CITIZENS

RADIO CALL BOOK

Reg. U. S. Pat. Office

Foreign
65 Cents

A ★ COMPLETE RADIO CYCLOPEDIA

This Issue

World's Broadcasting Stations

45 Kilocycle Super

Browning Drake Receiver

Radio Announcers' Directory

Harkness Counterpoint

Six Tube Tuned [illegible] Frequency Receiver

Maps — Log Sheets

Hookups

USED THE WORLD OVER

Cunningham RADIO TUBES

Since 1915—Standard for All Sets

TYPES, C-301A · C-299 · C-300 · C-11 · C-12 IN THE ORANGE AND BLUE CARTON

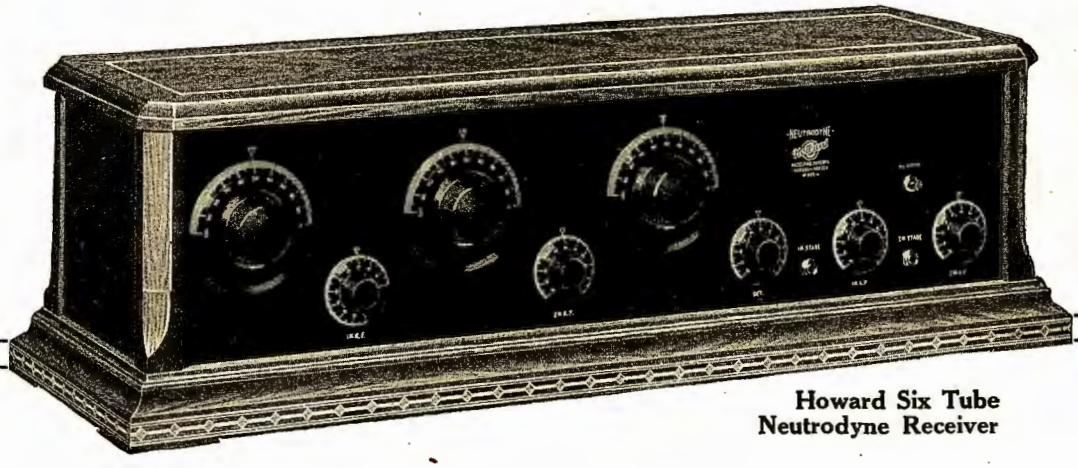
Whenever perfection is approached in any manufactured product, the qualities of that product soon become known to the great American public. Thus is has been with Cunningham Radio Tubes. From Maine to California, from the Florida Keys to Puget Sound, they have made themselves known in millions of American homes. Throughout the nation these tubes are now associated with all that is best in radio. That you may come to know the delight, the charm, of radio when every variation of tone is flawlessly re-created, install Cunningham Radio Tubes in every socket of your receiver. Then music becomes like laughter of clear, swift-flowing water; and the human voice like something not quite human but divine.

Price $2.50 each

C. J. Cunningham Inc.

Home Office: 182 Second Street
San Francisco

Chicago New York



Howard Six Tube Neutrodyne Receiver

SELECTIVITY; distant reception range, volume and ease of operation are the most important things to consider when buying your radio receiver. To be sure that your selection will provide these essentials, choose the Howard Five or Six-Tube Neutrodyne Receiver —they bear this label.

GUARANTEED Howard PRODUCTS

Programs from practically every point in the United States and Canada are at your command with a Howard. Far or near, a Howard brings them in with bell-like clarity and unheard of volume. The sweet velvety tones of the violin, the deep and majestic tones of the organ, the golden blast of the cornet, are all heard on a Howard with absolute freedom from distortion. If you have never heard a Howard you have not heard the ultimate in radio reception.

Any Howard dealer will be pleased to give you a demonstration

Write for Log Sheets and Catalogue

HOWARD RADIO COMPANY

Dept. C **451-469 E. Ohio Street** **Chicago**

Licensed by Independent Radio Manufacturers, Inc. Reg. U.S. Pat. Off. NEUTRODYNE Reg. U.S. Pat. Off. Pat. March 27, 1923 and April 1, 1924 Hazeltine Pats. Nos. 1,450,080 and 1,489,228 Other Patents Pending

FROST-RADIO

Ask Your Neighbor

Pacific Coast Prices Slightly Higher

"THE STRADIVARIUS *Musette* OF RADIO"

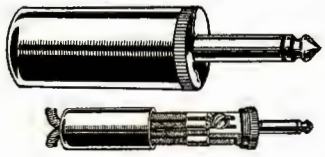
Popularly Priced

$12.50

in black finish

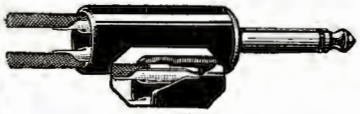
AWARDED TROPHY
RADIO WORLDS FAIR
MADISON SQUARE GARDEN
NEW YORK CITY
SEPTEMBER 1924

FROST-RADIO ACCESSORIES



FROST-RADIO
No. 140—2-Fone Plug..... 60c

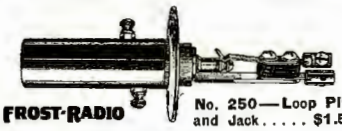
FROST-RADIO
No. 141—Automatic 2-Fone Plug..... 75c



FROST-RADIO
No. 142—Single Fone Automatic Plug.... 40c

FROST-RADIO
No. 143—Double Fone Automatic Plug... 50c

FROST-RADIO
Pan-Tab Jack Switches..... 65c to 95c

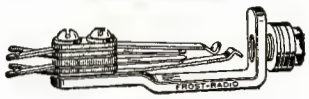


FROST-RADIO
No. 250—Loop Plug and Jack..... $1.50

FROST-RADIO
No. 332—30-foot Extension Cord, complete with plug and jack housing, twin conductor cord..... $2.50
No. 336—Mounted Jack only, 75c

Pacific Coast Prices Slightly Higher

FROST-RADIO

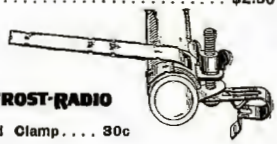


FROST-RADIO
Standard Jacks..... 45c to 70c

FROST-RADIO
Pan-Tab Jacks..... 65c to 90c

No. 712—Musselman Selective Antenna, 75 feet..... $5.00

FROST-RADIO
No. 501—Jac-Box, complete with cord and plug..... $2.50



FROST-RADIO
Ground Clamp.... 30c

HERBERT H. FROST, Inc.

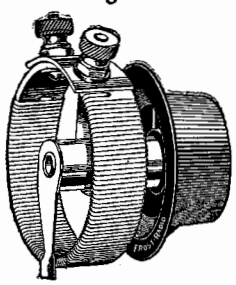
314-324 WEST SUPERIOR STREET, CHICAGO, ILLINOIS

NEW YORK CITY CLEVELAND KANSAS CITY LOS ANGELES

FROST-RADIO

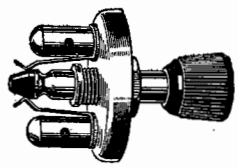
Ask Your Neighbor

Pacific Coast Prices Slightly Higher



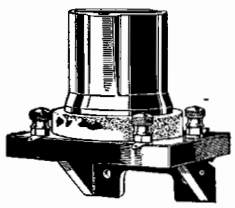
FROST-RADIO

No. 600—Metal Frame Plain Rheostat, 6 ohm 60c
No. 602—Metal Frame Plain Rheostat, 35 ohms 60c
No. 606—Metal Frame Plain Rheostat, 25 ohms 60c
No. 614—Metal Frame Plain Rheostat, 10 ohms 60c
No. 615—Metal Frame Plain Rheostat, 15 ohms 60c



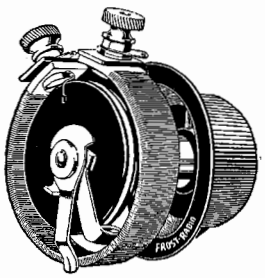
FROST-RADIO

No. 608—Push-Pull Battery Switch, single hole mounting, complete . . . 30c



FROST-RADIO

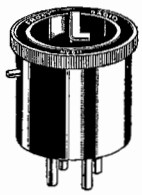
No. 618—BAKELITE Shock-Absorber Socket, standard base type, for panel or table mounting $1.25



FROST-RADIO

No. 601—Metal Frame Vernier Rheostat, 6 ohms 80c
No. 604—Metal Frame Vernier Rheostat, 35 ohms 80c
No. 613—Metal Frame Vernier Rheostat, 25 ohms 80c

No. 603—Metal Frame Potentiometer, 0-400 ohms 65c
No. 605—Metal Frame Potentiometer, 0-200 ohms 65c

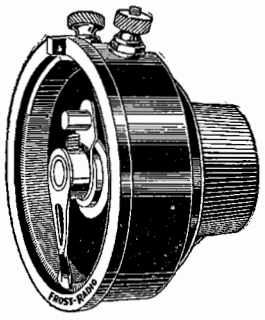


FROST-RADIO

No. 611—BAKELITE Adapter for UV-199 C-299 Tubes 60c

FROST-RADIO

No. 622—BAKELITE Toggle Switch, black 50c
No. 623—BAKELITE Toggle Switch, maroon 50c

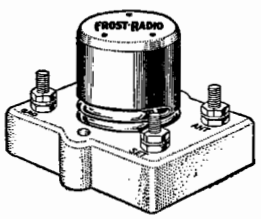


FROST-RADIO

No. 650—BAKELITE Plain Rheostat, 6 ohms $1.10
No. 652—BAKELITE Plain Rheostat, 35 ohms $1.10
No. 656—BAKELITE Plain Rheostat, 25 ohms $1.10
No. 651—BAKELITE Vernier Rheostat, 6 ohms $1.25
No. 653—BAKELITE Vernier Rheostat, 35 ohms $1.25
No. 657—BAKELITE Vernier Rheostat, 25 ohms $1.25
No. 654—BAKELITE Potentiometer, 0-400 ohms $1.25
No. 655—BAKELITE Potentiometer, 0-200 ohms $1.25
No. 658—BAKELITE Plain Rheostat, 10 ohms $1.10

FROST-RADIO

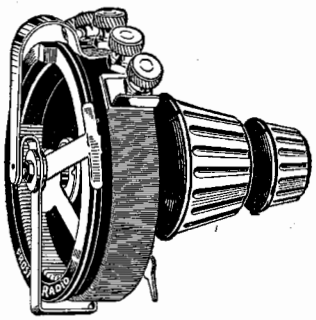
No. 619—BAKELITE Shock-Absorber Socket, 3-gang standard base type $3.25



FROST-RADIO

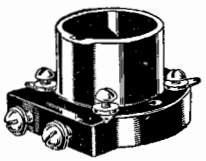
No. 700—Protector, complete. $1.50

Pacific Coast Prices Slightly Higher



FROST-RADIO

No. 607—BAKELITE Tube Control Unit, combining 6 ohm Vernier Rheostat and 400 ohm Potentiometer $1.75
No. 609—Same as No. 607, but with 25 ohm Rheostat and 400 ohm Potentiometer $1.75
No. 610—Same as No. 607, but with 35 ohm Rheostat and 400 ohm Potentiometer $1.75



FROST-RADIO

No. 612—BAKELITE Socket for UV-199 C-299 Tubes, panel or table mounting 65c

FROST-RADIO

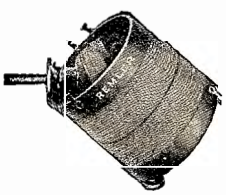
No. 253—Automatic Cord Tip Jack 20c

REMLER RADIO APPARATUS

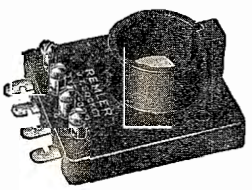
REMLER Type 600 Transformer $6.00

REMLER Type 610 Transformer. $5.00

"Apparatus that radiates quality"



REMLER Type 620 Coupling Unit $3.00

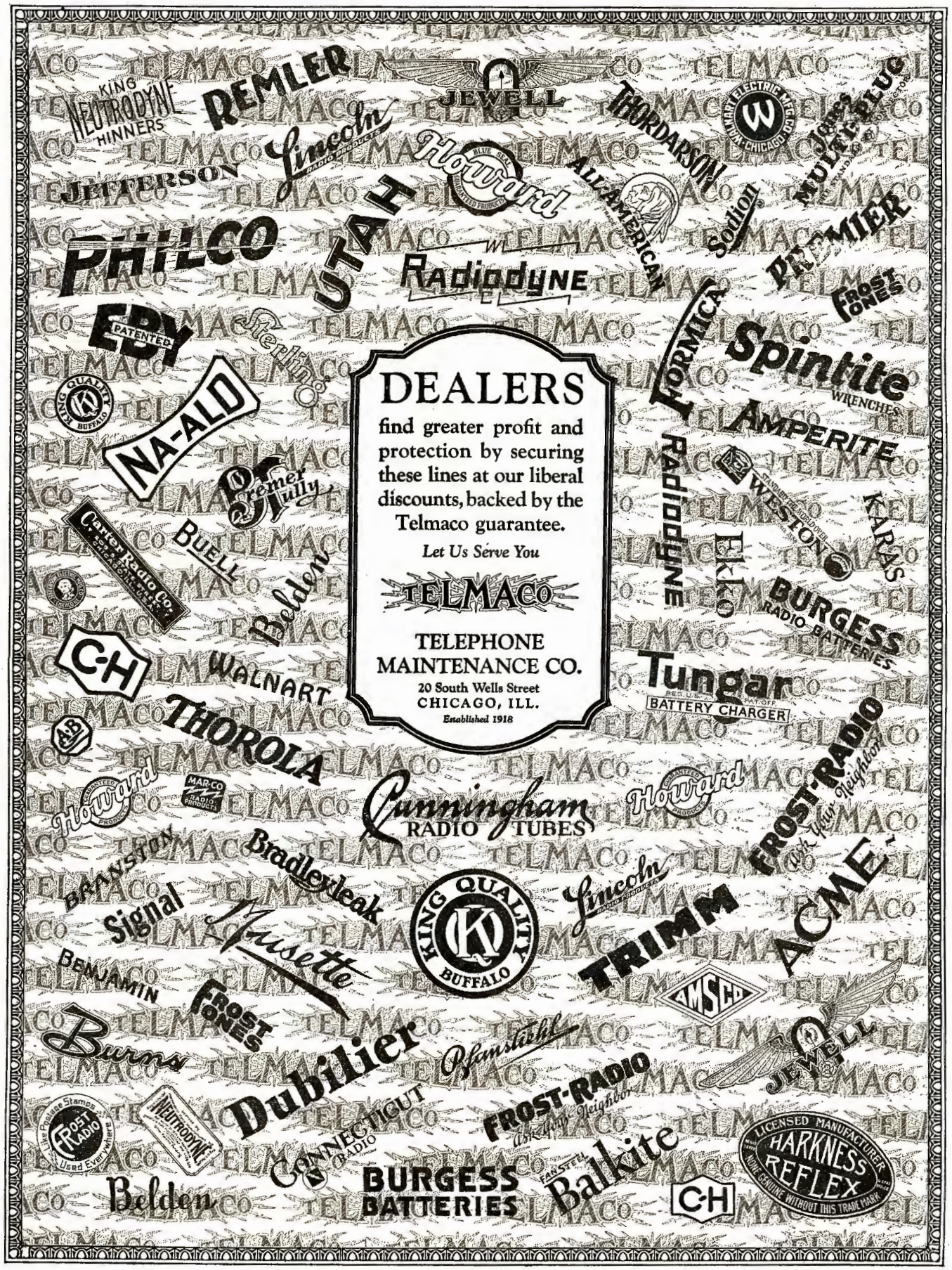


REMLER Type 399 Socket . . 75c

HERBERT H. FROST, Inc.

314-324 WEST SUPERIOR STREET, CHICAGO, ILLINOIS

NEW YORK CITY CLEVELAND KANSAS CITY LOS ANGELES



CITIZENS RADIO CALL BOOK

A COMPLETE RADIO CYCLOPEDIA

Vol. 6 FALL, 1925 No. 2

Published twice yearly by the

CITIZENS RADIO SERVICE BUREAU

Executive Offices: 508 South Dearborn Street, Chicago, Ill., U. S. A.

Telephones—Wabash 8057-8067

Contents This Issue

As in the last issue, the Amateur Section has been left out of the main book. A complete book containing an up-to-date list of all the calls in the world is now available for 75c.

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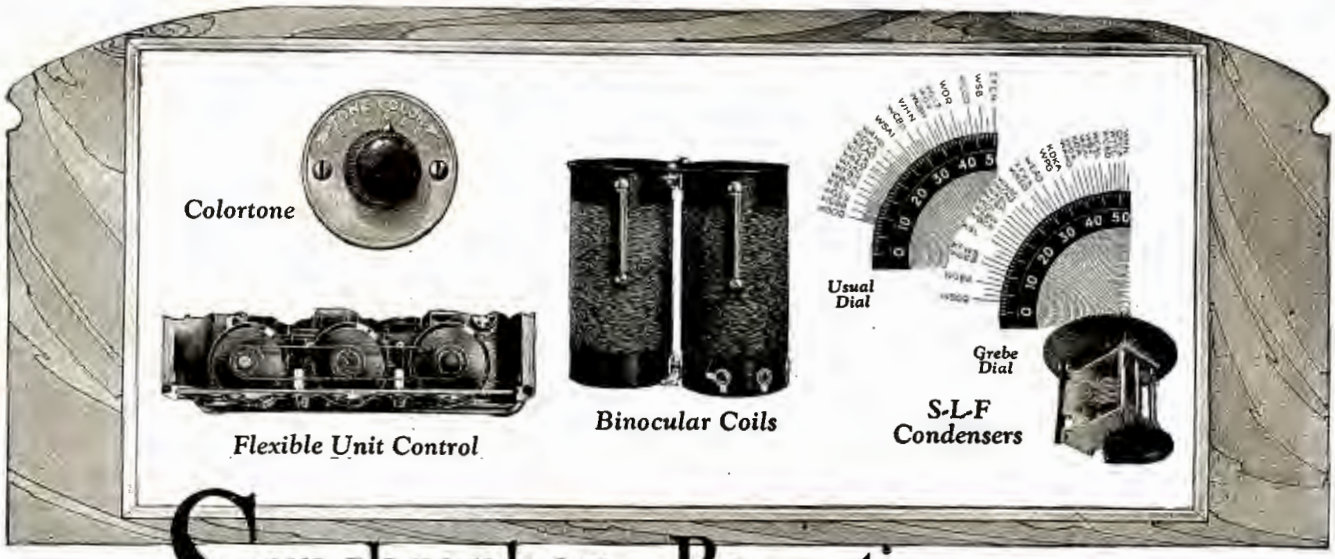


Synchrophase Reception

Five sound reasons why it is so unusual

IN the Synchrophase there are five outstanding and exclusive Grebe innovations that contribute to the clarity, volume, ease of operation, and *"selective sensitivity"* of this receiver.

1. ***Binocular Coils:*** Keep the set balanced against outside interference and give extreme "selective sensitivity."

2. ***Flexible Unit Control:*** Two or three dials may be operated by one; or all three can be set separately at will.

3. ***Low-wave Reception:*** The Synchrophase will receive from 550 down to 150 meters, making possible the reception of low-wave stations not included in the range of most receivers.

