacity and high resistance, and is arranged with solder coated terminals for panel mounting.



Special types can be made up with wire leads if desired. Cases are of strong, smooth-finished non-magnetic fiber. Length, 1 3/8 in. Distance between mounting centers, 1 7/8 to 2 in.

| Code No. | Capacity mfd. | Diam. in. | List price, each |
|----------|---------------|-----------|------------------|
| A-101    | .1            | 5/8       | \$0.55           |
| A-102    | .25           | 1         | .70              |
| A-103    | .5            | 1 1/4     | .90              |

## Potter By-Pass Condensers (Model 1 to 5, 101 to 105)

A high grade by-pass condenser applicable to sets and circuits where high B voltages, not exceeding 180 volts, are used.

Dimensions: Height, 2 in.; width, 1 1/2 in.; depth, 5/8 in.



| Code No. | Capacity mfd. | Working d-c. voltage | List price, each |
|----------|---------------|----------------------|------------------|
| 1        | .1            | 180                  | \$0.60           |
| 2        | .25           | 180                  | .70              |
| 3        | .5            | 180                  | .75              |
| 101      | .1            | 200                  | .70              |
| 102      | .25           | 200                  | .75              |
| 103      | .5            | 200                  | .90              |

## Potter Condensers for Amateur Transmitter Filters—Blocking D-C. Current of 1000 Volts or Above, Shunts in Electrical Instruments, High Voltage Experimental Work, Spark Discharge Apparatus—In All Capacities and Sizes

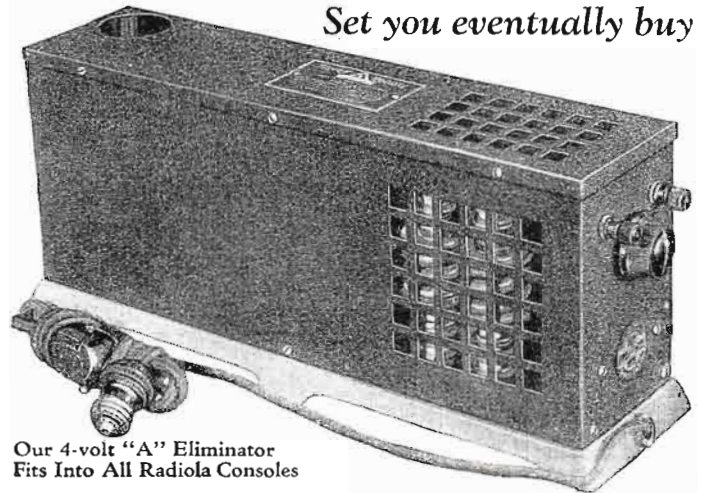


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THE 110 volts Alternating Current is scientifically reduced with the famous "Silver Beauty" transformer coil to deliver the proper voltage to an especially developed dry, noiseless rectifier, which transforms the electricity to direct current. This current of exact voltage is then transmitted through a patented special filter which clarifies the current, eliminating all foreign noises caused by rectifier or generator.

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| PRICES                     |
|----------------------------|
| \$39 <sup>50</sup>         |
| 6-volt—2 amp.              |
| \$43 <sup>50</sup>         |
| 6-volt—3 amp.              |
| \$39 <sup>50</sup>         |
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Gives maximum power to radio tubes and lengthens their life.

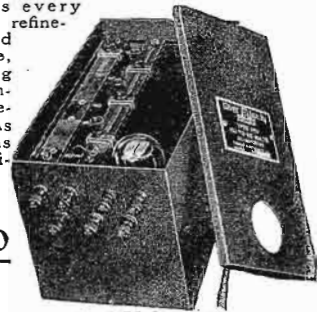
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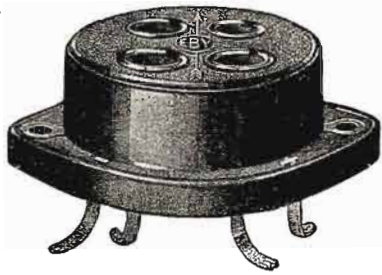


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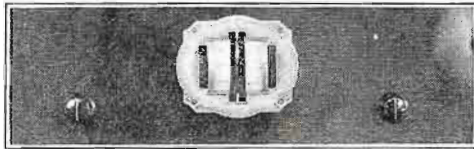


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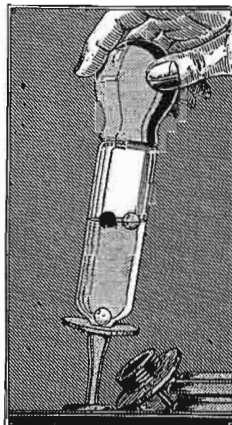
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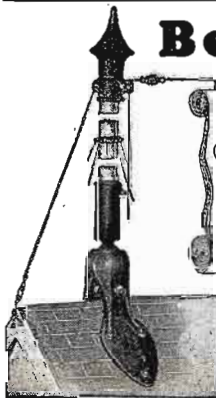
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The newly announced A. C. tubes offer an excellent solution to this problem.

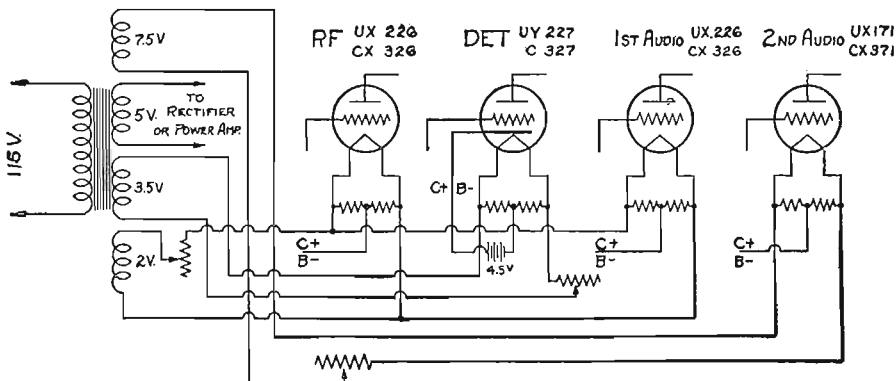


**Type 440-A  
Low Voltage Transformer**

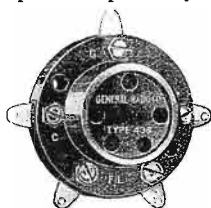
The alternating current tubes require a source of low voltage capable of delivering large current. The various types of tubes require several different voltages. The type 440-A transformer supplies voltages for all popular A. C. tubes and sufficient current for all ordinary receiver requirements. Filament supply is provided for filament, separate heater, power amplifier and rectifier tubes. The following voltages and currents are available. Pri. 115 (for lines 105-125 volts) 60 cycles.

