

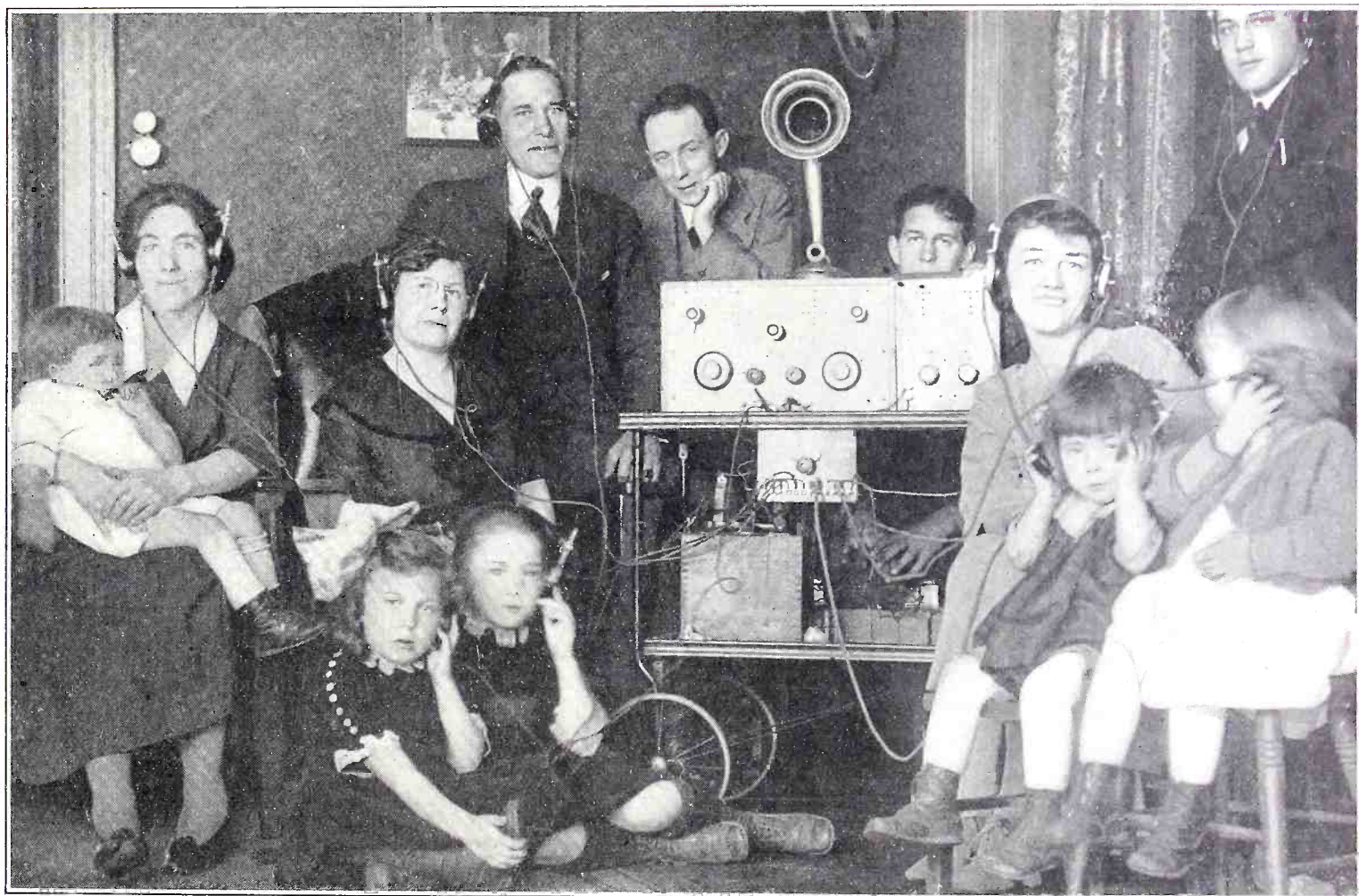
# RADIO WORLD

*Fixed condenser now to build a figure capacity*

Entered as second-class matter, March 28, 1922, at the post office at New York, New York, under the act of March 3, 1879

I L L U S T R A T E D

The Modern Home. Everyone Listens In.



(c. Underwood & Underwood)

A radio family—and every member smiling and happy. Left to right: Alfred Rinehart, Jr., (rear) Mennie Matoth; Phyllis and Mrs. Avery Lord of Elizabeth, N. J., John A. Matoth, President of the Matoth-Perry Automobile Body Co., of Rahway; Alfred Rinehart, Sr., of Elizabeth, father of the young inventor; Mrs. John A. Matoth; Helen and Josephine Matoth (at her feet) and a maid holding Fred Matoth. John A. Matoth is the inventor of the radio tea wagon, equipped with a radio set with three stages of amplification. Alfred Rinehart, Jr., is the inventor of the radio ring.

Design for an Amateur's Receiving Set—See page 13

# HOMCHARGE YOUR BATTERY for A Nickel



No muss, trouble, dirt—no moving of batteries—loss of time—no effort on your part—no technical or professional knowledge needed.

**THE HOMCHARGER** successfully meets all charging conditions, and is the only rectifier combining the following essential Homcharging features.

1. Self-polarizing. Connect battery either way and it will always charge. No danger of reverse charging, ruined battery or burnt-out rectifier.
2. No delicate bulbs to break or burn out. Only one moving and two wearing parts. These are replaceable as a unit, after thousands of hours' use, at small cost. Cannot be injured by rough handling.
3. Operation stops and consumption of current ceases immediately upon disconnecting battery.
4. The only charger costing less than \$100.00 that will fully charge a battery over night. Gives battery a taper charge—exactly as recommended by battery manufacturers. Guaranteed not to harm your battery even though left connected indefinitely.
5. Highest efficiency of any three or six cell charger made.
6. No danger of fire.

Approved by Underwriters. Immediate Delivery. Attention Motorists. Will charge your auto battery as well as radio battery. Send for Bulletin No. 58 for further information. For sale by all radio, electrical and accessory dealers or shipped, express prepaid, for purchase price, \$18.50. \$20 West of Rockies



**The Automatic Electrical Devices Co.**  
131 West Third Street Cincinnati, Ohio  
BRANCH OFFICES—New York, Chicago, Pittsburgh, Los Angeles, New Orleans, Detroit, Toronto, Philadelphia, Baltimore, Dallas.

### NEW RADIO PATENTS

That Need Financing

10-in-one refillable. Snap fuse plug, refillable pull-out fuse plug. Refillable Cartridge Fuse. New Radio Binding Post. Telephone Head Set. Horn adjuster. Instantaneous near and remote signaling flow and level indicator. I have several most valuable Radio patents that need proper financing. For demonstration and full details, address,

**W. C. FLORING**  
906 AMSTERDAM AVE.,  
NEW YORK



**SPECIAL OFFER TO DEALERS**

3 and 4 inch Dials  
Fixed and Variable Condensers  
Klosner Vernier Rheostats  
ALL RADIO EQUIPMENT

**NEW YORK RADIOPHONE CO.**  
32 UNION SQ. - NEW YORK CITY

## DEALERS

Write or wire for our prices on all  
**RADIO SUPPLIES**

We can furnish promptly

**Corona**  
Vacuum Tube Receiving Sets


**Turney's**  
Receiving Sets, Phones, Spider Webs, etc.

**CANADIAN-PACIFIC  
RADIO CORP.**

New York Office  
708 Canadian Pacific Building  
342 Madison Avenue

## CHAMPLIN FILAMENT RHEOSTAT

Dealers and Distributors: Wire for Discount



Retail \$1.00  
Add 10c for Postage

Resistance 5.24 Ohms

Shipped day of order.

**CHAMPLIN MFG. CO.**  
90 WEST BROADWAY, NEW YORK CITY  
Manufacturers of Quality Goods since 1860



### 3 PLATE VERNIER VARIABLE CONDENSER

Heavy aluminum plates, all parts of brass, nickel plated, molded composition ends.

Well made and separately inspected and tested. The best you can offer your customers.

Typical of our extensive line, which includes the products of fourteen of the largest manufacturers. Immediate delivery on all orders.

List, \$1.50. Attractive Discounts.  
Send for Samples and List of Line.

**WHOLESALE RADIO EQUIPMENT CO.**  
22 William St., Newark, N. J.

### Back Numbers and New Radio World Readers!

The publisher has reserved a limited supply of the first nine issues of RADIO WORLD for the benefit of new readers who want to become subscribers and have their files complete from the first issue. The first nine copies will be mailed on receipt of \$1.35; or better still, subscribe now for six months (\$3.00), or twelve months (\$6.00 for 52 issues) and have your subscription start with No. 1. Radio World Co., 1493 Broadway, New York City.

# RADIO WORLD

[Copyright, 1922, by Radio World Co., New York, N. Y.]

A WEEKLY JOURNAL, PUBLISHED EVERY WEDNESDAY AND DATED SATURDAY BY RADIO WORLD COMPANY, FROM PUBLICATION OFFICE, 1493 BROADWAY, NEW YORK, N. Y.

Vol. 1. No. 10.

June 3, 1922

15c. per copy, \$6.00 a year

## “Honest Commerce Is Nation’s Need” President Harding Radios World

President Harding delivered, by radio, the most important address he has made since he took office, before the Chamber of Commerce of the United States, last week. He pleaded for the building up of the merchant marine and for the needs of honest commerce. It was a speech that gave assurance to all business all over the world. The President used a sound detector to catch his words which were broadcast by radio through the powerful United States Navy Radio station at Washington.



(C. P. & A. Photo)

## Rectifying Devices for Charging Batteries

WHEN a motor generator is the power source, the voltage may be controlled by means of a rheostat in the machine itself which causes the voltage generated to be lower than normal. This latter method requires the services of a skilled electrician or at least a knowledge of the design of the generator and for that reason will not be discussed here.

During the discussion of methods of rectifying alternating currents to the necessary direct-current one-type was purposely omitted until this time because of a feeling that few ama-

teurs would wish to bother with it. This is the aluminum cell; or, as it is better known, the electrolytic rectifier.

This rectifying device consists of a rubber or glass jar into which a strip of aluminum and a strip of lead are placed. The jar is then filled two-thirds of the distance to the top with a saturated solution of borax. When an alternating current circuit is connected to this rectifier with the latter in series with one side of the circuit direct current will be produced at the other terminal. The action is similar to that of the vacuum tube rectifier mentioned in an earlier installment of

this series. The current in passing through from the lead plate to the negative aluminum plate forms a thin film of oxide on the latter plate which permits the current to pass in one direction only. Like the vacuum-tube rectifier, the direct current is not unvarying direct-current but is pulsating direct current. It is suitable, however, for battery charging. But the noise from this type of device and the bother of frequently renewing the chemicals makes it a rectifier seldom used, especially if other means are available. This is an economical device for rectification.

# The Cost of a Single-Circuit Receiver

By Howell W. Miller

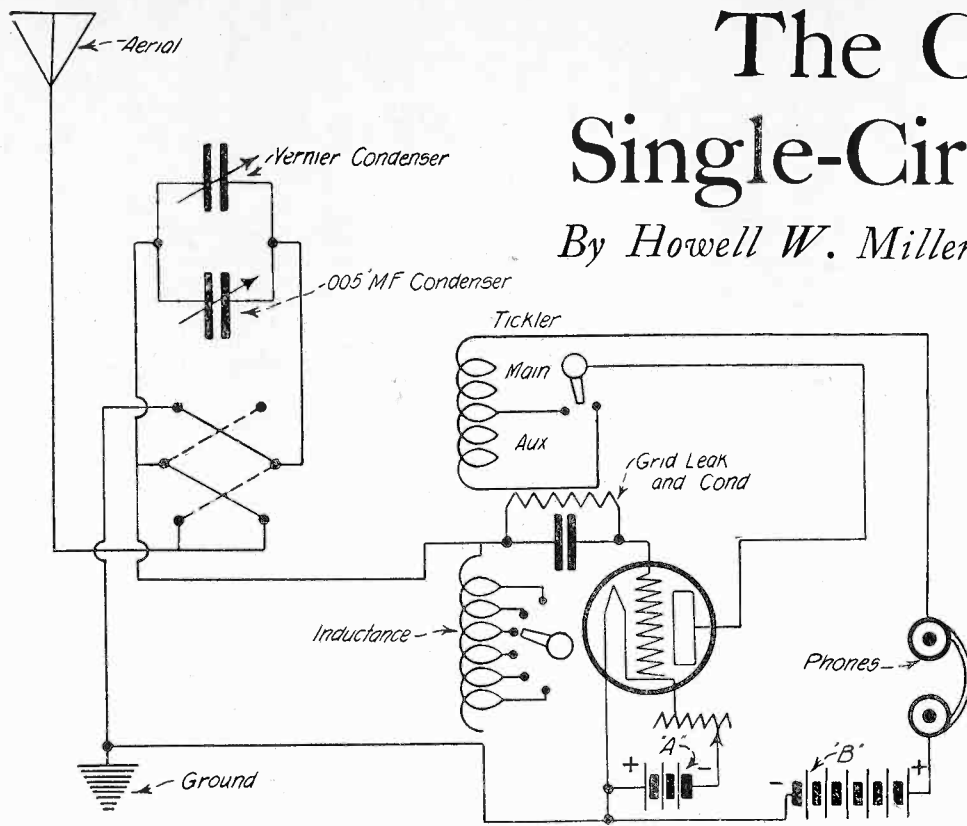


Diagram of the circuit of a simple receiver which tunes to 1,700 meters. The main inductance-coil switch-knob, which shows no connection, must be soldered to the positive pole of the A battery. This completes the regenerative receiver. Suggested by H. W. Miller. Drawn by S. Newman.

As soon as a beginner tires of the inefficient crystal set, and wishes to incorporate a vacuum-tube detector, the best outfit to construct is the single-circuit regenerative receiver. The ease and simplicity with which signals and speech may be tuned in more than makes up for the selectivity this type of receiver is supposed to lack.

The outfit I describe herewith I constructed. It is giving excellent results both for the reception of spark and c.w. The design is simple yet remarkably efficient.

The panel is constructed of bakelite or wood, and the dimensions are 7x12x $\frac{3}{8}$  inches. To the right of the panel is the detector. The circuit used is shown in Figure 1. The series-parallel switch places the condenser either in series or in shunt with the inductance. When in shunt, the set is able to tune up to 1,700 meters, which makes it possible to receive radiophone w.v.p. Bedloe's Island, New York.

The inductance is constructed as follows: On a cardboard tube  $3\frac{3}{4}$  inches in diameter and 4 inches in length, start winding No. 24 B and S., DCC wire. At the end of every tenth turn form a loop for connection to switch points of panel. This winding is kept up until 60 turns are wound. The unused portion of this tube is for the auxiliary tickler.

The main tickler is wound on a cardboard tube  $1\frac{1}{2}$  inches in length

and 3 inches in diameter. This coil rotates within the inductance. The winding is started about  $\frac{3}{4}$  inch from end of the tube and continued until 18 turns are wound. Then a spacing about  $\frac{3}{8}$  inch is left for the rod with which the coil is rotated. Then 18 turns are wound about the other half.

Now, directly beneath the inductance, on the unused part of the tube, the auxiliary tickler is wound. The tickler permits the set to oscillate on the higher wave-lengths. This winding is 20 turns of 24 DCC wire. A two-point switch on the top of the panel allows the use of the main tickler alone or with auxiliary tickler.

A 23-plate variable condenser is placed in series or parallel with the inductance by means of the series-parallel switch. In shunt with the 23-plate variable condenser is the vernier condenser, which is the secret of sharp-tuning with this set.

This vernier is home-made and consists of movable and 2 stationary plates. The stationary plates are  $3\frac{1}{2}$  inches in length and  $1\frac{1}{2}$  inches wide. They are cut from zinc or aluminum. The rotary plate is semi-circular in shape and has a radius of 1 inch. This condenser allows an overlapping when used with the 25-plate condenser. The stationary plates are separated  $\frac{3}{8}$  inch.

The detector is to the right of the panel. Five holes are drilled for observation of the V-T tube. The tube socket is raised  $1\frac{1}{4}$  inches above base of cabinet, which allows the observation holes to be centrally located.

The wiring is of No. 18, bell-wire.

The cabinet may be made of any kind of suitable wood,  $\frac{3}{8}$  in. in thickness. The dimensions are as follows: Top (beveled edges) and bottom (6 base)  $6\frac{3}{4}$  inches x  $12\frac{3}{4}$  inches; sides (2) are  $6\frac{3}{4}$  inches by  $7\frac{3}{4}$  inches and the panel and rear is 7 inches x 12 inches. The top is hinged to the front panel in order to remove the V. T. when necessary.

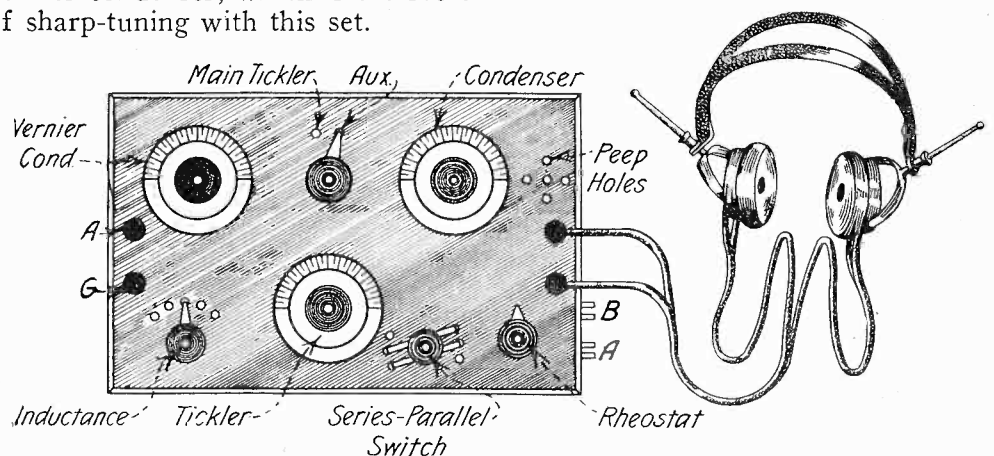
Using this outfit in New York City, I am able to hear Pittsburgh, (KDKA.)

## COST

|   |        |
|---|--------|
| 3—3" standard dials with knobs ..               | \$3.00 |
| 2—switch levers and knobs, 65c...               | 1.30   |
| 1—series-parallel switch .....                  | .85    |
| 14—contact points, 3c. ....                     | .42    |
| $\frac{1}{4}$ 16—116 24 B & S D. C. C. wire ... | .50    |
| Cardboard Tubes, $5\frac{3}{4}$ x 3 in.....     | .20    |
| 23—plate variable condenser .....               | 3.50   |
| Materials for vernier .....                     | .25    |
| No. 18— $\frac{1}{2}$ 16. (bell wire) .....     | .25    |
| Radiotron UV-200 .....                          | 5.00   |
| V. T. socket .....                              | 1.00   |
| Combination grid leak and condenser             | .65    |
| Rheostat .....                                  | 1.00   |
| Rods, etc., etc. ....                           | .25    |

\$17.17

This is exclusive of the cost of A and B batteries and phones.



View of front panel of regenerative receiver showing the layout of the equipment. Suggested by H. W. Miller. Drawn by S. Newman.

## Radio World's Hall of Fame



(c. Harris & Ewing, Washington, D. C. From Paul Thompson, N. Y.)

### JOHN HAYS HAMMOND, Jr.

Mr. Hammond is one of the leading radio experts and experimentors of the United States. From his laboratory in Gloucester, Mass., it is reported that he has perfected a comparatively simple device to prevent any station from receiving messages except those for which it is intended. The same wave can be made to carry several messages at the same time, and, it is claimed further, both voice and code may be transmitted. The new apparatus will permit a far greater number of stations to communicate over a limited number of wave lengths. Static is diminished to the extent that the system may be operated under conditions where the standard radio equipment would not receive. Mr. Hammond states that he has been at work on this important problem for the past fourteen years. He promises actual secrecy in radio reception to such extent that it will be practically impossible, under ordinary conditions, for any other than the proper receiving station to hear anything but a jumble.

# The Cost of a Single-Circuit Receiver

By Howell W. Miller

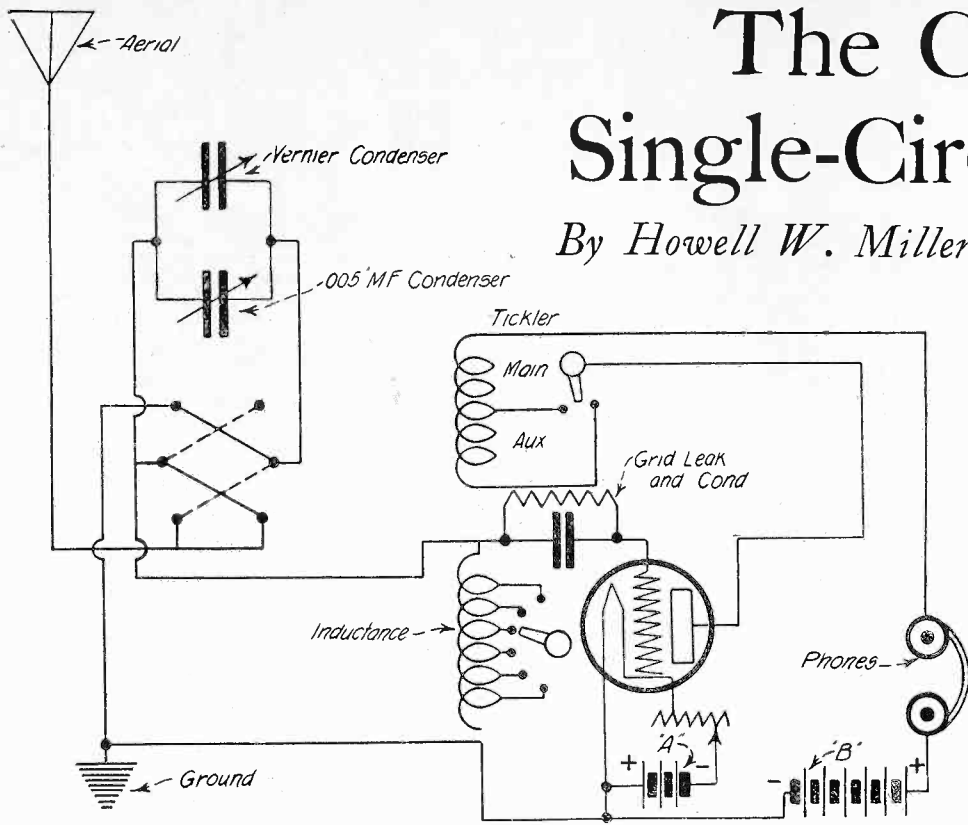


Diagram of the circuit of a simple receiver which tunes to 1,700 meters. The main inductance-coil switch-knob, which shows no connection, must be soldered to the positive pole of the A battery. This completes the regenerative receiver. Suggested by H. W. Miller. Drawn by S. Newman.