4. ***Colortone:*** An epoch-making feature by which the timbre of voice or instrument can be altered to suit the listener's taste.

5. ***S-L-F Condensers:*** (Straight line frequency) distribute the wave band so that all stations have equal spacing on the dials and accurate tuning is easy, quick and certain.

Ask your dealer to demonstrate; then compare

The GREBE

A. H. Grebe & Co., Inc., Van Wyck Blvd., Richmond Hill, N.Y.
New York Office: Steinway Hall, 109 West 57th Street
Western Branch: 443 So San Pedro Street, Los Angeles, Cal.

This company owns and operates stations WAHG and WBOQ; also low-wave rebroadcasting stations, mobile WGMU and marine WRMU.

SYNCHROPHASE

— TRADE MARK REG. U.S. PAT. OFF. —

"It is not easy to find one who, after three years of learning, has not found happiness."
—*Confucius*

In less than three minutes, owners of the Synchrophase become supremely happy.

The Synchrophase is also supplied with battery base

All Grebe apparatus is covered by patents granted and pending.

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

KFJR—Ashley Dixon & Son, Glenwood Ave. E 36th St., Portland, Ore. 263 meters, 1140 kilocycles, 50 watts, class A. Mon, 7:30-8:15 pm. Tues & Wed, 8-9 pm. Thurs. 8-8:45, 9-10:30 pm. Sat, 1:30-2:30 pm. Pacific standard time. Slogan: "The Eastmoreland Broadcasting Station."
1st Dial **2nd Dial** 3rd Dial

KFJX—Iowa State Teachers' College, Cedar Falls, Iowa. 258 meters, 1170 kilocycles, 50 watts, class A. Schedule irregular. Temporarily silent. Central time.
1st Dial 2nd Dial 3rd Dial

KFJY—Tunwall Radio Co., 13 N. 10th St., Fort Dodge, Iowa. 246 meters, 1220 kilocycles, 50 watts, class A. Daily, 5:30 pm. Sun, 11 am, church services. Central standard time.
1st Dial 2nd Dial 3rd Dial

KFJZ—W. E. Branch, 400 W. 7th St., Fort Worth, Texas. 254 meters, 1180 kilocycles, 50 watts, class A. Daily ex Sat, 8:30-9:30 pm. Central time.
1st Dial 2nd Dial 3rd Dial

KFKA—Colorado State Teachers' College, Greeley, Colo. 273 meters, 1100 kilocycles, 50 watts, class A. Mountain time.
1st Dial 2nd Dial 3rd Dial

KFKQ—Conway Radio Laboratories, Box 360, Conway, Ark. 250 meters, 1200 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFKU—University of Kansas, Lawrence, Kans. 275 meters, 1099 kilocycles, 500 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFKX—Westinghouse Elec. & Mfg. Co., Hastings, Nebr. 288.3 meters, 1040 kilocycles, 2000 watts, class B. Central time.
1st Dial 2nd Dial 3rd Dial

KFKZ—F. M. Henry, 107 E. Harrison St., Kirksville, Mo. 226 meters, 1330 kilocycles, 10 watts, class A. Sun, 9-10 pm, musicale. Thurs, 9:15-10:15 pm, orchestra. Central standard time. Slogan: "Kirksville, the Business and Educational Center of North Missouri, and the Home of Osteopathy."
1st Dial 2nd Dial 3rd Dial

KFLP—Everette M. Foster, 1242 S. 6th St., Cedar Rapids, Iowa. 256 meters, 1180 kilocycles, 20 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFLR—Korber Wireless Station, The State University of New Mexico, Albuquerque, N. Mex. 254 meters, 1180 kilocycles, 100 watts, class A. Mountain time.
1st Dial 2nd Dial 3rd Dial

KFLU—San Benito Radio Club, San Benito, Texas. 236 meters, 1270 kilocycles, 15 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFLV—Swedish Evang. Miss. Church, Rockford, Ill. 229 meters, 1310 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFLX—George R. Clough, 1214 40th St., Galveston, Texas. 240 meters, 1250 kilocycles, 10 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFLZ—Atlantic Automobile Co., 3rd & Poplar Sts., Atlantic, Iowa. 273 meters, 1100 kilocycles, 100 watts, class A. Daily, 11:50-12:15 pm. Tues, Thurs, 8:30-10:30 pm. Central standard time. Slogan: "The Garden Spot of Iowa."
1st Dial 2nd Dial 3rd Dial

KFMB—Christian Churches of Little Rock, Little Rock, Ark. 254 meters, 1180 kilocycles, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFMQ—University of Arkansas, Fayetteville, Ark. 299.8 meters, 1000 kilocycles, 500 watts, class B. Tues, 9 pm, music. Wed, 7:30 pm, talks by faculty members. Central standard time. Slogan: "The Voice of the Ozarks."
1st Dial 2nd Dial 3rd Dial

KFMR—Morningside College, Sioux City, Iowa. 261 meters, 1150 kilocycles, 50 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFMT—Dr. Geo. W. Young, 2219 Bryant Ave., North, Minneapolis, Minn. 263 meters, 1140 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFMW—M. G. Sateren, Houghton, Mich. 266 meters, 1130 kilocycles, 50 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFMX—Carleton College, Northfield, Minn. 337 meters, 890 kilocycles, 750 watts, class B. Central time.
1st Dial 2nd Dial 3rd Dial

KFNF—Henry Field Seed Co., Shenandoah, Iowa. 266 meters, 1130 kilocycles, 500 watts, class A. Daily ex Sun, 12:15-1:35, 3-4 pm, 7:30-9:30 pm, concert. Sun, 10:45-12:15, 8-9:15 pm, services. Central time. Slogan: "A Friendly Station in a Friendly Town."
1st Dial 2nd Dial 3rd Dial

KFNV—L. A. Drake Battery & Radio Supply Shop, 505 3rd St., Santa Rosa, Calif. 234 meters, 1275 kilocycles, 5 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFOA—Rhodes Dept. Store, 1321 2nd Ave., Seattle, Wash. 454.3 meters, 660 kilocycles, 1000 watts, class B. Daily ex Sun, 12:30-1:30, 4-5:15 pm. Daily ex Sun, Thurs, 6-10 pm. Tues, Fri & Sat, 10-11:30 pm. Pacific time. Slogan: "Pacific Northwest Station."
1st Dial 2nd Dial 3rd Dial

KFOL—Leslie M. Schafbuch, Marengo, Iowa. 234 meters, 1280 kilocycles, 10 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFON—Echophone Radio Shop, Long Beach, Calif. 234 meters, 1280 kilocycles, 100 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFOO—Latter Day Saints' University, Salt Lake City ,Utah. 261 meters, 1150 kilocycles, 5 watts, class A. Mountain time.
1st Dial 2nd Dial 3rd Dial

KFOR—David City Tire & Elec. Co., David City, Nebr. 226 meters, 1330 kilocycles, 20 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFOT—College Hill Radio Club, 1st & Erie Sts., Wichita, Kans. 231 meters, 1300 kilocycles, 50 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFOX—Technical High School, Omaha, Nebr. 248 meters, 1210 kilocycles, 100 watts, class A. No regular schedule. Central standard time. Slogan: "Keep Following Our Xample."
1st Dial 2nd Dial 3rd Dial

KFOY—Beacon Radio Service, 378 Robert St., St. Paul, Minn. 252 meters, 1190 kilocycles, 50 watts, class A. Central standard time. Slogan: "St. Paul's Radio Central."
1st Dial 2nd Dial 3rd Dial

KFPG—Oliver S. Garretson, 5118 Maywood Ave., Los Angeles, Calif. 238 meters, 1260 kilocycles, 10 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFPL—C. C. Baxter, Dublin, Texas. 252 meters, 1190 kilocycles, 15 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFPM—The New Furniture Co., Box 628, Greenville, Texas. 242 meters, 1240 kilocycles, 10 watts, class A. Daily ex Sun, 1-1:30 pm. Tues, Wed, Thurs, Fri, 7:45 pm. Sun, 11 am, 7:30 pm, irregularly. Central standard time. Slogan: "Biggest Little 10 Watts on the Air."
1st Dial 2nd Dial 3rd Dial

KFPR—Los Angeles Co. Forestry, Los Angeles, Calif. 237 meters, 1300 kilocycles, 500 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFPT—Radio Service Corp. of Utah, Salt Lake City, Utah. 261 meters, 1150 kilocycles, 500 watts, class A. Mountain time.
1st Dial 2nd Dial 3rd Dial

KFPW—St. John's M. E. Church, Box 424, Carterville, Mo. 258 meters, 1160 kilocycles, 20 watts, class A. Tues, 8-10 pm. Fri, 8-10 pm. Sun, 1 pm, chapel services. Central time. Slogan: "Keeping Pace with Christ Means Progress."
1st Dial 2nd Dial 3rd Dial

KFPY—Symons Investment Co., Symons Block, Spokane, Wash. 265.3 meters, 1130 kilocycles, 100 watts, class A. Daily ex Sun, 6:30-7:30 pm. Mon, Wed, 8:30-9:30 pm. Sat, 9:30-11 pm. Sun, 8-9 pm. Pacific standard time
1st Dial 2nd Dial 3rd Dial

KFQA—The Principia, 5539 Page Ave., St. Louis, Mo. 261 meters, 1150 kilocycles, 100 watts, class A. Sun, 8 pm, church service. Central standard time.
1st Dial 2nd Dial 3rd Dial

KFQB—Searchlight Publishing Co., Fort Worth, Texas. 254 meters, 1180 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFQC—Kidd Bros.' Radio Shop, Taft, Calif. 231 meters, 1300 kilocycles, 100 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFQH—Burlingame Chamber of Commerce, Burlingame, Calif. 220 meters, 1360 kilocycles, 50 watts, class A. Tues, Thurs, 8-10 pm. Sat, 8-12 pm. Pacific standard time. Slogan: "You Are a Stranger in Burlingame but Once."
1st Dial 2nd Dial 3rd Dial

KFQO—Meier Radio Shop, Russell, Kan. 261 meters, 1150 kilocycles, 10 watts, class A. Mon, 7:45-10:30 pm, concert. Thurs, 8.15-10.45 pm, oil news & concert. Sun, 2 pm, concert & church services. Central time. Slogan: "The Oil Center of the U. S."
1st Dial 2nd Dial 3rd Dial

KFQP—George S. Carson, Jr., 906 College St., Iowa City, Iowa. 224 meters, 1340 kilocycles, 10 watts, class A. Irregular schedules. Central standard time.
1st Dial 2nd Dial 3rd Dial

KFQT—Texas National Guard, 36th Signal Co., Denison, Texas. 252 meters, 1190 kilocycles, 10 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFQU—Holy City Broadcasting Station, Holy City (Alma P. O.), Calif. 222 meters, 1350 kilocycles, 100 watts, class A. Daily ex Mon, 9-10 pm. Sun, 11-12 noon, 9-10 pm. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFQW—Photo Radio & Electric Shop, North Bend, Wash. 215 meters, 1390 kilocycles, 50 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFQY—Farmers' State Bank, Belden, Nebr. 273 meters, 1100 kilocycles, 10 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFQZ—Taft Products Co., 5653 De Longpre Ave., Hollywood, Calif. 226 meters, 1330 kilocycles, 250 watts, class A. Tues & Fri, 9-11 pm. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFRB—Hall Bros. (Rialto Theater), Beeville, Texas. 248 meters, 1210 kilocycles, 250 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFRC—City of Paris Dry Goods Co., Geary & Stockton Sts., San Francisco, Calif. 268 meters, 1120 kilocycles, 50 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFRL—First Presbyterian Church, Grand Forks, N. D. 240 meters, 1250 kilocycles, 10 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFRM—Lieut. James P. Boland, Fort Sill, Okla. 263 meters, 1140 kilocycles, 50 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFRO—Curtis-Griffith Radio Sales Co., 1109 8th Ave., Fort Worth, Texas. 246 meters, 1220 kilocycles, 50 watts, class A. Wed, 8-10:30 pm, lectures. Sat, 8-10:30 pm, music. Central standard time. Slogan: "Who Does Your Printing?"
1st Dial 2nd Dial 3rd Dial

KFRU—Etherical Radio Co., 115 W. 6th St., Bristow, Okla. 394 meters, 760 kilocycles, 500 watts, class B. Central time.
1st Dial 2nd Dial 3rd Dial

KFRW—United Church, Olympia, Wash., 220 meters, 1360 kilocycles, 100 watts, class A. Wed, 8-10 pm. Sun, 11 am, 7:30 pm, church services. Pacific standard time. Slogan: "Make the World a Brotherhood."
1st Dial 2nd Dial 3rd Dial

KFRX—J. G. Klemgard, R. R. 2, Pullman, Wash. 217 meters, 1370 kilocycles, 10 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFRY—New Mexico College of Agriculture and Mechanic Arts, State College, N. Mex. 266 meters, 1130 kilocycles, 50 watts, class A. Mountain time.
1st Dial 2nd Dial 3rd Dial

KFRZ—The Electric Shop (P. M. Thies), Hartington, Nebr. 222 meters, 1350 kilocycles, 15 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFSG—Echo Park Evangelistic Ass'n, 1100 Glendale Blvd., Los Angeles, Calif. 278 meters, 1080 kilocycles, 500 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFSY—Van Blaricom Co., 20 S. Main, Helena, Mont. 248 meters, 1210 kilocycles, 10 watts, class A. Mountain time.
1st Dial 2nd Dial 3rd Dial

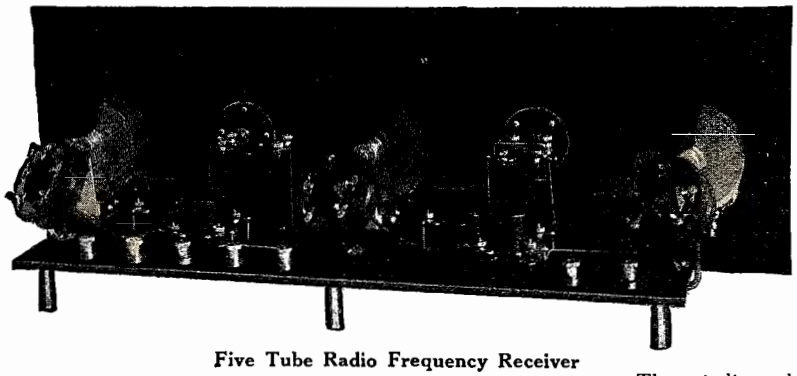
KFUJ—Hoppert Plumbing & Heating Co., Breckenridge, Minn. 242 meters, 1240 kilocycles, 50 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFUL—Thos. Goggan & Bro. Music Co., Galveston, Texas. 258 meters, 1160 kilocycles, 10 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFUM—City of Colorado Springs, 226 Hagerman Bldg., Colorado Springs, Colo. 242 meters, 1240 kilocycles, 100 watts, class A. Mountain time.
1st Dial 2nd Dial 3rd Dial

KFUO—Concordia Seminary, 3645 S. Jefferson Ave., St. Louis, Mo. 545 meters, 550 kilocycles, 500 watts, class B. Mon, 8 pm. Wed, 9:15 pm. Sun, 4 pm, 9:15 pm. Central standard time.
1st Dial 2nd Dial 3rd Dial

Kellogg Radio Parts for Your Station-Getting Receiver



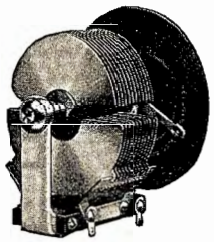
Five Tube Radio Frequency Receiver

The five tube tuned radio frequency receiver illustrated here is built completely of Kellogg apparatus. This receiver brings in DX stations with clearness and volume, due to the highly efficient and well made Kellogg equipment.

With 28 years of experience in building telephone and switchboard apparatus we are especially equipped to manufacture accurate and result-giving radio products.

The Kellogg new low loss condenser is unique in its design, has minimum and correct maximum capacity, is easy to tune and its dependability of performance places it in a class by itself.

When you purchase a Kellogg low loss condenser, you are buying the capacity you want in condenser plates, which are beautifully mounted. It answers all the latest demands for an efficient low loss type condenser.



No. 704

No. 704. 23 Plate .0005.....$5.50
No. 705. 18 Plate .00035..... 5.00

No. 501

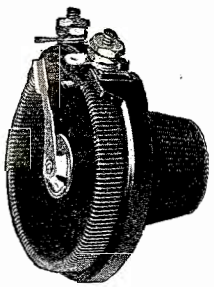
Kellogg molded Bakelite dials of reinforced construction are of unusually pleasing appearance, and very rugged. The calibrations are accurate and clearly marked. The large knob is shaped and corrugated to fit the fingers, making possible the slightest movement.

No. 501. 3-in. Radio Dial.....$0.75
No. 503. 4-in. Radio Dial..... .80

The new Kellogg rheostat is of the popular flat disc compact type and has a number of distinctive features that make it highly efficient and particularly attractive.

This new Kellogg rheostat has fewer parts and a more efficient and effective assembling than any other we have seen.

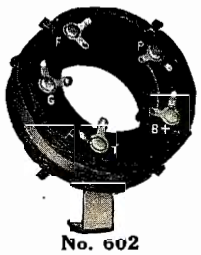
Code No. 505. 3 ohms—Code No. 506. 6 ohms—Code No. 507. 25 ohms. Each.....$0.75



No. 507

The windings, both primary and secondary, of the Kellogg radio frequency transformers, are wound without the use of "dope" of any kind, thus assuring the least degree of distributed capacity.

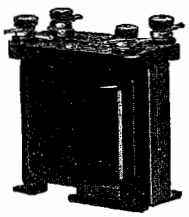
The secondary winding is designed and wound to function properly at the ratio cast wave lengths with the standard .00035 to .0005 variable condensers. The secondary winding is unilaterally wound-reducing capacity effects.



No. 602

No. 602.....$2.35
No. 603..... 2.35

Kellogg audio frequency transformers build up the volume of receiving sets both for radio frequency and audio frequency amplification, resulting in clear reproduction with minimum distortion and maximum volume.



No. 501-502

Shielded
No. 501. Ratio 4½ to 1.....$4.50
No. 502. Ratio 3 to 1..... 4.50
Unshielded
No. 503. Ratio 4½ to 1.....$3.75
No. 504. Ratio 3 to 1..... 3.50
No. 505. Ratio 4½ to 1..... 3.75
No. 506. Ratio 3 to 1..... 3.50

The new Kellogg Symphony Reproducer employs the magnetic diaphragm control exclusively.

Music comes in with a new charm, vocal selections have all the tone colorings of the artist.

Magnetic diaphragm control prevents excess vibration of the diaphragm, reproducing every sound with absolute fidelity. Every tone true.

No. 554. Black—Each.....$20.00

No. 554

If your dealer does not carry Kellogg, write us his name

Kellogg Switchboard & Supply Co.