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|        | 5 volts.....2.5 | amperes |
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Price \$10



The above diagram shows how to adapt the filament wiring of the popular type of receiver to A. C. operation by use of General Radio parts especially designed for this purpose.



**Type 438 Socket**

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Type 438 socket.....\$0.50

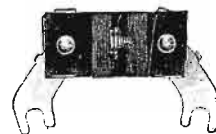
The various types of A. C. amplifier tubes are designed with standard UX or CX base having four prongs.

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**Type 439 Center Tap Resistance**

All the new A. C. tubes require a resistance with center tap across the filament as shown in the diagram. The Type 439 Resistance is adaptable to any socket in which the new A. C. tubes may be used.

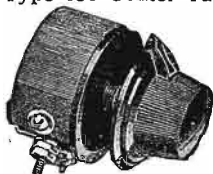
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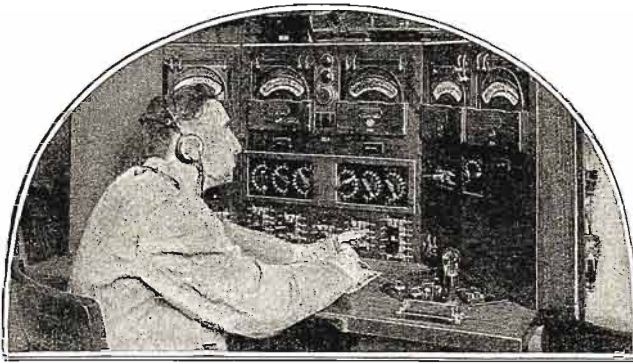
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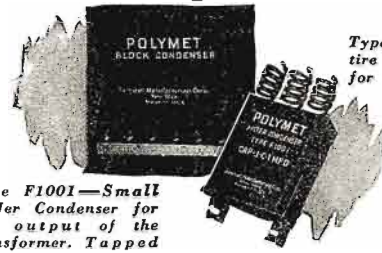
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Why confine your radio programs to a few local stations when the expensive concert, dance music and lectures of hundreds of big cities are ready for you? With every order for our greatest, "The Distance Getter," we include FREE our wonderful new Distance Transformer. Tune your set according to our special instructions and presto—note the distant stations roll in!

Your money instantly refunded if you are not satisfied. The attachment furnished free with the "Distance Getter" alone is worth the price. "Results beyond all expectations. Cuts thru local stations like a knife." writes Galloway of Chicago, Ill. "Send three more for my friends. I get Denver, and Calif. easily," says Homes, Palos, Ill.

**MAIL COUPON TODAY**

**HAZLETON LABORATORIES**  
 4554 Malden St., Dept. X, Chicago, Ill.

Send me Distance Getter, postpaid. Enclosed find \$2.00 (M.O., stamps or check.) Send C.O.D. plus small postage added. Also send 100-page Radio Catalogue Free.

Name.....  
 Address.....  
 City..... State.....

Tell 'Em You Saw It in the Citizens Radio Call Book

**5 TUBE RADIO ONLY \$19.98**

It's a wonder for power and selectivity. Famous ARL circuit. Coast to coast reception! Finely built of selected, tested parts. Beautifully designed and richly finished cabinet. Thousands in use. A remarkable value. Write for FREE Log and Call Book and New 132-page Catalog with

**AMERICAN RADIO BARGAINS**

**FREE Log and Call Book**

thousands of nationally advertised bargains. All latest in radio at big savings. Send for your FREE copy. **AMERICAN AUTO & RADIO MFG. CO.** Harry Schwartzberg, Pres. Dept. 161 American Radio Bldg. Kansas City, Mo.

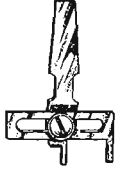


**THE G-R CIRCLE CUTTER**

Cuts holes in Radio Panels from 3/8 to 3 in. Fits into an ordinary carpenter brace.

Price 65 cents

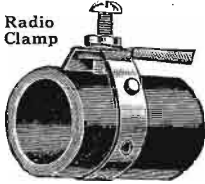
**Garrison-Rumely** 3020 Sheridan Rd. Chicago, Ill.



**Blackburn Ground Clamps**

Telephone companies using MILLIONS. Adjustable—fits any size pipe. Requires no pipe cleaning—screw bores through rust and scale. Send 12 cents for sample and postage.

**BLACKBURN SPECIALTY CO.** 1968 E. 66th St. Cleveland, Ohio



**GENUINE German Unit Speakers**

**Mystery Unit**

Clearer—Louder Distortionless Radio Amplifier Greater Distance

THE 3-Coil German **Mystery Unit**

Can be attached to any console or speaker. No rust—no corrosion—moisture proof, it endures.

BEAUTIFUL CRACKLE LACQUER FINISH CHOICE ONLY \$7.95 WITH UNIT

WHILE THEY LAST

1. Pedestal 29 in. high  
2. Imported Power Speaker  
3. Beautiful Sunburst  
4. Imported Bear Cat

\$16.00 to \$24.00 Values

\$12.00 Value — Introductory price..... **\$4.95**

Will stand all you give it and will hold up. Fully guaranteed. Quantity prices to Dealers.

Frank W. Wood, U. S. Rep. 416 S. State St., Chicago, Ill.

I enclose.....  
Send me.....  
Name.....  
Address.....