As soon as a beginner tires of the inefficient crystal set, and wishes to incorporate a vacuum-tube detector, the best outfit to construct is the single-circuit regenerative receiver. The ease and simplicity with which signals and speech may be tuned in more than makes up for the selectivity this type of receiver is supposed to lack.

The outfit I describe herewith I constructed. It is giving excellent results both for the reception of spark and c.w. The design is simple yet remarkably efficient.

The panel is constructed of bakelite or wood, and the dimensions are 7x12x3/8 inches. To the right of the panel is the detector. The circuit used is shown in Figure 1. The series-parallel switch places the condenser either in series or in shunt with the inductance. When in shunt, the set is able to tune up to 1,700 meters, which makes it possible to receive radiophone w.v.p. Bedloe's Island, New York.

The inductance is constructed as follows: On a cardboard tube 3 3/4 inches in diameter and 4 inches in length, start winding No. 24 B and S., DCC wire. At the end of every tenth turn form a loop for connection to switch points of panel. This winding is kept up until 60 turns are wound. The unused portion of this tube is for the auxiliary tickler.

The main tickler is wound on a cardboard tube 1 1/2 inches in length

and 3 inches in diameter. This coil rotates within the inductance. The winding is started about 3/4 inch from end of the tube and continued until 18 turns are wound. Then a spacing about 3/8 inch is left for the rod with which the coil is rotated. Then 18 turns are wound about the other half.

Now, directly beneath the inductance, on the unused part of the tube, the auxiliary tickler is wound. The tickler permits the set to oscillate on the higher wave-lengths. This winding is 20 turns of 24 DCC wire. A two-point switch on the top of the panel allows the use of the main tickler alone or with auxiliary tickler.

A 23-plate variable condenser is placed in series or parallel with the inductance by means of the series-parallel switch. In shunt with the 23-plate variable condenser is the vernier condenser, which is the secret of sharp-tuning with this set.

This vernier is home-made and consists of movable and 2 stationary plates. The stationary plates are 3 1/2 inches in length and 1 1/2 inches wide. They are cut from zinc or aluminum. The rotary plate is semi-circular in shape and has a radius of 1 inch. This condenser allows an overlapping when used with the 25-plate condenser. The stationary plates are separated 3/8 inch.

The detector is to the right of the panel. Five holes are drilled for observation of the V-T tube. The tube socket is raised 1 1/4 inches above base of cabinet, which allows the observation holes to be centrally located.

The wiring is of No. 18, bell-wire.

The cabinet may be made of any kind of suitable wood, 3/8 in. in thickness. The dimensions are as follows: Top (beveled edges) and bottom (6 base) 6 3/4 inches x 12 3/4 inches; sides (2) are 6 3/4 inches by 7 3/4 inches and the panel and rear is 7 inches x 12 inches. The top is hinged to the front panel in order to remove the V. T. when necessary.

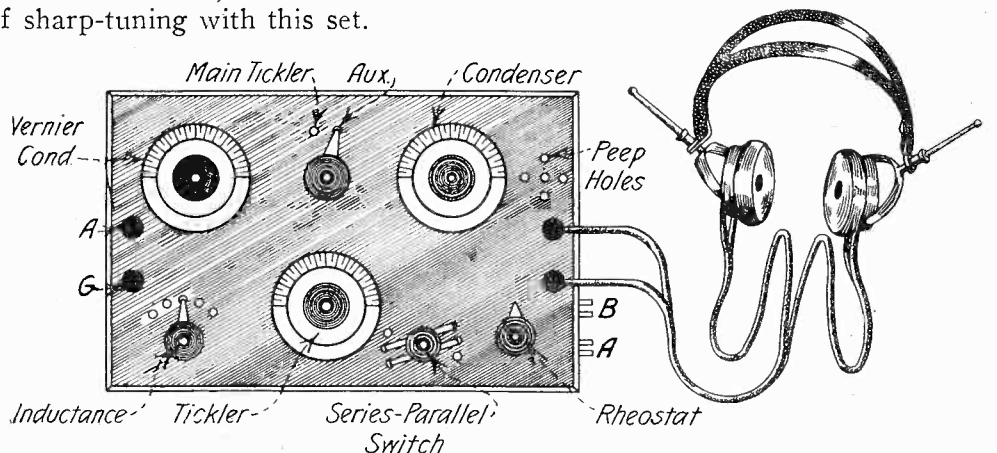
Using this outfit in New York City, I am able to hear Pittsburgh, (KDKA.)

### COST

|                                       |        |
|---------------------------------------|--------|
| 3-3" standard dials with knobs ..     | \$3.00 |
| 2-switch levers and knobs, 65c...     | 1.30   |
| 1-series-parallel switch .....        | .85    |
| 14-contact points, 3c. ....           | .42    |
| 1/4 16-116 24 B & S D. C. C. wire ... | .50    |
| Cardboard Tubes, 5 3/4 x 3 in.....    | .20    |
| 23-plate variable condenser .....     | 3.50   |
| Materials for vernier .....           | .25    |
| No. 18-1/2 16. (bell wire) .....      | .25    |
| Radiotron UV-200 .....                | 5.00   |
| V. T. socket .....                    | 1.00   |
| Combination grid leak and condenser   | .65    |
| Rheostat .....                        | 1.00   |
| Rods, etc., etc. ....                 | .25    |

\$17.17

This is exclusive of the cost of A and B batteries and phones.



View of front panel of regenerative receiver showing the layout of the equipment. Suggested by H. W. Miller. Drawn by S. Newman.

## Radio World's Hall of Fame



(c. Harris & Ewing, Washington, D. C. From Paul Thompson, N. Y.)

### JOHN HAYS HAMMOND, Jr.

Mr. Hammond is one of the leading radio experts and experimentors of the United States. From his laboratory in Gloucester, Mass., it is reported that he has perfected a comparatively simple device to prevent any station from receiving messages except those for which it is intended. The same wave can be made to carry several messages at the same time, and, it is claimed further, both voice and code may be transmitted. The new apparatus will permit a far greater number of stations to communicate over a limited number of wave lengths. Static is diminished to the extent that the system may be operated under conditions where the standard radio equipment would not receive. Mr. Hammond states that he has been at work on this important problem for the past fourteen years. He promises actual secrecy in radio reception to such extent that it will be practically impossible, under ordinary conditions, for any other than the proper receiving station to hear anything but a jumble.

# The Radio Primer

A. B. C. for the Beginner Who Must Have the Facts Put Plainly and Tersely, and all Terms Fully Explained

## The Beginner's Catechism

By Edward Linwood

**W**HAT is the general constructional features of a B battery?

The B battery is merely a collection of dry cells of the same type used in the common flash-light. There is nothing revolutionary about their make-up. Ordinary dry cells of the design used to operate door bells may be utilized for this purpose. An excellent article on the details of these batteries was contained in the RADIO WORLD No. 8, dated May 20.

\* \* \*

Why must the B battery be 22½ volts?

Because the usual detector-tube gives its best results when the voltage on the plate of the tube does not exceed that figure. The number of electrons flowing between filament and plate depends on the plate potential up to a certain point. With tubes using 6 volts and 1 ampere on the filament, the maximum electron flow is found to be possible when the voltage on the plate is not more than 22½ volts will not increase the electron flow as the plate then is absorbing all that are being produced by the flaming hot filament. Amplifier tubes require a higher plate-voltage.

\* \* \*

Why is it necessary that the B battery while the filament battery is a storage battery?

This question is worded in reverse order. There is no reason why the plate battery should be dry. It may as well be a storage battery except that the increased cost of the latter type does not recommend it to the amateur. But the filament battery—for reasons carefully explained many times in these columns—must be a storage battery for economy's sake. Whereas the amount of current taken by the plate is reckoned in thousandths of amperes, that of the filament is approximately 1 ampere, or a thousand times as great.

How long should a B battery last?

Like an incandescent lamp, or a vacuum tube, its life is indeterminate. The B battery is supposed to give 1,000 hours actual service. Some of them do. Many of them do not. Perhaps the reported average is nearer 500 hours. This decrease may be due to the battery itself; that is, the hastening of the chemical action within the case, or to misuse by the owner. At any rate, a good grade of B battery will give its purchasing cost in reliable service before signs indicate its weakening.

\* \* \*

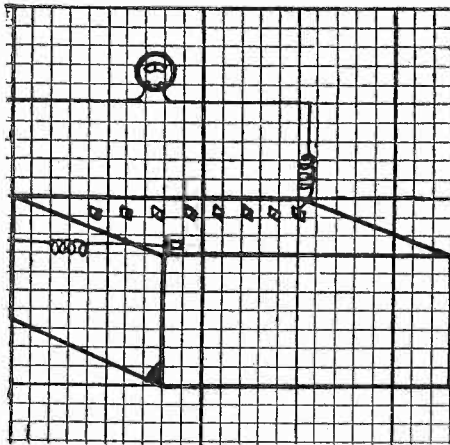
What is the sign of a weakening B battery?

If, after opening up the receiving set for the evening, the signals start strong and firm and then gradually decrease in intensity, the trouble is probably, but not surely, due to the B battery. Any dry battery recuperates considerably when not in use; but after commencing to draw current from it, the voltage will drop rapidly because it lacks the capacity.

\* \* \*

How can B batteries be tested?

A fairly satisfactory test may be made by means of a battery volt-meter across the terminals. Don't make the test when the battery has been resting



One method of testing B Batteries for voltage, using a low reading volt meter. Drawn by E. L. Bragdon.

but only after being in use for an hour or so. Try the battery on its individual terminals. If the readings are much below the markings for those terminals, discard the battery and get a new one.

\* \* \*

Is it advisable to attempt to rejuvenate B batteries by opening the case and soaking in vinegar or a sal ammoniac solution?

No. This stunt may work well enough with annunciator or door-bell batteries where it is not essential that their operation be "up to scratch;" but such rejuvenations around radio equipment is out of place.

\* \* \*

Can any of the "wet" batteries be used to supply the plate voltage?

Yes. Any of the common wet batteries will give good results although their bulky proportions work against their general use. The voltage of wet batteries seldom rises above 1.2 per cell, hence you would need twenty of them in order to produce the 22½ volts on the plate.

\* \* \*

Is a rheostat advisable for the B battery?

A rheostat in the plate circuit is a refinement, not a necessity. Most radio batteries—all the good ones—are supplied with taps from which any potential from 12 or 14 to 22½ can be selected. The tubes used for detectors do not ordinarily require an adjustment of plate voltage closer than that furnished by these taps. A plate rheostat, however, does no harm and may be added if desired.

\* \* \*

It is advisable to wind one's own rheostats for B and A batteries?

No; unless the maker is expert in the line. No extraordinary skill is required to design and wind a rheostat for this work, it is true; but the cost of the equipment is so slight that by the time a good home-made product is ready for use the cost in labor and material will exceed that of the professional article.

\* \* \*

Can a loud-speaking device be used on one vacuum tube?

It cannot be done. Before a loud speaker can be attached to the receiving set the signals must first be amplified to a considerable degree. There have been instances where the receiving station was located in the same city close to the broadcasting station and where the words and music came in so strong with a single tube regenerative set that the phones could not be held to the ears without discomfort. Under these conditions a loud speaker would be possible.



# Code Messages Now Circle Globe

By Carl Hawes Butman

**W**ASHINGTON. — "Within a few months, probably, it will be possible for a representative of the U. S. Government to talk to anyone in the world, or to all people at one time, on the new Naval radiophone transmitting set at NAA, the Arlington Station on the Potomac River." This remark was made by a high-ranking officer of the Navy Department, recently, who added that the Navy could now send code messages practically around the world, by the use of relays.

Speaking into any ordinary telephone in Washington connected with the Arlington Broadcasting Station, an official could talk to a Pacific Coast station, which would automatically relay the message within a sixtieth of a second to Pearl Harbor, thence to Guam and Cavite, where the message would arrive in one quarter of a second after it left Washington. The further routing he did not explain, but it is known that other big stations are in prospect overseas.

The simultaneous broadcasting of a single spoken message from two stations on different wave-lengths was successfully conducted for the first time by the Navy on Saturday, May 20, for the purpose of making sure

that plans for broadcasting the headquarters dedication program of the National Woman's Party were satisfactory. Through the cooperation of the American Telephone and Telegraph Company, direct wires were strung from the Woman's Party Headquarters to the Naval Air Station at Anacostia, D. C., and the Naval Radio Station at Arlington, Va. Test messages spoken at the headquarters were transmitted by wire to these stations and put on the radio-broadcasting circuits. At Anacostia, NOF, a 412-meter wave was used, with about 13 amperes radiation; at Arlington, NAA, on a 2,650 meter wave, with 40 amperes.

The system worked perfectly, serving two classes of receiving stations at once, the 412-meter wave furnishing many amateur stations within from 400 to 700 miles, while the long wave served stations equipped with larger receiving sets, between 800 and 1,500 miles distant.

The actual broadcasting of the speeches, Sunday afternoon, however, was prohibited by Naval officials Saturday, on the ground that the meeting was of a political nature such as was previously ruled against by Edwin Denby, Secretary of the Navy.

The experiments in simultaneous broadcasting from two stations on different wave-lengths have been so successful that, it is believed, several stations, not too greatly separated, will soon be able to broadcast a single phone message on a number of different wave-lengths at one time, reaching receiving stations nearby and at great distances, even crossing oceans to powerful foreign stations.

With the perfection of this system and the necessary apparatus, President Harding, for example, could address practically the whole world, or at least all the people provided with suitable receiving apparatus who understand English. This would furnish an excellent method of issuing official verbal statements of serious import or bearing on the policies of the country. The broadcasting of a direct personal message, such as President Wilson made to Congress on the day the United States declared war, would have made America's position immediately known to the world. It is unlikely that any international broadcasts will be sent out by the Naval stations except experimentally or in the event of a declaration of vital national importance. The station is for official use only.

## Radio Terms at a Glance

**LINES OF FORCE.**—Those invisible streams of magnetism that surround a coil of wire such as a tuning coil, loose coupler, or variocoupler. It is these lines of force that transfer the electrical energy from the primary coil of a tuning device to the secondary coil. That these lines actually exist can be easily proved by laying a piece of magnetized iron under a sheet of paper on which fine iron filings have been strewn. The filings will assume positions along curved lines which lead from one end of the magnetized strip to the other. Although there is no metal around tuning coils except the copper wire (which is non-magnetic) these lines of force exist. They pass out of the individual turns of the coil down through the center and around to the other side.

\* \* \*

**NON-MAGNETIC.** — The term applied to some common metals which are not attracted or repulsed by a

magnet. Copper brass carbon and gold are examples of non-magnetic metals.

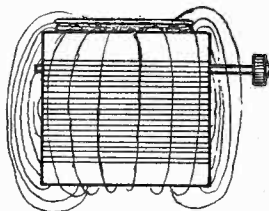


Figure 1. How lines of force act in a radio loose coupler.

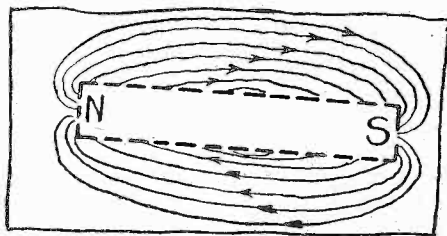


Figure 2. How the lines of force would affect iron filings if the metal particles were spread on a sheet of paper over a bar-magnet.

**MEGOHM** (*meg-ome*). — Meaning one million ohms. This term is used when referring to those devices

and parts which have a tremendously high resistance to an electric current. Correctly speaking, there are no perfect insulators. All insulators permit the passage of some current though it be infinitesimally small. A grid lead, used with vacuum tubes, is a conductor of extremely high resistance, usually of 2 megohms, or two million ohms.

\* \* \*

**MICROHM** (*my-crome*).—Meaning one-millionth of an ohm. This term is used when referring to a conductor which allows the passage of an electric current with exceedingly small resistance.

\* \* \*

**POLARIZATION** (*pole-r-ee-zay-shun*)—A word used to describe the result of a chemical action within dry cells which results in the destruction of the cell as a current generator. Polarization usually takes the form of bubbles of gas which surround one pole of the battery preventing the active chemicals from uniting with the metal of that pole to produce an electric current.

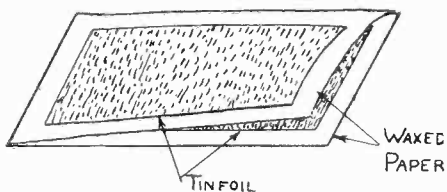
# How to Compute and Build a Fixed Condenser

By E. L. Bragdon

THE fixed condenser can never succeed the variable condenser for most applications in radio work, because of the wide flexibility of the latter which the stationary or fixed condenser lacks. But many amateurs building their own sets from odds and ends find the variable condenser to be the most expensive piece of equipment in the assembly. In many instances, they would be willing to sacrifice a bit of sensitiveness if the cost could be reduced. One method of doing this is by means of a home-made fixed condenser arranged in a small cabinet with taps brought out to a point switch to vary the capacity in the circuit. A second switch is then arranged so that additional capacity may be placed in parallel with the other thus providing a sort of step-vernier adjustment.

In building condensers, the first consideration is in regard to materials. For radio telephone receiving circuits, tin foil for the conducting plates and waxed paper for the insulating medium are as satisfactory as any and have the advantage of being readily purchased and easily worked.

Although waxed paper can be purchased at most novelty stores the amateur is not certain that the insulation will be perfect. This paper is liable to have multitudes of minute pinholes dotting its surface, providing



How a condenser is built up of alternate sheets of tin foil and waxed paper. Drawn by E. L. Bragdon.

by-passes for the electric charges and reducing, by a great extent, the condenser's capacity. By far the best procedure is to secure a good quality of bond paper—only a few sheets of regulation commercial letter size (8½ by 11 inches) are required—and add the paraffine coatings at home. A small block of paraffine may be purchased at any department store and at many drug stores. Shave the wax into small fragments and place them in a steam kettle. The wax will melt easily. After the liquid paraffine is

boiling freely, drop in the sheets of paper, cut up into smaller pieces if this is necessary because of the size of the kettle at hand. Allow the paper to remain in the wax for fifteen minutes, making sure that all air bubbles escape from the pores of the paper by frequently jabbing the sheets with a flat implement. At the end of the time, remove the paper from the paraffine and hang by the corners to dry.

A good grade of bond paper treated in this manner has been found to have a capacity quality denoted by the technical term and notation of "dielectric constant equal to approximately 3 inches." This is a fact to remember since the term and the quantity will appear frequently during the course of this article.

Scientists have worked out a formula for the construction of condensers which contains but few substitutions. It is as follows:

$$\text{Capacity} = .0885 \times \frac{KS}{1,000,000 D}$$

The capacity in this formula is given in microfarads, usually abbreviated to "mfd."

K is the dielectric constant which, in our case, is equal to 3, as explained above.

S is the area of one side of one piece of tin foil in square centimeters. If desired, this could be changed to square inches by dividing by 6.5, since there are 6.5 square centimeters in one square inch.

D is the thickness of one sheet of the paper expressed in centimeters. There are 2.54 centimeters in one inch. If the builder prefers he can change this figure to inches just as he changed the area of the tin foil. The thickness of the average grade of bond paper would range between .004 and .006 inch. The paraffine would add a slight amount to the thickness, hence it would be best to assume .006 inch as the total thickness of one insulating layer.

In order to show in a simpler case as to how this formula is used, it may be assumed that a fixed condenser for the head phones should be built up first. For the common simple receiving set this condenser need not have a capacity greater than .0005 microfarad. Knowing this, our problem becomes one of finding

how large in area the sheets of tin foil should be to obtain the capacity. This is found by substituting the known quantities in the formula previously given:

$$.0005 = .0885 \frac{3 \times S}{1,000,000 \times (.006 \times 2.54)}$$

.0005 is the desired capacity of the condenser.

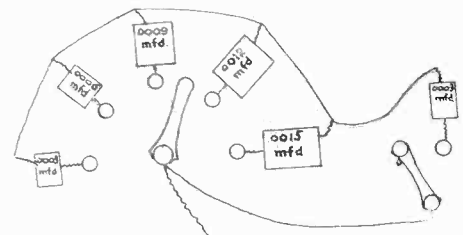
3 is the dielectric constant.

.006 is the thickness of the paper in inches.

2.54 is the number of centimeters per inch.

If this formula is then solved with these figures, it is found that the area of tin-foil sheet required is 28.6 square centimeters. As mentioned previously, there are 6.5 square centimeters to the inch. Thus by dividing the first figure, 28.6 by 6.5, the result is 4¼ square inches. If, then, we take three pieces of tin foil slightly over 2 inches long and 2 inches wide, and place between them a sheet of the prepared waxed paper, the fixed condenser has been completed.