1066 W. Adams Street **Chicago, Ill.**

Columbus **Kansas City** **San Francisco** **Portland**

Telephone Broadcasting Stations

For the United States

KDKA—Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa. 309.1 meters, 970 kilocycles, class B, 1000 watts. Daily ex Sun, 6:30-8:30 pm, music. Tues & Thurs, 10:30 pm, Sun, 10:45 am, 4:45 pm, 7:30 pm, church services. Eastern standard time. Slogan: "The Pioneer Broadcasting Station of the World."
1st Dial 2nd Dial 3rd Dial

KDLR—Radio Elec. Co., Devils Lake, N. D. 231 meters, 1300 kilocycles, class A, 5 watts. Daily, 12:10 pm, weather; 6:15 pm, markets. Mon, 9:30-11:30 pm, concert. Sun, 4:30-6 pm, concert. Central standard time. Slogan: "The Voice of the Lake Region."
1st Dial 2nd Dial 3rd Dial

KDPM—Westinghouse Elec. & Mfg. Co., Cleveland, Ohio. 250 meters, 1200 kilocycles, 500 watts, class A. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

KDPT—Southern Elec. Co., San Diego, Calif. 244 meters, 1230 kilocycles, 50 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KDYL—Newhouse Hotel, Salt Lake City, Utah. 245.8 meters, 1221 kilocycles, 50 watts, class A. Daily 3-4:30 pm; 6-6:30 pm. Mountain standard time.
1st Dial 2nd Dial 3rd Dial

KDZB—Frank E. Siefert, 1402 20th St., Bakersfield, Calif. 240 meters, 1250 kilocycles, 100 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFAB—Nebraska Buick Auto Co., 13th & Ive Sts., Lincoln, Nebr. 340 meters, 880 kilocycles, 500 watts, class A. Sun, 4-5 pm. Every night ex Sun & Thurs, 6-7 pm. Mon, Wed & Fri, 7:30-9:30 pm. Tues, 7:30-8:30 pm. Central standard time.
1st Dial 2nd Dial 3rd Dial

KFAD—McArthur Bros. Co., 134 S. Central St., Phoenix, Ariz. 278 meters, 1100 kilocycles, class A, 100 watts. Mountain time.
1st Dial 2nd Dial 3rd Dial

KFAE—The State College of Washington, Pullman, Wash. 348.6 meters, 910 kilocycles, 500 watts, class B. Mon, Wed & Fri, 7:30-9 pm. Pacific standard time. Slogan: "Your Service Station."
1st Dial 2nd Dial 3rd Dial

KFAF—Western Radio Corp., Denver, Colo. 278 meters, 1080 kilocycles, 500 watts, class A. Mountain time.
1st Dial 2nd Dial 3rd Dial

KFAJ—University of Colorado, Boulder, Colo. 261 meters, 1150 kilocycles, 100 watts, class A. Mountain time.
1st Dial 2nd Dial 3rd Dial

KFAN—University of Idaho, Moscow, Idaho. 231 meters, 1300 kilocycles, 50 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFAU—High School, Boise, Idaho. 278 meters, 1080 kilocycles, 750 watts, class A. Daily ex Sat & Sun, 4-4:45 pm, market, weather, educational. Mon & Fri, 8-10 pm, entertainment. Mountain time. Slogan: "Inter-Mountain Station."
1st Dial 2nd Dial 3rd Dial

KFAW—The Radio Den, 115 N. Broadway, Santa Ana, Calif. 280 meters, 1070 kilocycles, 10 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFBB—F. A. Buttrey Co., Havre, Mont. 275 meters, 1090 kilocycles, 50 watts, class A. Daily ex Sun, 12:45-1:30 pm. Mountain time.
1st Dial 2nd Dial 3rd Dial

KFBC—W. K. Azbill, 5038 Cliff Place, San Diego, Calif. 278 meters, 1080 kilocycles, 20 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFBG—First Presbyterian Church, Tacoma, Wash. 249 meters, 1200 kilocycles, 50 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFBK—Kimball Upson Co., 610 Calif. St., Sacramento, Calif. 283 meters, 1060 kilocycles, 100 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFBL—Leese Bros., 2814 Rucker Ave., Everett, Wash. 224 meters, 1340 kilocycles, 100 watts, class A. Daily ex Sat & Sun, 7:15 pm. Slogan: "The Spark Plug of the Northwest." Pacific time.
1st Dial 2nd Dial 3rd Dial

KFCB—Nielsen Radio Supply Co., 311 N. Central Ave., Phoenix, Ariz. 238 meters, 1260 kilocycles, 100 watts, class A. Mon, Wed & Sat nights, 8:30-9:30. Mountain time. Slogan: "When It's Winter Time in Michigan, It's Summer Time Down Here."
1st Dial 2nd Dial 3rd Dial

KFCC—First Congregational Church, Holter & Benton Sts., Helena, Mont. 248 meters, 1210 kilocycles, 10 watts, class A. Mountain time.
1st Dial 2nd Dial 3rd Dial

KFCF—Frank A. Moore, 707 Baker Bldg., Walla Walla, Wash. 256 meters, 1170 kilocycles, 100 watts, class A. Mon, 8-10 pm. Thurs & Fri, 8-12 pm, dance music. Pacific standard time. Slogan: "The Valley They Liked So Well They Named It Twice."
1st Dial 2nd Dial 3rd Dial

KFCY—Western Union College, Le Mars, Iowa. 252 meters, 1190 kilocycles, 50 watts, class A. Central standard time.
1st Dial 2nd Dial 3rd Dial

KFCZ—Omaha Central High School, Omaha, Nebr. 258 meters, 1160 kilocycles, 50 watts, class A. Central standard time.
1st Dial 2nd Dial 3rd Dial

KFDD—St. Michael's Cathedral, Boise, Idaho. 275 meters, 1090 kilocycles, 15 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFDH—University of Arizona, Tuscon, Ariz. 258 meters, 1150 kilocycles, 50 watts, class A. Mountain time.
1st Dial 2nd Dial 3rd Dial

KFDJ—Oregon Agricultural College, Corvallis, Ore. 254 meters, 1180 kilocycles, 100 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFDM—Magnolia Petroleum Co., Box 798, Beaumont, Texas. 315.6 meters, 950 kilocycles, 500 watts, class B. Tues & Fri, 12:30-1 pm, 7-7:30 pm, 8-10 pm. Sun, 11 am, 7:45 pm, services. Central standard time. Slogan: "Kali for Dependable Magnolene."
1st Dial 2nd Dial 3rd Dial

KFDX—First Baptist Church, Shreveport, La. 250 meters, 1200 kilocycles, 250 watts, class A. Sun, 10:45 am, 7:45 pm. Wed, 9-10 pm. Central standard time.
1st Dial 2nd Dial 3rd Dial

KFDY—South Dakota State College, Brookings, S. D. 273 meters, 1100 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFDZ—Harry O. Iverson 2510 Thomas Ave., South, Minneapolis, Minn. 231 meters, 1300 kilocycles, 10 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFEC—Meyer & Frank Co., Portland, Ore. 248 meters, 1210 kilocycles, 50 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFEL—W. L. Winner Radio Shop, Denver, Colo. 254 meters, 1184 kilocycles, 50 watts, class A. Mountain time.
1st Dial 2nd Dial 3rd Dial

KFEQ—Scroggin & Company, Bank, Oak, Nebr. 268 meters, 1110 kilocycles, 500 watts, class A. Sun, 4-6 pm. Tues, 7-8 pm. Wed, 9-10 pm. Central time.
1st Dial 2nd Dial 3rd Dial

KFEY—Bunker Hill & Sullivan Mining & Concentrating Co., 834 McKinley Ave., Kellogg, Idaho. 234 meters, 1290 kilocycles, 10 watts, class A.
1st Dial 2nd Dial 3rd Dial

KFFP—The First Baptist Church, Moberly, Mo. 266 meters, 1130 kilocycles, 50 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFFV—Graceland College, Lamoni, Iowa. 250 meters, 1200 kilocycles, 100 watts, class A. Mon, 7:30 pm. Thurs, 7:30 pm. First Sun each month, 7:45 pm. Second, third & fourth Sun, 11 am. Central standard time. Slogan: "School with t · Personal Touch."
1st Dial 2nd Dial 3rd Dial

KFGC—Louisiana State University, Baton Rouge, La. 268 meters, 1120 kilocycles, 100 watts, class A. Central standard time.
1st Dial 2nd Dial 3rd Dial

KFGD—Oklahoma College for Women, Chickasha, Okla. 252 meters, 1190 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFGQ—The Crary Hardware Co., Boone, Iowa. 226 meters, 1330 kilocycles, 10 watts, class A. Wed, 8-9. Sun, 3-4. Central standard time. Slogan: "Daniel Boone Station."
1st Dial 2nd Dial 3rd Dial

KFHA—Western State College of Colorado, Gunnison, Colo. 252 meters, 1190 kilocycles, 50 watts, class A. Tues, 7:30-9 pm. Fri, 9:30 pm. Mountain standard time. Slogan: "Where the Sun Shines Every Day."
1st Dial 2nd Dial 3rd Dial

KFHL—Penn College, Oskaloosa, Iowa. 240 meters, 1250 kilocycles, 10 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFI—Earle C. Anthony, Inc., Packard Motor Car Bldg., Los Angeles, Calif. 467 meters, 642 kilocycles, 3000 watts, class B. Daily 5-5:30 pm, 6-6:15 pm, 6:45-11 pm. Sat, 6:45 pm, to 3 am. Sun, 10-10:45 am, 4-5 pm, 6:30 11 pm. Pacific standard time. Slogan: "A National Institution."
1st Dial 2nd Dial 3rd Dial

KFIF—Benson Polytechnic Institute, Portland, Ore. 248 meters, 1210 kilocycles, 100 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFIO—Radio Club of North Central High School, Spokane, Wash. 363 meters, 1130 kilocycles, 100 watts, class B. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFIQ—First Methodist Church 332 Miller Bldg., Yakima, Wash. 256 meters, 1170 kilocycles, 100 watts, class A. Wed & Sat, 7:30 pm. Sun, 11 am, 7:30 pm. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFIU—Alaska Elec. Light & Power Co., Juneau, Alaska. 226 meters, 1330 kilocycles, 10 watts, class A. Mon, Wed & Fri, 6-7 pm. Alaska time. (Note: 6 am Seattle time is 5 am Alaska time.) Slogan: "A Voice from the Far North."
1st Dial 2nd Dial 3rd Dial

KFIZ—The Daily Commonwealth & The Seyfert Radio Corp., Fond du Lac, Wis. 225 meters, 1320 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFJB—Marshall Elec. Co., 1603 W. Main St. Marshalltown, Iowa. 248 meters, 1210 kilocycles, 10 watts, class A. Daily ex Sun, 10 am, market reports. Tues & Fri, 8:30 pm. Central standard time. Slogan: "Marshalltown, the Heart of Iowa."
1st Dial 2nd Dial 3rd Dial

KFJC—R. B. Fegan (auspices of the Episcopal Church), 410 N. Jefferson St., Junction City, Kan. 218 meters, 1370 kilocycles, 10 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

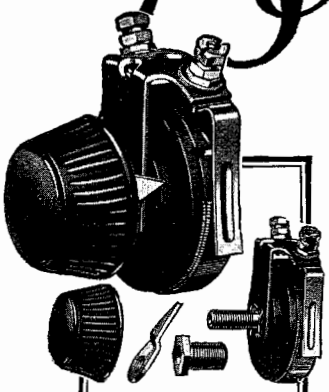
KFJF—National Radio Mfg. Co., 406 N. Hudson St., Oklahoma City, Okla. 261 meters, 1150 kilocycles, 225 watts, class A. Sun, 11 am, 8 pm, church services. Daily ex Sun, 9:40 am, 12:15, 2:15 pm, markets; 7 pm, news items. Tues, Thurs, 8 pm, music. Central standard time. Slogan: "Radio Headquarters."
1st Dial 2nd Dial 3rd Dial

KFJI—Liberty Theatre & E. E. Marsh, Astoria, Ore. 245 meters, 1220 kilocycles, 10 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFJM—University of North Dakota, Grand Forks, N. D. 278 meters, 1080 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

Now! C-H Quality at a New Low Price

75c



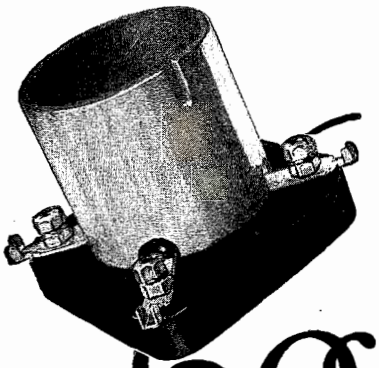
The Perfected C-H Rheostat

Designed to radio engineers' specifications. Revolving drum type with one hole mounting. All spring tensions adjusted at factory and undisturbed by mounting. Instrument cannot turn on panel. Very small size—less than ¾ inch back of panel and narrower than standard socket. Operation smooth and quiet. 6 ohms, 15 ohms, and 30 ohms—perfect control for all tubes and their combinations.

C-H Radio Potentiometer

Similar in construction to the perfected rheostat. 400 ohms and only a little larger than a silver dollar. Perfect, smooth operation—no back lash or sticking. Price $1.00.

Operating parts built as unit—the C-H Perfected Rheostat is not dismantled for mounting on panel. Rheostat is locked in place and knob positioned without a single set screw.



60c

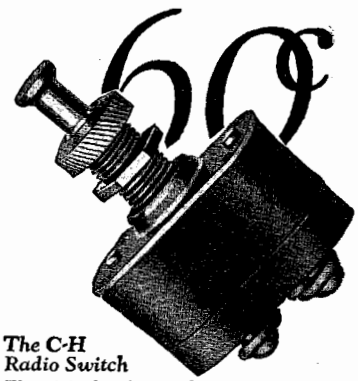
The C-H Low Loss Socket

The revolutionary socket design that created a sensation everywhere. Thin ORANGE Bakelite shell. Base of heatproof Thermoplax—terminals cannot loosen under heat of soldering iron. Contacts grip both sides of each tube prong and are SILVER plated to prevent corrosion losses. Preferred by careful builders at 90c—now 60c because of huge production savings.

60c

C-H Radio Toggle Switch

The newest idea in panel switches. ON or OFF with a flip of the finger. Beautiful appearance and simple one hole mounting—neat etched plate for panel provides definite indication. Quiet, easy operating switch mechanism.



60c

The C-H Radio Switch

The original radio switch. Millions in use. One hole mounting—high capacity mechanism. The only radio switch approved for 110 volt circuits by the Underwriters Laboratories. Ideal for batteryless sets or higher voltage circuits. Many switches now have buttons to look like the C-H but the patented mechanism cannot be duplicated. Demand the orange and blue box for satisfaction.

The name Cutler-Hammer has held an enviable position in radio. Consistently from the earliest days has the C-H trade mark been synonymous with proper design and unequalled precision. Radio builders everywhere justly had faith in these foremost engineers and millions of their radio parts in the orange and blue boxes have helped build receiving sets of quality.

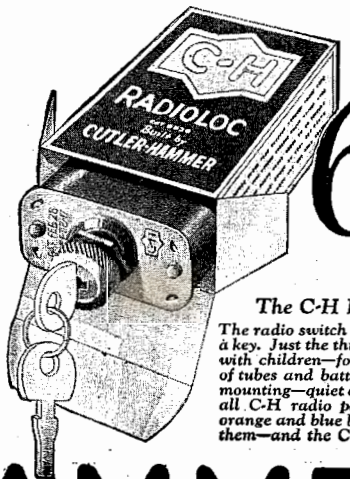
Better Sets at Lower Cost

These millions of sales have brought down manufacturing costs and today this quality carries no premium. Demanding the C-H trade mark now not only insures satisfaction, but provides a saving. Dealers everywhere are ready to serve you. If yours has not yet stocked any C-H part you desire, send us his name and we will see that you are supplied.

THE CUTLER-HAMMER MFG. CO.

Member Radio Section, Associated Manufacturers of Electrical Supplies

MILWAUKEE AND NEW YORK



60c

The C-H Radioloc

The radio switch that locks with a key. Just the thing for the home with children—for the protection of tubes and batteries. One hole mounting—quiet operation. Like all C-H radio parts, packed in orange and blue boxes. Look for them—and the C-H trade mark.

CUTLER-HAMMER

Buy Your Radio Parts by Name

KFUP—Fitzsimmons General Hospital, Denver, Colo. 234 meters, 1280 kilocycles, 50 watts, class A. Mountain time.
1st Dial 2nd Dial 3rd Dial

KFUQ—Julius Brunton & Sons Co., San Francisco, Calif. 234 meters, 1280 kilocycles, 5 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFUR—Peery's Egyptian Theater, H. W. Peery, Mgr., Ogden, Utah. 224 meters, 1340 kilocycles, 100 watts, class A. Tues, Thurs, Sat, 9:50-11:50 pm. Mountain time.
1st Dial 2nd Dial 3rd Dial

KFUS—Louis L. Sherman, Oakland, Calif. 234.5 meters, 1290 kilocycles, 50 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFUT—University of Utah, Salt Lake City, Utah. 261 meters, 1150 kilocycles, 100 watts, class A. Mountain time.
1st Dial 2nd Dial 3rd Dial

KFUU—Colburn Radio Laboratories, 448 Dowling Blvd., San Leandro, Calif. 224 meters, 1340 kilocycles, 50 watts, class A. Mon, Wed & Fri, 8-9:30 pm. Pacific standard time. Slogan: "Voice of the Cherry City."
1st Dial 2nd Dial 3rd Dial

KFUV—G. Pearson Ward, 236 W. State St., Springfield, Mo. 252 meters, 1190 kilocycles, 10 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFUY—Irvine H. Bouchard, 5 S. Excelsior Ave., Butte, Mont. 254 meters, 1180 kilocycles, 5 watts, class A. Mountain time.
1st Dial 2nd Dial 3rd Dial

KFUZ—Y. M. C. A., 510½ Chestnut St., Virginia, Minn. 248 meters, 1190 kilocycle, 10 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFVC—Bensberg's Music Co., 214 S. Adams St., Camden, Ark. 242 meters, 1240 kilocycles, 10 watts, class A. Central time. Slogan: "Rum Folks Visit Camden."
1st Dial 2nd Dial 3rd Dial

KFVD—McWhinnie Elec. Co., San Pedro, Calif. 205 meters, 1460 kilocycles, 50 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFVE—Film Corp. of America, University City, St. Louis, Mo. 240 meters, 1250 kilocycles, 500 watts, class A. Daily ex Thurs, 6:30-10 pm. Central standard time. Slogan: "You Will Know KFVE by the Tick of Her Clock."
1st Dial 2nd Dial 3rd Dial

KFVF—Clarence B. Juneau, 8091 Santa Monica St., Hollywood, Calif. 208 meters, 1440 kilocycles, 10 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFVG—First Methodist Episcopal Church, 204 S. Penn Ave., Independence, Kans. 236 meters, 1270 kilocycles, 10 watts, class A. Sun, 10:55 am, 7:30 pm, church services. Central standard time. Slogan: "The Buckle on the Oil Belt."
1st Dial 2nd Dial 3rd Dial

KFVH—Whan Radio Shop (Herbert Whan), 221 Poyntz St., Manhattan, Kans. 218.8 meters, 1370 kilocycles, 15 watts, class A. Irregular schedules. Central standard time. Slogan: "Kansas Fans Very Happy."
1st Dial 2nd Dial 3rd Dial