**Build Sets makes \$100.00 a week**

**GET INTO RADIO GAME**

Let us show you how to make money in your spare time building Infradyne receivers. The sale of one set with accessories nets you a substantial profit. The new 1928 Model DX Infradyne will be the season's winner.

**PROFITABLE, FASCINATING WORK. START NOW!**

Get going now—let us send you complete circulars outlining our entire system. Anybody with ordinary mechanical ability can profit from this new method.

**THE SEASON HAS OPENED**

August 1st is the opening date of the new radio season. Long distance reception will be good this year. You can make Infradyne demonstrations now and outperform any set on the market.

**GET OUR PLAN NOW**

The plan is ready for you—now. A post card will bring complete details. Be the first man in your town to get into the INFRADYNE business. Don't delay!

**RADIO CONSTRUCTORS CORPORATION**  
Dept. CB 357 12th St., Oakland, Cal.


**RADIO WHOLESALE**

Write for my Big 1928 Radio Catalog—just off the press. Thousands of marvelous bargains in nationally advertised goods. All the LATEST IN RADIOS and equipment. Lowest wholesale prices. Agents Wanted.

**FREE Log and Call Book and Catalog.** Get your copy today. Send postcard now!

**AMERICAN AUTO & RADIO MFG. CO.** HARRY SCHWARTZBERG, PRES. Dept. 163 American Radio Bldg., Kansas City, Mo.

**DEALERS NEW 1928 CATALOG**



**Build Sets! make \$100.00 a week**

**WRITE NOW FOR FREE DATA**

Get into the radio business. Let us show you how to make spare time money—easily and surely.

**COMPLETE SYSTEM** No obligations. Get our system now—today. A post card brings full details.

Dept. CB  
Radio Constructors Corp., 357-12th St., Oakland

**Nathaniel BALDWIN LOUD SPEAKERS**

**A Famous Speaker**

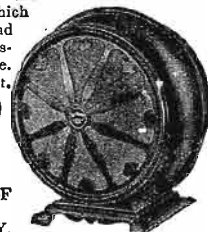
Benj. Franklin once said: "My performance devotes itself entirely to thy service & will serve thee faithfully and if it has the good fortune to please its master, tis gratification enough for the labor of—"Poor Richard."

**The New "99"**

is without comparison. Baldwin is the standard by which others are judged, and there is pride and satisfaction in owning one. Can be used on any set. At all good dealers **\$28.50**

Write for booklet  
Ask your dealer to demonstrate it.

**J. W. & W. L. WOOLF**  
Distributors & Exporters  
227-229 Fulton St., N. Y.



Tell 'Em You Saw It in the Citizens Radio Call Book

\$

# Down Brings To You This Super Power "A" ELIMINATOR Replaces "A" Battery Entirely



"Perfection"—that is what you'll say when you have experienced the real joy and satisfaction that comes with using this "A" Eliminator. By simply attaching it between an electric light socket and your radio you bring to your set the utmost in smooth, unvarying, even current. And that makes a real difference. All trace of hum goes. Your set has a chance to deliver its best. Stations come in clearer and easier.

**Electrifies Your Set—Battery Nuisance and Trouble Gone**

**Not a Battery-Charger Combination**

This "A" Eliminator consists of a large capacity rectifier which changes the alternating house lighting current to a direct current, and the most highly efficient heavy duty filter system that has ever been developed. This filter system with extremely high capacity condenser smooths out the pulsating direct current from the rectifier into even, constant, humless direct current for lighting the radio tubes. The "A" Eliminator comes to you complete. It is your only cost. There is no upkeep or replacements. You are assured of dependable current at 6 volts for any radio receiver using 201-A and power tubes.

Once you attach this "A" Eliminator you can forget you ever heard about "A" Batteries, chargers and all their disappointments. Here is reliable power when you want it for all time to come. This eliminator does the work with any and all types of sets. Used in connection with any good "B" Eliminator you have a completely electrified set.

Operates from the light socket 110-120 volts, 50-60 cycle A.C., output 6 volts direct current for all sets up to 12 tubes with or without power tubes. Current is used only while set is in use. It is always ready with dependable power whether used often or only at long intervals. As it contains **no storage battery or charger in any form** it is never charged or discharged.

**Send Us the Coupon Now**

Remember—this most modern and efficient of all "A" Eliminators is yours to try and test for 30 days upon our receipt of coupon and only \$1.00. In reality you test it free for your dollar is refunded and we pay return express charges unless this eliminator makes good by test. Complete instruction for attaching go with each eliminator. You can attach it yourself. Once hooked up you can forget about it as it has no moving parts to wear out and is almost fool-proof in operation. Send for it now. Know what your set can do with smooth, even "A" power—get 100% efficiency from your set at all times.

**Only \$1.00 Down  
—Then Test It for  
30 Days**

This "A" Eliminator is of the finest quality, identical with the best you can find anywhere selling for \$40.00 and \$45.00. However, you don't have to pay that much. Our tremendous buying power brings you this eliminator for 25% to 40% less. You pay only the low direct selling price of \$31.50 at the rate of but \$5.00 a month. Furthermore, you don't pay for it until it has made good on its own merits. Just fill out the coupon below and mail it to us with a dollar bill. That brings you this reliable "A" Eliminator. Attach it to your set and test it for 30 days before you pay another cent. If it doesn't delight you—give you even better results than you obtained with "A" Batteries, return it at our expense and your money will be cheerfully refunded. You have no risk at all.

**Here Is the  
Coupon—**

**Mail This Coupon NOW!**

ELLIOTT RADIO CORPORATION, Dept. 19  
709 West Lake Street, Chicago, Illinois

Attached find \$1.00 for which you are to send me your Super-power "A" Eliminator as described in your advertisement. Full particulars are to be sent me by return mail and my money is to be refunded if I do not accept your offer.

Name.....  
Address.....  
City..... State.....