The same principles of design are applied to the variable step condenser for use in the aerial or ground circuit, or across the secondary of the



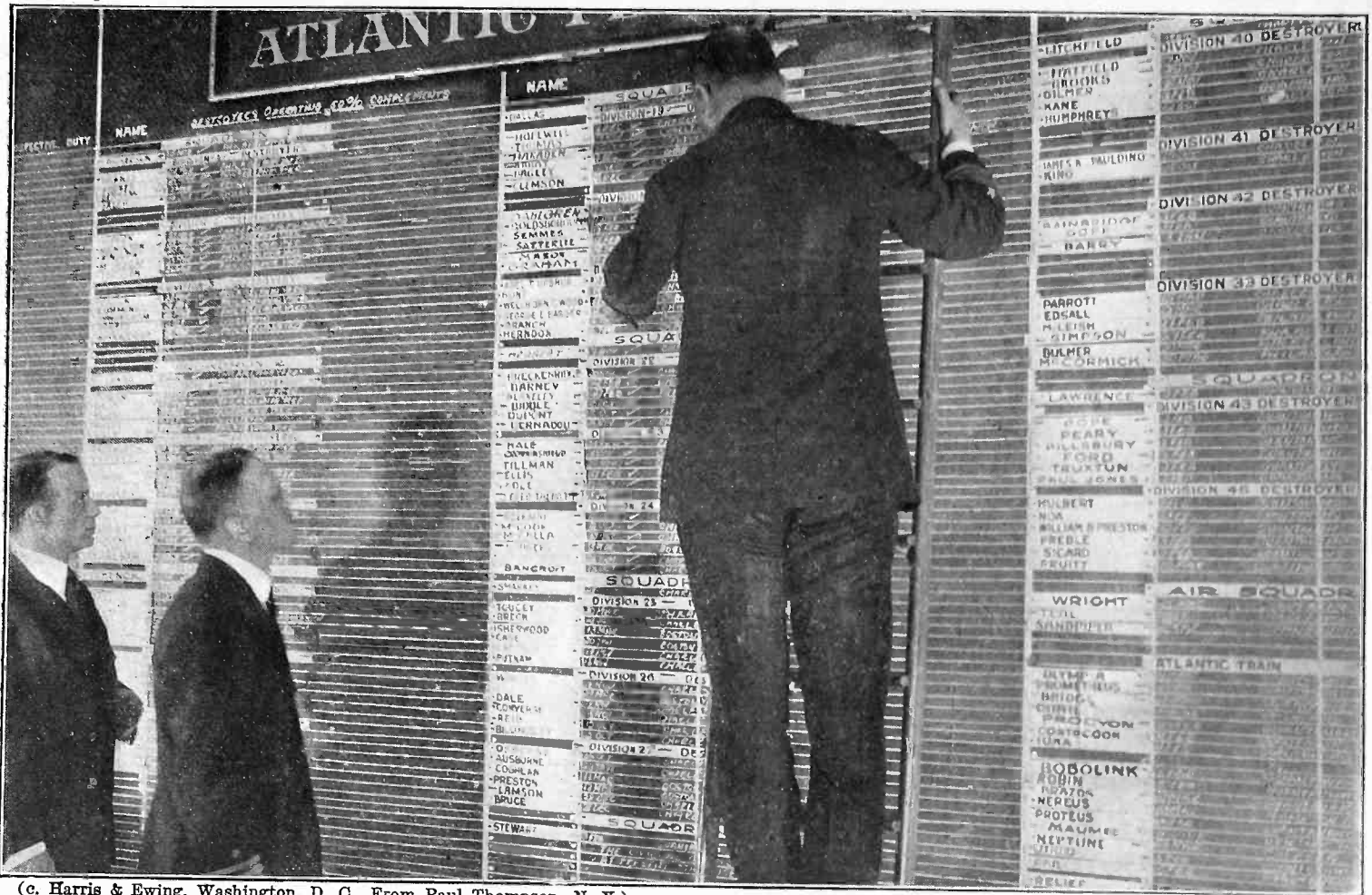
Method of wiring step-condenser with five steps. The vernier step is shown at the extreme right. It consists of a single step which throws a .0003 mfd., condenser in parallel with the step being used on the main condenser. Drawn by E. L. Bragdon.

loose coupler or other tuning inductance. The maximum capacity of this condenser should be about .0015 microfarads or three times as great as the phone condenser. In order to provide the finer steps of capacity, there should be at least five steps, which is the equivalent of .0003 microfarads to each step. Finally, there should be a sixth condenser of equal capacity—.0003 mfd., which can be switched in parallel with the others for closer adjustment.

Having made the fundamental computations for the phone condenser, in which we used the same materials which will be used in the step condenser, it is merely a matter of proportioning the area of the tin foil to the capacity desired, eliminating the bothersome task of refiguring the formula for each condenser step.

The smallest condenser, with its capacity of .0003 mfd., will have 3-5 of the area of the tin foil in the phone since the amounts of their capacities are in the same ratio, viz.:

# Radio Record of Uncle Sam's Ships



(c. Harris & Ewing, Washington, D. C. From Paul Thompson, N. Y.)

Uncle Sam is a master of efficiency in the conduct of his mighty nation and its possessions, and radio has helped him to make his efficiency far-reaching and effective. Particularly with his Army and Navy he is unusually efficient. For instance he must know the exact position—every hour of the day, if necessary—of every craft in his fleets—every craft from the lowliest collier to the gigantic and stately dreadnaught—and in order that this information may be absolutely correct and up to the second, there is a mighty blackboard in the Navy Department in charge of a staff of officers and men, under the direct supervision of Theodore Roosevelt, Jr., assistant secretary of the Navy, at the extreme left of the photograph. As no other institution in the world is better equipped with radio, its use in keeping tabs on the various fleets of the United States Navy gives it an important part to play.

(Continued from preceding page)  
 .0003/.0005. The area of the latter was  $4\frac{3}{4}$  square inches. Therefore, the area of the .0003 mfd. condenser will be 2.5 square inches.

Since each of the four following steps is a multiple of this first one, it is readily seen that the tin foil required in the five steps is as follows:

| STEP | CAPACITY | AREA                       |
|------|----------|----------------------------|
| 1    | .0003    | $2\frac{1}{2}$ sq. inches  |
| 2    | .0006    | 5 sq. inches               |
| 3    | .0009    | $7\frac{1}{2}$ sq. inches  |
| 4    | .0012    | 10 sq. inches              |
| 5    | .0015    | $12\frac{1}{2}$ sq. inches |

There is a point in the construction of condensers which should be understood by the amateur before he assembles the sheets, otherwise the final capacity will be considerably greater than the design calls for. Whereas, 2 sheets of tin foil separated by 1 sheet of insulating medium constitutes 1 condenser unit, 3 sheets of tin foil separated by 2 sheets of paper constitute 2 complete units.

Both sides of the tin foil in the center act as conducting surfaces; hence, instead of 4 such surfaces for 2 condensers, there is need for but 3.

If the above table is worked out further on this basis, it is discovered that each of the 5 steps requires tin foil sheets,  $2\frac{1}{4}$  inches by 2 inches as follows:

| STEP | NUMBER OF SHEETS OF TIN FOIL |
|------|------------------------------|
| 1    | 2                            |
| 2    | 3                            |
| 3    | 4                            |
| 4    | 5                            |
| 5    | 6                            |

A sixth step is then made up for the vernier adjustment and the variable condenser is complete. The diagrams show how the separate condensers are interconnected and, also, how they are connected to the switch and through the switch to the receiving circuit. This will enable the operator to cut in and experiment with any amount of capacity needed, and he will have the aid of the vernier.

## Vienna Police Make Arrests by Radio

THE Vienna police have discovered two American citizens who have been swindling people at the various race-tracks. Radiotelegraphy played the important role whereby both men, one a wireless operator, backed the horses heavily just ten minutes after the race was over. A Vienna bookmaker accepted the bets, believing that communication between Vienna and Paris was impossible except by ordinary telegraphy, which takes at least four hours. After the bookmaker had paid out large sums several times, he became suspicious and informed the police. Both swindlers were arrested and admitted the fraud, claiming that, through radiotelegraphy, they had reaped a harvest of gold. Other European capitals, it is said, will use radio in police work.

# Radio Making Headway in Canada

By E. L. Chicanot

**M**ONTREAL, June 1. — The radio fever, which has so violently attacked all sections of the United States, has not been halted by the boundary between that country and Canada, and the epidemic has swept this country from coast to coast in the same novel and rapid manner. The general public, made cognizant with the fact that the wonders of wireless, hitherto surrounded with the mysteries of technique, are within its power to utilize and enjoy, has entered eagerly and enthusiastically into the study of radio. Judging by the headway radio has made in business circles as well as social, it bids fair to revolutionize Canadian life in many ways. Railways, newspapers, pleasure resorts, theaters, business houses and thousands of private individuals are installing radio outfits.

Canada has always been ready to adopt wireless inventions in her shipping, her trades, her forests and her fisheries. The wireless service on the Great Lakes, the Gulf of St. Lawrence, and on the Atlantic and Pacific Coasts are second to none in the world in the opinion of navigators. The Canadian trans-atlantic wireless service, in competition with the cables, has been in operation some fourteen years with great success. Authorities declare that no series of wireless direction-finding stations have given such help and satisfaction to mariners as that established by the Canadian government on the Atlantic Coast.

Previous to the general interest awakened in radio in this country, wireless was used in the Dominion in numerous lines of operation. A very fine service was built up by the forestry department of British Columbia as part of its precautions against fires and to keep rangers in instant touch with one another, and with headquarters. Several pulp and paper companies have had communication between different parts of their limits as well as between the limits and city headquarters, by wireless. Excellent results have been achieved with the use of radio in the fishing industry, especially in the annual seal hunt off the coast of Newfoundland, when the work of aviators, flashing back the location of seal herds, has proved invaluable and resulted in much larger catches being made in much shorter time.

In the new wave of wireless interest that is sweeping over the country, new associations have been and are being formed in every section where, through co-operation, wireless entertainment is provided and the intricacies of radio studied. Organizations have sprung into existence all over for the manufacture of apparatus and

## A "Juice" Saver



(c. Harris & Ewing, Washington, From Paul Thompson, N. Y.)

Laboratorian of the United States Navy Radio Research Laboratory conducting low electrical resistance tests in radio transmission for greater efficiency of antennas. The result of the use of this antenna will mean a saving of \$30,000 a year at the Annapolis high-power station, by cutting down the consumption of electricity.

the operation of stations. Demands are being made for a greater commercial use of radio, and projects under way are calculated to provide this within a short time. Recently the Maritime Radio Corporation was incorporated at St. John, New Brunswick, to engage in the radio telegraph business and operate both sending and receiving stations as well as to sell equipment. A similar company has been organized at Vancouver and a five-million-dollar company has been incorporated at Winnipeg for the same purpose, while in the various provinces between, many companies are being formed for the purpose of promoting the work of wireless.

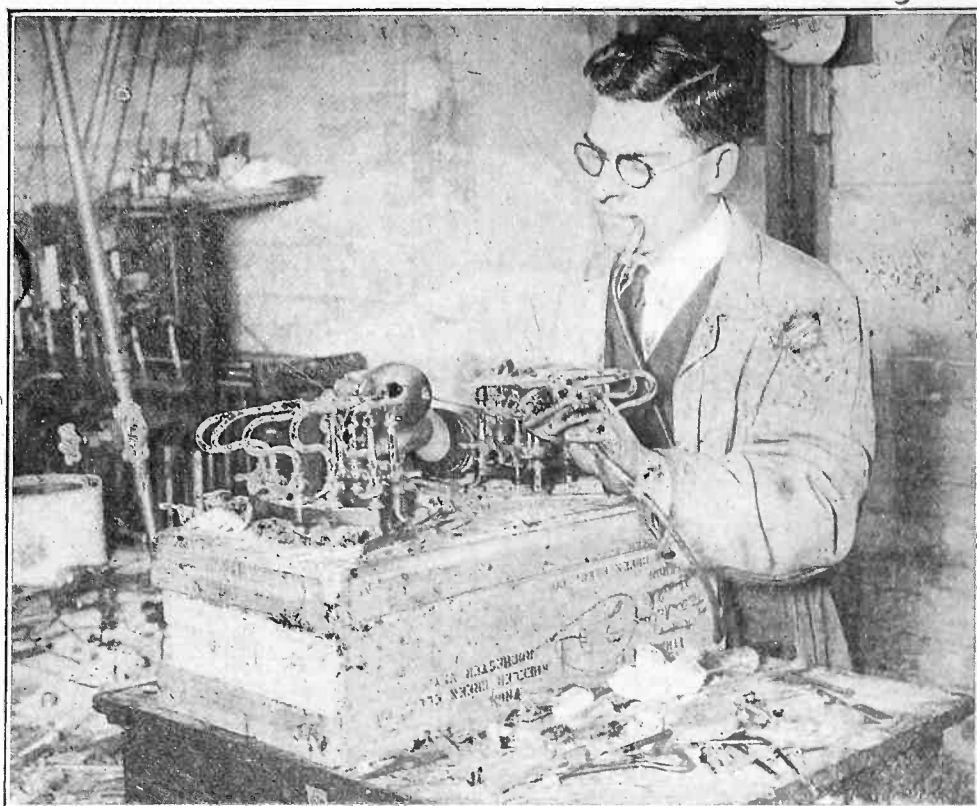
Indications are that the new interest in wireless will bring about an extension of the systems prevailing for the protection and development of various Canadian natural resources. The splendid aid of the wireless in forestry has been ably demonstrated in British Columbia, and now it is intended to install two radio stations in Manitoba for the use of forest aeroplane surveys in the province. This entails, also, the equipment of the flying boats in operation with wireless outfits. Their main work will be that of reporting fires and enabling fighting parties to be transported to the burning areas without loss of time.

The remarkable aid wireless service has been to the sealing fleet has caused Nova Scotia fishermen to petition the Dominion government for a similar service by aeroplane which will, it is expected, considerably aid their work by locating the schools of fish and then telegraphing their whereabouts to the fishing fleets.

The commercialization of radiotelegraphy should be greatly facilitated in the western provinces from the fact that the telephones are owned and operated by the various provincial governments, thus making it a convenient extension to bring the radio system of the provinces under one control. The province of Manitoba is to take the lead in this regard, according to announcements, and enter into the radio broadcasting business at an early date on a commercial basis.

The first passenger train in the Dominion of Canada to be equipped with a radio apparatus was on the Canadian Pacific Railway out of Winnipeg. This was the Live Stock Im-

## Students Make Vacuum Tubes



(c. Kadel & Herbert News Service).

Institutions of learning in America are becoming so advanced in radio that a student, on completion of one of the various courses, frequently finds himself well equipped as a graduated engineer. No greater aid for the advancement of radio can be undertaken than the making of vacuum tubes. Professor B. R. Northrup, of the Cornell radio school (in photograph) is blowing glass for the very important vacuum tubes. A collection of intricate instruments may be seen, through the use of which the perfected tube is attained. This is quite a tedious undertaking. Cornell students and faculty are adding their quota to the progress of the world's greatest science.

(Continued from preceding page)

provement Train of seventeen cars which left during May, to tour the province of Manitoba under the auspices of railway and federal and provincial departments of agriculture to promote better farming methods. Two Marconi representatives and a mechanic accompanied the train and successful demonstrations were given each day.

The Canadian Pacific Steamships, Limited, was the first to inaugurate an exclusively Canadian wireless news service to its liners in mid-ocean, supplanting a United States service of a similar method which was discontinued.

Radio, already operating at a high degree of efficiency in Canadian shipping and coastwise circles, has naturally not been neglected in the new interest. A new high-power wireless station is to be erected on Lulu Island, off the British Columbia Coast, to take care of the commercial needs of Vancouver and relieve the Point Grey station for purely maritime work. A radiotelephone service for the British Columbia interior, for

coastwise vessels, as well as deep sea ships as far out as 2,500 miles at sea has been inaugurated with the object for disseminating world news, speeches and concerts. The wireless system at the port of Montreal are also being improved, and now the most intimate touch will be preserved between that port and Port Colborne, Kingston, and other lake ports and as far out as Cape Race, to Atlantic vessels; the radio keeping the harbor commissioners informed of the number of vessels approaching, the character of the cargo, equipment of vessel, its requirements and other pertinent information valuable to procure, ahead of time, to provide necessary accommodation and fit out.

In the words of a noted Canadian authority, "Radio is here to stay and it is going to become a part of our every day life." In September next, a dominion-wide radio convention will be held at Toronto, bringing together the leading figures of Canadian radio circles as well as many United States experts. Impetus and expansion is expected to result from this convention.

## New Transmitting Stations Now

### 19,067

A SURVEY of all radio transmitting stations licensed by the Department of Commerce shows that there are, to-day, 19,067 stations. Of this number 15,495 are amateur stations, 348 experimental and technical training schools, 2,783 American ships, and the balance, 439, commercial stations.

Of this last number, there are 274 broadcasting stations, known as limited commercial stations, twenty of which were licensed the week of May 20.

The growth of this class of radio stations has been remarkable; it jumped from 67 stations a little over two months ago to 274 on May 20. Applications are filed on an average of about three or four a day.

| Transmitting Stations             |        |
|-----------------------------------|--------|
| Trans-Oceanic                     | 11     |
| General Public or "ship to shore" | 31     |
| Point to Point                    | 124    |
| Broadcasting                      | 274    |
| American ships                    | 2,783  |
| Experimental                      | 225    |
| Technical and Training Schools    | 123    |
| Amateur                           | 15,294 |
| Special Amateur                   | 201    |

Total .....19,067

Amateurs by Districts

|                  |       |
|------------------|-------|
| 1. Boston        | 2,490 |
| 2. New York      | 2,313 |
| 3. Baltimore     | 1,831 |
| 4. Savannah      | 319   |
| 5. New Orleans   | 699   |
| 6. San Francisco | 1,616 |
| 7. Seattle       | 726   |
| 8. Detroit       | 2,393 |
| 9. Chicago       | 2,907 |

Total .....15,294

The Commerce Department does not regulate or record receiving stations, and will not guess at the total number, now unofficially estimated at about a million and a half.

### Navy Bids Rejected

Seventeen bids received by the Navy Department last week, for its 30,000 surplus vacuum transmitting tubes were rejected Saturday, and new bids called for June 1. The best bid received was at \$3.17 $\frac{3}{4}$  each. These tubes, although originally purchased for transmitting tubes, can be reslotted and used as receiving tubes. Bids must be made for lots of 10,000 each, and forwarded to Surplus Sales Officer, Navy Yard, Washington, before June 1.

### YOUR RADIO VACATION

This Summer will be your first Radio Vacation. In the mountains, at the seashore, or in camp, radio will predominate all else. You will need RADIO WORLD. Subscribe for 3 months, \$1.50. Radio World, 1493 Broadway, New York. —(Adv.)

# Radio and the Woman

Latest Gossip About the Feminine Enthusiasts

By *Crystal D. Tector*

ONE of the busiest women in this country, to-day, is Mrs. W. F. Harlow, who answers the thousands of inquiries that arrive at the Bureau of Standards since the publication of the bureau's booklet which contains data for the construction of an inexpensive receiving set for boys and girls.

\* \* \*

Word comes from an enterprising department-store in Dayton, Ohio, that, because of the great amount of interest displayed in radio by women of that State, store news relating to bargain and special sales will be broadcast from their station. Anticipating prompt results from this effective form of commercial advertising, the firm's mail order department is being enlarged.

\* \* \*

Radcliffe College girls are giving a great amount of time and attention to radio transmitting and receiving.

\* \* \*

The published assertion of Dr. Frank B. Channes, the neurologist, that radio waves will eventually result in curing the ailments of humanity and become a standardized obesity treatment, is read with passing indifference by the present-day flapper, but the news is of more than momentary interest to the woman of more advanced years.

\* \* \*

Atop a certain woman's automobile is a cleverly arranged loop antenna which is designed to stand upright when she desires to use her receiving set, and lies flat when she is otherwise disposed.

\* \* \*

Women would not make such frequent use of the word "radiograph" if they knew for certain that there is no such radio term. A radiograph is a photograph taken by X-ray and has no bearing, whatsoever, on wireless.

\* \* \*

A charming debutante asks, with petulant pout, why, when she's giving a radio party, can't she have continuous dance-music instead of having to listen in on lecture or concert.

And a woman friend exclaims: "I'd give anything, if, when I got stuck for a design for that new sport-wrap the other day, I could have tuned in on a fashion talk!"

Still another inquires: "When will broadcasting stations be able to give

us just what we want and when we want it?"

I can only reply that the time is near at hand when these drawbacks will be adjusted. Meanwhile, despite the splendid efforts of broadcasting stations, it's impossible, it seems, for them to satisfy everyone.

\* \* \*

So that radio shall be enjoyed by woman occupants of State prisons is the end towards which many women social workers are striving.

\* \* \*

Edna Beatrice Bloom's song recitals broadcast from John Wanamaker's New York store, are delightful.

\* \* \*

Thoroughly pleasing to the feminine eye are the rose-and-gold hand-painted loud-speaker horns on display at 18 Murray Street, New York

City. An arrangement which permits the base of the horn to be attached to a wall—and the horn itself when not in use, to be supplanted by a candlestick to match, is a decorative and unique contrivance.

\* \* \*

A dealer in radio accessories tells me that, where, formerly, it was a brother or other male relative who shopped for the girl who wanted the best that money could buy in the way of amplifiers, detectors, or condensers, it is now the girl, herself, who goes about on her own particular shopping tour and makes selective purchases in a way that demonstrates her keen interest in and scientific knowledge of what is best in radio apparatus.

\* \* \*

Managers of broadcasting stations are always receptive to suggestions for programs; and they are particularly interested in what women like. Intelligent, sane, and constructive criticism submitted to them through the mails will reveal our point of view as to what would or would not prove good public entertainment. If you wish to have a voice in the matter of programs, write to managers.



(c. Keystone View Co.)

Miss Victoria Merritt hears a concert through the new radio medium, the victrola, at a recent radio show in Greater New York.

## Radiograms

**R**ADIO WILL SUPPLEMENT, NOT SUPPLANT, THE TELEPHONE, according to Brigadier-General John J. McCarthy, vice-president of the American Telegraph and Telephone Co. This is due to the fact that secrecy is still in doubt and that long-distance transmission is seasonal because of atmospheric conditions.

THE LACKAWANNA RAILROAD IS CONSIDERING the establishing of a broadcasting station at Syracuse, N. Y., for the purpose of keeping the trains of its system in touch with division offices and to supply passengers with news.

CONCERTS BROADCAST FROM CINCINATI WERE HEARD IN PUERTO RICO, according to Juan Casellas, of San Juan, who picked up WLW, of the Crosley Manufacturing Co., the most powerful station in the Middle West.

EXPENSES OF COMMUNICATION HAVE BEEN CUT 40 PER CENT. in the War Department by the use of radio. Formerly official messages were sent over the wires of the commercial companies; now radio is used entirely.

THE FIRST RADIO COLLEGE REUNION took place, last week, at the University of Michigan, when the Detroit "News" sent out a program of music and talks, including the famous "locomotive" cheer given by ten thousand students.

EIFFEL TOWER STATION, PARIS, NOW BROADCASTS NEWS. The news consists of important financial and political events.

RADIOPHONE SERVICE BETWEEN PARIS AND LONDON is expected soon. Any subscriber to the telephone service of either city may talk with a similar person, or on a ship or airplane during the trip from France to England.

THAT RADIO WILL EQUAL THE LINOTYPE AND HIGH-SPEED PRESS in its effect on journalism, is the belief of Lord Northcliffe, the British publisher. He claims that radio will come into general as a newsgatherer.

A RADIO TIME-KEEPING SYSTEM is the invention of Irving L. Thompson, a war veteran, of Chicago. His claim is that it will do away with the well-known dial clock. His timepiece will have many new elements. It is entirely controlled by radio.