KFVI—Headquarters Troop, 56th Cavalry Brigade, 305 Sabine St., Houston, Texas. 248 meters, 1210 kilocycles, 10 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFVK—Sacramento Chamber of Commerce, Cor. 10th & J Sts., Sacramento, Calif. 248 meters, 1210 kilocycles, 500 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFVL—Richard F. Lussier, 1st Lt. Hd. 5th Inf. Brigade, USA, Vancouver, Wash. 231 meters, 1300 kilocycles, 5 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFVN—Carl E. Bagley, Welcome, Minn. 227 meters, 1320 kilocycles, 10 watts, class A. Mon, Wed & Fri, 9 pm, Sun, 3 pm, church services. Central standard time. Slogan: "The Voice of Martin County."
1st Dial 2nd Dial 3rd Dial

KFVR—Moonlight Ranch Broadcasting Station (Eugene Rossi), Route No. 6, Denver, Colo. 246 meters, 1220 kilocycles, 50 watts, class A. Mountain time.
1st Dial 2nd Dial 3rd Dial

KFVS—Cape Girardeau Battery Station, 312 S. Frederick St., Cape Girardeau, Mo. 224 meters, 1340 kilocycles, 50 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFVU—The Radio Shop, 531 G St., Eureka, Calif. 209.7 meters, 1429 kilocycles, 5 watts, class A. Mon, Wed, Fri, 8-10 pm. Wed, 10-12, redwood choppers program. Pacific time. Slogan: "Eureka on the Redwood Highway, the End of the West."
1st Dial 2nd Dial 3rd Dial

KFVW—Airfan Radio Corp., 402 B St., San Diego, Calif. 246 meters, 1220 kilocycles, 500 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFVX—Radio Shop, 1211 S. Main St., Bentonville, Ark. 236 meters, 1270 kilocycles, 10 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFVY—Radio Supply Co., 413 W. Central Ave., Albuquerque, N. Mex. 250 meters, 1200 kilocycles, 10 watts, class A. Mountain time.
1st Dial 2nd Dial 3rd Dial

KFVZ—Glad Tidings Tabernacle, Inc., 1536 Ellis St., San Francisco, Calif. 234 meters, 1280 kilocycles, 50 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFWA—Browning Bros. Co., 2451 Kiesel St., Ogden, Utah. 261 meters, 1153 kilocycles, 500 watts, class A. Mon, Wed, Fri, 4-5 pm, 9-11 pm. Tues, Thurs, Sat, 4-5 pm, Sun, 9-11 pm. Mountain time. Slogan: "Keeping Friends with All."
1st Dial 2nd Dial 3rd Dial

KFWB—Warner Bros. Motion Picture Studios, Inc., 5842 Sunset Blvd., Hollywood, Calif. 252 meters, 1190 kilocycles, 500 watts, class A. Mon, Tues, Wed, 6-11 pm, Thurs, 7:40-11 pm. Fri & Sat, 8-11 pm (Sat, 2-3 pm). Sun, 9-11 pm. Pacific time. Slogan: "Movieland—Lights—Camera—Action."
1st Dial 2nd Dial 3rd Dial

KFWC—L. E. Wall, Upland, Calif. 211.1 meters, 1420 kilocycles, 50 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFWD—Arkansas Light & Power Co., Arkadelphia, Ark. 266 meters, 1130 kilocycles, 500 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFWF—St. Louis Truth Center, 4030 Lindell St., St. Louis, Mo. 214 meters, 1400 kilocycles, 500 watts, class A. Church services Sun and Thurs, 10:45 am, 7:45 pm. Central standard time. Slogan: "Kind Favors Wins Friends."
1st Dial 2nd Dial 3rd Dial

KFWH—F. Wellington Morse, Jr., Chico, Calif. 254 meters, 1180 kilocycles, 100 watts, class A. Mon, Wed, Fri, 8-10 pm. Pacific standard time. Slogan: "Kind Friends We're Here."
1st Dial 2nd Dial 3rd Dial

KFWI—Radio Entertainments (Inc.), 1085 Monadnock Bldg., South San Francisco, Calif. 220 meters, 1360 kilocycles, 500 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFWM—Oakland Educational Society, 1520 8th Ave., Oakland, Calif. 224 meters, 1340 kilocycles, 500 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KFWO—Major Lawrence Mott, Avalon, Catalina Island, Calif. 346 Claressa Ave. 211.1 meters, 1420 kilocycles, 250 watts, class A. Daily, 12-1:30, 5-6 pm, 6:30-8 pm. Pacific standard time. Slogan: "Katalina for Wonderful Outings."
1st Dial 2nd Dial 3rd Dial

KFWP—Rio Grande Radio Supply House, Brownsville, Texas. 214.2 meters, 1400 kilocycles, 10 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFWU—Louisiana College, Pineville, La. 238 meters, 1260 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KFWV—Wilbur Jerman, 385 58th St., S., Portland, Ore. 212.6 meters, 1410 kilocycles, 5 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KGB—Tacoma Daily Ledger, Tacoma, Wash. 249.7 meters, 1109 kilocycles, 100 watts, class A. Mon, Wed, Fri, 7-9 pm. Tues, Thurs, 6-7:30 pm. Sat, 6-7:30 pm, 8:30-12 midnight. Pacific standard time. Slogan: "The Lumber Capital of the World."
1st Dial 2nd Dial 3rd Dial

KGO—General Elec. Co., 5555 E. 14th St., Oakland Calif. 300 meters, 1000 kilocycles, 1000 watts, class B. Daily ex Sun, 7:15 am, 8:15 am, health exercises; 8:30, 11:30 am, concert; 1:30 pm, stock market, weather (Sat, 12:30 pm). Tues, Wed, Thurs, Fri, Sat, 4-5:30 pm, music. Mon, Tues, Thurs, Sat, 8-10 pm; Tues, Thurs, Sat, 10-1 am, dance. Sun, 11 am, services; 3:30-5:30 pm, concert; 7:45 pm, services. Pacific time.
1st Dial 2nd Dial 3rd Dial

KGTT—Glad Tiding Temple, 1536 Ellis St., San Francisco, Calif. 234 meters, 1280 kilocycles, 50 watts. Daily ex Thurs, 8-9:45. Pacific standard time.
1st Dial 2nd Dial 3rd Dial

KGU—Marion A. Mulrony, 236 King St., Honolulu, Hawaii. 270 meters, 1110 kilocycles, 500 watts, class A. 2½ hours' later than Pacific time.
1st Dial 2nd Dial 3rd Dial

KGW—The Morning Oregonian, Portland, Ore. 491.5 meters, 610 kilocycles, 500 watts, class B. Daily ex Sun, 11:30-11:45 am, weather; 12:30-1:30 pm, music; 7:30-7:45, market, news. Mon, 6-7 pm, organ. Tues, Wed, Thurs, Sun, 9-10 pm. Tues, Thurs, Sat, 10-12 pm. Wed, Thurs, 8-9 pm. Wed, 10-11 pm. Fri, 10:30-12 pm, frolic. Sat, 6-8 pm. Sun, 10:30-12 noon, 7:45-9 pm, church services. Pacific standard time. Slogan: "Keep Growing Wiser."
1st Dial 2nd Dial 3rd Dial

KGY—St. Martin's College, Lacey, Wash. 246 meters, 1220 kilocycles, 50 watts, class A. Sun, Tues, Thurs, 8:30-9:30 pm. Pacific standard time. Slogan: "Out Where the Cedars Meet the Sea."
1st Dial 2nd Dial 3rd Dial

KHJ—Times-Mirror Co., 1st & Broadway, Los Angeles, Calif. 405.2 meters, 740 kilocycles, 500 watts, class B. Daily ex Sat, Sun, Mon, 7-7:30 am, 12-1:30 pm, 2:30-3:30 pm, 5:30-11 pm. Sat, 5:30 pm-2 am. Sun, 10-12:30 pm, 6-10 pm. Mon, 12-1:30 pm only. Pacific time. Slogan: "Kindness, Happiness and Joy."
1st Dial 2nd Dial 3rd Dial

KHQ—Louis Wasmer, Excelsior, Motorcycle & Bicycle Co., Seattle, Wash. 278 meters, 1100 kilocycles, 100 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KJBS—Julius Brunton & Sons Co., 1380 Bush St., San Francisco, Calif. 238 meters, 1270 kilocycles, 5 watts, class A. Sun, 5-6:30 pm. Mon, 9-11:30 am, 2-2:30 pm, 8-10 pm. Tues, 9-11:30 am, 2-2:30 pm, 6:30-7:30 pm. Wed, 9-11:30 am, 2-2:30 pm, 8-10 pm. Thurs, 9-11:30 am, 2-2:30 pm, 6:30-7:30 pm. Fri, 9-11:30 am, 2-2:30 pm, 8-10 pm, 10-11:30 pm. Sat, 9-11:30 am, 2-2:30 pm. Pacific standard time. Slogan: "Kleen Jokes, Better Songs."
1st Dial 2nd Dial 3rd Dial

KJQ—C. O. Gould, 615 E. Main St., Stockton, Calif. 248 meters, 1100 kilocycles, 5 watts, class C. Wed, 8-11 pm. Sat, 9-11 pm. Pacific standard time. Slogan: "Gould the Light Man."
1st Dial 2nd Dial 3rd Dial

KJR—Northwest Radio Service Co., 614 Terminal Sales Bldg., Seattle, Wash. 384.4 meters, 780 kilocycles, 1000 watts, class B. Mon, Fri, 1-11 pm. Tues, Wed, 9-1 pm. Thurs, 12:45-1 pm. Sat, 1-10 pm. Sun, 11-12:30 am, 7:15-9 pm, church services. Pacific standard time.
1st Dial 2nd Dial 3rd Dial

KJS—Bible Institute of Los Angeles, Inc. 536 S. Hope St., Los Angeles, Calif. 293 meters, 1020 kilocycles, 750 watts, class B. Pacific time.
1st Dial 2nd Dial 3rd Dial

KLDS—Reorganized Church of Jesus Christ of Latter Day Saints, Box 255, Independence, Mo. 440.9 meters, 680 kilocycles, 1000 watts, class B. Sun, 11 am, 6:30 pm, 9 pm, church services. Tues, Thurs, Sat, 8 pm. Central standard time. Slogan: "KLDS of Missouri—the Land of Promise."
1st Dial 2nd Dial 3rd Dial

KLS—Warner Bros. Radio Supplies Co., 22nd & Telegraph Ave., Oakland, Calif. 242 meters, 1240 kilocycles, 250 watts, class A. Sun, 10-11 am. Pacific time. Slogan: "City of Golden Opportunities."
1st Dial 2nd Dial 3rd Dial

KLX—The Tribune Pub. Co., Oakland, Calif. 508 meters, 588 kilocycles, 500 watts, class B. Daily ex Sun, 7-7:30 pm. Mon, Fri, 8-10:30 pm. Wed, 8-11:30 pm. Pacific standard time. Slogan: "Where Rail and Water Meet."
1st Dial 2nd Dial 3rd Dial

KLZ—Reynolds Radio Co., 1385 S. Marion, Denver, Colo. 266 meters, 1150 kilocycles, 1000 watts, class A. Mountain time. Slogan: "'Tis a Privilege to Live in Colorado."
1st Dial 2nd Dial 3rd Dial

KMA—May Seed & Nursery Co., Shenandoah, Iowa. 252 meters, 1190 kilocycles, 500 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KMJ—Fresno Bee, Fresno, Calif. 234 meters, 1280 kilocycles, 50 watts, class A. Mon, Wed & Fri, 7:15-9:15 pm. Tues, Thurs, Sat, 2-3 pm. Pacific time.
1st Dial 2nd Dial 3rd Dial

KMO—Association Station (Love Elec. Co.), Tacoma, Wash. 250 meters, 1200 kilocycles, 10 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KNX—Los Angeles Evening Express, 6116 Hollywood Blvd. Hollywood, Calif. 336.9 meters, 890 kilocycles, 500 watts, class B. Daily every hour on the hour, 7-8 pm, 6-12 pm. Pacific standard time. Slogan: "The Voice of Hollywood."
1st Dial 2nd Dial 3rd Dial

KOA—General Elec Co., Rocky Mountain Broadcasting Station, 1370 Krameria St., Denver, Colo. 322.4 meters, 930 kilocycles, 2000 watts, class B. Daily ex Sun, 11:45 am, weather, stocks. Tues, Thurs & Fri, 8 pm, musical; 3:30 pm, housewives' matinee; 4 pm, fashion review; 6 pm, stocks, markets, news; 6:30 pm, orchestra. Mon & Wed, 7:30 pm, sandman's hour. Mon, Wed, Fri, 8 pm, studio program. Wed, Sat, 10 pm-12 midnight, dance. Sun, 11 am, 7:45 pm, church services; 4 pm, music hour. Mountain standard time. Slogan: "Rocky Mountain Broadcasting Station."

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WDBS—The S. M. K. Radio Corp., 39 E. 3rd St., Dayton, Ohio. 275 meters, 1090 kilocycles, 5 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WDBX—Otto Baur, 138 Dyckman St., New York, N. Y. 233 meters, 1290 kilocycles, 5 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WDBY—North Shore Congregational Church, 1011 Wilson Ave., Chicago, Ill. 258 meters, 1160 kilocycles, 500 watts, class A. Sun, 11 am-12:30 pm, 3:30-5 pm, 7:45-9:30 pm. Wed, Fri, 7:30-9 pm. Central standard time. Slogan: "Church by the Side of the Road."
1st Dial 2nd Dial 3rd Dial

WDBZ—Ulster County Council, Boy Scouts of America, Kingston, N. Y. 233 meters, 1290 kilocycles, 5 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WDOD—Chattanooga Radio Co., Inc., 17 E. 6th St., Chattanooga, Tenn. 256 meters, 1170 kilocycles, 50 watts class A. Sun, 7:30-9 pm. Mon, Wed, Fri, 8:30-10:30 pm. Central standard time. Slogan: "Dynamo of Dixie."
1st Dial 2nd Dial 3rd Dial

WDRC—Doolittle Radio Corp., 115 Crown St., New Haven, Conn. 268 meters, 1120 kilocycles, 100 watts, class A. Sun, 11 am, church services. Mon, 8:15 pm, theater program. Thurs, 8 pm, studio program. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WDS—Penna. Power & Light Co., Pottsville, Pa. 137 meters, 2188 kilocycles. Eastern time.
1st Dial 2nd Dial 3rd Dial

WDWF—Dutee Wilcox Flint, Inc., Allens Avenue, Cranston, R. I. 440.9 meters, 680 kilocycles, 500 watts, class B. Eastern time.
1st Dial 2nd Dial 3rd Dial

WDZ—James L. Bush, Tuscola, Ill. 278 meters, 1080 kilocycles, 100 watts, class A. Daily ex Sat & Sun, 8-8:30 am, 9-9:30, 10-10:30, 11:30 am, 12-12:15 pm. Sat, 8-8:30, 9-9:30, 10-10:30 am. Central standard time.
1st Dial 2nd Dial 3rd Dial

WEAF—American Telephone & Telegraph Co., 195 Broadway, New York City, N. Y. 492.5 meters, 610 kilocycles. 3500 watts, class B. Daily ex Sun, 6:45-7:45 am, 4-5 pm. Daily ex Sun, Mon, Fri, 11-12 am. Daily ex Mon & Sun, 6-12 pm. Mon, 6-11:30 pm. Sun, 3-5, 7:20-10:15 pm. Eastern time.
1st Dial 2nd Dial 3rd Dial

WEAH—Wichita Board of Trade, Wichita, Kansas. 268 meters, 1120 kilocycles, 50 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WEAI—School of Electric Engineering, Cornell University, Ithaca, N. Y. 254 meters, 1180 kilocycles, 500 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WEAJ—University of South Dakota, Vermillion, S. Dak. 278 meters, 1060 kilocycles, 100 watts, class A. Wed evenings during college year, 8-11 pm. Central standard time. Slogan: "South Dakota U for South Dakotans."
1st Dial 2nd Dial 3rd Dial

WEAM—Borough of North Plainfield, North Plainfield, N. J. 261 meters, 1150 kilocycles, 250 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WEAN—The Shepard Stores, Westminster St., Providence, R. I. 270 meters, 1110 kilocycles, 100 watts, class A. Daily, 12-1-4-5-6:30-11 pm. Eastern standard time. Slogan: "We Entertain a Nation."
1st Dial 2nd Dial 3rd Dial

WEAO—Ohio State University, Columbus, Ohio. 293.9 meters, 1020 kilocycles, 500 watts, class B. Daily ex Sun & holidays, 9:45 am, weather, market; 11 am, weather, market reports; 1 pm, music & market; 8 pm (Wed) lectures and musical program. Thurs, 8-10 pm, lectures & music. Eastern standard time. Slogan: "Where Education Advances Ohio."
1st Dial 2nd Dial 3rd Dial

WEAR—The Goodyear Tire & Rubber Co., 2023 Union Trust Bldg., Cleveland, Ohio. 389.4 meters, 770 kilocycles, 1000 watts, class B. Daily, 7-8 pm. Daily ex Sun, 11 am-11:30-12 noon. Daily ex Sat & Sun, 3:30 pm. Tues, Thurs & Fri, 7-11 pm. Sun, 3:30-5-7-8 pm. Eastern standard time. Slogan: "Goodyear Tires, WEAR."
1st Dial 2nd Dial 3rd Dial

WEAU—Davidson Bros. Co., Sioux City, Iowa. 275 meters, 1090 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WEAY—Iris Theater, 612 Travis St., Houston, Tex. 270 meters, 1110 kilocycles, 500 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WEBA—The Electric Shop, 131 Church St., New Brunswick, N. J. 233 meters, 1290 kilocycles, 15 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WEBC—Walter C. Bridges, 1011 N. 21st St., Superior, Wis. 242 meters, 1240 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WEBD—Electrical Equipment & Service Co., Anderson, Ind. 246 meters, 1220 kilocycles, 15 watts, class A. Mon, Wed, Fri & Sun evenings, 8:30-9:30 pm. Central standard time. Slogan: "Willard Expert Battery Doctors."
1st Dial 2nd Dial 3rd Dial

WEBE—Roy W. Waller, 319 Wall St., Cambridge, Ohio, 234 meters, 1280 kilocycles, 10 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WEBH—Edgewater Beach Hotel, Chicago Evening Post, 5300 Sheridan Rd., Chicago, Ill. 370 meters, 810 kilocycles, 1000 watts, class B. 7:30-8:30 pm, 9:30-10:30 pm, 11:30 pm-1 am. Central standard time. Slogan: "Voice of the Great Lakes."
1st Dial 2nd Dial 3rd Dial

WEBJ—Third Avenue Railway System, 130th St. and Third Ave., New York, N. Y. 273 meters, 1100 kilocycles, 500 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WEBK—Grand Rapids Radio Co., Hotel Rowe, Grand Rapids, Mich. 242 meters, 1240 kilocycles, 20 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WEBL—Radio Corp. of America, Woolworth Bldg., New York City, N. Y. (portable). 226 meters, 1330 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WEBM—Radio Corp. of America, Woolworth Bldg., New York City, N. Y. (portable). 226 meters, 1330 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WEBQ—Tate Radio Co. (Jos. R. Tate), Harrisburg, Ill. 226 meters, 1330 kilocycles, 10 watts. Daily ex Sun, 7-15 pm, local news, markets. Tues, Fri, 8-10 pm, entertainment. Sun, 7-8:30 pm, church services. Central standard time. Slogan: "Blue Bird Station."
1st Dial 2nd Dial 3rd Dial