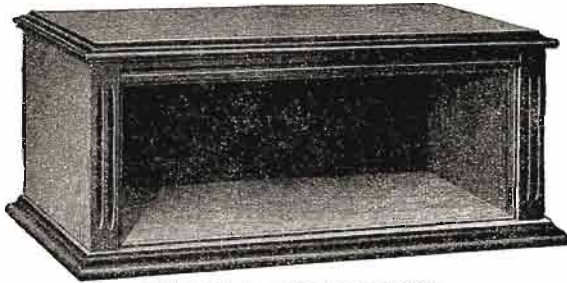
**No Battery  
No Charger  
No Bulbs  
No Hum  
...  
Nothing to  
Wear Out  
or  
Replace**

**Guaranteed  
for 1 Year  
No Chargings  
No More Dead  
or Run-Down  
Storage  
Batteries**

**STARTLING  
NEW PRICES**

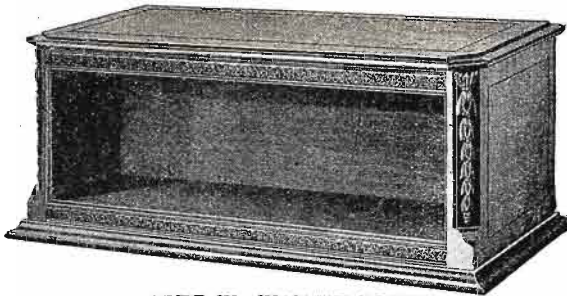
Tell 'Em You Saw It in the Citizens Radio Call Book

# SIGNAL Radio Cabinets



**TYPE M—MAHOGANY FINISH**

Type M cabinets are made of quarter sawed gum and properly matched to secure that fine grain so well known in Signal Cabinets.



**TYPE W—WALNUT FINISH**

Type W cabinets are made of solid and veneer walnut, all matched to a perfect grain and color.

Signal radio cabinets are designed by experienced radio specialists and conform to every modern radio requirement.

In material, workmanship, and high class lacquer finishes, these cabinets set a new high mark in skilled cabinet work. See article in this issue showing a Browning-Drake Receiver with power amplifier in a Signal Cabinet.

Owing to our large production, we can quote prices that will give you the greatest possible quality for the money. It will pay you well to write for pictures, construction details and prices.

## Signal Electric Mfg. Company

Menominee, Mich.

### BRANCH OFFICES

Boston  
New York  
Philadelphia  
Atlanta

Pittsburgh  
Chicago  
Minneapolis  
St. Louis  
Los Angeles

Toronto  
Winnipeg  
Buffalo  
San Francisco

Export Office, 56 Wall St., New York, Room 225

### Modernize Your Radio!

Build your own Battery-Less receiver with the

### Advanced 1928 Model Sovereign A-C Kit

No more "A" Battery—No Battery Charging—No "A" Battery Eliminator—No Hum—No Microphonic Disturbance—Just Clear, Clean Cut, Truthful Reproduction powered from the never failing light socket by the mere snap of the switch.

You need not be a Radio Engineer—or master "radiotrician" to construct an A.C. Receiver or convert your present set. Just follow the very simple, definite, detailed instructions given FREE with Sovereign Equipment. That's all!

When you purchase Sovereign Products you have the knowledge that nothing in the radio industry today, carries greater assurance of proper design—construction—satisfaction—or guarantee.

Sovereign A-C Tubes acknowledged the "Crowning Achievement" in the Radio Field are guaranteed. They have more rugged construction—a longer life, and their operation is unaffected by voltage changes. Sovereign A-C Tubes improve tonal quality as they are non-microphonic, and they fit all standard sockets. Summing it all in a few words, Sovereign Equipment means **ECONOMY—EFFICIENCY—MINIMUM SERVING—THE IDEAL IN RADIO RECEPTION!**



### Convert Your Present Receiver to 1928 Standards with the Advanced 1928 Model Sovereign A-C Kit

With but slight modifications, easily accomplished by following the detailed instructions supplied in every Sovereign A-C Kit, ANY radio set becomes a light socket powered receiver.

If your dealer cannot supply you, we will ship C.O.D. direct to you. Sovereign A-C Kits can be furnished for use on 110 or 220 Volts—25 or 60 Cycles.

Sovereign A-C Kit, 110 or 220 Volts—60 Cycles.....Price \$8.75  
Sovereign A-C Kit, 110 or 220 Volts—25 Cycles.....Price \$9.75

In ordering Kits specify Voltage of House Current—Number of Cycles—Type of Circuit—Number of Tubes.

Sovereign A-C Tubes.....Price \$5.00  
Sovereign A-C Power-Tube for Last Audio Stage.....Price 6.00

We have prepared for you a comprehensive—NON-TECHNICAL—pamphlet on A.C. Receivers and Tubes. Write for your copy today!

# SOVEREIGN ELECTRIC & MFG. CO.

123 N. Sangamon St.

Chicago, Illinois

Tell 'Em You Saw It in the Citizens Radio Call Book

# Radio Dealers

## Get This Valuable 1928 Catalog FREE

The new 136-Page Colored and Illustrated 1928 Hamilton-Carr **Wholesale Radio Catalog** is ready. It has been carefully compiled after an exhaustive study of all radio sets and radio accessories on the market or to be introduced. We have examined these sets, accessories and parts and tested them in our own laboratories and know their value. You can be sure that you will find in this complete new catalog an accurate and reliable illustration and listing of everything pertaining to radio.

### ALL THE CALL BOOK KITS

We show the latest Citizen's Radio Call Book Kits, including complete Parts for the following at the best dealers' prices:

Tyrman Ten, Karas 2-Dial Equamatic, Improved Infradyne, Best's 45 K. C. Super, Citizen's Super, Camfield Duoformer 7, Scott's World Record Ten, Camfield Super 9, Bodine Electric, Aero Seven, Aerodyne, Improved 9-in-Line, Hot Spot 14, Magnaformer-9-8, Best Lincoln 8, Silver Shielded Super, S.M. Unipac.

### All Electric Radio Sets

This year electric (socket-power) radio receivers are very popular. The demand for them is constantly on the increase. In the Hamilton-Carr catalog you will find a complete showing of six, seven and eight-tube electric and non-electric sets. And you can be sure that both are of the finest quality—sure to deliver satisfaction. Easy to sell on demonstration. Styles of receivers in both table models and console models have been made to meet all requirements.