HUNDREDS OF UNEMPLOYED HAVE FOUND PROFITABLE WORK since radio began to boom, according to the Federated American Engineering Society. Since January 1, the society has placed in employment more than 900 engineers, and continues to place about twenty a day.

BRITAIN'S BAN ON BROADCASTING HAS BEEN RAISED by order of the Post-Master General. Permission, however, will not be given generally and will be largely conditional. The amateur of England is, probably, the most law-governed enthusiast in the world.

RADIO FAKERS ARE GOING TO HAVE A HOT TIME when the newly organized Radio Chamber of Commerce gets busy. The Chamber announces that it intends to prevent the marketing of carelessly constructed merchandise and sets that infringe on patent rights.

MORE SHORT-WAVE BANDS FOR BROADCASTING is the gist of the new law proposed in Congress. The use of shorter wave lengths will introduce new problems into radio apparatus manufacturing and allow the establishment of a large number of low-power, short-wave transmitting stations in a small area. Each city will be able to have its own transmitting station.

CONTROL OF AIRPLANES BY RADIO is recorded as a notable achievement in France. A large machine was taken up. The pilot left his controls in the hangar and allowed his "ship" to be maneuvered for over an hour by wireless operators in a land station far below. At a given signal, the pilot resumed control and landed.

THE 740 STATEROOMS OF THE "LEVIATHAN" will be equipped with radio when the giant steamer is reconditioned. Communication from any telephone to any vessel and, in the case of the "Leviathan," to any stateroom, will be possible.

PASSENGER AIRPLANES MUST CARRY SUITABLE RADIO or there will be laws to that effect. Rear-Admiral W. A. Moffett, U. S. N., Head of the Naval Aviation Service, states the above as a possibility. He says that, with such equipment, the lives of passengers will be safeguarded.

OVER 2,000 PER CENT. INCREASE IN REVENUE was derived by the United States Government from private and commercial radio stations, in 1921, over the year 1917. The earnings of these stations is estimated to be in excess of \$1,600,000 and shows a profit of more than 15 per cent. on the government's investment of \$25,000,000.

SWEDEN EXPECTS TO TALK DIRECT TO AMERICA when the gigantic station in that country is completed. An agreement with the Radio Corporation of America and the Swedish State Telegraph board will bring about the undertaking. Sweden's wireless communications are now dispatched from the station at Stavanger, Norway.

## Played in Holland, Heard in Ireland

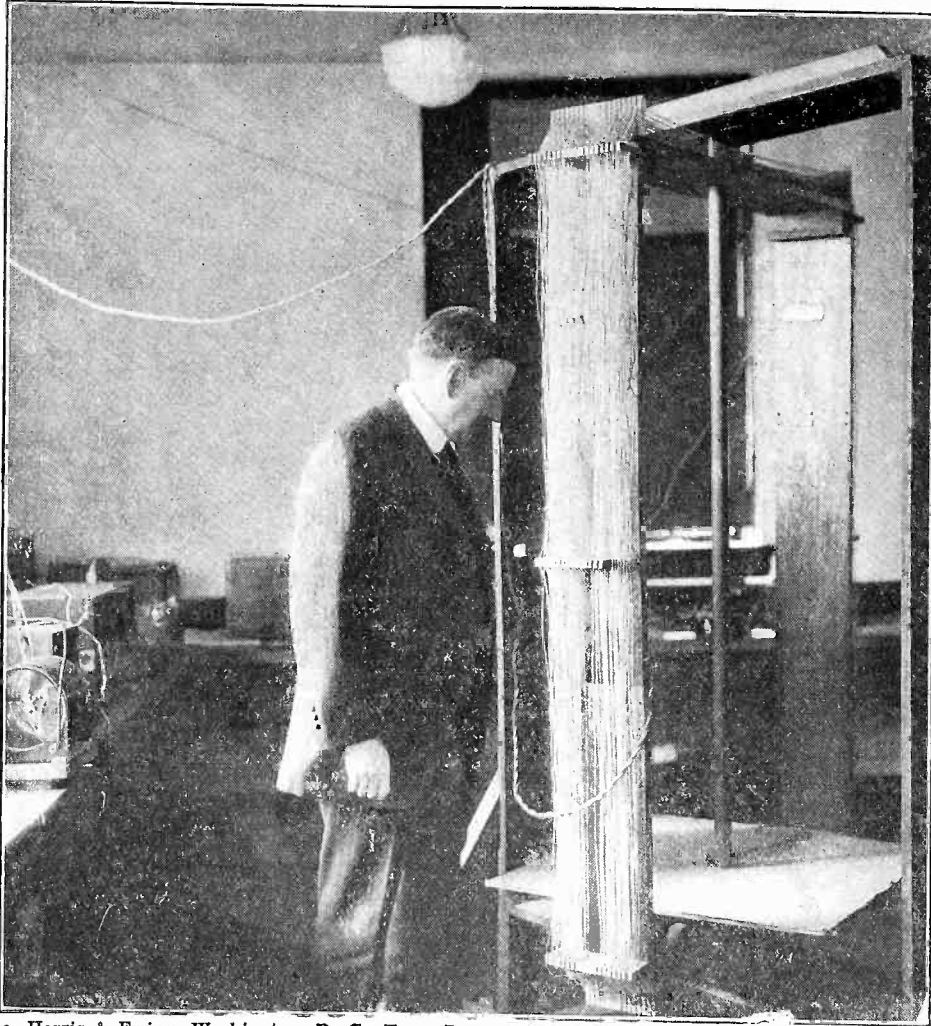


(c. Kadel & Herbert News Service)

The radio receiving-set shown in the photograph was constructed by a clerk in the Tiverton, Ireland, post office, who regularly entertains his friends by music received from Holland and France. The delicate waves are caught by the six-valve high-frequency amplifier and then passed into the two-valve. Note the magnifier shown directly above it. This latter stage increases the sound to such an enormous degree that music is heard with startling clearness from the horn on the table. Although situated so far west from The Hague, Holland, music thus transmitted is about the same degree of loudness as that from an ordinary gramophone. Music from Paris sent daily loses no strength or quality as when played originally in the French capital.

# New Pathfinders to Guide Airmen

By Fred Charles Ehlert



(c. Harris & Ewing, Washington, D. C. From Paul Thompson, N. Y.)

(C. P. & A. Photos)

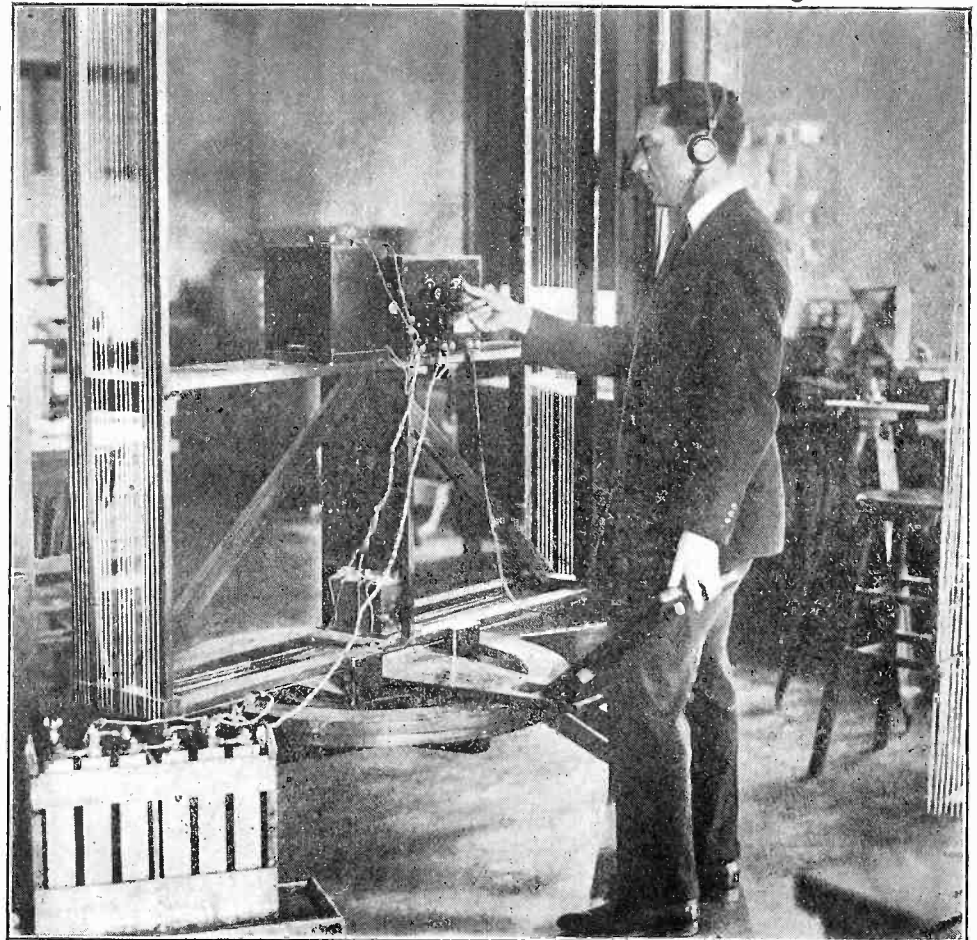
(Above) Dr. L. W. Austin, head of the Radio Research Laboratory of the United States Navy, inspecting the loop aerial with which he has conducted tests to reduce atmospheric disturbances, or static, the bugaboo of long-distance radio communications.

(Below) Direction finder for airplanes operated by the Bureau of Standards, Washington, D. C. One of the experts is conducting an experiment with the necessary equipment. For airplane-direction finding, this large loop-aerial is built on a smaller scale in order that it may be operated in conjunction with an airplane outfit, enabling aviators to know exactly their location, especially in fogs.

planes a small rotatable coil may be mounted vertically aft in the plane. This method gives the direction of the landing field, but does not give accurate information as to its distance when the plane is near the landing field.

Several years ago, the Bureau of Standards, Washington, D. C., was called upon to develop a method to assist airplanes to accurately locate the landing field when the airplane was quite near. It was desired to develop a method that would give a good signal which would be easily audible over a comparatively large area when the airplane was at comparatively high altitude, but would be localized within a small area when the airplane was near the ground. The accurate location of the landing field is very important when near the ground.

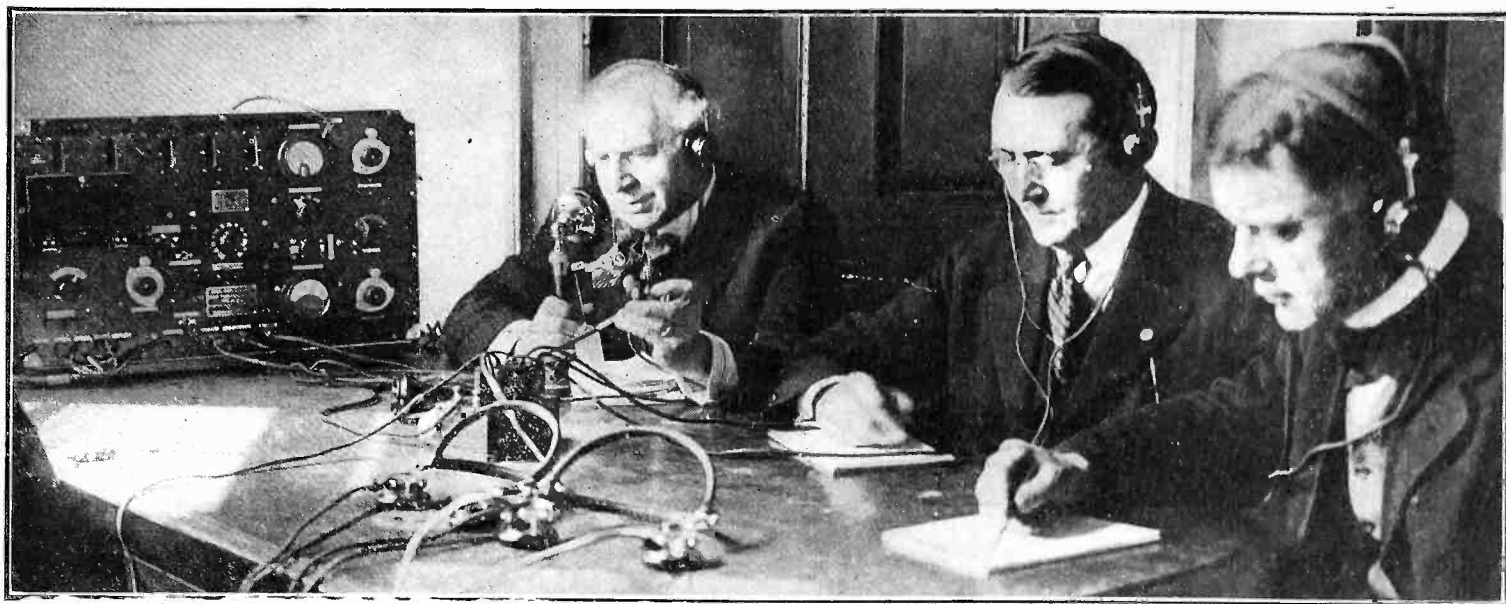
A method of induction signaling was first tried, using 500-cycle alternating current. This current flowed through a large horizontal single-turn coil, 600 by 800 feet, at the landing field. The coil was tuned to 500 cycles, so that a large current flowed. For the induction signaling the reception on the airplane was made using horizontal coils wound on the



**R**ADIO direction-finders and other radio devices have been in use for some time to assist airplanes to land during the night, during fog, or at other time of poor visibility. The most usual method of using radio for this purpose is to transmit from an ordinary elevated antenna at the landing field radio signals which are received on a direction-finder located on the airplane. On small planes the direction-finder may be simply a coil of wire wound on the fuselage; in larger



# Busy Men Find Radio Booms Business



(c. Harris & Ewing, Washington, D. C. From Paul Thompson, N. Y.)

United States Government departments, in these enlightened days when most everybody has a press agent, spare no pains to "sell" themselves both to Congress and the public. The War Department has rigged up a wireless telephone outfit in the rooms of the House Committee on Military Affairs and has connected it with the department. A good advocate at the other end is explaining to the members of a sub-committee on appropriations, why the department should have more money for this and other projects. The committee members are, from left to right, Representatives Julius Kahn, chairman; William J. Fields, and Frank L. Greene.



(c. International Newsreel)

How radio is depended upon by big business men to keep them informed is well illustrated in this picture. A meeting of the directors of the Fidelity Trust and Savings Bank, Chicago, who are going over the bank's business while the radio is keeping them informed of financial and market conditions.

(Continued from preceding page)  
lower wings of the airplane. It was found that this method gave a signal which was audible over a wide area when the airplane was near the ground, but was confined to a small area when the airplane was at an elevation of about a mile. This was not satisfactory.

The use of radio-frequency waves was, therefore, undertaken. Two horizontal coils were placed one above the other. The coils were identical in construction, and placed so

that their axes coincided. The current in one coil flowed in a direction opposite to the current in the other cell. A fairly high radio-frequency, suitable for direction-finding work, such as 300 kilocycles, was used.

A calculation was made which indicated that the signals radiated from the two coils would be strongest for an airplane flying in a given horizontal plane, whenever the plane was inside a comparatively small ring-shaped area located above the landing field. After the coils had been con-

structed a careful experimental investigation was made under actual flying conditions, and the results of this calculation were verified. Signals were received on the airplane only when it was nearly above and in the immediate vicinity of the landing field. A Curtiss type biplane was used for the experimental work for both the induction signaling and the radio signaling.

Further experiments in this important branch of radio are being made in laboratory and field work.

# Simple Methods of Recharging Storage Batteries

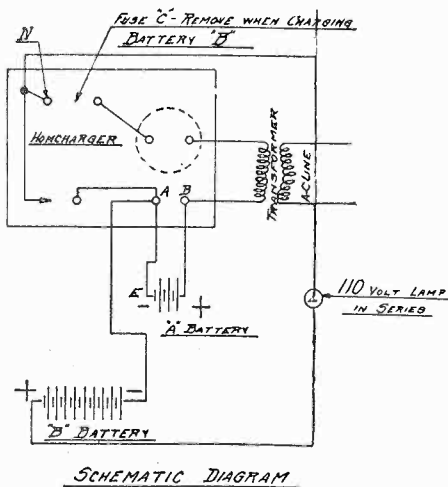
By John Grayson

**M**INIATURE storage-battery cells are being offered by various manufacturers for supplanting the small dry B-battery used with vacuum tube receiving sets. These batteries consist of from 8 to 50 small cells, and the recharging of such batteries has presented quite a serious problem to the user and is largely responsible for their not being more readily adopted by the wireless enthusiasts.

Where direct current is available, it is a very easy matter to charge these batteries by connecting same in series with a 40-watt lamp. When charging in this manner, it is quite essential that positive battery-terminal be connected to positive line as, otherwise, batteries will discharge instead of charge.

Various types of Homcharges are now on the market for charging the 3-cell A battery used for heating the lamp filaments, and, practically, every wireless enthusiast has one of these machines in order to eliminate the inconvenience and expense of having to lug his battery to a service station every time it required recharging.

Through a very simple scheme of connection it is possible to recharge any radio



Schematic diagram: Lamp "L" burns with less than normal brilliancy when connections are properly made. If the lamp is extra bright, turn off socket immediately and reverse A battery.

B battery with the same Homcharger that is used for charging the A battery. Figure 1 shows the connections employed.

The Homcharger fuse C is removed, so as to open normal charging circuit. One side of the 110-volt alternating-current line is connected to the armature at N, the other going to positive terminal of the B-battery through a 110 volt lamp-L in series, which acts as a current reducing resistance.

Charging circuit is completed from negative terminal of B battery to terminal A.

The 3-cell 6-volt A battery is connected to the Homcharger terminals A and B in the usual manner. As soon as alternating current supply is turned on, the armature should start to vibrate and act as a rectifying valve, completing the B battery charging-circuit during the proper part of the A. C. cycle, thereby delivering to the B battery a series of intermittent uni-directional current impulses.

It is necessary that either the positive or negative pole of both A and B battery be connected to the Homcharger terminal A. If this is not done, B battery will discharge instead of charge, the same being indicated by the series lamp L glowing with intense brilliancy. When connections have been properly made, and B battery is charging, this lamp burns quite dull.

Making the proper connections is a very simple undertaking.

The material required can be purchased for less than \$2 from any electrical dealer and consists of:

- 1 Two-way Socket Plug or Duplex
- Current Tap at.....\$1.00
- 1 Attachment Plug at ..... .25
- 1 Porcelain Wall Receptacle at..... .25
- 1 10 ft. Lamp Cord at..... .50

The two-way socket plug is screwed into lamp socket and the standard Homcharger attachment plug screwed into one side thereof. Another attachment plug is inserted in the other side of current tap, one lead being connected in series with the 11-volt lamp L of the proper size, the other lead running direct to screw N of the vibrator assembly. The other terminal of lamp L is connected to the positive terminal of B battery and the other side of B battery running to terminal A of Homcharger.

Fuse C of the Homcharger is then removed, A battery connected, and lamp socket turned on.

It is impossible to charge both A and B battery at the same time, as with fuse C in place the B battery will discharge through transformer secondary.

As the Homcharger ammeter is not connected when fuse is out, this instrument does not indicate charging rate of B battery. However, when lamp L burns dull, the batteries are charging properly and no other indication is required.

## Waves Travel 4200 Miles Pittsburgh Broadcasting Picked up by Vessel in South America

**K**DKA, the Westinghouse broadcasting station at Pittsburgh, is the first American radiophone station to be heard south of the equator, having been picked up by Frank F. Reb, chief operator of the steamer "Santa Luisa," of the Grace Line, while in the Port of Iquique, Chile.

Iquique is about 4,200 miles directly south of Pittsburgh. In a letter to the Westinghouse Company, Mr. Reb says:

Though the atmospheric disturbances were bad during the test, the selections came in so strong that they were easily heard by Captain Williamson and a number of passengers.

Owing to the fact that your station designated itself too infrequently it was only at the end of the program that we were able to identify KDKA, this prevented us from ascertaining the identity of another broadcasting station heard at the same time, but whose signals or selections came in about half as strong as KDKA and when heard designating itself only once sounded like WFD.

The tests were conducted only while in the ports of the trip, so as not to interfere with radio regulations.

The reception of broadcasting stations this distance and the remarkable intensity of the selections was beyond my expectations



This sketch indicates how far radio waves emanating from station KDKA, East Pittsburgh, Pennsylvania, had to travel to be heard in Iquique, Chile, South America.

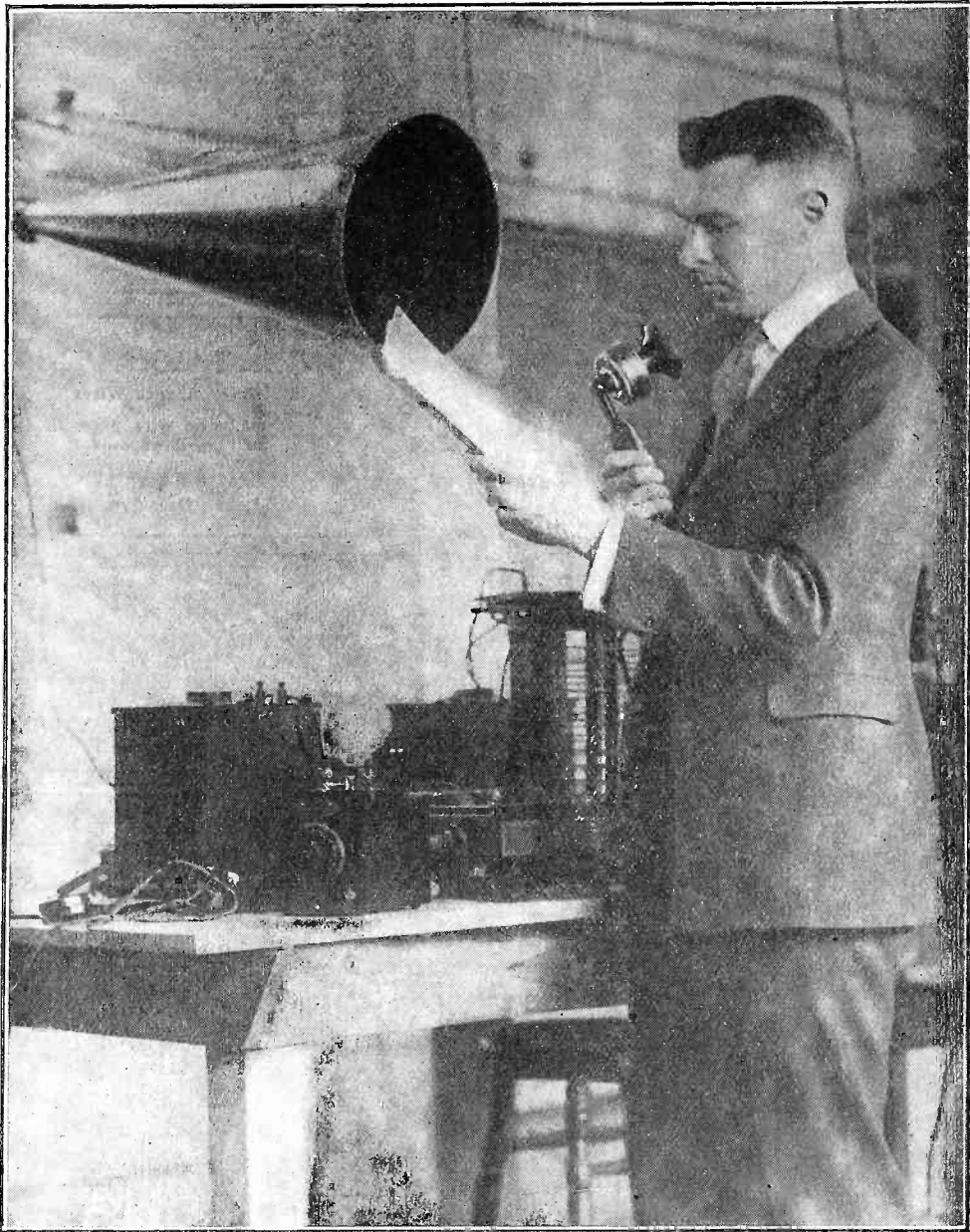
and is without doubt the first time that American radiophone stations were heard south of the Equator.