WEBR—Howell Elec. Co., 54 Niagara St., Buffalo, N. Y. 244 meters, 1230 kilocycles, 50 watts, class A. Tues, Thurs, Sat, 7:45-8:30 pm, bed time stories; 8:30-12 midnight, concert. Sun, 12 noon-3 pm, concert. Eastern standard time. Slogan: "We Extend Buffalo's Regards."
1st Dial 2nd Dial 3rd Dial

WEBT—The Dayton Co-operative Industrial High School, Dayton, Ohio. 256 meters, 1170 kilocycles, 5 watts, class A. Irregular schedules. Central standard time. Slogan: "Worthy Effort Brings Triumph."
1st Dial 2nd Dial 3rd Dial

WEBW—Beloit College, Beloit, Wis. 268 meters, 1120 kilocycles, 500 watts, class A. Sun, 4:30-5:30 pm. Tues, 8-9:30 pm. Central standard time.
1st Dial 2nd Dial 3rd Dial

WEBZ—Savannah Radio Corp., Savannah, Ga. 234 meters, 1280 kilocycles, 5 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WEEI—Edison Elec. Illuminating Co., 39 Boylston St., Boston, Mass. 476 meters, 630 kilocycles, 500 watts, class B. Daily ex Sat, 6-11 pm. Sun, 7-10 pm. Eastern standard time. Slogan: "The Friendly Voice."
1st Dial 2nd Dial 3rd Dial

WEHS—Evanston Township High School, Evanston, Ill. 202.6 meters, 1480 kilocycles, 20 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WEMC—Emanuel Missionary College, Berrien Springs, Mich. 286 meters, 1050 kilocycles, 500 watts, class B. Mon & Wed, 8:15 pm, music and educational lectures. Fri, 9 pm, music. Sun, 11 am, chapel service; 8:15 chapel service. Central standard time. Slogan: "The Radio Lighthouse."
1st Dial 2nd Dial 3rd Dial

WENR—All-American Radio Corp., 4201 Belmont Ave., Chicago, Ill. 266 meters, 1130 kilocycles, 1000 watts, class A. Mon, 6-7 pm. Tues, Thurs, 6-7 pm, 8-10 pm. Wed, Fri, Sat, 6-7 pm, 8-10 pm, 12 midnight. Sun, 2-4 pm, 6-8 pm, 9:30 pm. Central standard time.
1st Dial 2nd Dial 3rd Dial

WEW—St. Louis University, University Station, St. Louis, Mo. 248 meters, 1210 kilocycles, 100 watts, class A. Daily, 9-10 am, 2-5 pm, market, weather. Tues, 7 pm, literary reading. Thurs, 7 pm, musical. Sun, 7:30, lecture. Central standard time.
1st Dial 2nd Dial 3rd Dial

WFAA—Dallas News & Journal, Dallas, Tex. 475.9 meters, 630 kilocycles, 500 watts, class B. Daily, 10:30-10:55 am, weather, markets; 12:30-1 pm, lectures; 3:30-4 pm, agriograms, health bulletins; 4:30-5 pm, news and sports; 6:30-7:30 pm, concert; 8:30-9:30 pm, concert, weather; 9:30-11 pm, concert, weather. Wed, 12:30-1 pm. Tues, Thurs, Sat, 11 pm-12 midnight. Central standard time. Slogan: "Working for All Alike."
1st Dial 2nd Dial 3rd Dial

WFAM—Times Publ. Co., St. Cloud, Minn. 273 meters, 1100 kilocycles, 10 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WFAV—Dept. of Elec. Engineering, University of Nebraska, Lincoln, Nebr. 275 meters, 1090 kilocycles, 500 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WFBC—First Baptist Church, Knoxville, Tenn. 250 meters, 1200 kilocycles, 50 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WFBD—Gethsemane Baptist Church, Philadelphia, Pa. 234 meters, 1280 kilocycles, 5 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WFBE—Van de Walle Music & Radio Co., 208 W. 2nd St., Seymour, Ind. 226 meters, 1330 kilocycles, 20 watts, class A. Mon, Wed and Fri, 9-10 pm. Central standard time. Slogan: "Wait for Better Entertainment."
1st Dial 2nd Dial 3rd Dial

WFBG—The Gable-Tribune Broadcast Station, Altoona, Pa. 277.8 meters, 1080 kilocycles, 100 watts, class A. Eastern standard time. Slogan: "Altoona, the Original Gateway to the West."
1st Dial 2nd Dial 3rd Dial

WFBH—Concourse Radio Corp., Hotel Majestic, 72nd St. & Central Park West, New York City, N. Y. 272.6 meters, 1010 kilocycles, 500 watts, class A. Sun, 9-11 am, 5-8 pm, 11:30 pm-1:30 am. Mon, Tues, Fri, 11-1 am, 2-7 pm, 11:30 pm-1:30 am. Wed, Thurs, 11-1 am, 2-8 pm, 11:30 pm-1:30 am, Sat, 9-11 am, 2-8 pm, 11:30 pm-1:30 am. Eastern time. Slogan: "Voice of Central Park."
1st Dial 2nd Dial 3rd Dial

WFBI—Galvin Radio Supply Co., 516 Broadway, Camden, N. J. 236 meters, 1160 kilocycles, 500 watts, class A. Mon, Thurs, Fri, 9:30-12 midnight. Eastern standard time. Slogan: "In Camden, the City of Opportunity."
1st Dial 2nd Dial 3rd Dial

WFBJ—St. John's University, Collegeville, Minn. 286 meters, 1270 kilocycles, 50 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WFBK—Dartmouth College, Hanover, N. H. 256 meters, 1172 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WFBL—The Onondaga Hotel, Syracuse, N. Y. 252 meters, 1190 kilocycles, 100 watts, class A. Daily, 3-4 pm, 6:30-8:30 pm, Tues & Thurs, 10:30-11:30 pm. Fri, 9-10 pm. Eastern standard time. Slogan: "When Feeling Blue Listen."
1st Dial 2nd Dial 3rd Dial

WFBM—Merchants Heat & Light Co., Indianapolis, Ind. 268 meters, 1126 kilocycles, 250 watts, class A. Daily ex Sat, Sun, 5:30 pm-12 midnight. Sun, church services. Central standard time. Slogan: "The Goodwill Station—Convention City."
1st Dial 2nd Dial 3rd Dial

WFBN—Radio Sales & Service Co., 1 Broad St., Bridgewater, Mass. 226 meters, 1330 kilocycles, 20 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WFBQ—Wynne Radio Co., Raleigh, N. C. 252 meters, 1190 kilocycles, 50 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WFBR—Fifth Infantry, Maryland Nat'l Guards, Baltimore, Md. 254 meters, 1180 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WFBZ—Knox College, Galesburg, Ill. 254 meters, 1180 kilocycles, 10 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WFDF—Frank D. Fallain, 321 1st Ave., Flint, Mich. (Station at Police Bldg.) 234 meters, 1280 kilocycles, 100 watts, class A. Mon, Wed, Fri (also special broadcasts). Eastern standard time. Slogan: "The Vehicle City."
1st Dial 2nd Dial 3rd Dial

WFI—Strawbridge & Clothier, 8th & Market Sts., Philadelphia, Pa. 394.5 meters, 760 kilocycles, 500 watts, class B. Daily afternoons. Tues, Thurs & Sat evenings, Sun, irregular. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WFKB—Francis K. Bridgman, 4536 Woodlawn Ave., Chicago, Ill. 217.3 meters, 1380 kilocycles, 200 watts, class A. Tues, Thurs & Fri, 7-8 pm, classical; 8-10 pm.concert. Wed, Sat, 7-7:30 pm, children's program; 7:30-8:30 pm, classical; 8:30-10 pm, concert. Central time.
1st Dial 2nd Dial 3rd Dial

Prest-O-Lite

There are many improvements in the new Prest-O-Lite Battery

IN THIS new battery you'll find all the good points and high quality that have made Prest-O-Lite an unfailing aid to better radio. And in addition there are many important refinements and improvements that make it the most attractive, most convenient battery you can buy.

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

WBBG—Irving Vermilya, 24 Vermilya Ave., Mattapoisett, Mass. 248 meters, 1210 kilocycles, 500 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WBBL—Grace Covenant Church, Richmond, Va. 229 meters, 1310 kilocycles, 50 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WBBM—Atlas Investment Co., 1554 Howard St., Chicago, Ill. 226 meters. 1330 kilocycles, 1500 watts, class B. Mon, 4-7 pm. Tues, Thurs, 4-6-8-12 pm. Wed, 4-6-8-10 pm, 12-2 am. Fri, 4-6-8-10 pm. Sat, 4-6-8-2 am. Sun, 4-6-8-10 pm, 12-2 am. Central standard time. Slogan: "World Best Broadcast Medium."
1st Dial 2nd Dial 3rd Dial

WBBP—Petoskey High School, Petoskey, Mich. 214 meters, 1400 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WBBR—Peoples' Pulpit Ass'n, 124 Columbia Heights, Brooklyn, N. Y. 272.6 meters, 1100 kilocycles, 500 watts, class A. Sun, 10-11:30 am, 9-10:30 pm. Mon, Thurs & Sat, 8-9 pm. Eastern standard time. Slogan: "Watchtower."
1st Dial 2nd Dial 3rd Dial

WBBS—First Baptist Church, 3400 St. Charles St., New Orleans, La. 252 meters, 1190 kilocycles, 50 watts, class A. Sun church services, 11 am-7:45 pm. Central standard time. Slogan: "The Gospel Wave."
1st Dial 2nd Dial 3rd Dial

WBBU—Jenks Motor Sales Co., Monmouth, Ill., 224 meters, 1340 kilocycles, 10 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WBRW—Ruffner Junior High School, Norfolk, Va. 222 meters, 1350 kilocycles, 50 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WBBY—Washington Light Infantry, Charleston, S. C. 268 meters, 1120 kilocycles, 10 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WBCN—Southtown Economist Station, Foster & McDonnell, 720 W. 65th St., Chicago, Ill. 266 meters, 1130 kilocycles, 500 watts, class A. Mon, Wed & Sat, 3-5 pm. Tues, 8-9 pm, 10-12 midnight. Wed, 7-11 pm. Thurs, 8-9 pm, 10 pm-1 am. Fri, 8-9 pm, 10-12 midnight. Sun, 4-5 pm, 7-11 pm. Central standard time. Slogan: "World's Best Community Newspaper."
1st Dial 2nd Dial 3rd Dial

WBDC—The Baxter Laundry Co., 747 Fountain St., N. E., Grand Rapids, Mich. 256 meters, 1170 kilocycles, 50 watts, class A. Daily, 5:30-6 pm, 7-8 pm. Eastern standard time. Slogan: "World Wide Baxter Dry Cleaning."
1st Dial 2nd Dial 3rd Dial

WBES—Bliss Electrical School, Takoma Park, Washington, D. C. 222.1 meters, 1350 kilocycles, 100 watts, class A. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WBOQ—A. H. Grebe & Co., Inc., 70 Van Wyck Blvd., Richmond Hill, N. Y. 236 meters, 1270 kilocycles, 500 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WBR—Pennsylvania State Police, Troop D, Butler, Pa. 203 meters, 1470 kilocycles, 250 watts, class A. Irregular periods from 9:30 am-12 midnight. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WBRC—Bell Radio Corp., 1913 5th Ave., No., Birmingham, Ala. 248 meters, 1210 kilocycles, 50 watts, class A. Mon, Wed, Fri, 8-10 pm. Central standard time. Slogan: "Nothing but Radio."
1st Dial 2nd Dial 3rd Dial

WBRE—Baltimore Radio Exchange, Wilkes-Barre, Pa. 231 meters, 1300 kilocycles, 10 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WBS—D. W. May, Inc., 325 Central Ave., Newark, N. J. 252 meters, 1190 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WBT—Southern Radio Corp., Realty Bldg., Charlotte, N. C. 275 meters, 1090 kilocycles, 250 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WBZ—Westinghouse Elec. & Mfg. Co., 625 Page Blvd., Springfield, Mass. 333.1 meters, 900 kilocycles, 2000 watts, class B. Schedule daily. Eastern standard time. Slogan: "Broadcasting Station of New England."
1st Dial 2nd Dial 3rd Dial

WCAC—Connecticut Agricultural College, Storrs, Conn. 275 meters, 1090 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WCAD—St. Lawrence University, Canton, N. Y. 263 meters, 1140 kilocycles, 250 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WCAE—The Pittsburgh Press and the Kaufman & Baer Co., Pittsburgh, Pa. 461.3 meters, 650 kilocycles, 500 watts, class B. Daily ex Sun, 12:30-3 pm, 4-5 pm, 6-6:15-6:30-7:30 pm, 8-8:30 pm, 10-11 pm. Sun, 3-4 pm, 6:30-7:20-9:15 pm. Eastern standard time. Slogan: "Workshop of the World."
1st Dial 2nd Dial 3rd Dial

WCAH—Entrekin Elec. Co., 321 W. 10th Ave., Columbus, Ohio. 266 meters, 1130 kilocycles, 500 watts, class A. Daily ex Sun, 11:30 am-12:30 pm, Tues, 8-10:30 pm. Sun, 10:30 am-12 noon, 4 pm; vesper service, 7:30-9 pm. Eastern standard time. Slogan: "The Heart of Ohio."
1st Dial 2nd Dial 3rd Dial

WCAJ—Nebraska Wesleyan University, University Place, Nebr. 254 meters, 1180 kilocycles, 300 watts, class A. Daily, 10:30 am. Tues, 7 pm. Fri, 9 pm. Central standard time.
1st Dial 2nd Dial 3rd Dial

WCAL—St. Olaf College, Northfield, Minn. 336 meters, 890 kilocycles, 500 watts, class B. Central time.
1st Dial 2nd Dial 3rd Dial

WCAO—Sanders & Stayman Co., 319 No. Charles St., Baltimore, Md. 275 meters, 1090 kilocycles, 50 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WCAP—Chesapeake & Potomac Tel. Co., 725 13th St. N. W., Washington, D. C. 469 meters, 640 kilocycles, 500 watts, class B. Sun, 11 am-4 pm, 6:20-9:15 pm. Mon, Wed, Fri, 7:30-11 pm. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WCAR—Southern Radio Corp. of Texas, 324 N. Navarro St., San Antonio, Tex. 263 meters, 1140 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WCAT—South Dakota State School of Mines, Rapid City, S. D. 240 meters, 1250 kilocycles, 50 watts, class A. Mountain time.
1st Dial 2nd Dial 3rd Dial

WCAU—Durham & Co., 1930 Market St., Philadelphia, Pa. 278 meters, 1060 kilocycles, 500 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WCAX—University of Vermont, Burlington, Vermont. 252 meters, 1200 kilocycles, 100 watts, class A. Eastern standard time. Slogan: "Voice of the Green Mountains."
1st Dial 2nd Dial 3rd Dial

WCAZ—Carthage College, Carthage, Ill. 246 Meters, 1220 kilocycles, 50 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WCBA—Chas. W. Heimbach, Queen City Radiophone Station, 1015 Allen St., Allentown, Pa. 254 meters, 1180 kilocycles, 200 watts, class A. Wed, 8:15 pm. Fri, 6:45 pm. Sun, 2 pm. Eastern standard time. Slogan: "Sunshine Jolliers."
1st Dial 2nd Dial 3rd Dial

WCBD—Wilbur Glenn Voliva, Shiloh Park, Zion, Ill. 344.6 meters, 870 kilocycles, 5000 watts, class B. Sun, 9-10:45 am, 2:30-6 pm. Mon, 8-10:30 pm. Wed, 12:30-1 pm. Thurs, 2:30-3:45 pm, 8-10:30 pm. Central standard time. Slogan: "Where God Rules Man Prospers."
1st Dial 2nd Dial 3rd Dial

WCBE—Uhalt Bros. Radio Co., New Orleans, La. 263 meters, 1130 kilocycles, 5 watts, class A. Sun, 12:30-2 pm, concert. Sat, 7:30-8:30 pm, varied program. Central time. Slogan: "Second Port, U. S. A.—Strongest 5 Watt Station in the World."
1st Dial 2nd Dial 3rd Dial

WCBG—Howard S. Williams (portable), permanent address, Hattiesburg, Miss. 268 meters, 1120 kilocycles, 10 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WCBH—University of Mississippi, University P. O. Miss. 242 meters, 1240 kilocycles, 10 watts, class A. Mon, Fri, 8 pm. Central standard time. Slogan: "The Voice of 'Ole Miss.'"
1st Dial 2nd Dial 3rd Dial

WCBK—E. Richard Hall, St. Petersburg, Fla. 266 meters, 1120 kilocycles, 500 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WCBM—Hotel Chateau, Baltimore, Md. 229 meters, 1310 kilocycles, 50 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WCBQ—First Baptist Church, Nashville, Tenn. 236 meters, 1270 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WCBR—C. H. Messter (portable), 42 Doyle Ave., Providence, R. I. 205 meters, 1460 kilocycles, 30 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WCBT—Clark University, Worcester, Mass. 238 meters, 1260 kilocycles, 250 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WCBU—Arnold Wireless Supply Co., Arnold, Pa. 220 meters, 1360 kilocycles, 50 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WCBX—The Radio Shop, Newark, N. J. 233 meters, 1280 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WCCO—Gold Medal Station, St. Paul, and Minneapolis, Minn. 416.4 meters, 720 kilocycles, 5000 watts, class B. Daily, 8:40 am-12 midnight. Central standard time.
1st Dial 2nd Dial 3rd Dial

WCEE—Charlene Broadcasting Station, Elgin, Ill. 275 meters, 1090 kilocycles, 1000 watts, class A. Daily ex Sun & Thurs, 10:30-12 pm. Central standard time. Slogan: "Where Charlene Entertains Everybody."
1st Dial 2nd Dial 3rd Dial

WCLS—Boston Store, 301 Jefferson St., Joliet, Ill. 214.2 meters, 1333 kilocycles, 150 watts, class A. Mon, Wed, Fri & Sat, 8 um-12 midnight. Central standard time. Slogan: "Will County's Largest Store."
1st Dial 2nd Dial 3rd Dial

WCSH—Henry P. Rines, Congress Square Hotel, Portland, Maine. 256.3 meters, 1170 kilocycles, 500 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WCSO—Wittenberg College, Springfield, Ohio. 248 meters, 1210 kilocycles, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WCTS—C. T. Sherer Company, 44 Front St., Worcester, Mass. 268 meters, 1120 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WCUW—Clark University, 950 Main St., Worcester, Mass. 238 meters, 1260 kilocycles, 250 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WCX—Detroit Free Press, Detroit, Mich. 516 meters, 580 kilocycles, 500 watts, class B. Eastern time.
1st Dial 2nd Dial 3rd Dial

WDAE—Tampa Times, Tampa, Fla. 273 meters, 1090 kilocycles, 250 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WDAF—The Kansas City Star, Kansas City, Mo. 365.6 meters, 820 kilocycles, 500 watts, class B. Daily ex Sun, 3:30-4:30 pm, 6-7 pm, 11:45 pm-1 am. Mon, Wed, Fri, 8-9:30 pm. Sun, 4-5:30 pm. Central standard time.
1st Dial 2nd Dial 3rd Dial

WDAG—J. L. Martin, 605 E. 4th St., Amarillo, Tex. 263 meters, 1140 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WDAH—Trinity Methodist Church, El Paso, Tex. 268 meters, 1120 kilocycles, 50 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WDAY—Radio Equipment Corporation, 119 Broadway, Fargo, N. Dak. 261 meters, 1150 kilocycles, 50 watts, class A. Daily ex Sun, 9:30 am, news, markets & weather. 10 am, markets; 11:30 am, markets; 12:30 pm, concert; 1 pm, markets; 5 pm, entertainments; 5:30 pm, news. Tues, Thurs, Sat, 7:30 pm, musical. Sun, 10:30 am, services; 4 pm, musical. Central standard time. Slogan: "The Biggest Little City in the World."
1st Dial 2nd Dial 3rd Dial

WDBC—Kirk, Johnson & Co., Lancaster, Pa. 258 meters, 1160 kilocycles, 50 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WDBE—Gilham-Schoen Elec. Co., 35 Cone St., Atlanta, Ga. 275 meters, 1080 kilocycles, 100 watts, class A. Tues, 9-10 pm. Sat, 9-10 pm. Central standard time. Slogan: "We Distribute Better Equipment."
1st Dial 2nd Dial 3rd Dial

WDBJ—Richardson-Wayland Elec. Corp., Roanoke, Va. 229 meters, 1310 kilocycles, 50 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WDBK—M. F. Broz Furniture, Hardware & Radio Store, 13918 Union & Kinsman Sts., Cleveland, Ohio. 227 meters, 1320 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WDBO—Rollins College, Winter Park, Fla. 240 meters, 1250 kilocycles, 50 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WDBQ—The Morton Radio Supply Co., Salem, N. J. 234 meters, 1280 kilocycles, 10 watts, class A. Irregular schedules. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WDBR—Tremont Temple Baptist Ch'ch, 82 Tremont St., Boston, Mass. 261 meters, 1150 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

EAGLE

Know Ye All Men By These Presents

New Models-

Superlatives and adjectives are not adequate to describe

THE NEW EAGLE RECEIVERS

Suffice Therefore to State That

IN APPEARANCE, PERFORMANCE AND STABILITY
THEY HAVE NO PEER

Write for our beautiful booklet entitled

Radio At Its Best

From its descriptive, illustrated pages you can select models most adaptable to your needs, then go to an EAGLE DEALER, where a demonstration will convince.