### Nationally Advertised Accessories

All the fast-selling, nationally advertised accessories, parts and kits are shown in the new Hamilton-Carr Catalog. Many of these are advertised in this magazine now or have been in the past. All the recognized successful methods of converting old sets into electric sets are explained.

### "A" and "B" Eliminators

The success and sale of "A" and "B" **Eliminators** is unquestioned. There is always a call for them. This new catalog shows all the latest improved models at **astorishingly big discounts**. You will want to stock them at once for immediate sales. You can win hundreds of customers with these great values.

### Thousands of Other Amazing Values

Get this new catalog today and keep it handy. You will find in it everything you want in radio, including all new types of loud speakers and chargers. During the last few months cabinet and console designers have created many beautiful new models. All of these are shown.

### Hamilton-Carr Service to Dealers

The Hamilton-Carr Radio Corporation is not new. They pioneered in the radio business and have devoted all their efforts exclusively to radio and bettering their service to dealers. The thousands and thousands of dealers now doing business with Hamilton-Carr show how successful we have been. We have perfected our organization in every department. Orders received are shipped when they are wanted without fail. We unconditionally stand back of all merchandise bought from us whether of our manufacture or not.

### Write for the New Catalog Today

Of course, you want this new Hamilton-Carr Catalog. Write for it today on your letterhead. Silver-Marshall Kits and Parts in stock. It is new from start to finish—and packed full of the greatest values ever offered. **Write now while it is fresh in your mind.**

## HAMILTON-CARR RADIO CORP.

711 West Lake Street Dept. 20 Chicago, Illinois



Tell 'Em You Saw It in the Citizens Radio Call Book

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# 12-Hour Service that is a Fact and Not Just a Promise

*A New, Larger Home—a Greater  
Organization Make it Possible*



**B**ECAUSE of the steady expansion of our business, we have been forced to move into larger quarters, increasing our floor space several fold. Our working staff has been doubled. A group of expert radio merchants, assisted by an able corps of assistants, stand ready to give the quickest and most efficient distribution service ever afforded in the radio business.

From the beginning, we believed that the substantial future of radio retailing lay through the distributor carrying the burden of stock and investment and allowing the retailer to devote his entire

resources and efforts to the proper handling of the consuming public. That our views in this direction were sound has been eloquently proven by the truly amazing upward growth of our business.

That we might carry this purpose to the furthestmost point, we have provided warehouse space and operating facilities so that today we may give the same day service to every radio dealer in the country on practically all the leading lines of parts, accessories, equipment and finished sets. Most orders are shipped same day of receipt.

## The Largest Selection of Radio Goods in the World—Make the Best of the Greatest Year in Radio History

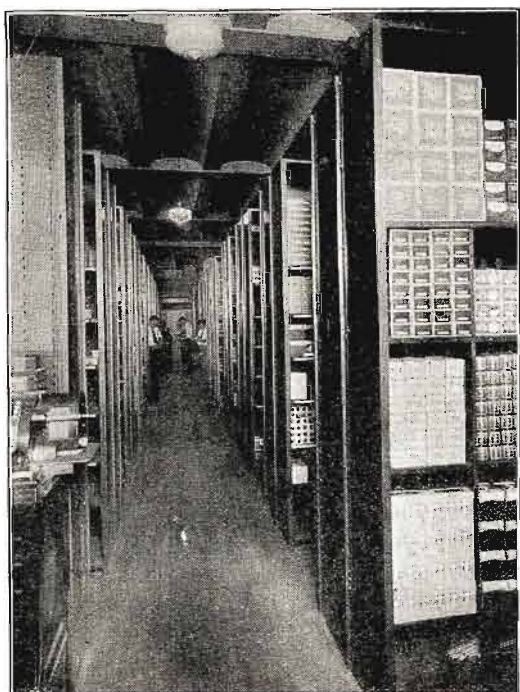
**I**T is the belief of all those intimately associated with the industry that this will be the greatest year in radio history. The quality of radio apparatus has reached a high point of perfection. Broadcasting conditions were never better. Distribution facilities were never more highly developed. The public has never indicated a more wholesome confidence and appreciation of the desirability of radio in the home and the reliability of most of the apparatus now offered for its use.

All these factors form a basis of opportunity for selling radio which has not been paralleled in this field during the past two or three years. All indications point to a real boom for this Fall and Winter. Thousands of homes never yet graced by radio will this year be equipped, because there is a wide-spread feeling that broadcasting and reception equipment can now be depended upon. The dealer who does not take advantage of this opportunity will, in our opinion, pass up a chance that he will likely never see again.

*Showing a section of aisles where goods are stored in all-steel service shelves in methodical order. Orders are filled easily, quickly and efficiently.*



*We invite all our dealers to visit us. Our new home has provided a ground floor Display Room and Service Counter with a skilled staff of attendants.*



We have made vast preparations in anticipation of the rush of business which we know will come this Fall and Winter. We have perhaps the largest selection of radio goods ever assembled by one organization—all under one roof, ready to serve the dealer instantly. Our lines have been strengthened and our stocks sufficiently ample to care for our thousands of dealers and the new ones which we know will come to us.

### Follow Braun's Year' Round Profit Guide

**B**Y the time of the appearance of this announcement, our new Fall and Winter Catalog will be off the press. In it you will find more than 200 pages listing practically all the leading reliable radio apparatus on the American market. In it you will find a complete list of the nationally known lines. We believe this book has been a means of establishing thousands of dealers upon a sound basis of retailing. Pointing as it does to a source for practically every radio article in demand, it gives the dealer an opportunity to service his trade with a minimum investment, and together with our service make a rapid turnover on his capital.

If you are not now on our list, we would suggest that you write us immediately on your official letterhead, and if you are not rated, give us the names of three wholesale establishments from which you now purchase. As it has to thousands of other dealers, let this book of ours be in truth, your Profit Guide in Radio.