It is quite possible that the call letters which as Mr. Reb states in his letter sounded like WFD were WJZ, the call of the Westinghouse station at Newark. In this event, Mr. Reb heard two Westinghouse stations the same night, both located over 4,000 miles away.

Don't think that because the fluid in the batteries is distilled that you can drink it. You wouldn't want to be classed with the man who blew out the gas or the one who "didn't know the gun was loaded!"—*"Evening Telegram."*

RADIO WORLD has found great difficulty in filling all the newstrade demands for copies of various issues to date. We freely acknowledge that we have fallen short by several thousand copies in printing as many as actually were required by newsdealers.

## Extra! First Radio Newspaper Here!



(c. International)

Of course, the newspaper cannot be published by radio—for that is out of the question, but every evening, the Boston "American" from its broadcasting station at Medford, Massachusetts, sends out a service that reaches not only thousands of its readers but others who may be listening in. L. D. Trofey, shown at the transmitter, is the official news vendor. Compare him with "ye ancient town crier" who with bell and husky voice, ambled up and down Main Street, calling out news that was over a month old. How times have changed since the days of our greatgrandfathers.

### Radio Must Pay Royalties

**N**ATHAN BURKAN, attorney for the American Society of Composers, Authors, and Publishers, has delivered to that organization an opinion in which he claims that the broadcasting of copyrighted songs constitutes a public performance for profit, and that the owners of the copyright are entitled to revenue for such renditions.

The A. S. C. A. and P., recently adopted a resolution that performances such as Mr. Burkan describes, are without license and subject to prosecution. A performing-rights tax-system is being drawn up. Several are under advisement, including a royalty per radio, or a lump sum to be arranged according to the location of the broadcasting station.

A form letter has been sent to all broadcasting stations notifying them of Mr. Burkan's opinion, with the warning that performances of copyrighted music by radio will be prosecuted as an infringement.

This means that if radio stations still care to transmit copyrighted music they will be compelled to apply for license privilege to the A. S. C. A. & P.

The Westinghouse Company, for several weeks, has recognized that the copyright owners are entitled to their equity, and have not permitted the performance of copyrighted music from their station in Newark without permission. Such permission has been readily granted so far; but what the arrangement for the future will be is still in abeyance.

Red hot off the press every seventh day! **RADIO WORLD** is published every week. Have a complete file by subscribing direct or through newsdealers.—(Adv.)

If your dealer sells out, tell him to save you a copy of **RADIO WORLD** every week, or subscribe. \$6 a year, \$3 for six months, \$1.50 for three months.—(Adv.)

## MAGNAVOX Radio

*Everyone will  
envy you these  
evenings of pleasure*

**T**O enjoy the thrills of a Magnavox Radio is a matter of *progressiveness* rather than *wealth*.

The average family, when alive to its possibilities, can and *will* secure the simple, dependable equipment which gives the home circle the inexhaustible resources of *wireless entertainment*.

No wireless receiving set is complete without the Magnavox Radio.



**Radio brings it,  
MAGNAVOX  
tells it**

Attached to any commercial receiving set, the Magnavox Radio reproduces every sound in full volume, transforming wireless telephony from a scientific "fad" into a universal home service.

The Magnavox Radio makes it possible for you to hear all that is in the air as if it were being played by your phonograph.

*Any radio dealer will demonstrate for you, or write to us for descriptive booklet and name of nearest dealer.*

**The Magnavox Co.**  
Oakland, California  
N. Y. Office: 370 Seventh Ave.  
Penn. Terminal Bldg.



**EXCEPTIONAL DEALER PROPOSITION ON**

VARIABLE CONDENSERS  
23 AND 43 PLATES

and all Radio Parts and Apparatus.  
Very comprehensive stock on hand.

**SIGNAL SYSTEMS SERVICE CO.**

1 East 42nd St., New York City  
Telephone Vanderbilt 10022

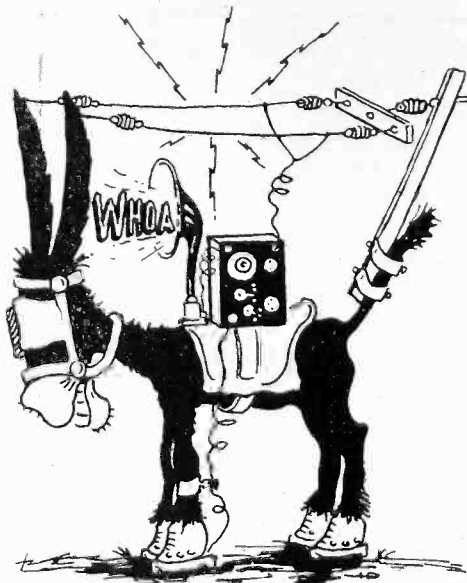
**TESTED RADIO MATERIAL ONLY**

|   |        |
|---|--------|
| 48 plate variable condensers (panel type) .00125                                | \$4.50 |
| 23 plate variable condensers (panel type) .006                                  | 3.50   |
| 2,200-ohm head sets   | 8.00   |
| 3,000-ohm head sets   | 6.50   |
| Spider web, inductances primary, secondary, tickler, mounted with binding posts | 6.00   |
| Tube sockets  | .60    |
| Federal amplifiers, two stage   | 58.00  |
| Turney tube receivers (spider web)  | 40.00  |
| Amplifying transformers   | 6.90   |
| Tuska 0-800 meter couplers  | 7.50   |
| JJN couplers \$4.50—Variometers   | 4.35   |
| Drawing regenerative receivers  | 50     |
| Regenerative tuner mounted spider web 0-1,000 meters                            | 15.00  |

Wholesale & Retail  
Mail orders filled upon receipt of money order  
**ROBIN ENGINEERING COMPANY**  
261 West 49th Street, New York

**Radio Stopped Him; But What Will Make Him Go?**

Cartoon by H. C. Diefenbach



**Fewer Hens; More Radio**

The following letter recently arrived at the offices of Radio Corporation of America, New York. It gives just a hint of the growing interest taken by everybody in radio, and shows that it pays to mix a little sentiment with a little business:

Dear Sirs,  
I have just received your acknowledgment of my order to be shipped c. o. d. but I find that you will have to give me Terms if you are to sell me. I am only 12 (twelve) years old and am a Boy Scout, as I have already told you, and being a Boy Scout I am not able to borrow money from my Mother.  
I saw your advertisement in a Boys' magazine some time ago but did not have the Money; but about a week ago a man asked me if I would sell him some hens. He was to come for them but didn't, so I cannot pay the c. o. d. If you would accept Terms, say \$1 (dollar) down and a month to pay I could sell my Hens to the Butcher as they are not be laying and I expect some chicks next week anyway.  
I am enclosing a \$1 (dollar) in hopes You will accept my Terms. Please tell the Post Office employees to keep the set at the Post Office until I call for it.

Yours Truly,

We are advised that an executive of the corporation who desires his name withheld, instructed the bookkeeping department to charge the \$15 for the set to his personal account and see that the "Boy Scout" immediately got his set.—"Journal," Providence, R. I.

Ask your dealer to show you the  
**"ARROW"**

MAHOGANY VARIOMETER  
and the "ARROW" Knock Down Set.  
JOBBER—Write for proposition.  
Arrow Wire Co., 557 W. 35th St., New York

**FREDERICK WINKLER, Jr.**

Manufacturer of  
High Grade  
Radio Phone Receiving Sets  
Prices \$25 to \$135  
59 Park Place New York City

**ELECTRICAL SPECIALTIES**

Auto — Electric & Magnet Wires.  
Dealers write for magnetic wire price lists,  
on 1- 1/2 and 1/4-lb. spools  
**RICHMOND ELECTRIC CO.**  
181 McDougal St. Brooklyn, N. Y.

**PAPER TUBES FOR WIRELESS**

ALL SIZES ON HAND  
FOR IMMEDIATE DELIVERY  
WHOLESALE AND RETAIL  
**BAEHM PAPER CO., INC.**  
219 FULTON STREET NEW YORK  
Bet. Church and Greenwich Sts.

**RADIO SUPPLIES— RADIO SUPPLIES**

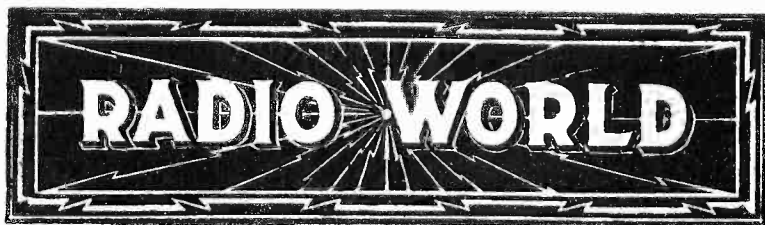
We carry a full line of Radio Goods  
**Dictograph Head Sets \$12.00**  
**Vario Couplers . . . . . 5.00**  
**Everett Head Sets . . . . . 8.50**  
**Variometers . . . . . 4.50**  
**Transformers . . . . . 4.25**  
**2 Slide Tuning Coils . . . . . 2.50**  
**Dials . . . . . Knobs**  
**Send 50c for 20 Blue Print Hook-Ups**  
Radio Sets Made to Order  
**SUNBEAM ELECTRIC CO.**  
71 3rd Ave., New York City

**THE MARVEL**

REG. U.S. PAT. OFF.  
**OF WIRELESS**

If you live within 30 miles of a radio broadcasting station, you can bring the speeches and music right into your own home with the nationally famous MARVEL! The set comes complete, including telephone headset, complete aerial equipment, aerial and ground wires, lightning switch, insulators, ground clamp, complete, simple instructions, Complete code chart, etc. Nothing additional needed.  
**\$15**  
Remember, the MARVEL is built by the same engineering skill that designed radio apparatus now used by the U. S. Navy, and every MARVEL Set is on a money-back basis. If your dealer is not supplied, send check or money order for immediate shipment from stock. \$1.50 extra will bring you an interesting book on wireless—150 pages, 150 illustrations. Or send 25c for a 72-page illustrated beginner's radio book.  
**Freed-Eisemann Radio Corp.**  
Manufacturers of the Finest Radio Apparatus in the World.  
255 Fourth Avenue Dept. 22 New York City  
"ASK ANY MARVEL OWNER"

**SUBSCRIPTION BLANK**



**RADIO WORLD CO.,**  
1493 Broadway, New York City.

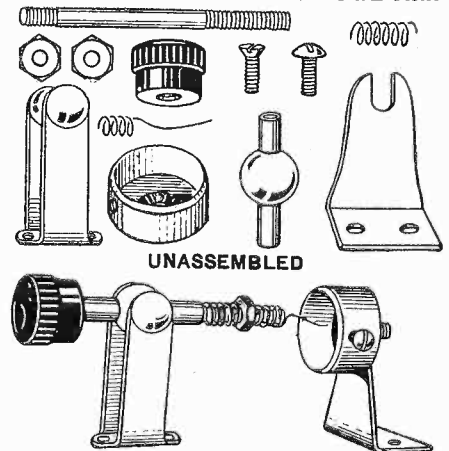
Please send me **RADIO WORLD** for.....months, for which please find enclosed \$.....

**SUBSCRIPTION RATES:**

|   |             |
|---|-------------|
| Single Copy   | .....\$ .15 |
| Three Months  | ..... 1.50  |
| Six Months  | ..... 3.00  |
| One Year (52 issues)                                | ..... 6.00  |
| Add \$1.00 a Year for Foreign and Canadian Postage. | .....       |

**"SCOT" CRYSTAL DETECTOR**

Assemble Your Own and Save a Dollar



**UNASSEMBLED**  
**ASSEMBLED**  
Complete Parts As Illustrated. All Brass, Heavily Nickel Plated  
**40c**  
ASK YOUR DEALER  
BY MAIL, 45c. NO STAMPS  
Manufacturer, Jobbers and Dealers write or see us for Proposition.  
**Scot Novelty Company**  
33 SPRINGFIELD AVE.  
Newark New Jersey

**RADIO CABINETS**

Manufactured  
in any Style, Size or Quantity  
A. E. CHERNACK & CO., INC.  
314 E. 75th ST., NEW YORK  
Phone Rhineland 2747

Distributors of Everything in

**RADIO**

Mail us your orders

**CITY SUPPLY CO.**

56 Warren St., N. Y. City

**Radio Cabinets**

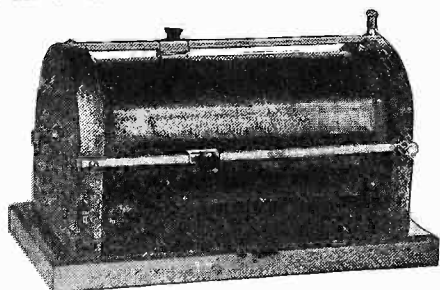
and

**BATTERY BOXES**

Sheip & Vandegrift, Inc.

814-32 N. Lawrence St.

Philadelphia, Pa.

**Double Slide  
Tuning Coil**

Very attractively mounted on mahogany finished base. Put together with a conscience. G.-W. Sliders, nickel plated binding posts and best of materials and workmanship. Its appearance sells it.

**Radio Supply Service  
UP-TO-THE-MINUTE**

The radio dealer needs a new kind of jobber service to meet the demand of a new and different business. North Ward Service is developed especially to meet the need. Give it a trial!

**JACKS**

- No. 30. Single Circuit Open.
- No. 32. Double Circuit Closed.
- No. 31. 3 Spring Automatic Filament Control.
- No. 33. 5 Spring Automatic Filament Control.

**ALL PARTS**

Binding Posts (unremovable head).  
Fixed Condensers.  
Switch Lever.  
Duplex Adapter.  
Royalphone Receivers.  
Complete Crystal Sets.  
Crystal Detectors.  
Coils.

Get Our Prices and Discounts.

**NORTH WARD RADIO  
EQUIPMENT CO.**

Orange St., Newark, N. J.

**Oar-Rigged Antenna on  
Rowboat New Radio Stunt**

(c. Kadel & Herbert News Service)

Here is a novel and practical radio stunt. The young lady is holding the oar aloft in order to support the aerials and antenna.

**A Canadian Radio Prediction**

An American friend of mine, says a writer in the Montreal "Herald," who is associated with Mr. Edison, tells me that he is hard at work on a sound amplifier "which, when perfected, will let you hear the ants talk." Sitting in Montreal, you will be able to carry on a conversation with your fiancée in London, precisely though she were sitting beside you. I wonder whether it will be a benefit or not. Mr. Edsion, who was 75 the other day, expects to work at full pressure until he is 90.

ALL RIGHT, raise the bonus by a tax on radios.—Chicago Journal of Commerce.

**NOVO****"B" BATTERIES**

FOR RADIO OUTFITS

Noiseless—Dependable—Guaranteed

All standard sizes 22½ to 105 volts.

For Sale by Leading Dealers

**NOVO MFG. CO.**

NEW YORK—424-438 W. 33rd St.  
CHICAGO—531 So. Dearborn St.

**VARIOMETERS**

UNWIRED

Mahogany wood turned cup, white wood ball ready for wiring. Range 175 to 600 meters. Ready for immediate delivery in any quantity. Workmanship guaranteed.

SAMPLE SET, \$1.10

The Ever Ready Woodworking Co.

810-12 East 5th St., New York City

Phone Orchard 5585

**VARIOMETERS  
VARIOCOUPERS**

Price **YANKEE** \$6.00

**YANKEE RADIO SUPPLIES**

1615 Stiles St.

Philadelphia, Penna.

**Silvertone Talkers, \$10.00**

We manufacture a high grade Loud Talker. The horn is made of aluminum and brass, producing the best results. Can be used on any amplifying set, with either single or double receivers.

Price \$3.50

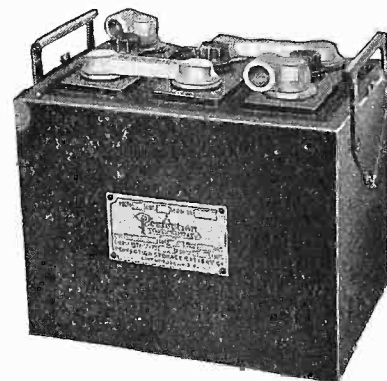
We also make aerials to be attached to any electric light socket for either crystal or bulb sets.

Reliable Dealers Wanted.

**Silvertone Talker Company**

1433-1434 DIME BANK BLDG.

DETROIT, MICHIGAN

**Radio Batteries  
Ready for Delivery**

WE are ready to deliver radio batteries (A type only) 6 volt from 40 to 120 amperes for single orders, dealer quantities, or distributor quotas where we are not already represented by distributor.

These are not the ordinary automobile batteries. They are specially built for radio work with heavy plates and heavy separators and fully guaranteed.

In writing be sure to state whether this is an individual order or whether you are a dealer with quantity demand or whether you want a distributor's quota.

**Perfection Battery Mfg. Corp.**

2300 S. La Salle St., Chicago, Ill.

# Radio Merchandising

## The Cameron Books

Three notable books on radio have just been published by James R. Cameron, whose various books on motion-picture projection have had such wide acceptance in the industry.

Cameron's newest efforts are all for the amateur, and they are notable not alone for their thoroughness but for their simplicity of style. There is no effort to be highly technical, and the treatment in each of the books is such that the most rank beginner quickly will find understanding of points he now feels are vague.

The first of the books, "How to Build Your Own Radio," contains thirty-two pages and sells at 25 cents. By diagrams and the most lucid of explanation, it presents an almost indispensable volume for radio fans who plan to make their own outfits.

The "Radio Dictionary," eighty pages, at 50 cents, contains, besides its 700 definitions of radio terms, many illustrations of radio parts, tables, important statistics, construction advice, and various other data.

The most imposing volume of the three, selling at \$1. is 160 pages of helpfulness that no amateur should be without. It is called "Radio for Beginners." In it, Mr. Cameron has supplied complete information on the installation and care of every type of instrument now used in radio receiving, and he has not been hesitant in mentioning the various types by name. Indeed, he has devoted special chapters to each of the nationally known makes of equipment in addition to his general discussion of the various steps of operation, care and repair. It is profusely illustrated.

The books are being distributed by the Technical Book Company, Bush Building, New York City, N. Y.

THE SELF-SERVICE PHONOGRAPH COMPANY, distributors of the "Rova" line of radio parts and accessories, has moved to new and larger quarters at 167 West 18 St., New York City.

## Will All New Firms Join This List?

If you are a new firm and your name is not on our list, send it to Merchandising Editor, RADIO WORLD, 1493 Broadway.

### Southern States:

Holt Electric Utility Co., Jacksonville, Fla.

Southern Radio Supply Co., 1601 13th St. S., St. Petersburg, Fla.

Carter Electric Co., 63 Peachtree St., Atlanta, Ga.

National Radio Corp., Atlanta, Ga.

The White Co., Columbus, Ga.

Hi-Grade Wireless Instrument Co., Asheville, N. C.

Carolina Radio Co., Asheville, N. C.

Piedmont Electric Co., Asheville, N. C.

Smith Novotoy Elec. Co., Charlotte, N. C.

A. A. Hartman, Salisbury, N. C.

Clarke Electric Co., Danville, Va.

### Southwestern States:

Nichols Radio Supply Co., Bowling Green, Ky.

H. C. Tafel Co., 236 W. Jefferson St., Louisville, Ky.

Nola Radio Co., 134 Chartres St., New Orleans, La.

Rose Radio Supply, 604 Gravier St., New Orleans, La.

Oklahoma Radio Shop, Oklahoma City, Okla.

Hebrick & Lawrence Co., Nashville, Tenn.

Zibart Bros., Nashville, Tenn.

John R. Koch, Charleston, W. Va.

McCray's Store, Fairmont, W. Va.

Radio Gish Auto Shop, Amarillo, Tex.

Southwest Radio Supply Co., Dallas, Tex.

Southern Radio Laboratory, Dublin, Tex.

Galveston Wireless Supply Co., 2006 Avenue B, Galveston, Tex.

Mr. Wayman Davenport, Plainview, Tex.

Port Arthur Radio Laboratories, 2048 Fifth St., Port Arthur, Tex.

Alamo Radio Elec. Co., 608 W. Evergreen St., San Antonio, Tex.

Wace Elec. Supply Co., Tex.  
The North Texas Radio Co., Whitesboro, Tex.

### Middle States:

Tresco, Davenport, Iowa.

The Radio Exchange, 804 Helen St., Sioux City, Iowa.

The Kehler Radio Laboratories, 901 1st St., Abilene, Kans.

T. & H. Radio Co., Anthony, Kans.

Cos. Radio Co., Wichita, Kans.

Rad. Radio Service, Winfield, Kans.

Detroit Elec. Co., 434 Shelby St., Detroit, Mich.

Saginaw Radio & Elec. Co., Saginaw, Mich.

O. B. Radio Supply Co., 406 Brown Bldg., Omaha, Neb.

Wolfe Elec. Co., Omaha, Neb.