Old Policies

¶ A careful selection and limited appointment of dealers—thereby assuring **Courteous** and **efficient Treatment** to you.
¶ Production in harmony with quality, which sets a **Standard of Excellence** on each individual Receiver.
¶ A **Sales and Service Campaign,** the combination of which insures against a depreciation of your investment.
¶ A Weekly Broadcast of **Talented Artists** who furnish you with **Quality Entertainment,** under the title of EAGLE **Neutrodyne Trio,** from **Station WEAF,** New York City.

The Trade Mark of Quality

WE SOAR ABOVE
EAGLE RADIO COMPANY
NEWARK NEW JERSEY

Ask Your Neighbor

Eagle Radio Company

16 BOYDEN PLACE **NEWARK, N. J.**

KOB—New Mexico College of Agriculture & Mechanic Arts, State College, New Mexico. 348.6 meters, 860 kilocycles, 750 watts, class B. Daily, 11:55-12 noon, 9:55-11 pm, time signals; 12 noon, weather reports. Mon, Wed & Fri, 7:30-8:30 pm, concerts, lectures. Mountain time. Slogan: "Keep Out Blues."
1st Dial 2nd Dial 3rd Dial

KOIL—Mona Motor Oil Radio Station, Monarch Mfg. Co., 1124 6th St., Council Bluffs, Iowa. 278 meters, 1080 kilocycles, 500 watts, class A. Daily, 7:30-9 pm, paramount program. Daily ex Sun, 11-12 pm, "hotsy-totsy." Sun, 11-12 noon, church services. Central standard time.
1st Dial 2nd Dial 3rd Dial

KOP—Detroit Police Headquarters, 1300 Beaubien St., Detroit, Mich. 278 meters, 1080 kilocycles, 500 wats, class A. Daily ex Sun, 1 pm, 5:30 pm, police reports. Emergencies broadcast any time. Eastern standard time. Slogan: "Safety First."
1st Dial 2nd Dial 3rd Dial

KPO—Hale Bros., Inc., Market & 5th Sts., San Francisco, Calif. 429 meters, 700 kilocycles, 500 watts, class B. Pacific time.
1st Dial 2nd Dial 3rd Dial

KPPC—Pasadena Presbyterian Church, Colorado & Madison Sts., Pasadena, Calif. 228.9 meters, 1310 kilocycles, 50 watts, class A. Sun, 10:30-11 am, tower chimes and program; 11-12:30, services; 6:45-7 pm, tower chimes; 7-7:30 pm, organ recital; 7:30-9 pm, services. Wed, 7:30-7:45 pm, chimes; 7:45-9 pm, services. Pacific time.
1st Dial 2nd Dial 3rd Dial

KPRC—Houston Post-Dispatch, Houston, Texas. 296.9 meters, 1010 kilocycles, 500 watts, class B. Daily, 10:55 am, time signals; 12-1, 7-11 pm. Sun, 10:45 am, 8 pm, church service. Central time. Slogan: "Kotteu Post Rail Center."
1st Dial 2nd Dial 3rd Dial

KQP—Apple City Radio Club, 308 Cascade Ave., Hood River, Ore. 270 meters, 1110 kilocycles, 100 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KQV—Doubleday-Hill Elec. Co., 719 Liberty Ave., Pittsburgh, Pa. 270 meters, 1110 kilocycles, 500 watts, class A. Daily, 10:30 am, music; 11 am, weather; 12:15-5 pm, program & baseball scores. Eastern time.
1st Dial 2nd Dial 3rd Dial

KRE—Berkeley Daily Gazette, Berkeley, Calif. 258.5 meters, 1500 kilocycles, 100 watts, class B. Sun, 10-11 am, 6:30-7:30 pm, church services; 8-9, 9-10 pm, sacred concert. Mon, 8-10 pm, play with music. Tues, 8-10 pm, educational; 10-11 dance. Wed, 5-6 pm, kiddies' hour; 8-12 pm, dance. Thurs, 8-10 pm, music; 10-11 pm, dance. Fri, 8-8:30 pm, travel talks; 8:30-12 pm, dance. Sat, 8-12 pm, dance. Pacific standard time. Slogan: "Berkeley, the Seat of the University of California and the Music and Art Center of the Pacific."
1st Dial 2nd Dial 3rd Dial

KSAC—Kansas State Agricultural College, Manhattan, Kans. 341 meters, 882 kilocycles, 500 watts, class B. Daily ex Sat & Sun, 9 am-1 pm, 6:30-7:30 pm, Central Standard time.
1st Dial 2nd Dial 3rd Dial

KSD—St. Louis Post-Dispatch, 12th & Olive Sts., St. Louis, Mo. 545.1 meters, 550 kilocycles, 500 watts, class B. Daily ex Sun, 8:40 am-3:40 pm. Mon, 7-9 pm. Tues, 7-8-10 pm. Wed, 7 pm. Fri, 7-8 pm. Sat, 7-8 pm. Central standard time.
1st Dial 2nd Dial 3rd Dial

KSL—The Radio Service Corp. of Utah, 7 N West Temple, Salt Lake City, Utah. 299.8 meters, 1000 kilocycles, 1000 watts, class B. Daily, 7-10 pm. Mountain standard time.
1st Dial 2nd Dial 3rd Dial

KTAB—Tenth Ave. Baptist Church, Oakland, Calif. 215.7 meters, 1390 kilocycles, 50 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KTCL—American Radio Telephone Co., Inc., New Washington Hotel, Seattle, Wash. 305.9 meters, 980 kilocycles, 1000 watts, class B. Pacific time. Slogan: "Know the Charmed Land."
1st Dial 2nd Dial 3rd Dial

KTHS—New Arlington Hotel, Hot Springs, Ark. 374 meters, 800 kilocycles, 1000 watts, class B. Daily 9-11 pm. Daily ex Sun, 12:30-1 pm. Sun, 11-12:30 pm. Central standard time. Slogan: "Kum to Hot Springs."
1st Dial 2nd Dial 3rd Dial

KTW—First Presbyterian Church, 7th Ave. & Spring St., Seattle, Wash. 454 meters, 660 kilocycles, class B, 1000 watts. Pacific time.
1st Dial 2nd Dial 3rd Dial

KUO—Examiner Printing Co., San Francisco, Calif. 246 meters, 1220 kilocycles, 150 watts, class A. Pacific time.
1st Dial 2nd Dial 3rd Dial

KUOM—State University of Montana, Missoula, Mont. 244.8 meters, 1235 kilocycles, class A, 500 watts. Daily, 12:45-6:45 pm, 8-9:30 pm. Sun, 9:15-10:30 pm. Mountain Standard time.
1st Dial 2nd Dial 3rd Dial

KUPR—Union Pacific Railroad Co., Omaha, Nebr. 270 meters, 1110 kilocycles, 50 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KWG—Portable Wireless Telephone Co., 530 E. Market St., Stockton, Calif. 248 meters, 1210 kilocycles, class A, 50 watts, Pacific time.
1st Dial 2nd Dial 3rd Dial

KWH—W. G. Patterson, Shreveport, La. 273 meters, 1100 kilocycles, class A, 500 watts. Mon-Thurs, 8-9 pm, musicale. Tues-Sat, 9-12 pm, dance music. Central standard time.
1st Dial 2nd Dial 3rd Dial

KWKC—Wilson Duncan Studios, 39th & Main Sts., Kansas City, Mo. 286 meters, 1270 kilocycles, 10 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KWWG—City of Brownsville, 708 10th St., Brownsville, Tex. 278 meters, 1080 kilocycles, 500 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

KYW—Westinghouse Elec. & Mfg. Co., 111 W. Washington St., Chicago, Ill. 535.4 meters, 560 kilocycles, 2000 watts, class B. Central time.
1st Dial 2nd Dial 3rd Dial

KZKZ—Electrical Supply Co., 109 Plaza Moraga, Manila, P. I. 270 meters, 1110 kilocycles, 100 watts, class A.
1st Dial 2nd Dial 3rd Dial

KZM—Preston D. Allen, 13th & Harrison Sts., Hotel Oakland, Oakland, Calif. 242 meters, 1240 kilocycles, 100 watts, class A. Daily ex Sun, 6-7 pm. Pacific standard time.
1st Dial 2nd Dial 3rd Dial

KZRQ—Far Eastern Radio, Inc., Manila, Hotel, Manila, P. I. 222 meters, 1350 kilocycles, 500 watts. class A.
1st Dial 2nd Dial 3rd Dial

KZUY—F. Johnson Elser, Manila, P. I. 370 meters, 810 kilocycles, 500 watts, class B.
1st Dial 2nd Dial 3rd Dial

WAAB—Valdemar Jenson, 187 S. St. Patrick St., New Orleans, La. 268 meters, 1120 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WAAC—Tulane University, New Orleans, La. 273 meters, 1090 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WAAD—Ohio Mechanics Institute, Cincinnati, Ohio. 258 meters, 1160 kilocycles, 25 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WAAF—Chicago Daily Drovers Journal, 836 Exchange Ave., Chicago, Ill. 278 meters, 1080 kilocycles, 200 watts, class A. Daily ex Sun & holidays, 8:40 am, markets; 10:30 am, weather; 10:45 am, markets; 12:30 pm, weather; 12:45-3 pm, markets; 4:30 pm, eastern meat trade conditions. Sat, final weather & market reports, 12:30 pm. Central standard time.
1st Dial 2nd Dial 3rd Dial

WAAM—I. R. Nelson Co., 1 Bond St., Newark, N. J. 263 meters, 1140 kilocycles, 500 watts, class A. Daily ex Sat & Sun, 11-12 am. Daily ex Thurs & Sun, 7-11 pm. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WAAW—Omaha Grain Exchange, 19th & Harney St., Omaha, Nebr. 384.4 meters, 780 kilocycles, 500 watts, class A. Daily, 9:30 am-1:45 pm. Central standard time. Slogan: "Where Agriculture Accumulates Wealth."
1st Dial 2nd Dial 3rd Dial

WABA—Lake Forest College, Lake Forest, Ill. 227 meters, 1320 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WABB—Harrisburg Sporting Goods Co., Harrisburg, Pa. 266 meters, 1130 kilocycles, 10 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WABC—Asheville Battery Co., Inc., 19 Haywood St., Asheville, N. C. 254 meters, 1180 kilocycles, 10 watts, class A. Daily, 4-5 pm. Tues, Thurs, Sat, 7-9 pm. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WABI—Bangor Hydro-Electric Co., 84 Harlow St., Bangor, Maine. 240 meters, 1250 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WABL—Connecticut Agricultural College, Storrs, Conn. 275 meters, 1090 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WABN—Ben Ott, LaCrosse, Wis. 244 meters, 1230 kilocycles, 500 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WABO—Lake Ave. Baptist Church, Rochester, N. Y. 278 meters, 1080 kilocycles, 100 watts, class A. Sun, 10:30 am-12 noon; 7:30-9 pm. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WABQ—Haverford College Radio Club, Haverford, Pa. 261 meters, 1150 kilocycles, 100 watts, class A. Thurs, 9-11 pm. Eastern standard time. Slogan: "The First College Broadcasting in the East."
1st Dial 2nd Dial 3rd Dial

WABR—Scott High School, Toledo, Ohio. 263 meters, 1140 kilocycles, 50 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WABU—Victor Talking Mach. Co., Camden, N. J. 226 meters, 1330 kilocycles, 50 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WABW—College of Wooster, Wooster, Ohio. 206 meters, 1450 kilocycles, 20 watts, class A. Irregular schedule. Eastern time.
1st Dial 2nd Dial 3rd Dial

WABX—Henry B. Joy, near **Mt. Clemens**, Mich. 246 meters, 1220 kilocycles, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WABY—John Magaldi, Jr., 815 Kimball St., Philadelphia, Pa. 242 meters, 1240 kilocycles, 50 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WABZ—Coliseum Place Baptist Church, 1376 Camp St., New Orleans, La. 278 meters, 1090 kilocycles, 50 watts, class A. Sun, 11 am-7:30 pm, church services. Central standard time. Slogan: "The Station with a Message."
1st Dial 2nd Dial 3rd Dial

WADC—Allen T. Simmons, (Allen Theater), Portage Hotel, E. Market St., Akron, Ohio. 258 meters, 1160 kilocycles, 100 watts, class A. Daily, 11 am-6:30 pm. Tues-Fri, 8 pm-11 pm. Thurs, 8:30-10 pm. Sun, 12:30 pm. Eastern standard time. Slogan: "Watch Akron Develop Commerce."
1st Dial 2nd Dial 3rd Dial

WAFD—Albert B. Parfet Co., 1432 Military St., Port Huron, Mich. 256 meters, 1170 kilocycles, 500 watts, class A. Mon-Wed and Sat evenings. Sun morning. Central standard time. Slogan: "We Are Ford Dealers."
1st Dial 2nd Dial 3rd Dial

WAHG—A. H. Grebe & Co., Inc., 70 Van Wyck Blvd., Richmond Hill, L. I., N. Y. 315.6 meters, 950 kilocycles, 500 watts, class B. Daily, 12:30-1:30 pm. Mon, Wed & Fri, 7:30-12 pm. Mon-Sat, 12 midnight-2 am. Eastern standard time. Slogan: "Wait and Hear Grebe."
1st Dial 2nd Dial 3rd Dial

WAIT—A. H. Waite & Co., 32 Weir St., Taunton, Mass. 229 meters, 1310 kilocycles, 10 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WAMD—Hubbard & Co., 12 W. Grant St., Minneapolis, Minn. 244 meters, 1230 kilocycles, 500 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WARC—American Radio & Research Corp., 1 Radio Ave., Medford Hillside, Mass. 261 meters, 1150 kilocycles, 100 watts, class A. Eastern time. Slogan: "Amrad—The Voice of the Air."
1st Dial 2nd Dial 3rd Dial

WBAA—Purdue University, Dept. of Electrical Engineering, W. Lafayette, Ind. 273 meters, 1100 kilocycles, 250 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WBAK—Pennsylvania State Police, 18th & Herr Sts., Harrisburg, Pa. 276 meters, 1090 kilocycles, 500 watts, class A. Daily, 10 am-1:30 pm-5:45 pm-7:30-12 midnight. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WBAO—James Milliken University, Decatur, Ill. 270 meters, 100 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WBAP—The Star-Telegram, Fort Worth, Texas. 475.9 meters, 630 kilocycles, 1000 watts, class B. Daily ex Sat & Sun, 7:30-8:30 pm; 9:30-10:45 pm. Sun, 11 pm. Central standard time.
1st Dial 2nd Dial 3rd Dial

WBAV—Erner & Hopkins Co., 146 N. Third St., Columbus, Ohio. 293 meters, 1020 kilocycles, 500 watts, class B. Central time.
1st Dial 2nd Dial 3rd Dial

WBAX—John H. Stenger, Jr., Box 104, Wilkes-Barre, Pa. 256 meters, 1170 kilocycles, 100 watts, class A. Tues, Wed, Thurs & Sun, 9:30 pm to 12 midnight. Eastern standard time. Slogan: "In Wyoming Valley, Home of the Anthracite."
1st Dial 2nd Dial 3rd Dial

WBAY—A. T. & T. Co., New York, N. Y. 492 meters, 610 kilocycles, 500 watts, class B. Eastern time.
1st Dial 2nd Dial 3rd Dial

WBBA—Plymouth Congregat'al Church, Newark, Ohio. 225 meters, 1330 kilocycles, 20 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WGAL—Lancaster Elec. Sup. & Const. Co., Lancaster, Pa. 248 meters, 1210 kilocycles, 10 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WGAQ—W. G. Patterson, Shreveport, La. 263 meters, 1140 kilocycles, 150 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WGAZ—South Bend Tribune, South Bend, Ind. 275 meters, 1090 kilocycles, 500 watts, class A. Mon., Wed, Fri. Central standard time. Slogan: "You Are Listening to the Hoosier State."
1st Dial 2nd Dial 3rd Dial

WGBA—Jones Elec. & Radio Mfg. Co., Baltimore, Md. 254 meters, 1180 kilocycles, 50 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WGBB—Harry H. Carman, 217 Bedell St., Freeport, N. Y. 244 meters, 1230 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WGBC—First Baptist Church, Memphis, Tenn. 266 meters, 1130 kilocycles, 10 watts, class A. Sun, 9:30-10:45 am, 7:30-9 pm. An occasional week night program. Central standard time.
1st Dial 2nd Dial 3rd Dial

WGBF—The Finke Furniture Co., 307 Upper Seventh St., Evansville, Ind. 286 meters, 1270 kilocycles, 150 watts, class A. Tues, Fri, 8-9:30 pm, musical program. Daily, 12:10 noon, market reports, weather. Central standard time.
1st Dial 2nd Dial 3rd Dial