## W. C. BRAUN COMPANY

*Pioneers in Radio*

**563-571 W. Randolph St. Dept. 91 CHICAGO**

*Tell 'Em You Saw It in the Citizens Radio Call Book*

# RADIO CONFIDENCE



FROM the very earliest days of radio --- while others shouted wild claims of performance and impossible exaggerations of selectivity --- we have been noted for sticking closely to the facts ---for offering sound advice and intelligent service---and have thereby gained the confidence of thousands of radio fans from all over the country.

## Our New Free Service Laboratory

In order to continue rendering the very best radio service consistent with our reputation as the world's largest radio store we have completely reorganized and enlarged our service laboratory.

This completely equipped laboratory is at your service. Our experts are in attendance to help you with your radio sets. If your set is not working properly, bring it to our service laboratory and we'll soon find out what's wrong.

Absolutely no charge is made for this service --- and all are welcome.

## Blue Prints and Kits A Complete Service

We carry a complete stock of blue prints and parts to build all of the new sets illustrated and described in this issue of the "Citizens Radio Call Book." All parts offered to you are guaranteed exactly as specified. A few of the sets are as follows:

World's Record Super Ten  
New Two Control Equamatic  
Improved Nine-in-Line  
Camfield Super-Selective Nine  
Improved Remler  
The "Best Lincoln" Nine  
Silver Super  
Eight-in-Line Super  
Aero Seven  
1928 Infradyne  
Magnaformer 9-8 Receiver  
And Others

### Free Catalog

Come to our store or write us for a copy of our new 1927-1928 Radio Catalog. Parts for all the latest circuits including those described in this issue of the "Citizens Radio Call Book" are included.

### Save Money

We guarantee to save you money on parts and accessories made by leading manufacturers. Get our catalog before you buy.

**Set Builders and Dealers  
Write for Our Wholesale Catalog**

**CHICAGO SALVAGE STOCK STORE**

*"The Largest Radio Store in the World"*

**509 South State St. Dept. CB CHICAGO, ILL.**

*Tell 'Em You Saw It in the Citizens Radio Call Book*



# Barawik Now Offers Lowest Wholesale Prices to Community Set Builders, Dealers, Agents

**H**ERE is an opportunity for the community set builder, the small dealer and the agent to concentrate all of his purchases at regular wholesale prices, in one place. No longer need he seek his parts and supplies from a dozen different sources.

Moreover, he will find here a 12 hour service, that will be of immense value to him in building up his circle of friends and customers. In almost every case, orders will be shipped the same day, received by us.

Here he may draw upon the largest, most complete stock of radio parts, accessories and supplies in all the country. The very latest circuits are described and listed in all their parts, exactly as specified in the various publications. A special staff is maintained to keep the assembly of these circuits exactly correct, and an advisory department is ready at all times to assist each and every Barawik customer in the furthering of his set building activities.

Due to the tremendous volume and our universal connections with practically all of the leading manufacturers, the Barawik customer is always assured of obtaining the very most advanced, perfected, accredited parts and supplies. Each and every item is fresh, new and exactly as it comes from the manufacturer who makes it. We do not sell "job lots," obsolete stocks or "close-outs."

## Radio Parts

The standard parts of all the famous radio manufacturers are here for you to choose from. Your favorite part can be had from BARAWIK at a bargain. Coils, transformers, condensers, panels, rheostats, switches, grid leaks, binding posts, brackets, wiring material, jacks, sockets, dials—everything you can think of—the best and most famous brands.

## Radio Sets

Something new to the radio fan is the line of BARAWIK sets. Three series of models from which to choose: three-dial, two-dial and one-dial controls with 5, 6 and 8 tubes. The finest, most complete line of cabinets and consoles ever assembled. Marvelous values in portable sets—great bargains in standard sets for home use. A variety of styles for every purpose, every taste, every whim, and every pocketbook.

## Radio Kits

For those dealers, set builders and agents who sell to others, and who "build their own," we have complete kits of parts for every known circuit at tremendous savings. The famous kits of the world's leading radio circuit designers—everything in the good

old reliable standby circuits, as well as the new pretentious ones that are the last word in radio perfection. Hundreds of thousands of builders have used our kits and saved thousands of dollars. Your savings now are greater than ever.

## Radio Supplies

The BARAWIK CO. is famous for its variety of supplies, which it offers at money-saving prices. Newest cone speakers, "B" eliminators, socket power equipment, amplifiers, latest amateur equipment, tubes, batteries; in fact, anything you can ask for is here, ready to ship, at a saving in price. Quality merchandise, selected goods by reliable makers—just what you want.

## Get Our Prices on All the Famous Circuits Shown in Radio Call Book

It will pay you to get our prices for complete parts for the RADIO CALL BOOK circuits and all the popular circuits advertised and heralded in various radio magazines and newspapers. We save you money on every part. See our prices before you buy.

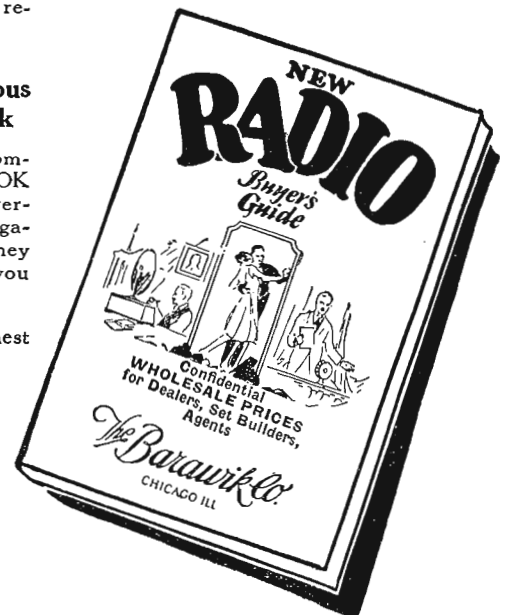
All merchandise guaranteed and of highest quality as required and specified.

Write today for our new 1927-1928 wholesale Radio Catalog and Builder's Guide, showing radio's newest creations.

If you are in the market for any set or hook-up shown in this issue and desire the parts at once, order direct from us.

## Send for Buyer's Guide Now

You need this book before you spend another cent on radio. Just mail your request now and free copy will be sent you. Standard discounts to dealers, set builders, agents, schools, manufacturers, and all quantity buyers.