Bullock's, York, Neb.

Lee Brothers, Champaign, Ill.

Apex Radio Shop, 1105 W. 69th St., Chicago, Ill.

The Barawik Co., 25 N. Desplaines St., Chicago.

Chicago Radio Apparatus Co., Inc., 508 S. Dearborn St., Chicago.

Herbert H. Frost, 154 W. Lake St., Chicago.

Haupt Elec. Supply Co., 2442 Ogden Ave., Chicago.

W. A. Hotz & Co., 6325 S. Peoria St., Chicago.

Independent Radio Supply Co., 3716 W. Douglas Blvd., Chicago.

Post Office News Co., Chicago.

G. M. Proudfoot, 361 E. Ohio St., Chicago.

Radio Receiving Shoppe, 4640 N. Paulia St., Chicago.

Klaus Radio Co., Eureka, Ill.

Devore Radio Supply Co., Gibson City, Ill.

Hico Wireless Supply Co., Marion Ill.

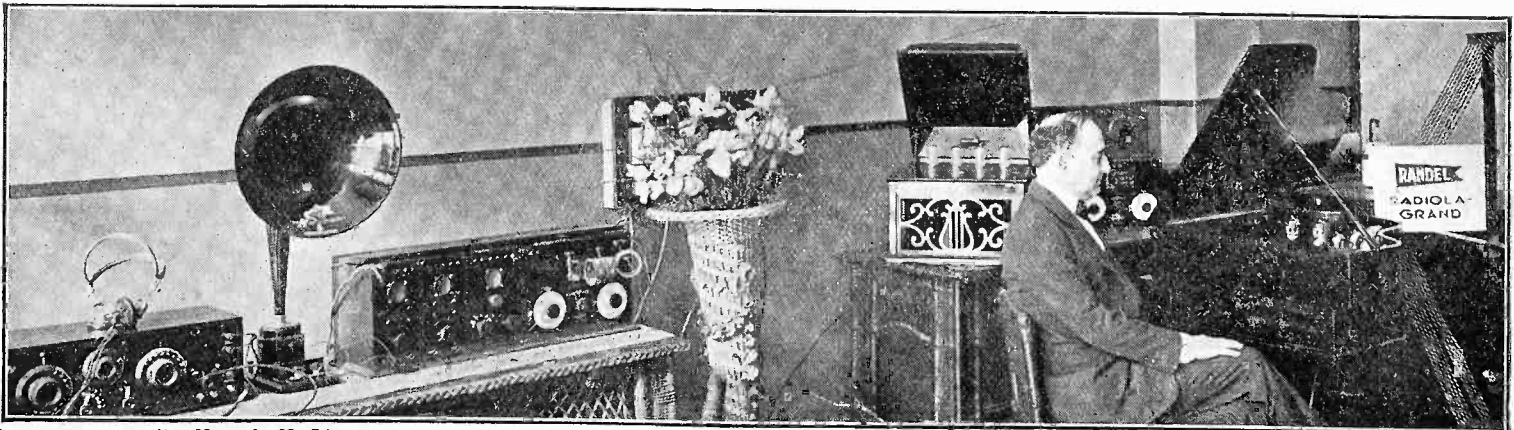
Citizens Radio Supply Co., Box 155, Mattoon, Ill.

W. R. Welton, 1020 N. Prairie, Mattoon, Ill.

Peoria Radio Sales Co., Peoria, Ill.

(To be continued)

## One of the Up-to-the-Minute Radio Displays that Secure Business



(The Walters Studio, Newark, N. J.)

A corner in the retail sales department of the Randel Wireless Co., of Newark, N. J. This company makes it a point to keep its retail-demonstration room and sales salon tastily appointed, because not only does it mean profitable business but proves a great aid to the wholesale division.

## New Firms and Corporations

(The firms and corporations mentioned in these columns can be reached by communicating with the attorneys, whose addresses are given whenever possible).

The Aetna Radiophone Corporation of America, a five-million-dollar organization for the manufacture of radio products filed its charter at Dover, Delaware, on May 23. The representative is the United States Corporation Co., Dover, Del.

E. R. Knott Machine Co., 1 Ellery St., South Boston, Mass., have established a radio department. Are manufacturing Knott's Sure Ground and their own line of meostats, condensers and variometers.

The Plywood Tube, Inc., South Broadway, Lawrence, Mass. Capitalization, \$150,000. J. H. Proctor, Andover, Mass., president; Carl J. Olson, Lawrence, Mass., treasurer. Will manufacture plywood tubing adaptable for radio work, wireless, electrical and telephone purposes.

Radio Cabinet Co., 1215 Geary St., San Francisco, Cal. Harry Martin, general manager.

Beaumont Radio Equipment Co., Beaumont, Texas. H. C. Morrow, president.

Pottstown Radio Supply Co., 228 High St., Pottstown, Pa. C. A. Caldwell, manager.

S-W Radio Co., Thomasville, Ga. J. R. Shumate, Jr., president.

Maddell Radio & Manufacturing Co., has opened a factory at 65 East 61 St., Chicago, to manufacture and install radio receiving apparatus. Office address: 6128 Prairie Ave., Chicago.

Radio Products Corp. of America, Wilmington, Del., manufacture apparatus, \$5,000,000. (American Guaranty and Trust Co.)

Coffield Radio Equipment Co., Ellenville, \$20,000; J. S. Coffield, R. E. Xemerer, F. L. Flanagan. (Attorney, C. B. Murray, Ellenville, N. Y.)

Prima Radio Corp., Manhattan, \$15,000; N. L. Forrestal, W. Schilling, G. Klumpp. (Attorney, H. H. Oshrin, 1,476 Broadway, N. Y.)

Lowenstein Radio Phone Corp., Manhattan, 1,000 shares preferred stock, \$100 each; 4,000 common, no par value; active capital, \$100,000; M. and E. Lowenstein, M. R. Cusack. (Attorney J. C. Wait, 233 Broadway, N. Y.)

Penn Radio Co., Manhattan, \$10,000. W. Curtis, O. Mautner. (Attorney, S. D. Jones, 120 Broadway, N. Y.)

Radio Development & Mfg. Co., Manhattan, \$25,000; N. I. Kaplan, B. F. Isler, M. Ehrenreich. (Attorney, N. Schachner, 38 Park Row, N. Y.)

Wireless Improvement Co., Jersey City, N. J., radio apparatus, \$3,000. (Registrar & Transfer Co.)

## SPECIAL OFFER TO DEALERS

Write us for wonderful inducements in the following:

- Storage Batteries
- Insulators
- Dials
- Double Slide Tuners
- Galena Cups
- Loading Coils
- Mounted Galena
- Switch Knobs
- Fixed Condensers

### A DETECTOR THAT DETECTS

Write us about the complete detector which does away with the crystal. Always set. No fishing around for sensitive spots.

### Lexington Vulcanizing Co.

565 Lexington Ave., New York  
Phone—Plaza 1826

embraced every up-to-date device in the operation of the new science. It was particularly noticed, at every exhibitor's booth, that eager enthusiasts asked innumerable questions

## LISTEN IN PHONES

Retail at Factory Prices.

Enjoy your Radio Concert with Century Specialty Phone. Absolute Satisfaction Guaranteed or Money Refunded.



PRICE \$5.85

### Immediate Delivery

Three reasons why we highly recommend these phones.

1. Highest quality of material used throughout.
2. Highly sensitive, matched tone.
3. Well built to stand hard service, easily adjusted to head.

ORDER DIRECT.

## CENTURY SPECIALTY COMPANY

1221 Pennsylvania Ave., Washington, D. C.

## REAL LOUD SPEAKER 50c

Designed to amplify the vibrations produced in a head-set receiver by attaching our special HOOKED DIAPHRAGM to the phonograph reproducer same as a needle, a feature no other radio attachment does.

We all know how wonderful a phonograph reproducer is when it magnifies minute hairlines (so many in a record that it feels smooth) to the loud, clear sounds we all wonder at. Now attach a radio receiver, already loud enough to be audible to the human ear, and magnify these vibrations through the same process that is used with the record and phonograph.

DEALERS—WRITE FOR PROPOSITION

Mailed, postpaid, 50 cents  
State head-set used

### C. RADIO JACK

158 Fulton St., New York City

|   |                         |
|---|-------------------------|
| Westinghouse, Jr. ....                    | \$25.00                 |
| Radio Panel 7x18 .....                    | 2.25                    |
| Double Slide Tuning Coils .....           | \$3.00 and 3.75         |
| De Forest Sockets .....                   | \$1.00. Metal .90       |
| Fixed Condensers .....                    | \$0.75 and .95          |
| Mesco Head Phones, 2,000-ohms .....       | 6.00                    |
| Everett Head Phones, 3,000-ohms .....     | 8.50                    |
| Federal Head Phones, 2,200-ohms .....     | 8.00                    |
| Daveau Gold Seal Phones, 2,200-ohms ..... | 8.00                    |
| Western Electric Phones, 2,200-ohms ..... | 15.00                   |
| Daveau Jacks, .....                       | \$0.70, \$0.85 and 1.00 |
| Universal Bakelite Rheostats .....        | 1.00                    |

## UNIVERSAL RADIO COMPANY

355 E. 149th Street, New York City

## New York's Radio Show

AS we go to press, the first radio show held in the city of New York in the 71st Regiment Armory, is in full blast. This is the largest radio exhibition ever assembled in the United States. It attracted unusual crowds—in fact, as much interest as if it were a successful theatrical hit. Dealers were present from all over the country. The array of apparatus

## HOW CAN I ENJOY RADIO at home?

What is the best way for me to listen to the daily concerts, news, government reports, sporting results, etc.? What kind of set will I need? How shall I put up my aerial? Just what are the different pieces of apparatus for?

Lefax Radio Handbook is the one recognized authority where you can get dependable information on every phase of radio. Whether you buy a complete outfit or make it yourself, Lefax will explain just how it works and how you can change it to get best results under varying conditions.

The authors are the heads of the United States Bureau of Standards Radio Laboratory! Lefax knows all—tells how—and never grows old! New events, new developments, will be covered as fast as they happen on new sheets sent FREE to every owner up till July 1st, 1923. Get your handbook now for a full year of Lefax service free! Order a copy from your dealer or send \$3.50 direct to

LEFAX, Inc., 157C South Ninth Street, Philadelphia, Pa.

**Lefax** \$3.50  
LOOSE-LEAF FACTS  
RADIO HANDBOOK



## The Radio Builder

### Complete Knockdown Radio Receiving Set

A wonderful little radio set that performs as well as the more expensive ones. Complete with aerial, coil, detector, wires, binding posts, etc. Easy to set up—easy to take apart and portable.

- 7 strand aerial wire, per hundred foot 71 cents.
- No. 14 hard drawn copper wire, per hundred foot 49 cents.
- Ground switches, with porcelain base, 32 cents.
- Nickel plated binding posts, 4 cents.
- Bakelite head binding post, 8 cents.
- Aerial insulators, 20 cents.
- 3 16" sliders, 15 cents.
- 23-plate variable condensers, \$2.95.
- 43-plate variable condensers, \$3.85.
- Mica phone and grid condensers, 35 cents.

All makes of phones at 50c. below the regular price.

Large Discounts to Live Dealers.

**LIBERTY RADIO CO.**  
106 Liberty St. New York City

# RADIO WORLD

PUBLISHED EVERY WEDNESDAY (Dated SATURDAY OF SAME WEEK)  
 FROM PUBLICATION OFFICE, 1493 BROADWAY, NEW YORK, N. Y.—PHONE, BRYANT 4786  
 BY RADIO WORLD COMPANY

ROLAND BURKE HENNESSY, Editor and Proprietor . . . . . 1493 Broadway, New York  
 FRED S. CLARK, Manager . . . . . 1493 Broadway, New York

ASSOCIATE EDITORS:  
 ROBERT MACKAY . . . . . FRED CHAS. EHLERT  
 CENTRAL-WESTERN ADVERTISING REPRESENTATIVES:  
 W. B. ZIFF CO., 608 S. Dearborn St., Chicago.

### SUBSCRIPTION RATES

Fifteen cents a copy. \$6.00 a year. \$3.00 for six months. \$1.50 for three months.  
 Add \$1.00 a year extra for postage to Canada and foreign countries.  
 Receipt by new subscribers of the first copy of RADIO WORLD mailed to them after sending in their order, is automatic acknowledgment of their subscription order and payment therefor.

### ADVERTISING INFORMATION

#### MECHANICAL REQUIREMENTS:

Size of page: 12 inches deep—9 inches wide.  
 Size of type page: 10½ inches deep—7¼ inches wide.  
 Three columns, 147 lines each—441 lines to the page.

#### CUTS:

All plates should be mounted. We can use screens up to and including 133. We prefer 120 screen half-tone. We cannot use matrices.

#### ADVERTISING RATES:

One page: One time—\$150.00.  
 Half, Quarter, Third and Two-thirds pages at proportional rates.  
 One inch, one time—\$5.00. Per agate line, \$0.40.  
 On four consecutive issues, 10% discount.  
 On thirteen consecutive issues, 15% discount.  
 Terms: 30 days Net. 2% 10 days.

#### CLASSIFIED ADVERTISEMENTS:

Five cents per word. Minimum, 10 words. Discount of 10% on 4 consecutive issues—15% on thirteen consecutive issues. Cash with order.

Cover and preferred position rates made known on application  
 Entered as second-class matter, March 28, 1922, at the Post Office at New York, New York, under the act of March 3, 1879.

#### IMPORTANT NOTICE:

While every possible care is taken to state correctly matters of fact and opinion in technical and general writings covering the radio field, and every line printed is gone over with a scrupulous regard for the facts, the publisher hereby disclaims any responsibility for statements regarding questions of patents, priority of claims, the proper working out of technical problems, or other matters that may be printed in good faith and on information furnished by those supposed to be trustworthy. This statement is made in good faith and to save time and controversy over matters which the publisher cannot possibly have control.

## FOR IMMEDIATE DELIVERY

We offer the following items of our own manufacture.

### Variable and Fixed Condensers.

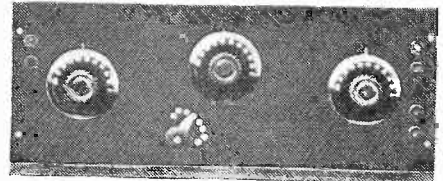
Mounted Crystals. Crystal Detectors.  
 Distributors for—Grebe, De Forrest, Federal, Acme, Thordarson, Fada.

WHOLESALE ONLY—LARGE STOCKS  
**RADIO SHOP of NEWARK**

(Telephone Market 9607)  
 41½ SOUTH ORANGE AVE.  
 NEWARK, N. J.

Dealers: Forward Your Inquiries Promptly

## The HI-GEE RADIO CONCERT RECEIVER Price, \$29.50



The above instrument comes to you completely assembled, ready to wire; all parts mounted on genuine Formica Panel, set in quartered oak cabinet with hinged cover. Panel is properly shielded so that no "body effects" are experienced with this instrument. This is truly a HI-GEE quality instrument consisting of two variometers, one variocoupler, socket and rheostat. (Rheostat not shown in above cut).

IMMEDIATE SHIPMENTS. PREPAID.  
 Our catalogue is ready for distribution—send for your copy NOW.

**HI-GEE RADIO MFG. CO.**  
 Marion, Illinois

## HAYNES RADIO EQUIPMENT

Come to the exclusive radio shop for tested and proven efficient radio equipment and be assured complete satisfaction and honest values.

The HAYNES RADIO Shop  
 629 Lexington Ave., New York  
 At 54th Street Plaza 6801

## Radio Set Complete

Enjoy daily concerts, weather crop and sporting news.

Complete Outfit **\$12.75**  
 Including 2,000-ohm Phones  
 Immediate Shipment

Can be installed in 30 minutes by any one.

Full instructions with each set.  
 Send check or money order to.

**F. L. MARVIN & CO.**  
 2908 Woolworth Bldg., New York  
 Selling Agents Wanted

## Boston College Dean Has Radio in Office



(c. Underwood & Underwood)

Miss Marcia Godfrey (seated) and Miss Lucille Eldridge listening in on the newly installed radio set in the office of the dean of the College of Secretarial Science at Boston University.

## Keeps Them Hot

Si Jones for the first time on board a ship of the Navy is being shown around by an officer friend of his. Upon entering the radio room, he is being told of the wonders performed by wireless.

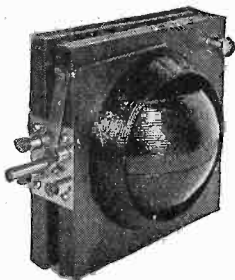
Si—"Gosh dang, but this is a wonderful arrangement." (Then turning to operator, who is busy copying a message) "What do you wear those funny things on your ears for?"

Radio "op" who is tired of listening to his foolish questions—"You see I am receiving a message from Alaska and as it is very cold up there I am wearing these to keep my ears from freezing."—"News," New York.

Subscription for Radio World, \$6.00 a year, \$3.00 six months, \$1.50 three months.

## DEPENDABLE

# TESCO LINE



Unmounted  
 \$6.50

Panel Mounted  
 \$8.50

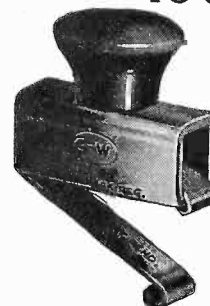
No. 41 Precision Variometer  
 Mail Orders Filled From Stock  
 DEALERS: Write for Bulletin, R-10  
 Manufactured by

**The Eastern Specialty Co.**  
 3551 N. 5th St., Philadelphia, Pa.

Fifty-two issues for \$6.00. Sub-Department, Radio World, 1493 Broadway, N. Y. C.

## KNOWN FROM COAST TO COAST

### G - W SLIDERS



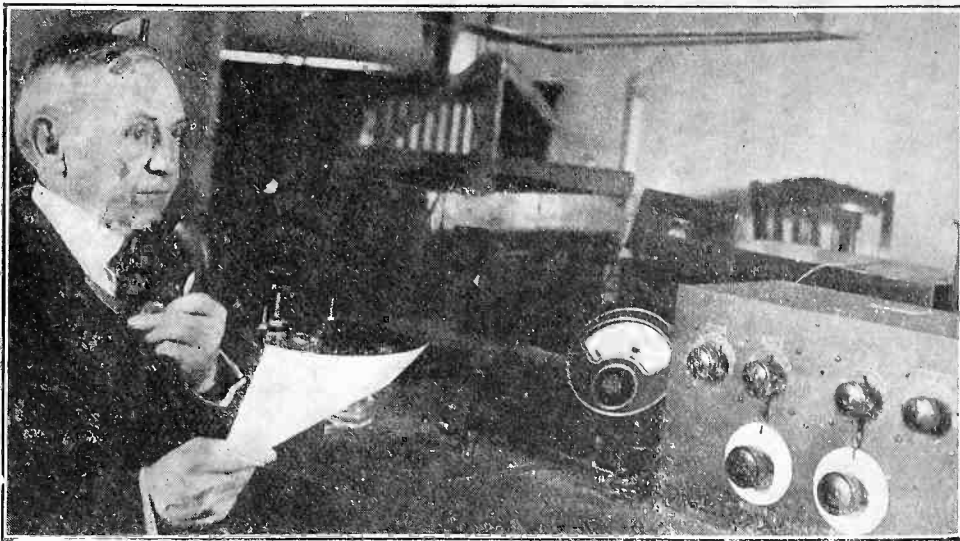
Advertised and sold all over the country because it is Absolutely the Best Slider. Slides easily. Cannot cut or damage wire. Makes perfect electrical contacts. For better tuning, insist upon G-W Sliders. They cost no more.

HIGHLY POLISHED BRASS  
 3/16" 25c, 1/4" 30c

Ask for G-W Slider Rods  
**GEHMAN & WEINERT**  
 42 Walnut St. Newark, I. J.



## Seeks Many Hearers With Speech by Radio



(c. Underwood & Underwood)

William Lowe Bryan, president of Indiana University, on a trip to Washington in the interests of the million-dollar drive for a memorial for soldiers to be built on the university grounds, unable to visit all the cities that he wished, broadcast a speech from Washington which was distinctly heard in his own State.

### New Kansas City Station

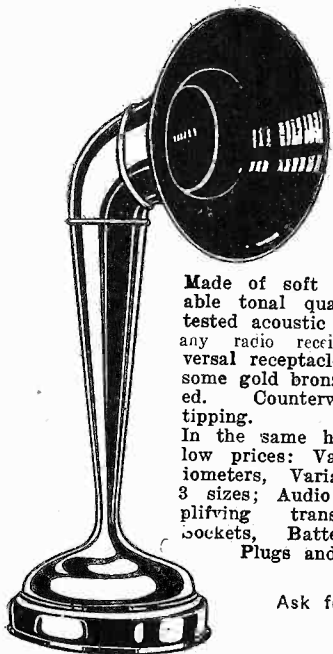
One of the largest inland stations in the United States has just been erected by the Sweeney Automobile School, Kansas City, Mo. The aerials are 325 feet high and the station is equipped at a total cost of \$20,000. An interesting feature is that the call is WHB, known for years to all ships at sea. Concerts will be broadcast at 316-meter length, and market and weather reports from the government at 485 wavelength.

The range of this station covers the whole United States and the power is displayed from a 500-watts W-E set.

Mr. Sweeney has also installed a sound-proof studio where concerts will be rendered. Arrangements are being made to install a pipe organ.

Get RADIO WORLD regularly every week. Order your newsdealer to save you a copy or subscribe direct or through newsdealers; \$6 a year, \$3 for six months, \$1.50 for three months.—(Adv.)

### S-C LOUD SPEAKER HORN



Delivered at  
any door in  
U. S. for  
**\$7.50**

Largest value  
on the market.  
22½" high  
with 8 3-16"  
bell.

Made of soft brass of remarkable tonal quality, on correct, tested acoustic principles. Takes any radio receiver in large universal receptacle in base. Handsome gold bronze finish, lacquered. Counterweight prevents tipping.  
In the same high quality with low prices: Variocouplers, Variometers, Variable Condensers, 3 sizes; Audio Frequency Amplifying transformers, Tube sockets, Batteries, Telephone Plugs and Jacks.

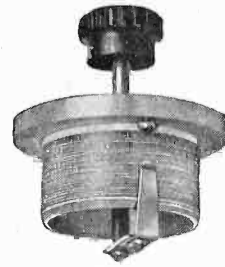
Ask for Bulletin R.