WGBG—Breitenbach's Radio Shop, Thrifton, Va. 226 meters, 1330 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WGBI—Frank S. Megargee, 608 Linden St., Scranton, Pa. 240 meters, 1250 kilocycles, 10 watts, class A. Indefinite schedule. Eastern time.
1st Dial 2nd Dial 3rd Dial

WGBK—Lawrence W. Campbell, Johnstown, Pa. 248 meters, 1210 kilocycles, 5 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WGBL—Elyria Radio Assn. (Albert H. Ernst), 621 Lodi St., Elyria, Ohio. 227 meters, 1320 kilocycles, 10 watts, class A. Thurs, Fri, 8-10 pm. Sat, 11 pm-1 am. Religious meetings are broadcast on various occasions, Eastern standard time. Slogan: "We Get Best Listeners."
1st Dial 2nd Dial 3rd Dial

WGBM—Theodore N. Saaty, 92 Dover St., Providence, R. I. 234 meters, 1280 kilocycles, 100 watts, class A. Mon, 6:30-8 pm. Wed, Fri, 10 pm-12 midnight. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WGBQ—Stout Institute, Menominee, Wis. 234 meters, 1290 kilocycles, 20 watts, class A. Central standard time.
1st Dial 2nd Dial 3rd Dial

WGBR—Geo. S. Ives, 731 W. 5th St., Marshfield, Wis. 229 meters, 1310 kilocycles, 10 watts, class A. Sun, 2-4 pm, 7-9 pm. Occasionally week days—same hours. Central standard time. Slogan: "Wisconsin Greatest and Best Radios."
1st Dial 2nd Dial 3rd Dial

WGBS—Gimbel Brothers, Inc., 33rd St. & Broadway, New York, N. Y. 315.6 meters, 950 kilocycles, 500 watts, class B. Mon, Wed & Fri, 10-11 am, 1:30-2:30 pm, 3-4 pm, 6-10:30 pm. Tues, Thurs & Sat, 10-11 am, 1:30-2:30 pm, 3-4 pm, 6-11:30 pm. Sun, 3:30-4:40 pm, 8-11 pm. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WGBT—Furman University, Greenville, S. C. 286 meters, 1270 kilocycles, 15 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WGBU—Chamber of Commerce, Fulford-by-the-Sea, Fla. 270 meters, 1139 kilocycles, 500 watts, class A. Daily ex Sun, 12-1 pm, 6:30-7:30 pm, 10 pm-1 am. Sun, 9-11 pm. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WGBW—Valley Theater, Spring Valley, Ill. 256 meters, 1170 kilocycles, 10 watts, class A. Tues, Thurs, 10-11:30 pm. Central standard time.
1st Dial 2nd Dial 3rd Dial

WGBX—University of Maine, Orono, Maine. 252 meters, 1190 kilocycles, 500 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WGCP—D. W. May, Inc., 325 Central Ave., Newark, N. J. 252 meters, 1190 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WGES—Coyne Electrical School, Inc., 1300 W. Harrison St., Chicago, Ill. 250 meters, 1200 kilocycles, 500 watts, class A. Daily, 5-7 pm. Daily ex Sun, Mon, 10:30-1 am. Sun, 10:30-12 noon. Central standard time. Slogan: "World's Greatest Electrical School."
1st Dial 2nd Dial 3rd Dial

WGHP—George Harrison Phelps, Inc., 110 Rowena St., Detroit, Mich. 270 meters, 1110 kilocycles, 500 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WGI—American Radio & Research Corp., Medford Hillside, Mass. 261 meters, 1150 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WGMU—A. H. Grebe & Co., Inc., Richmond Hill, L. I., N. Y. (portable). 236.1 meters, 1270 kilocycles, 100 watts. class A. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WGN—The Chicago Tribune, Drake Hotel, Chicago, Ill., 140 E. Walton Place. 370.2 meters, 810 kilocycles, 800 watts, class B. Sun, 11-11:45 am—Uncle Walt; 11:45-12:45 pm—organ recital; 3-5 pm—band concert; 9-10 pm—music. Daily ex Mon, 9:31 am—time signals; 9:35 am—wheat pit; 10 am, 11 am, 11:30 am—wheat pit; 11:56 am—time signals; 12 noon (ex Sat)—wheat pit; 12:30 (ex Sat)—wheat pit; 1:35 pm (ex Sat)—readings from Chi. Tribune; 12:40-2:30 pm—music; 2:30-3:30 pm—rocking chair time; 6 pm—stock quotations; 5:30-5:57 pm—Skeezix time; 5:57 pm—time signals; 6:30-7:30 pm (ex Mon)—music; 8-9 pm (ex Mon)—classic hour; 10:30-11:30 pm—music. Central standard time. Slogan: "World's Greatest Newspaper."
1st Dial 2nd Dial 3rd Dial

WGO—Illinois Radio Corp. of America, 608 S. Dearborn St., Chicago, Ill. 1000 watts. Central time.
1st Dial 2nd Dial 3rd Dial

WGR—Federal Telephone Mfg. Corp., Hotel Statler, Buffalo, N. Y. 319 meters, 940 kilocycles, 750 watts, class B. Sun, 10:30 am-3 pm, vesper service. Mon, Wed, Fri, 12:45-2:30-9 pm. Tues, Thurs, 12:45-2:30-8 pm. Sat, 12:45-2:30-8:45 pm. Eastern standard time. Slogan: "Key City of Industry."
1st Dial 2nd Dial 3rd Dial

WGST—Georgia School of Technology, Atlanta, Ga. 270 meters, 1110 kilocycles, 500 watts, class A. 9-10 pm, Mon. 7-8 pm, Thurs. Central standard time. Slogan: "With Georgia School Technology."
1st Dial 2nd Dial 3rd Dial

WGY—General Electric Co., 1 River Road, Schenectady, N. Y. 379.5 meters, 790 kilocycles, 1500 watts, class B. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WHA—University of Wisconsin, Madison, Wis. 535 meters, 560 kilocycles, 500 watts, class B. Central time.
1st Dial 2nd Dial 3rd Dial

WHAD—Marquette University, Milwaukee, Wis. 275 meters, 1090 kilocycles, 500 watts, class A. Central standard time.
1st Dial 2nd Dial 3rd Dial

WHAG—University of Cincinnati, Cincinnati, Ohio. 232.5 meters, 1290 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WHAM—Eastman School of Music, Rochester, N. Y. 278 meters, 1080 kilocycles, 100 watts, class A. Sun, 3:15 pm. Daily, 3:30-4 pm, 5-6 pm, 7-7:35 pm. Tues only, 6:15-6:45 pm. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WHAP—H. Alvin Simmons, 290 Flatbush Ave., Brooklyn, N. Y. 240 meters, 1250 kilocycles, 100 watts, class A. Eastern standard time. Slogan: "The Station for Public Service."
1st Dial 2nd Dial 3rd Dial

WHAR—F. P. Cooks Sons, The Hotel Seaside, Atlantic City, N. J. 275 meters, 1090 kilocycles, 500 watts, class B. Daily, 2-3 pm, 7:30-9 pm. Tues, Fri, 11-12 noon, organ recital. Sun, 11-12 noon, organ recital; 2:45-3 pm, sermon; 9 pm, classical concert. Eastern standard time. Slogan: "Pioneer Broadcasting Station of Atlantic City."
1st Dial 2nd Dial 3rd Dial

WHAS—Courier-Journal & Louisville Times, Louisville, Ky. 399.8 meters, 750 kilocycles, 500 watts, class B. Daily, 3:30-5 pm, 7:30-9 pm ex Sun & Mon. Sun, 9:57-10:40 am, church services; 4-5 pm, vespers. Central standard time. Slogan: The chorus of "My Old Kentucky Home," played on chimes.
1st Dial 2nd Dial 3rd Dial

WHAV—Wilmington Electric Specialty Co., Wilmington, Delaware. 266 meters, 1130 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WHAZ—Rensselaer Polytechnic Institute, Troy, N. Y. 379.5 meters, 790 kilocycles, 500 watts, class B. Mon, 9-11:30 pm. Second Mon of each month special trans-Atlantic & transcontinental test program, 12 midnight to 1:30 am. Eastern standard time. Slogan: "Transcontinental and International Broadcasting Station Located at the Oldest College of Science and Engineering in America."
1st Dial 2nd Dial 3rd Dial

WHB—Sweeney Automotive & Electrical School, Kansas City, Mo. 365.6 meters, 820 kilocycles, 500 watts, class B. Central standard time. Slogan: "The Heart of America."
1st Dial 2nd Dial 3rd Dial

WHBA—Shaffer Music House, Oil City, Pa. 250 meters, 1200 kilocycles, 10 watts, class A. Schedule irregular, Eastern time.
1st Dial 2nd Dial 3rd Dial

WHBB—Hebal's Store, 328 McCulloch St., Stevens Point, Wis. 240 meters, 1249 kilocycles, 50 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WHBC—Rev. E. P. Graham, 627 McKinley Ave., Canton, Ohio. 256 meters, 1810 kilocycles, 10 watts, class A. Slogan: "Ignorance Is the Greatest Foe of the Truth." Eastern time.
1st Dial 2nd Dial 3rd Dial

WHBD—Chas. W. Howard, 110 Chillicothe St., Bellefontaine, Ohio. 222 meters, 1350 kilocycles, 20 watts, class A. Every evening ex Sun, 7:30 pm. Eastern standard time. Slogan: "Watch How Bellefontaine Does."
1st Dial 2nd Dial 3rd Dial

WHBF—Beardsley Spec. Co., 217 18th St., Rock Island, Ill. 222 meters, 1350 kilocycles, 100 watts, class A. Mon, 8-11 pm. Wed, 7:30-10:30 pm. Sat, 2-4 pm, 7-9 pm. Central standard time.
1st Dial 2nd Dial 3rd Dial

WHBG—John S. Skane, 1810 N. 4th St., Harrisburg, Pa. 231 meters, 1300 kilocycles, 20 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WHBH—Culver Military Academy, Culver, Ind. 222.1 meters, 1350 kilocycles, 100 watts, class A. Mon, 8 pm, cadet band. Sat, 7:10 pm, cadet jazz orchestra. Central standard time.
1st Dial 2nd Dial 3rd Dial

WHBJ—Lauer Auto Co., 2708 S. Wayne St., Fort Wayne, Ind. 234 meters, 1280 kilocycles, 10 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WHBK—Franklin St. Garage, Inc., 3 McKenzie Ave., Ellsworth, Maine. 231 meters, 1300 kilocycles, 10 watts, class A. Wed, 8-10:30 pm. Eastern standard time. Slogan: "The Voice from the Maine Coast."
1st Dial 2nd Dial 3rd Dial

WHBL—James H. Slusser, 1214 Eric Ave., Logansport, Ind. 220 meters, 1360 kilocycles, 50 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WHBM—O. L. Carrell (portable), 1506 N. American Bldg., 36 S. State St., Chicago, Ill. 233 meters, 1290 kilocycles, 20 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WHBN—First Ave. Methodist Church, 1st Ave. & 5th St., St. Petersburg, Fla. 238 meters, 1260 kilocycles, 10 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WHBP—The Johnstown Automobile Co., 101 Main St., Johnstown, Pa. 256 meters, 1170 kilocycles, 100 watts, class A. Wed, 9-10:30 pm. Sat, 10-12 pm. Eastern standard time. Slogan: "The Voice of the Friendly City."
1st Dial 2nd Dial 3rd Dial

WHBQ—Men's Fellowship Class of St. John's M. E. Church, South, Bellevue & Peabody Aves., Memphis, Tenn. 233 meters, 1290 kilocycles, 50 watts, class A. Sun, 9:45-10:45 am—class services; 11 am-12 noon—church services; 7:30-8:30 pm. Wed, 8-9:30 pm, music. Central standard time. Slogan: "We Have Best Quartet."
1st Dial 2nd Dial 3rd Dial

WHBR—Scientific Elec. & Engineering Co., Gladstone Bldg., Cincinnati, Ohio. 215.7 meters, 1390 kilocycles, 300 watts, class A. Tues, 8-10:30 pm. Thurs, 10-12 pm. Sun, 2-4 pm, 9-11 pm. Central standard time. Slogan: "That's Us."
1st Dial 2nd Dial 3rd Dial

WHBU—Riviera Theater & Bing's Clothing, 1002 Meridian St., Anderson, Ind. 218.8 meters, 1370 kilocycles, 10 watts, class A. Daily ex Sun, 9 am, market reports. Wed, Fri, Sun, 7-9 pm. Central standard time. Slogan: "The Home of Chief Anderson."
1st Dial 2nd Dial 3rd Dial

WHBV—Fred Ray's Radio Shop, 2014 Talbot Ave., Columbus, Ga. 244 meters. 1230 kilocycles, 20 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WHBW—D. R. Klenzle, 4916 Chestnut St., Philadelphia, Pa. 215 meters, 1390 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WHBY—St. Norbert's College, College Ave., West De Pere, Wis. 250 meters, 1200 kilocycles, 100 watts, class A. Central time. Slogan: "We Have the Best Yet."
1st Dial 2nd Dial 3rd Dial

Now You Can Buy Direct

Radio Spinet

at a Big Saving in Price

RADIO-SPINETS for Atwater Kent Radio Sets have always been most popular. In them you will find all the charm and beauty of the old-time musical Spinet. They are, above all, the most distinctive style of radio furniture. Their simple lines and graceful beauty make them desired for the home; no other radio cabinet blends in so harmoniously with the home furnishings. But Radio-Spinets are practical as well as beautiful. In them you find all the conveniences that add to the enjoyment of radio. You sit down to the Radio-Spinet like you do to a desk, with no obstructions underneath and with elbow room aplenty. Battery equipment is all contained in the rear, out of sight, and yet at your finger tips.

Model 10

This is the Original Radio-Spinet, made famous by its beauty and great utility. The top and front are made of Solid Mahogany and the whole piece is finished in a beautiful dull brown. A large drawer at each end takes care of all your radio accessories. Battery compartment in the rear, large enough to hold batteries and charger. Never sold for less than $70.00 prior to this unusual offer.

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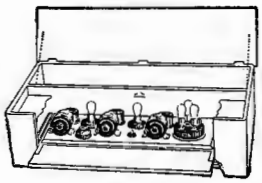
Your Choice $59.50

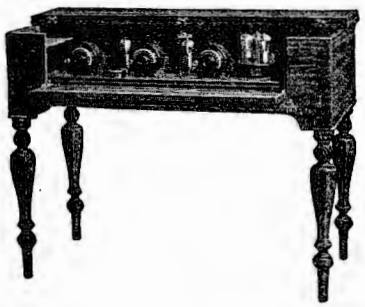
Money Back if Not Satisfied in Every Respect



Model 12

A De Luxe Radio-Spinet built for the Model 12 Atwater Kent Receiving Set, altho Model 10 and other sets can be nicely accommodated. A splendid design showing excellent taste. Top and front of Solid Mahogany, finished in a warm dull brown. Large compartment in rear for all battery equipment. Front lid drops down as an arm rest. Offered for the first time at less than $75.00.

For Atwater Kent Model 12



The Radio Spinet Co.

Box 6 **Holland, Michigan**

The Radio-Spinet Co.
Box No. 6
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Use This Coupon

Send me a Model.....Radio-Spinet. I will pay for it on arrival. If not satisfied I will return it in ten days at your expense and you will refund my money.

Name.....

Address.....

WHDI—Wm. Hood Dunwoody Industrial Institute, 818 Superior Blvd., Minneapolis, Minn. 278 meters, 1072 kilocycles, 500 watts, class A. Mon, 8-9 pm. Wed, 9-10 pm. Fri, 9-10 pm. Central standard time.
1st Dial 2nd Dial 3rd Dial

WHEC—Hickson Elec. Co., Inc., 36 S. Ave., Rochester, N. Y. 258 meters, 1160 kilocycles, 100 watts, class A. Daily ex Sun, 6:30-7:30 pm, orchestra. Eastern standard time. Slogan: ,'Watch Hickson Elec. Co."
1st Dial 2nd Dial 3rd Dial

WHK—The Radiovox Co., 1025 Boliver St., Cleveland, Ohio. 273 meters, 1100 kilocycles, 500 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WHN—Geo. Schubel, Loew's State Theater Bldg., 1540 Broadway, New York City, N. Y. 361 meters, 830 kilocycles, 500 watts, class B. Daily, 2:15-12 midnight. Eastern standard time. Slogan: "Station of the Great White Way."
1st Dial 2nd Dial 3rd Dial

WHO—Bankers Life Co., 1101 Liberty Bldg., Des Moines, Iowa. 526 meters, 570 kilocycles, 500 watts, class B. Daily ex Sun, 9:45 am-12 noon-2 pm. Daily, ex Sat, 7:30-11 pm. Wed, 6:30 to 12 midnight. Sun, 11 am-7:30 pm. Sat night silent. Central standard time. Slogan: "WHO-Who? Bankers Life in 'The Nation's Convention City.'"
1st Dial 2nd Dial 3rd Dial

WHT—Radiophone Broadcasting Corp., Wrigley Bldg. (410 N. Mich. Blvd., Chicago, Ill.). 238 meters, 1260 kilocycles, 1500 watts, class B. Sun, 12 noon to 4:45 pm, 6-11:30 pm. Mon, 11 am-2 pm, 7 pm-1 am. Daily ex Sun & Mon, 11 am-2 pm, 7-8:30 pm, 8:45-10:15 pm, 10:30 pm-1 am. Central standard time. Slogan: "Write Home Tonight."
1st Dial 2nd Dial 3rd Dial

WIAD—Howard R. Miller, 6318 N. Park Ave., Philadelphia, Pa. 250 meters, 1200 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WIAS—Home Elec. Co., Burlington, Iowa. 254 meters, 1180 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WIBA—The Capital Times—Studio, 237 W. Gilman St., Madison, Wis. 236 meters, 1270 kilocycles, 100 watts, class A. Mon, Wed, Fri, 8:45-10 pm. Sat, 12-2 am, "The Original Coo Coo Club." Central standard time. Slogan: "The Four Lake City."
1st Dial 2nd Dial 3rd Dial

WIBC—L. M. Tate Post, No. 39, Veterans of Foreign Wars, 484 2nd Ave., N., St. Petersburg, Fla. 222 meters, 1350 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WIBD—X-L Radio Service, 223 Van Buren St., Joliet, Ill. 200 meters, 1500 kilocycles, 50 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WIBE—Martinsburg Radio Broadcasting Co., 145 S. Queen St., Martinsburg, W. Va. 209 meters, 1430 kilocycles, 5 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WIBG—St. Paul's Protestant Episcopal Church, Elkins Park, Philadelphia, Pa. 222 meters, 1350 kilocycles, 50 watts, class A. Sunday, 11 am-4 pm. Occasional programs on week day evenings. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WIBH—Elite Radio Stores, (Moriarty), 55 Hillman St., New Bedford, Mass. 210 meters, 1430 kilocycles, 5 watts, class A. Daily, 12-1 pm. Mon, Wed, Fri, 6-8 pm. Sun, 3-5 pm. Eastern standard time. Slogan: "The Voice of New Bedford."
1st Dial 2nd Dial 3rd Dial