*The Barawik Co.*

129 North Jefferson Street  
CHICAGO, ILLINOIS

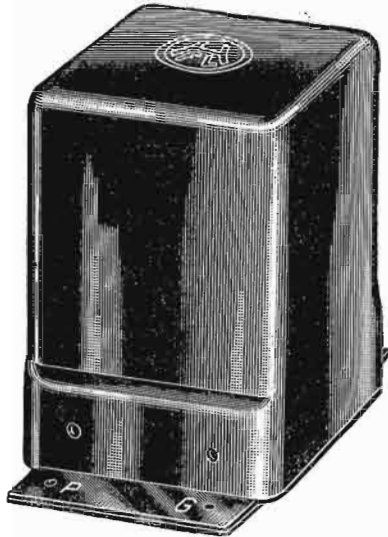
*Tell 'Em You Saw It in the Citizens Radio Call Book*



# TRANSFORMERS



For Set Builders Who Demand



**EFFICIENCY  
SENSITIVITY  
PRECISION  
HIGH QUALITY  
BEAUTY**



**H. F. L. C-16  
Audio Trans-  
formers and  
C-25 Output  
Transformer**  
—new com-  
panions to the  
famous H. F.  
L. Products.

The new C16  
and C25 Trans-  
formers will  
improve any  
circuit and will  
work in any  
Radio Set.



## LAST SEASON'S RADIO SENSATION!

Now Greatly Improved By These Marvelous Additions—The  
Supreme Achievement In Audio Amplification

Technically and practically the H. F. L. C-16 is the most efficient Audio Frequency Transformer built. It is constructed to match perfectly the two circuits between which it is placed and carries signals at highest volume without blasting or developing harmonics, and will amplify signals of low amplitude as well.

Even with the most up-to-date broadcasting stations there is a noticeable loss in amplification at frequencies of 100 cycles or less, and again on the high registers of 5,000 cycles or over. Remote control operation takes another toll, only that the high register starts to drop off even sooner. In most cases at 3,500 cycles per second. Furthermore, it is a known fact that the amplification curves of the present day loud speaker shows over and under amplification of certain notes.

The H. F. L. C-16 Audio Transformer is so designed as to bridge over and under amplification. Therefore the amplification of all frequencies throughout the entire musical scale is accomplished with amazing, life-like truthfulness. A specially treated silicon steel alloy, combined with proper gapping and right proportion in density, make saturation of core practically impossible.

### A Guarantee That Counts

We positively guarantee each and every H. F. L. Transformer against any mechanical or electrical defect.

Furthermore, we will exchange—free of charge—any H. F. L. Transformer that fails to give complete satisfaction, providing that the shells and terminals are not damaged.

**JOBBERS—WRITE  
FOR FURTHER DETAILS**

In conjunction with this core the correct size of wire and the correct balance of primary turns has been determined and is being used to insure the proper impedance and to make possible distinct amplification of low notes and frequencies of low amplitude with a marked absence of harmonics. The H. F. L. C-16 Audio Transformer is especially designed to operate with all power tubes as well as the standard type of tubes.

An important feature in connection with our C-16 audio is our H. F. L. C-25 Output Transformer. Its ability to handle the voltage output of the power amplifying tubes and at the same time match the impedance of the average speaker to the tubes, makes it a very desirable addition to audio amplification. It is especially recommended because of the protection it renders to the loud speaker unit without reducing the plate voltage.

The mechanical features of the H. F. L. C-16 and C-25 Transformers are: A coil designed and treated so as to exclude moisture and withstand heavy electrical surges without breaking down, complete magnetic shielding to avoid interstage coupling, with terminals brought out so as to insure short leads.

### PRICES

|  |        |
|--|--------|
| No. H-210 Transformers..               | \$8.00 |
| No. H-215 Transformer....              | 8.00   |
| No. C-16 Transformer.....              | 8.00   |
| No. L-425 R. F. Choke....              | 5.50   |
| No. L-430 R. F. Trans-<br>former ..... | 5.50   |
| No. C-25 Output Trans-<br>former ..... | 8.00   |

**Dealers—Set Builders**  
If your jobber cannot supply you with H. F. L. Transformers, write us direct for name of your nearest jobber.

### Endorsed by Leading Radio Engineers

H. F. L. Units have been used, approved and most highly endorsed by Radio News, Citizens Radio Call Book, Radio Review, Radio Age, Radio Engineering, Radio Mechanics, Chicago Evening Post, the Daily News and thousands of radio engineers.

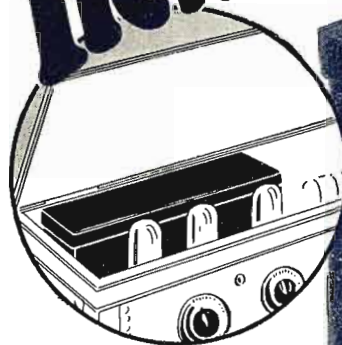
**JOBBERS—WRITE  
FOR FURTHER DETAILS**

# HIGH FREQUENCY LABORATORIES

131B NORTH WELLS STREET

CHICAGO, ILLINOIS

# new·different·better!



Small, thin, and compact. Fits inside of most any table-type cabinet, or slides in between books on book shelves.

The knob on the end panel operates the variable resistance (wire-wound everlasting type) which is placed in the 110 volt a.c. primary circuit. This affords you absolute mastery over line voltage fluctuations.



For  
110 Volt  
60 Cycle  
Alternating  
Current

No exposed binding posts to short or shock. Wires to the set pass thru slots in the back of the case.



2 Year  
Guarantee

## 180 Volt <sup>"B"</sup> TUBE TYPE (QRS. or Raytheon) Eliminator

Price no longer stands in the way of enjoying a high powered, long life, thoroughly dependable "B" eliminator. For the Cloverleaf "B" is now ready for delivery—a "B" built to the highest standards of electrical practice—a "B" that supplies every voltage (up to 180 volts at 85 milliamperes) needed by the modern multi-tube radio set—a "B" eliminator that will operate a Super Heterodyne receiver and resistance coupled audio amplifiers without a trace of "motor-boating"—a "B" not affected by line voltage fluctuation and possessing a dozen other outstanding features—at a price just half what others ask! Try it FREE. Prove its superiority, before you buy.