SOUTHERN CEDAR PRODUCTS CO.  
1263 NICHOLAS BLDG. TOLEDO, OHIO

RADIO INVENTIONS  
and other ideas promptly  
patented by reliable  
Patent Attorneys &  
Engineers. Call or  
write. FREE ADVICE.

ASK  
FOR  
MANUFACTURERS  
PATENT CO.  
520 FIFTH AVE.  
NEW YORK

### The Ajax All Vernier Rheostat (Patent pending)



10,000 Adjustments

The Ideal rheostat for fine control of Amplifier and Detector Tubes. Aluminum Base. Asbestos Insulation.

2amp. .7ohm. 2¼ in. base,  
\$1.75 postpaid.

4amp. .7ohm. 3¼ in. base,  
\$2.00 postpaid.

Buy from your dealer or send to  
PHILLIPS MCH. CO., 28 Newberne St.,  
West Somerville, Mass., Mfgs.  
or AJAX ELECTRIC CO., Palmer St.,  
Cambridge 38 Mass.

# \$15 Radio \$15 Batteries

Our "A" batteries for radio work are unexcelled.  
Unconditional guarantee for one year.

If your battery fails within this time we will replace it  
with a new one free of charge.

Out of town orders must be accompanied by money order.

## Liberty Storage Battery Co.

334 N. 15th Street, Philadelphia, Pa.

## INSULATION!!!

### BINDING POSTS and KNOBS

### for Radio Apparatus and Appliances

Made in every conceivable shape and design—with or without trade mark or initial as desired.

PRICES UNUSUALLY REASONABLE  
DELIVERIES UNUSUALLY PROMPT

Estimates cheerfully furnished on special shapes and sizes.

## JANEWAY INSULATION CO.

Specialists in Radio Insulation

NEW BRUNSWICK,

NEW JERSEY

### Answers to Readers

WHICH radiophone is the best to use to hear Chicago and Pittsburgh, and what kind do I need? With a 31-volt home electric-light plant, can I use three cells of my batteries in place of the regular storage batteries that come with a radiophone.—D. S. Ockerman, Scio, N. Y.

There are a number of high-class receivers on the market that will receive music and speech from the stations you mention, but it must be a detector tube with a two or three-stage amplifier. You may use any three of your storage cells for lighting your filaments, but suggest that you switch batteries, using a different unit. This will keep your batteries so that no set will be discharged below the others. As a rule, batteries never come with a radiophone set.

\* \* \*

Having read the article on honeycomb coils, by Fred. Chas. Ehlert, in RADIO WORLD, No. 4, dated April 22, I am interested in building a one-step amplifier and, later, a two-step amplifying set. Please enlighten me regarding the hook-up and other matters.—Theo. F. Schuetze, New Britain, Conn.

Read the article by George W. May, R. E., on how to make a two-step amplifier, in RADIO WORLD No. 9, dated May 27. We advise you to build a two-step as, no doubt, you will want it after you have seen the results produced by a one-step.

\* \* \*

I have a pair of so-called watch-case receivers, single pole. Can they be wound so as to give satisfactory results in connection with a good crystal set? If so, what size wire should be used?—C. C. Huntington, Mauch Chunk, Pa.

It would be inadvisable to attempt re-winding them, as a single-pole receiver would not respond to the weak signals, in fact, they would not have sufficient resistance. A pair of 2000-ohm receivers would work to a better advantage than a 75-ohm receiver, as in your case.

\* \* \*

I plan to purchase a set composed of two variometers, a detector tube, a grid condenser, batteries, rheostats, and phones. A friend says that I must have a variocoupler for tuning various wave lengths.—Theodore F. Fehlardt, Ripon, Wis.

You need all of the parts you mention, including a variocoupler. Read George W. May's article, in this issue, on short-wave regenerative receivers.

\* \* \*

I intend purchasing a Clapp-Eastham type H. R., regenerative set. I live in an apartment house and find it inconvenient to erect an outdoor antenna. What necessary indoor antenna and accessory apparatus may I use in order to get the maximum efficiency from the outfit?—David Altman, New York City.

For an indoor aerial you will need some steps of radio frequency. In RADIO WORLD, No. 7, dated May 13, we published an article by George W. May, and another article by Harold S. Potter, in No. 6, dated May 6, both of which will give you valuable and lengthy information.

\* \* \*

I have a crystal set and frequently hear 9 DGW coming in. Where is this station located?—Edward Rooke, St. Paul, Minn.

9 DGW is the station of F. M. Ende, Fort Riley, Kansas.

\* \* \*

Will an audion tube-detector, work satisfactorily in place of a crystal in the circuit I submit? If not would you mind submitting one that would?—W. E. L., Detroit, Mich.

Your circuit is drawn correctly, but advise you to insert a rheostat in series with the filament lighting-battery. Your batteries are termed wrong. They should be vice-versa.

### SPECIAL!

|                                     |           |
|-------------------------------------|-----------|
| Brach outdoor Lightning Arresters.. | \$2.50    |
| Brach indoor Lightning Arresters..  | 2.10      |
| Arkay loud speaker Horns .....      | 4.00      |
| King Amplitone Horns .....          | 10.50     |
| 23-plate Condensers .....           | 2.25      |
| 43-plate Condensers .....           | 2.75      |
| V. T. Sockets .....                 | .50       |
| Large Bakelite Binding Posts .....  | .08       |
| Nickel Binding Posts .....          | .03       |
| 3-INCH DIALS .....                  | .55       |
| Grid leak Condensers .....          | .26       |
| Phone Condensers .....              | .20       |
| VARIOMETERS .....                   | 4.50      |
| VARIOCOUPERS .....                  | 4.00      |
| Switch Points .....                 | 6 for .10 |
| Insulators .....                    | .01       |
| Solderal .....                      | .22       |
| 3,000-ohms Phones, standard make..  | 6.00      |
| 3,000-ohms Phones, standard make..  | 8.00      |
| 2,200-ohms Phones, standard make..  | 7.50      |
| 2,000-ohms Phones, standard make..  | 7.50      |
| 2,000-ohms Phones, standard make..  | 6.90      |
| 6x12—XX Bakelite Panels.....        | 1.55      |

All for immediate delivery.  
Mail Orders promptly filled C. O. D.  
If you are interested in any items not listed here write us for prices.

SEND YOUR NAME AND ADDRESS and receive weekly copy of "SPARKS," containing program and list of broadcasting stations.

### THE RADIO SHACK

Wholesale Retail  
Longacre 7079 ..... 419 W. 42nd Street  
NEW YORK CITY

### SO MANY READERS ARE

disappointed in not receiving their copies of RADIO WORLD on the newsstands regularly, from week to week—due to early selling out by dealers—that we suggest that you place a standing order with your newsman. Ask him to save you a copy of every issue.

OR, BETTER STILL, subscribe \$6.00 a year; \$3.00 for six months; \$1.50 for three months; either direct or through your newsdealer, who will forward your subscription to us.

RADIO WORLD CO.  
1493 Broadway, New York City  
(Adv.)

Subscribe direct or through your news dealer. \$6.00 a year, \$3.00 six months, \$1.50 three months. Radio World, 1493 Broadway, N. Y. C.

"How to Make the Vacuum Tube Wireless Receiving Set, Detector and Two-Stage Amplifier Sets. 50 Cents.  
Amplifier Sets. .... 50 Cents.  
Dealers, send trial order, 12 copies. \$4.00.  
"How to make your own Wireless Receiving Set. .... 25 Cents.  
Trial order 12 copies. .... \$2.00.

### ARDWAY BOOKSTORE SEATTLE, WASH.

### RADIO Blue Prints FREE

Price list of supplies and complete sets. Parts listed on blue prints. Special inducements to dealers.

### American Radio Mfg. Co. Dept. E

223 Admiral Blvd., Kansas City, Mo.

Subscribe direct or through your news dealer. \$6.00 a year, \$3.00 six months, \$1.50 three months. Radio World, 1493 Broadway, N. Y. C.

### Protect Your Home and Set JACOBUS VACUUM

#### Aerial Protector

Approved by Underwriters to Replace Ground Switch.



The Way Your Telephone Line is Protected.

Type J. S. W.

#### Protection from the Inside

Automatic safety features of the JACOBUS permit inside installation—just the same as for the protector on your telephone line.

#### No Ground Switch Required

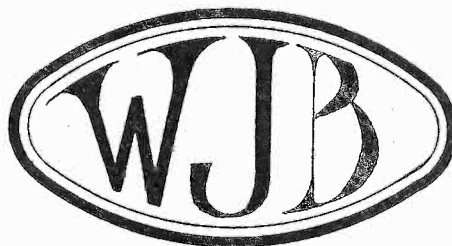
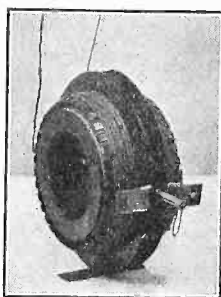
Carries off all static and lightning automatically without damage to itself or interference with your set. Protection every minute of the day and night.

\$2.00 at your dealers

Dealers Write for Discounts.

### Apex Electrical Specialty Co., Inc.

77 ORANGE ST., NEWARK, N. J.



## VARIOMETERS and VARIOCOUPERS

OF THE BETTER KIND

VARIOMETER  
PANEL TYPE, \$5.50

VARIOCOUPLER  
PANEL TYPE, \$5.50

Discount in quantities, 175-600 meters.

## WARREN J. BAUMAN CO.

LOCK HAVEN, PA.

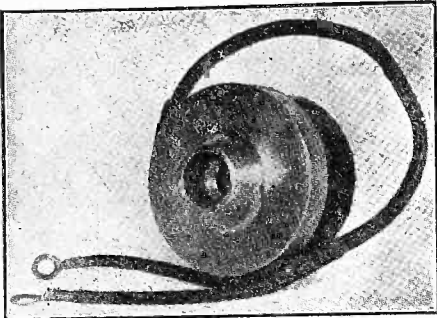
## MAKE MONEY AT HOME

You can earn from \$1 to \$2 an hour in your spare time writing show cards. Quickly and easily learned by our new, simple "Instructograph" method. No canvassing or soliciting; we teach you how, guarantee you steady work at home no matter where you live, and pay you cash each week.

Full particulars and Booklet free.

### American Show Card School

41 Ryrie Building Toronto, Can.



## Phone Adapter

Make a loud speaker of your Phonograph by using the "Phone-Adaptor," a Scientific Device which can be used with any make of Radio Head-Phones or Phonograph.

Made from a nickel aluminum alloy highly polished to match the fittings of most expensive instruments.

In ordering be sure to specify make of Head-Phones and Phonograph you have. Immediate delivery anywhere. Satisfaction guaranteed. Price \$1.00 postpaid.

Special discount to dealers in dozen or gross lots.

SEND FOR YOURS NOW

**Harry D. Cromer, Agent**  
30 CHURCH STREET  
Room 919, New York City

## A Thousand Miles at Sea, Talking to Land



(c. Underwood & Underwood)

Radiophone operator of the ocean liner, "America," talking to E. F. W. Alexander, chief engineer of the Radio Corporation of America, at the Engineers' Club, New York. The vessel was a thousand miles at sea when this conversation took place. This established a record for distance in the use of the duplex transmitter for simultaneous sending and receiving.

## KEYSTONE VARIABLE CONDENSERS

21 Plate  
\$3.55

43 Plate  
\$4.50

Our selection of materials and built-up type design give assurance of low energy loss and high efficiency.

Agents and Jobbers write for information.

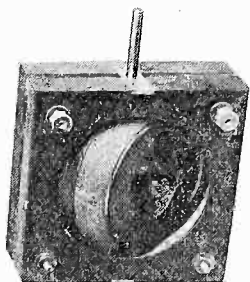
## KEYSTONE MOTOR COMPANY

OAKS, MONTG. CO., PA.

## S-U-P-E-R-I-O-R

### Variometer Model XXX

Positive spring contact on Rotor Shaft overcoming the annoying click of loose bearings. Polished, seasoned Mahogany, insuring against warping and shrinking. Windings are treated with a special insulating compound. Thumb screws on terminals. Price, each, \$4.50.



### Vario-coupler Model K

Wound with No. 20 D.C.C. copper wire on the outside primary in two groups, seven taps, eight turns apart, and seven taps single turns apart. And is treated with a special insulating compound. Bearings are self-aligning with positive contact throughout its 360 degrees rotation. Price, each, \$4.00.

DISCOUNTS TO JOBBERS AND DEALERS  
**SUPERIOR RADIO EQUIPMENT CO., Inc.**

Manufacturers  
OFFICES: 217 W. 125th ST., NEW YORK CITY  
Awarded the EVENING MAIL Certificate of Excellence.

## Coming Events

MILO E. WESTBROOKE RADIO SHOW.—Leiter Building, Chicago, June 25 to July 1.

FIRST CENTRAL WEST RADIO SHOW.—Auditorium, Milwaukee, Wis. Week of June 21.

SPRINGFIELD RADIO EXPOSITION, Springfield, Mass. Under auspices of Springfield, Mass., "Daily Union." June 19, 20, 21. J. P. O'Connor, managing director.

CHICAGO RADIO SHOW, Coliseum, Chicago, Ill., October 14 to 22. U. J. Hermann, managing director, 549 McCormick Building.

CHIEF JUSTICE TAFT'S YALE ALUMNI ADDRESS will be broadcast from the U. S. Naval stations at Anacostia, D. C., and Arlington, Va., June 2. Justice Taft will speak from his home at 9 p. m.

## RADIO WILL MAKE YOU MONEY

Well known established concern manufacturing WIRELESS specialties offers investors an opportunity to participate in big profits to be made in the WIRELESS INDUSTRY EXPANDING BUSINESS. Not a promotion.

**ALL CAPITAL STOCK—**  
**No preferred shares or bonds**  
**Price Advancing Rapidly**

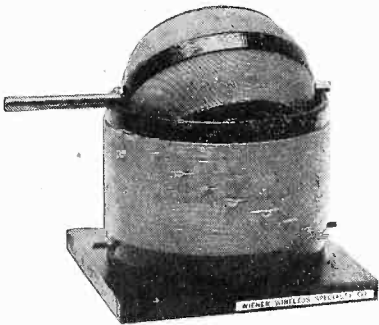
Factory, offices and demonstrating rooms, Testimonials open for inspection. Strictest investigation invited. Call or write for information.

**G. BOISSONNAULT CO.**

26 Cortlandt St., New York.

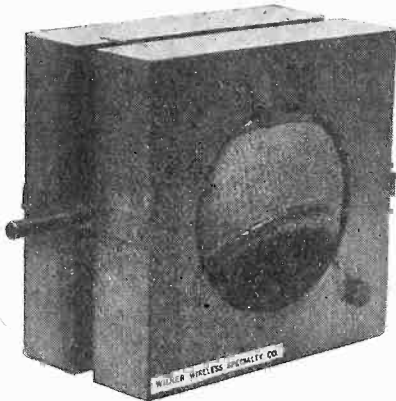


Up-to-the-minute  
**POPULAR  
SELLERS**



The "Wiener-made" Standard Variocoupler

Price, \$4.50 Each  
— A N D —



The "Wiener-made" Standard Variometer

Price, \$5.00 Each

Our standard variocoupler and variometer here illustrated, are not only attractive in appearance but are manufactured of the best material and in accordance with rigid engineering specifications, in our own factory by competent craftsmen. Each and every unit is carefully examined and tested before shipment assuring uniformity of quality and product.

Our "Induction Units" department in which these variocouplers and variometers are made has been liberally increased in size so that we can assure prompt shipments in any quantity.

**"Every Customer On Our Books  
Must Be A Pleased Customer"**  
This is our aim and policy.

We are also manufacturers and distributors of "Nerco" 2,200-ohm phones, crystal detectors, variable condensers, fixed condensers, dials, knobs, rheostats, binding posts, galena cups, lever contact switches, switch contact points, insulators, magnet wire, tuning coils equipped with two sliders, V. T. sockets, and complete outfits—**THE "WIENER" LINE IS A COMPLETE LINE.**

Liberal Discounts to the Trade.

**WIENER WIRELESS  
Specialty Company**  
21 ACADEMY ST.  
NEWARK NEW JERSEY

## Cup for Winner of Radio Speed



(c. Underwood & Underwood)

Theodore R. McElroy, of Somerville, Mass., who won the world's amateur championship in the wireless-code receiving contest at the Boston Radio Show, being presented with the championship cup by S. H. Fairbanks, manager of the show. Mr. McElroy received 51½ words a minute.

About the only way a girl can get her shape in the papers now is to invent a way to attach a radio outfit to her bathing suit.—"Evening Telegram," New York.

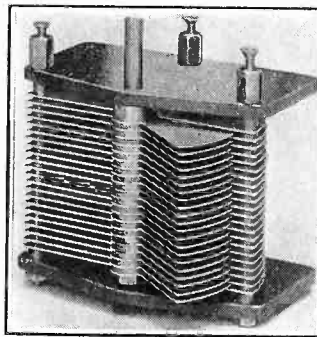
Now that the radiophone has provided the largest audiences ever known for the statesman's words of wisdom, is it too much to hope that he will give more attention to knowing what he is talking about?—Springfield, Mass., "Republican."



### RIGHT—ALL WAYS VARIABLE CONDENSERS

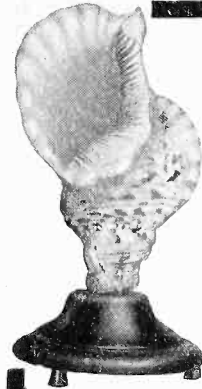
- 3 PLATE .....\$2.00
- 13 PLATE ..... 2.75
- 23 PLATE ..... 3.50
- 43 PLATE ..... 4.25

Absolutely Guaranteed



A condenser built for all times—not to satisfy abnormal demand. Heavy Plates, Turned Brass Washers, ¼-inch Brass Shaft, Genuine Bakelite Ends, Positive constant contact on rotary plate-self adjusting.

DEALERS—JOBBER  
We ARE making delivery.  
**Oidar Radio Mfg. Corp.**  
508 W. 55th St. New York City



## Sea Horn Loud Speakers

Nature's perfect amplifier. Positively the loudest amplifying horn offered.

**GENUINE SEA SHELLS.**

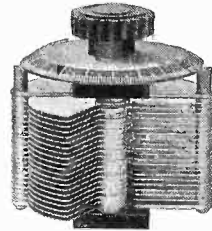
Mounted on rich mahogany finished bases complete with phone-clamp.

13 to 13¾ inches high, \$ 8.00

14 to 14¾ inches high, 12.00

15 to 16 inches high, 15.00

Our smallest shell will produce as much volume as other makes of large size speaker horns.



### PRECISION CONDENSERS

43 plate .....\$4.00

20 plate ..... 3.50

11 plate ..... 3.25

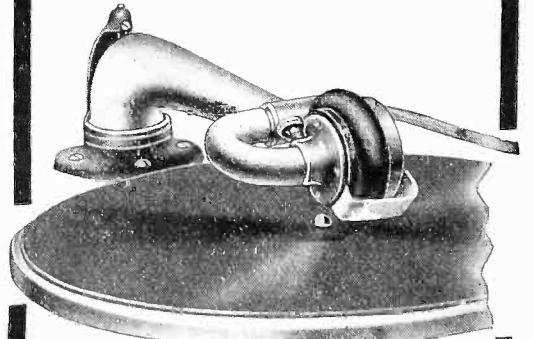
Above prices without dials.

3 inch dials .....\$0.85

### INDESTRUCTIBLE TUBE SOCKETS

May be used for either base or panel mountings.

No. 50. Tube sockets.....\$1.00



### USE YOUR PHONOGRAPH AS A LOUD SPEAKER

Our No. 51 phone clamp attaches your phone to the tone arm as shown in cut making your Phonograph a loud speaker.

No. 51. Phone clamp.....\$1.50

Mention make of phonograph with order.

**ALL ABOVE ARTICLES FOR  
IMMEDIATE SHIPMENT.  
DEALERS SEND FOR SPECIAL  
FOLDER.**

The  
**Oro-Tone Co.**

Mfrs. of Phonographs and  
Radio Equipment.

1010 George St., Chicago, Ill.

Money back if you are not satisfied.



HERE THEY ARE

**EBY**

BINDING  
POSTS



See them at your dealers

Corporal

Ensign "H"

H. H. EBY MFG. CO., PHILA., PA.

You will find many Special Values in our display advertisement in Radio World issue May 27 and June 10.

BEACON RADIO and ELEC. CO.  
246 Greenwich St., N. Y. C.

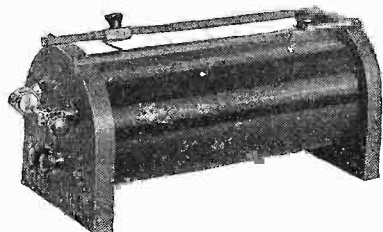
\$4.00 Ohms  
3000



IMMEDIATE DELIVERIES — POST PAID  
Audibility Unsurpassed—Money Back if Dissatisfied  
Antenna Wire 7 strand Tipped, 150 Ft., \$1.60  
TOWER MANUFACTURING COMPANY  
11 Station St., Brookline, Mass.

**JOBBERS — DEALERS**

Write for discounts on our  
"RELIANCE"  
TUNING COIL \$5.00  
CRYSTAL SET



Wound with No. 21 enameled wire on specially treated tubing, neat in appearance, efficient in receiving, has a range of 600 meters.

IMMEDIATE DELIVERY

We also manufacture:—

A small set at \$4.00

A 2 slide tuner at \$3.50

Unmounted coils in 3 sizes, 6x3, 8x3, 8x3½" at \$1.00, \$1.25 and \$1.50 respectively.

RELIANCE MFG. CO.

354 Mulberry St.

NEWARK NEW JERSEY

**F. M. C. RADIO PRODUCTS**

We are ready to make immediate deliveries of our "Guaranteed-to-Give-Satisfaction" F. M. C. Radio products.

The Music Box Crystal Set is superior in design and tone to anything in the market ..\$10.00

Post Phone Condenser ..... .70

Eyelet Condenser ..... .35

Tuning Coils, etc. .... 1.00

Eiseman Head Sets ..... 8.00

Mail orders promptly filled

Dealers, write for our proposition.

Our Name is Our Guarantee.

FORD MICA CO., Inc.

14 CHRISTOPHER STREET, N. Y.

**When the Noon Hour "Ticks"**



(Courtesy Kadel & Herbert News Service)

There is a wireless time-service in almost every country where radio is used which enables anyone equipped with a receiving set to get the correct time. In France, the time is sent out from the Eiffel Tower station daily. Here is a small wireless set no larger than a telephone receiver, on the back of which is mounted a multi-contact detector and a switch as well as the small spools containing the conducting cables and a condenser for changing the wave lengths.