### Operates "171" Power Tube

Never before has there been a "B" eliminator at the price of the Cloverleaf which supplied enough current to operate the new high voltage power tubes. The Cloverleaf DOES. It supplies the 22-45-90-135 volt outputs for the radio frequency, detector and ordinary audio requirements of any set—then it provides 180 volts for the operation of the power tube. No buzz—no hum—no odor—no acids or liquids.

### Small and Compact—Fits Inside Most Any Table-Type Set

The Cloverleaf "B" is only 3 inches wide, only 5 3/4 inches tall and only 9 inches long. Its "thin model" construction enables it to be placed inside most any radio cabinet. Or—if it must be out in full view, its handsome crystal maroon finished metal case presents a neat appearance.

THE  
TRUE  
LIFE-  
TIME

### "B" ELIMINATOR—Finest Quality

Don't confuse the Cloverleaf "B" with cheap electrolytic or chemical "B" eliminators. The Cloverleaf is the standard gas-tube rectifier type which uses either the Raytheon or QRS tubes. Moreover, the Cloverleaf "B" is not to be classed with similar type eliminators which use only one choke coil in the filter circuit, and which use short-lived single-paper filter condensers. The Cloverleaf has two oversize chokes, has the very finest high voltage, heavy duty filter condensers that money can buy, and the best grade of wire wound resistances that can be made. A better "B" cannot be built—and no "B" eliminator offers you so many advantages as the Cloverleaf—and think! Its better quality and better construction acclaim it the true "lifetime" eliminator.

**1/2 the price of others**

Why pay twice the price of the Cloverleaf "B" when you can't possibly get more in performance and long life? Remember—You Take No Risk. Try it FREE. READ OUR OFFER.

# TRIAL FREE!

We want you to try the Cloverleaf; to put it to any test you can. Hook it on to 8 or 10 tubes. Make it drive a power tube. Compare it with any other "B" eliminator at any price. Compare its performance—compare its many detailed advantages such as the absence of exposed binding posts and many other important refinements. Make this test at our risk under our FREE TRIAL GUARANTEE OFFER. Then decide why, if at all, you should pay more for a "B" eliminator than the ridiculously low price at which the Cloverleaf Lifetime "B" is sold. Mail coupon at once for full particulars of this great new "B," and for details of our FREE TRIAL GUARANTEE OFFER and 2 Year Guarantee.

Made by the makers of  
**Subantenna**  
the underground antenna whose remarkable performance has placed the Cloverleaf Mfg. Company in the enviable position of being known as makers of reliable radio apparatus

# lifetime Cloverleaf "B" ELIMINATOR

Made by **CLOVERLEAF MANUFACTURING CO.**  
2712-A CANAL STREET CHICAGO, ILLINOIS

### CLIP AND MAIL AT ONCE

CLOVERLEAF MFG. CO.  
2712-A Canal St., Chicago, Ill.

Tell me more about the Cloverleaf "B" Eliminator and particulars of your FREE TRIAL OFFER.

Name.....

Town.....

State.....

## Exclusive Designs in Unexcelled Speakers

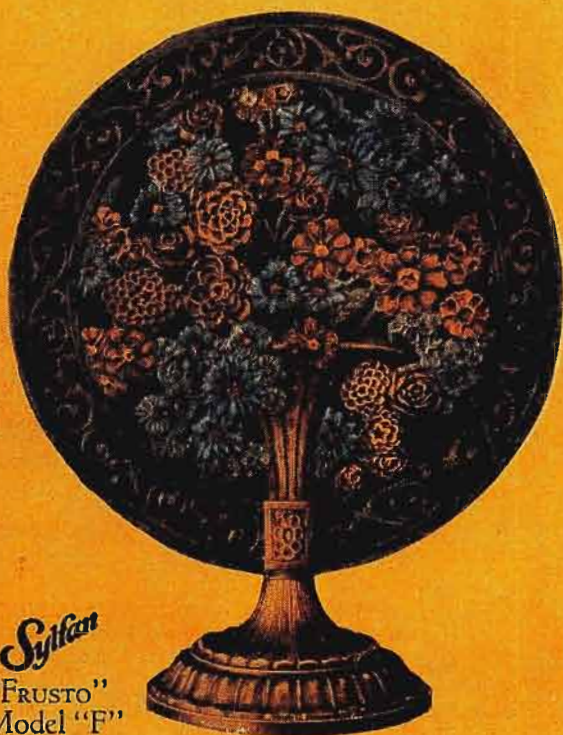
EACH of the speakers illustrated embodies desirable principles of Radio reception not to be found elsewhere. Each reflects a new note of charm and beauty and dignity that find a warm welcome in any home.

By turning a small knob the *Syllan* "FRUSTO" can be quickly and easily adjusted and tone quality modulated to produce clear distinct tones and to increase volume. The adjustable device is simple and effective and cannot get out of order. Connection of unit with cone is such as to minimize distortion and to enable the speaker to take larger loads with finer tonal results and without producing second harmonics. There is an utter absence of blasting and chattering from power tubes.

*Syllan* "FRUSTO" has a conical cone—an exclusive Baker-Smith feature—sharply responsive to sound vibrations on a wide range of frequency. It brings out the overtones with full resonance and faithfully reproduces, without distortion, the deep bass notes. Models "G" and "H" are regular cone type speakers, antique finish.

Ask your radio dealer for a demonstration in your home.

BAKER-SMITH CO., INC.  
Manufacturers and National Distributors  
CHRONICLE BUILDING SAN FRANCISCO, CALIFORNIA



*Syllan*

"FRUSTO"  
Model "F"

\$32.50 West of Rockies  
\$35.00 East of Rockies



ENCHANTER Model "H"

\$32.50 West of Rockies  
\$35.00 East of Rockies



ENCHANTER Model "G"

\$25.00 West of Rockies  
\$27.50 East of Rockies