GUARANTEED  
RADIO SETS & ACCESSORIES  
NORTHERN RADIO SUPPLY  
CO., Inc.

14-16 Church St., New York  
Mail orders promptly attended to.

**RADIO For Everybody**

Make radio a profession instead of a plaything. You can earn big money as a Radio-trician. Learn by mail, in spare time, how to design, construct, install, repair, maintain, operate, sell and demonstrate complete radio outfits. Write for free 32-page catalog describing our course entitled, "How to Learn Radio at Home." National Radio Institute, Dept. 1071, Washington, D. C.

The Best Chance You've Ever Had to Get Fine

**VARIABLE CONDENSERS**

At Popular Prices

11 PLATE, \$1.25

23 PLATE, \$1.75

Mounted with Bakelite, 25c. extra  
Guaranteed on Money Back Basis  
Orders Promptly Filled.

**RADER WIRELESS  
SPECIALTY CO.**

22 BEDFORD ST., NEWARK, N. J.

**RADIO**

"The Popular National Radio Journal"

All that its name implies  
Get a copy from your radio dealer or  
news stand today—20c.

PUBLISHED BY

Pacific Radio Pub. Co., Inc.

Pacific Bldg., San Francisco

**De FOREST**

"Synonymous for good Radio Equipment all over the World"



Radio instruments are among the most scientific of all instruments and their manufacture requires not only mechanical skill, but scientific knowledge and appreciation of delicate and intricate instruments. De Forest radio apparatus for amateur, commercial and laboratory use has long been recognized by scientists, engineers and operators as the finest in the world. No attempt has ever been made to meet price competition, our aim having been to provide the radio man with instruments and apparatus which would give efficient, dependable service under the exacting conditions which radio communication has to meet with.

Broadcasting brought about a tremendous demand for radio receiving equipment. Apparatus had to be developed suitable for use

by Mr. Average Citizen and his family and production had to reach huge figures almost overnight. Yet in spite of the demand for sets, sets, more sets, we adhere to our policy of the past Decade: Every set manufactured by us is made of the best materials, carefully and accurately constructed and is thoroughly tested before leaving our laboratory.

**The Everyman Receiver**

A simple, easily adjusted, crystal detector receiving set in a handsome walnut finished cabinet, complete with receivers at \$25.

**Radiohome Receiver**

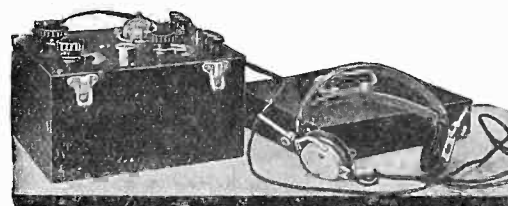
A De Forest radiophone with a vacuum tube detector at \$36. Antenna, phones, batteries and vacuum tube bring the total cost to about \$75.

**DT-800 Amplifier**

A two-stage amplifier in cabinet identical with those of the Everyman and Radiohome and giving signal strength sufficient to operate a horn. \$35.

**Interpanel MR-6 Receiver**

A set unsurpassed in appearance, efficiency and dependability and having a highly selective tuning system with 150-25,000 meter wavelength range. Price, \$112.



De FOREST RADIO TEL. & TEL. CO.

JERSEY CITY, N. J.

# RADIO WORLD'S QUICK-ACTION CLASSIFIED ADS

This department is intended for everybody who wants quick action on short announcements covering the buying, selling, exchanging or general merchandising in the radio field. Readers of RADIO WORLD will find that it pays to read these columns every week. Advertisers will get a ten-day service here—that is, copy received for this department will appear in RADIO WORLD on the news-stands ten days after copy reaching us.

The rate for this RADIO WORLD QUICK ACTION CLASSIFIED AD. DEPT. is 5c. per word (minimum of 10 words, including address), 10% discount for 4 consecutive insertions, 15% for 13 consecutive insertions (3 months). Changes will be made in standing classified ads., if copy is received at this office before 4 P. M. on any second Tuesday preceding date of publication. RADIO WORLD CO., 1493 Broadway, New York City. (Phone, Bryant 4796.)

**SAVE MONEY**—Supersensitive galena quarter pound, 55c., half pound, \$1.00. Big sample, 30c. Streiff, 73 Flatbush Ave., Brooklyn, N. Y.

**BOOK**—How to Build the Home Radiophone. Send ten cents—Radio Service Institute, U. S. S. Bank Building, Washington D. C.

**VARIABLE CONDENSERS**, 23 plate, .0005 M. F. Panel type, accurately made and adjusted, big value, \$3.00, postpaid. Zeunert Co., 1752 N. Park Ave., Chicago, Ill.

**Big Money and Fast Sales**—Every owner buys Gold Initials for his auto. You charge \$1.50; make \$1.35. Ten orders daily easy. Write for particulars and free samples. American Monogram Co., Dept. 198 East Orange, N. J.

**Crystal Set That Gets Radio Concerts. Build it right boys.** Plans and full instructions for building at low cost, high grade fine adjustable Crystal Receiving Set, fifty cents postpaid. Dept. R. D. Shaw Mfg. Co., Galesburg, Kans.

**INSULATORS FOR AERIALS**—Support your antennae properly. Prevent current leaks. Our antennae insulators are of hard glazed porcelain, the ideal insulating material. Made to withstand a pull of 2,200 pounds. Light, strong, inexpensive. Write for samples and full information. THE FEDERAL PORCELAIN CO., Carey, Ohio.

**LOFT FOR RENT**—124 East 14th Street. Immediate possession. For terms, apply L. B. Schindler Co., 148 Duane St., N. Y. C.

### MAGNAVOXES

Type R-3. Immediate shipment from stock. Aeriolian Co., Bethlehem, Pennsylvania.

**WANTED**—A second hand Omnigraph with Morse Code Records. Must be in good working order and cheap. Russell Traymore, Box 201, East Pittsburgh, Pa.

**GUS KLEIN AND C. V. ROSS** will be in charge of the new and larger store which E. Klein & Bros. have opened at 34 Park Place, New York, to be known as Klein's Radio and Electric Supply Co. Prompt attention will be paid to local and mail orders, wholesale and retail.

**THE WHOLESALE RADIO EQUIPMENT CO.**, 24 William St., Newark, N. J., a co-partnership, Bernard Miller, president of the Economy Auto Supply Co., Newark, N. J., and Mortimer Salzman. This company intends to deal in complete radio sets and parts as distributors. Mr. Salzman advises that \$16,000 is in the treasury and an additional \$20,000 is available when wanted.

**"MIRACLE"**

RECEIVING SET **\$25**



**Complete with Double Head Phones**

Also Copper Antenna Lead Wire, Ground Wire, Insulators and all the necessary parts that will enable you to hear everything within a range of from 25 to 50 miles. Also included is a radio text-book with complete instructions and valuable charts.

SHIPPED PARCEL POST INSURED UPON RECEIPT OF MONEY ORDER OR CHECK

**Metro Mail Order Co.**  
358 Fifth Avenue, New York City

**Send for a "Miracle" to-day**

### New Army Radio Stations

Two United States Army radio stations have been added to the Signal Corps radio net; one at Jefferson Barracks, Missouri, and the other at Fort Leavenworth, Kansas.

**Batteries for Radio.** Guaranteed two years, full eighty ampere hour capacity, \$16.35. All orders filled day received. Peterson Battery & Radio Service, Detroit, Minnesota.

**Loudspeaker Attachments** (rubber) fit victrola, etc., \$0.40 prepaid. Two-step Amplifier, complete with Baldwin Loudspeaker, \$45.00. Max Veneske, Troy, Pa.

**LOOK**—While they last, new UV-201 Radiotrons, \$5.50. Federal Phones, \$7.00. Kellog, \$9.00. 43-plate Panel Mounting Variable Condensers, \$4.00. 23-plate, \$3.50. Fada Switches, \$0.40 Rheostats, \$0.85. Acme Amplifying Transformers, \$4.25. General Radio, \$4.25. Federal, \$6.25. Order NOW. Russell Hall, North Ave., Washington, Pa.

**Guaranteed Ganaerite Crystals** exceptionally sensitive. Mounted Crystals, \$0.50, postpaid. Special discounts to dealers. Haigh, Chapin & Co., Box 178, Cranford, New Jersey.

**50 Clapp Eastham Regenerative Sets** and some H. Z. Audio Frequency Amplifiers. All brand new and latest models. My price is less than others, ask and there is no mistake about quality. Get your order in before supply is exhausted. Mayport Radio Co., Mayport, Penna.

**Immediate Delivery**—Radiotron UV-201 Amplifier Tubes, \$6.50. Kellog, 2,400-ohm Phones (special), \$10.00. Nickel Plated Switch Points, dozen, \$0.36. Switch Stops, \$0.05. Switch levers, 1" or 1 1/4" radius, \$0.50. Attractive Binding Posts, \$0.10. Detector Cups, \$0.20, postpaid. C. Chamberlain, Berea, Ohio.

**PATENTS**—Electrical cases our specialty. Pre-war charges. B. P. Fishburne, Registered Patent Lawyer, 386 McGill Bldg., Washington, D. C.

## First Radio Dog Story

An Airedale terrier in the receiving room of the University of Kentucky, one night, recently, heard his owner, F. Paul Anderson, dean of the University, call him from



(c. Wide World Photos)

The new "His Master's Voice."

the Westinghouse station at Pittsburgh, Pa. "Jerry" was asleep when his master's voice came in. He jumped to his feet, wagged his tail, and cavorted before the set.

## Books Received

M. B. Sleeper. "Radio Hook-ups." 1920. Norman W. Henley Publishing Co., 2 West 45th St., New York.

P. E. Edelman. "Experimental Wireless Stations." 1920. Norman W. Henley Publishing Co., 2 West 45th St., New York.

A. C. Lescarbourea. "Radio For Everybody." 1922. Scientific American Publishing Co., 233 Broadway, New York.

**Complete Crystal Receiver** including Phones, \$20.00. Gilbert Rich, Sharon, Mass.

**Use Your Electric Lights for Aerial**, buy Wolverine Aerial Plug, \$3.50. All radio goods carried. Money back guarantee. Write, L. M. Emery, Lyndonville, Vt.

**Radio Crystals, Cube Galena, Steel Galena and Pyrite Crystals.** These minerals have been tested and guaranteed extra sensitive. Ounce, 25c. Pound, \$2.00. Special prices to dealers. The Western Research Corp., 516 18th St., Denver, Colo.

**Enclose Self-addressed Envelope** and receive free bulletin of various designs from which you may build your own Receiver from our blueprints. The blueprints show full constructional details, wiring diagram, bill of material and necessary data and we guarantee the performance of the model. Price of blueprints varies as to subject desired. Ask for bulletin No. 349. Experimenters Information Service, 220 West 42nd St., New York City.

**We Manufacture All Radio Parts** in large quantities. Logan Machine Co., 222 South Clinton St., Chicago, Ill.

**Radio Cabinets**—Parcel Post, Prepaid. Made of seasoned wood, stained beautiful walnut or mahogany. Front rabbited to receive panel, top hinged—knock down, screws included. To fit panels 6x7, \$2.00; 6x10 1/2, \$2.50; 6x14, \$2.50; 6x21, \$2.75; 9x14, \$2.75; 12x14, \$2.75; 12x21, \$3.25. Prompt shipment. H. N. FitzGerald, Onancock, Va.

**Regenerative Tuner and Detector** in Cabinet, \$20.00. Two-Step Amplifier, \$30.00. Single Tuner and Detector in cabinet, \$25.00. Marconi Code Records, \$4.00. Baldwin Phonograph Attachment, \$12.00. Short Wave Variometer, Detector, Two-Step in cabinet, \$65.00. H. Denyse, 203 Speedwell Ave., Morristown, N. J.

## We Save You Money On RADIO SUPPLIES

Radiotron amplifier tubes, 201 \$ 5.85  
Western Electric Phones 2200  
Ohms, per pair ..... 13.50  
Murdock No. 56, 3000 Ohms  
per pair ..... 5.40  
Federal 2200 Ohms, per pair.. 7.20  
Paragon rheostats, each ..... 1.35  
Paragon amplifying transformers, each ..... 4.50  
Paragon V T. sockets, each .. .90  
R-3 Magnavox, each ..... 40.50  
The above are special June prices ONLY.

Mail orders shipped day received.  
**FREE DELIVERY EVERYWHERE**  
except on the Magnavox. This will be shipped express collect.

**A. V. GREGORY**  
41 BROAD ST., RED BANK, N. J.

## A REAL VARIABLE

THE HAYNES VARIABLE CONDENSER was designed before it was built. IT DOES NOT LEAK. DEALERS—Here is a condenser worth twice its price, yet there is plenty in it for you. Write for particulars. We can make delivery.

**The Haynes Radio Shop**  
629 Lexington Avenue, New York City

**RADIO HANDBOOK**  
How and why radio works and essential information to get results. 48 pp., illustrated. Send 25¢  
Agents Wanted

**RADIO HANDBOOK PUB. CO.**  
Sheridan Bldg., 9th & Sansom Sts., Phila., Pa.

## DEALERS

Communicate with us regarding Detectors, Binding Posts and other radio parts.

**C. R. BAIRD COMPANY**  
243 EAST 151st STREET, NEW YORK

Wholesale and Retail

# Radio Supplies

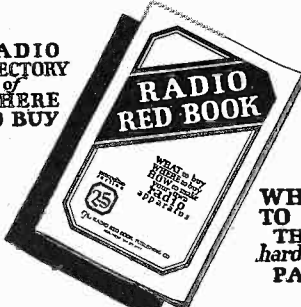
**PARK ROW CYCLE & RADIO CO.**

29 Park Row, N. Y. C.

Entrance Basement Store.

**-something different?**

RADIO DIRECTORY OF WHERE TO BUY



WHERE TO GET THAT HARD TO GET PART

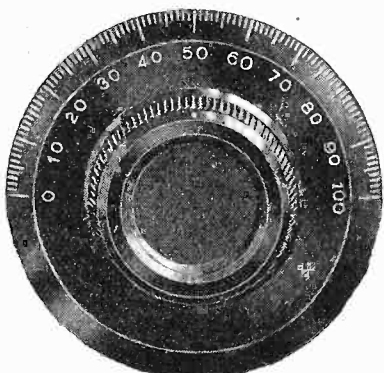
**RADIO RED BOOK**

406 W. 31<sup>ST</sup> ST.

Your Dealer or the Newsstand

Another Attractive Proposition offered by

# Randel



—3 inches—

A perfectly constructed dial made of the best dielectric material—pure black—accurately balanced—clearly engraved white figures from 0 to 100 are scientifically arranged as illustrated, affording fine adjustment—bored for 3/16 and 1/4 inch shafts.

**Price, \$1.00 each**

Send \$5.50 for sample box of 10. Liberal discounts in quantities.

**RANDEL WIRELESS CO.**

9 CENTRAL AVE.

Newark, New Jersey

## Navy Department Sells Its Excessive Vacuum Tubes

THE Navy opened sealed bids on 30,000 surplus vacuum transmitting tubes, which are being sold in wholesale lots of 10,000 at the Washington Navy Yard, on Monday, May 15. These tubes were originally designed for transmitting, and fit ordinary commercial transmitting sockets, but may also be used for detecting and amplifying by reslotting the receiving tube socket about 45 degrees from the usual slot. This is essential, it is pointed out, because the retaining pin in the lamp base is about 45 degrees from the position of the re-

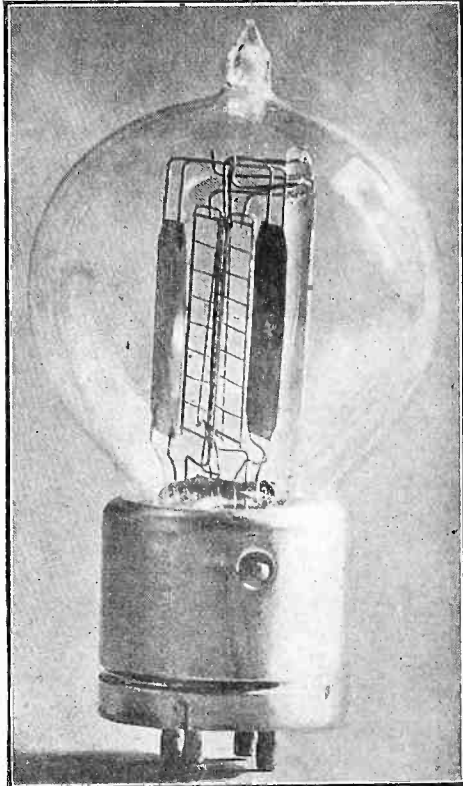
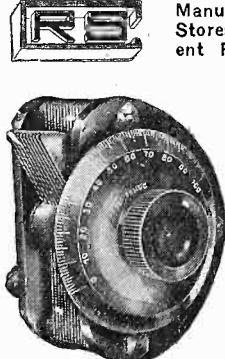


Photo by Paul Thompson.

Type E transmitting tube used by the United States Navy. It is said to be one of the most efficient tubes ever made.

taining pin as ordinarily in receiving tubes sold to-day. When these tubes are retailed, they must be sold in their original cartons to licensed amateurs only, for experimental or entertainment use. The fact that they are several years old and that they were originally purchased by the Navy as transmitting tubes, must be shown on the label. In case the retailers fail to comply with the regulations of the Navy Department, the tubes will be seized and the payments forfeited.

### A NEW VARIABLE CONDENSER



Manufactured by Radio Stores Corporation. Patent Pending. Type VC-1

Concealed Counterweight. Brass Studs through Aluminum Plates: Die Cast Shaft Held in True Center Through Brass Bushings. Binding Posts Mounted on Separate Metal Straps. No Insulating Material Tapped—Brass Inserts Throughout.

Immediate Shipment

List—23 Plate .....\$4.25  
43 Plate ..... 4.75

Complete with Knob, Dial and Counter Weight. Each packed in individual carton.

**RADIO STORES CORPORATION**

National Distributors and Manufacturers  
218-222 W. 34th St., New York City

## RADIO

EVERYTHING FOR THE AMATEUR FOR IMMEDIATE DELIVERY

|  |                       |
|--|-----------------------|
| De Forest Crystal Set (Inc. phones)    | \$25.00               |
| De Forest Tube Set                     | 36.00                 |
| De Forest Two-Stop Amplifier           | 35.00                 |
| Westinghouse Crystal Set (Inc. phones) | 25.00                 |
| Westinghouse Sr. Crystal Detectors     | 65.00                 |
| 50c., 75c., \$1.00, \$1.25, \$2.75     |                       |
| Bakelite Dial 4 in.                    | 1.25                  |
| Bakelite Dial 3 in.                    | .90                   |
| Bakelite Panels 6 1/2 x 9 in.          | 1.25                  |
| 23 Plate Variable Condenser            | \$3.25 4.50           |
| 43 Plate Variable Condenser            | 3.75 4.75             |
| De Forest Amplifying Transformers      | 6.50                  |
| Variometers                            | \$4.50 5.00 5.50 6.00 |
| Variocouplers                          | \$4.00 4.50 6.00      |
| Lightning Arrestor Brach               | 2.50                  |
| De Forest Rheostats                    | 1.20                  |
| Tested Galenas, Silicoan, Radiosite    | .35                   |
| Aerial Wire, 100 ft.                   | 50c. 75c. 1.00        |
| Catalog and Radio Book                 | .50                   |
| Books on Radio                         | 10c. 25c. 35c. .75    |
| Plans for Complete Sets                | .50                   |
| Contact Points, a doz.                 | .30                   |
| Switch Levers, 1 in., 50c. 1 1/2 in.   | .60                   |
| Alcohol Torches                        | 1.00                  |
| Tuning Coils                           | \$3.00 3.75           |
| Tube Sockets                           | 90c. 1.00             |
| Phone and Grid Condensers              | .30                   |
| Variable Grid Leak and Condenser       | .75                   |
| Fixed Condensers                       | 75c. .95              |
| Lighting Switches, 500 Volt. D. C.     | 2.94                  |

WHOLESALE AND RETAIL  
Mall Orders Filled Day Received.

**UNIVERSAL RADIO CO.**  
355 E. 149th STREET, NEW YORK CITY  
Distributors for De Forest Wireless Sets and Parts

## MORADIO

Radio Products of Dependability Are Always Good Sellers—Try Them



Our "EVERY-WIRE-CONTACT" Coupler as illustrated is made strictly along scientific lines—the primary coil has a lever contact affording an every-wire-adjustment of this element which eliminates the disadvantages of the old style primary or tuning coil with soldered taps and its poor selectability—at the same time the rotor is accurately fixed with perfect air gap allowing further finer tuning—the unit is ideal for use in regenerative or crystal sets.

We Are Prepared To Ship In Quantity.

**MORELAND SALES CORP.**  
30 OGDEN ST.

Newark, New Jersey

# Radio Dealers Attention!

*Increase Your Profits*

*12<sup>1</sup>/<sub>2</sub>% to 25%*

*by Co-operative Buying*

**T**HE unprecedented profit producing power of syndicate and chain drug, cigar, grocery stores, etc., etc., lies in Co-operative Buying.

This power has been applied to Radio Products by The Radio Buyers' Syndicate—an organization of experts in the buying of radio products, with offices in the heart of the radio industry.

## GUARANTEE

On demand R. B. S. agrees to refund to any subscriber to our service, the full amount of his subscription, providing we do not save the member a minimum of \$125.00 on each thousand dollars worth of Radio Equipment we are able to purchase for him.

Saving based on regular discount to the retail trade given by any reputable distributor.

RADIO BUYERS' SYNDICATE.

## Read Our Guarantee

**A saving of ten times the six months' membership fee on every \$1,000 of purchases OR MONEY REFUNDED.**

**Sign, Cut Out and Mail this membership application blank,—Attach your check for \$12.50 and reap the benefits—**

**Your money back if we don't save you ten times the amount on your purchases of \$1,000.**

The Radio Buyers' Syndicate,  
145 West 45th Street, New York.

Gentlemen:

Please file our application for membership in the Radio Buyers' Syndicate, it being understood that in the event of our application being approved that we are to enjoy all benefits such as discounts, etc., accruing to members, and furthermore that you will refund our membership fee for six months in the event of your not saving us \$125 on every \$1,000 of purchases as stipulated in your guarantee.

(Name) .....

(Address) .....

Enclose check for \$12.50

# RADIO BUYERS' SYNDICATE

*Co-operative Buyers of Radio Products*

145 West 45th Street

New York City