WIBI—Frederick B. Zittell, Jr., 369 Amity St., Flushing, L. I., N. Y. 218 meters, 1370 kilocycles, 5 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WIBJ—O. L. Carrell, 1506 N. American Bldg., Chicago, Ill. (portable). 215 meters, 1390 kilocycles, 50 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WIBK—University of the City of Toledo, Cor. 11th & Ill. Sts., Toledo, Ohio. 205 meters, 1460 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WIBL—McDonald Radio Co., (portable), 179 W Wash. St., Chicago, Ill. 215 meters, 1390 kilocycles, 250 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WIBM—Billy Maine (portable) 36 W. Randolph St., Chicago, Ill. 215.7 meters, 1390 kilocycles, 10 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WIBO—Nelson Brothers Bond & Mortgage Co., 6310 Broadway, Chicago, Ill. 226 meters, 1350 kilocycles, 500 watts, class A. Daily ex Sun, 2-4 pm. Daily ex Sun & Mon, 6-8 pm, music. Wed, 10 pm-12 midnight. Fri, 10 pm- 2 am. Tues, Thurs, midnight-3 am—midnight jamboree. Sun, 10:15 am, church services; 2-4 pm, concert; 6-8 pm, concert; 10 pm-12 midnight. Central standard time. Slogan: "Chicago's Uptown Radio Station."
1st Dial 2nd Dial 3rd Dial

WIBP—First Presbyterian Church, 10th & 23rd Ave., Meridian, Miss. 209.7 meters, 1430 kilocycles, 5 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WIBR—Tri-State Radio Co., Thurman A. Owings, Mgr., Weirton, W. Va. 246 meters, 1220 kilocycles, 100 watts, class A. Fri, 8:30-11:30 pm. Sun, 2-3 pm, church services. Eastern standard time. Slogan: "The Town Where Every One Works."
1st Dial 2nd Dial 3rd Dial

WIBS—New Jersey National Guard, Fifty-Seventh Infantry Brigade, 921 Edgewood Road, Elizabeth, N. J. (Portable.) 206.8 meters, 1480 kilocycles, 20 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WIBT—Orlando Edgar Miller, New York, N. Y. (portable). 211.1 meters, 1420 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WIBU—The Electric Farm, R. F. D. 3, Poynette, Wis. 222 meters, 1350 kilocycles, 20 watts, class A. Irregular schedules. Central standard time.
1st Dial 2nd Dial 3rd Dial

WIBW—Dr. L. L. Dill, Roselawn Addition, Logansport, Ind. 220 meters, 1360 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WIBX—Grid-Leak, Inc., 236 Genesee St., Utica, N. Y. 205.4 meters, 1460 kilocycles, 5 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WIBZ—Powell Elec. Co., Montgomery, Ala. 231 meters, 1300 kilocycles, 10 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WIL—St. Louis Star and Benson Radio Co., St. Louis, Mo. 273 meters, 1099 kilocycles, 150 watts, class A. Mon, Wed, Sat, 10-12 pm. Fri, 9-11 pm. Central time. Slogan: "Watch It Lead."
1st Dial 2nd Dial 3rd Dial

WIP—Gimbel Bros. Philadelphia, Pa. 509 meters, 590 kilocycles, 500 watts, class B. Eastern time.
1st Dial 2nd Dial 3rd Dial

WJAD—Jackson's Radio Eng. Laboratories, Waco, Texas. 352 meters, 850 kilocycles, 500 watts, class B. Central time.
1st Dial 2nd Dial 3rd Dial

WJAG—The Norfolk Daily News, Norfolk, Nebr. 270 meters, 1110 kilocycles, 250 watts, class A. Daily, 12:15 noon. Central standard time. Slogan: "World's Greatest Country Daily."
1st Dial 2nd Dial 3rd Dial

WJAK—Rev. Clifford L. White, Greentown, Ind. 254 meters, 1180 kilocycles, 100 watts, class A. Daily ex Sun, 12 noon, radio chapel service. Tues, 9-10:30 pm, concert. Sat, 5:30-6:30 pm, bible school lesson, music. Central standard time. Slogan: "The Radio Parson."
1st Dial 2nd Dial 3rd Dial

WJAM—D. M. Perham, 322 3rd Ave., West, Cedar Rapids, Iowa. 268 meters, 1120 kilocycles, 100 watts, class A. Tues, Thurs, Sat, 7-10:30 pm. Sun, 4 pm, vesper services. Central time.
1st Dial 2nd Dial 3rd Dial

WJAR—The Outlet Company, 174 Weybosset St., Providence, R. I. 305.9 meters, 980 kilocycles, 500 watts, class B. Mon, 10 am, 1:05 pm, 7:45 pm. Tues, 1:05 pm, 7:30 pm, 8:30 pm, 9 pm. Wed, 10 am, 1:05 pm, 7:30 pm. Thurs, 1:05 pm, 8 pm, 9 pm, 10 pm. Fri, 10 am, 1:05 pm, 8 pm, 11 pm. Sat, 1:05 pm, silent night. Sun, 7:20-9:15 pm, 10:15 pm. Eastern standard time. Slogan: "The Southern Gateway of New England."
1st Dial 2nd Dial 3rd Dial

WJAS—Pittsburgh Radio Supply House, 963 Liberty Ave., Pittsburgh, Pa. 275 meters, 1090 kilocycles, 500 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WJAZ—Zenith Radio Corp., 310 S. Michigan Ave., Chicago, Ill. (portable). 322.9 meters, 930 kilocycles, 100 watts, class B. Thurs, 10-12 pm. Central standard time.
1st Dial 2nd Dial 3rd Dial

WJBA—D. H. Lentz, Jr., 301 Whitley Ave., Joliet, Ill. 206.8 meters, 1450 kilocycles, 50 watts, class A. Tues, Thurs, 8-10:30 pm. Central standard time.
1st Dial 2nd Dial 3rd Dial

WJBB—Radio Service Co., 1922 Central Ave., St. Petersburg, Fla. 206.8 meters, 1450 kilocycles, 10 watts, class A. Slogan: "Sunshine Station." Eastern time.
1st Dial 2nd Dial 3rd Dial

WJBC—Hummer Furniture Co., Second & Joliet Sts., La Salle, Ill. 234.2 meters, 1180 kilocycles, 100 watts, class A. Daily, 12:30-1 pm, weather reports, music. Mon, Thurs, 8-10 pm, music. Central standard time.
1st Dial 2nd Dial 3rd Dial

WJBD—Ashland Broadcasting Committee, (C. W. Pfefferkorn), Ashland, Wis. 233 meters, 1290 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WJD—Denison University, Dept. of Physics, Granville, Ohio. 217.3 meters, 1380 kilocycles, 50 watts, class A. Schedule irregular. Eastern time. Slogan: "The College on the Hill."
1st Dial 2nd Dial 3rd Dial

WJJD—Loyal Order of Moose, Mooseheart, Ill. 302.8 meters, 990 kilocycles, 500 watts, class B. Daily, 3:30-4:30 pm, music, educational talks; 6:45-7:15 pm, concert; 10:30-1 am, concert. Central standard time. Slogan: "The Call of the Moose."
1st Dial 2nd Dial 3rd Dial

WJY—Radio Corporation of America, 33 W. 42nd St., New York, N. Y. 405 meters, 740 kilocycles, 750 watts, class B. Daily ex Mon, Sat, 7:30-11:30 pm. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WJZ—Radio Corporation of America, 33 W. 42nd St., New York, N. Y. 455 meters, 660 kilocycles, 500 watts, class B. Daily, 10 am-12 noon, 1-2 pm, 4-6 pm, 7-11:30 pm. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WKAA—H. F. Paar, 1444 Second Ave., E., Cedar Rapids, Iowa. 278 meters, 1080 kilocycles, 500 watts, class A. Daily ex Tues & Sat, 4-9-10:30 pm. Central standard time. Slogan: "Voice of Cedar Rapids."
1st Dial 2nd Dial 3rd Dial

WKAF—WKAF Broadcasting Co., 130 2nd St., Milwaukee, Wis. 261 meters, 1150 kilocycles, 250 meters, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WKAP—Dutee Wilcox Flint, Allens Ave., Cranston, R. I. 234 meters, 1280 kilocycles, 50 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WKAQ—Radio Corp. of Porto Rico, San Juan, Porto Rico. 340 meters, 880 kilocycles, 500 watts, class B. Daily from 8-10 pm, local time (one hour earlier than E. S. T.). Slogan: "The Island of Enchantment."
1st Dial 2nd Dial 3rd Dial

WKAR—Michigan Agricultural College, East Lansing, Mich. 285 meters, 1050 kilocycles, 500 watts, class B. Central time.
1st Dial 2nd Dial 3rd Dial

WKAV—Laconia Radio Club, 480 Main St., Laconia, N. H. 209 meters, 1430 kilocycles, 50 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WKBE—K. & B. Electric Co., 59 Emerald Ave., Webster, Mass. 231 meters, 1300 kilocycles, 100 watts, class A. Tues, 8 pm-12 midnight. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WKRC—The Kodel Radio Corp., Cincinnati, Ohio. 325.9 meters, 920 kilocycles, & 422.3 meters, 920 kilocycles, 1000 watts, class B. Sun, 6:45-7:30-10-12 pm. Mon, 8-10 pm, 12-2 am. Tues, Sat, 10-12 pm. Wed, Thurs, 8-10 pm. Central standard time.
1st Dial 2nd Dial 3rd Dial

WLAL—First Christian Church, 9th & Boulder Sts., Tulsa, Okla. 250 meters, 1200 kilocycles, 150 watts, class A. Sat, 7:30, bible class. Sun, 10:45 am-7:30 pm. Wed, 9 pm, musical. Central standard time. Slogan: "The Voice of the Church."
1st Dial 2nd Dial 3rd Dial

WLAP—W. V. Jordon, 306 W. Breckenridge St., Louisville, Ky. 275 meters, 1090 kilocycles, 20 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WLAX—Greencastle Community Broadcasting Station, Greencastle, Ind. 231 meters, 1300 kilocycles, 10 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WLB—University of Minnesota, Minneapolis, Minn. 278 meters, 1080 kilocycles, 5 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WLBL—Wisconsin Dept. of Markets, Stevens Point, Wis. 278 meters, 1080 kilocycles, 500 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WLIT—Lit Bros., Philadelphia, Pa. 394.5 meters, 760 kilocycles, 500 watts, class B. Daily, 12 noon-8 pm. Mon, Wed, Fri, 8 pm-12 midnight. Sun, 2-8 pm. Eastern standard time. Slogan: "Quaker City Siren."
1st Dial 2nd Dial 3rd Dial

WLS—Sears, Roebuck & Co., 925 Homan Ave., Chicago, Ill. 345 meters, 870 kilocycles, 500 watts, class B. Daily, 8-9-10-11-12 am-12-1 pm. Tues, 6:30-1am. Wed, 6:30-11 pm. Thurs, 6:30-8:55. Fri, 6:30-11 pm. Sat, 6:45-1 am. Sun, 6:30-8:55 pm. Central standard time. Slogan: "World's Largest Store."
1st Dial 2nd Dial 3rd Dial

WLTS—Lane Technical High School, 1225 Sedgwick St., Chicago, Ill. 258 meters, 1160 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WLW—The Crosley Radio Corp., 3401 Colerain Ave., Cincinnati, Ohio. 422.3 meters, 710 kilocycles, 5000 watts, class B. Sun, 9:30-11 am, 7:30-10:30 pm. Mon, 10:45-8 pm. Tues, 10:45-10 pm. Wed, 10:45 am to 12 pm. Thurs, 10:45 am-10 pm. Fri, 10:45 am-1:30 pm. Silent night. Sat, 10:45 am-6:55 pm. Central time. Slogan: "The Station with a Soul."
1st Dial 2nd Dial 3rd Dial

WLWL—Missionary Society of St. Paul the Apostle, 415 W. 59th St., New York, N. Y. 288.3 meters, 1040 kilocycles, 1000 watts, class B. Eastern time.
1st Dial 2nd Dial 3rd Dial

WMAC—Clive B. Meredith, Cazenovia, N. Y. 275 meters, 1090 kilocycles, 100 watts, class A. Irregular schedule. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WMAF—Round Hills Radio Corp., So. Dartmouth, Mass. 440.9 meters, 680 kilocycles, 1000 watts, class B. Eastern time.
1st Dial 2nd Dial 3rd Dial

WMAK—Norton Laboratories, Lockport, N. Y. 266 meters, 1130 kilocycles, 500 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WMAN—First Baptist Church, Columbus, Ohio. 278 meters, 1080 kilocycles, 50 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WMAQ—The Chicago Daily News, 15 N. Wells St., Chicago, Ill. 447.5 meters, 670 kilocycles, 500 watts, class B. Daily, 4-5, 6-7, 8-10 pm. Central standard time.
1st Dial 2nd Dial 3rd Dial

WMAY—Kingshighway Presby'ian Ch'ch, St. Louis, Mo. 247 meters, 1215 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WMAZ—Mercer University, Macon, Ga. 261 meters, 1150 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WMBB—Amer. Bond & Mortgage Co., 6201 Cottage Grove Ave., Chicago, Ill. 250 meters, 1200 kilocycles, 500 watts, class B. Daily ex Mon, Sun, 7-8:30-10:30 pm. Sun, 3-5 pm, 7-8:30 pm, 10:30 pm. Central time. Slogan: "World's Most Beautiful Ballroom."
1st Dial 2nd Dial 3rd Dial

WMBF—The Fleetwood Hotel, Miami Beach, Fla. 330 meters, 910 kilocycles, 500 watts, class B. Daily, 7-7:30 pm, concert; 7:30-8 pm, dance; 8 pm, weather and news, 10-12 midnight, dance. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WMC—Commercial Appeal, Memphis, Tenn. 499.7 meters, 600 kilocycles, 500 watts, class B. Central time.
1st Dial 2nd Dial 3rd Dial

WMCA—Greeley Square Hotel Co., Operators of Hotel McAlpin, 1282 Broadway, New York, N. Y. 340.7 meters, 880 kilocycles, 500 watts, class B. Daily, 11-12 am, 3-5 pm, 6-8 pm, 9-12 midnight. Eastern standard time. Slogan: "Where the White Way Begins."
1st Dial 2nd Dial 3rd Dial

WMH—The Ainsworth-Gates Radio Co., Cincinnati, Ohio. 326-424 meters, 920-690 kilocycles, 750 watts, class B. Central time.
1st Dial 2nd Dial 3rd Dial

WNAB—The Shepard Stores, Winter St., Boston, Mass. 250 meters, 1200 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WNAC—The Shepard Stores, Winter St., Boston, Mass. 280.3 meters, 1070 kilocycles, 500 watts, class B. Daily, 10:30-11:30 am, 1-2 pm, 4-5 pm, 6-7:30 pm, 8-10 pm. Thurs, silent night. Sun, 11 am, 1:30-3 pm, 6:45-9:30 pm. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WNAD—University of Oklahoma, Norman, Okla. 254 meters, 1180 kilocycles, 250 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WNAL—Omaha Central High School, 5019 Capitol Ave., Omaha, Nebr. 258 meters, 1160 kilocycles, 50 watts, class A. Tues, Fri, 7:30-9 pm. Central standard time. Slogan: "Omaha Pioneer Broadcast."
1st Dial 2nd Dial 3rd Dial

WNAP—Wittenberg College, Springfield, Ohio, 248 meters, 1210 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WNAR—First Christian Church, Butler, Mo. 231 meters, 1300 kilocycles, 20 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WNAT—Lening Bros. Co., Spring Garden & Ninth St., Philadelphia, Pa. 250 meters, 1200 kilocycles, 100 watts, class A. Wed, 6:50 pm-12 midnight. Eastern standard time. Slogan: "We Never Are Tired."
1st Dial 2nd Dial 3rd Dial

WNAV—Peoples Telephone & Telegraph Co., 313 Commerce Ave., Knoxville, Tenn. 233 meters, 1290 kilocycles, 500 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WNAX—Dakota Radio Apparatus Co., Yankton, S. Dak. 244 meters, 1230 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WNJ—Radio Shop of Newark, 89 Lehigh Ave., Newark, N. J. 233 meters, 1290 kilocycles, 150 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WNYC—City of New York, New York City, N. Y. 526 meters, 570 kilocycles, 1000 watts, class B. Eastern time.
1st Dial 2nd Dial 3rd Dial

WOAC—The Page Organ Co., Lima, Ohio. 261 meters, 1130 kilocycles, 50 watts, class A. Irregular schedule. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WOAI—Southern Equip. Co., San Antonio, Texas. 394.6 meters, 760 kilocycles, 1500 watts, class B. Mon, 9:30 am-12:15 pm, 3-7-8:30 pm. Tues, Wed, 9:30 am-12:15 pm, 3 pm, 7 pm, 8:30-9:30 pm. Thurs, 9:30 am-12:15 pm, 8:30-9:30-10:30 pm. Fri & Sat, 9:30 am-12:15 pm, 3, 8:30 pm. Sun, 11 am-8 pm, church services; 9:30-10:30 pm, music. Central standard time. Slogan: "The Winter Playground of America."
1st Dial 2nd Dial 3rd Dial

WOAN—James D. Vaughan, Lawrenceburg, Tenn. 282.8 meters, 1060 kilocycles, 500 watts, class B. Daily ex Sat, 9-10 pm. Daily ex Sun, 12:15-12:45 pm. Central standard time. Slogan: "Watch Our Annual Normal."
1st Dial 2nd Dial 3rd Dial

WOAW—Woodmen of the World, Omaha, Nebr. 526 meters, 576 kilocycles, 1000 watts, class B. Central standard time. Slogan: "Omaha, the City Surrounded by U. S."
1st Dial 2nd Dial 3rd Dial

WOAX—Franklin J. Wolff, The Monument Pottery Co., Trenton, N. J. 240 meters, 1250 kilocycles. 500 watts, class A. Daily, 12:15 pm, weather report. Wed, weekly crop reports. Eastern standard time. Slogan: "The Voice from Trenton."
1st Dial 2nd Dial 3rd Dial

WOC—The Palmer School of Chiropractic, Davenport, Iowa. 484 meters, 620 kilocycles, 5000 watts, class B. Central standard time. Slogan: "Where the West Begins."
1st Dial 2nd Dial 3rd Dial

WOCG—The Triple Alliance Radio Station, Sycamore, Ill. 205.4 meters, 1460 kilocycles, 10 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WOCL—Hotel Jamestown, Jamestown, N. Y. 275 meters, 1090 kilocycles, 30 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WODA—James K. O'Dea Radio & Victrola Shop, Paterson, N. J. 224 meters, 1340 kilocycles, 100 watts, class A. Daily, 11 am-1 pm, 4-7 pm, 8:30-11 pm. Thurs, 12 midnight-2 am, Owls club. Eastern standard time. Slogan: "Voice of the Silk City."
1st Dial 2nd Dial 3rd Dial

WOI—Elec. Engineering Dept., Iowa State College, Ames, Iowa. 270 meters, 1110 kilocycles, 500 watts, class A. Mon, 9:30 am, weather; 12:30 pm, chimes, weather, markets; 9:30 pm, weather. Tues, 9:30 am-12:30-9:30 pm. Wed, 9:30 am, 2:30 pm, 9:30 pm. Thurs & Fri, 9:30 am, 12:30 pm, 9:30 pm. Sun, 10:45 am, chimes; 11 am, chapel. Central standard time.
1st Dial 2nd Dial 3rd Dial

WOK—Neutrowound Radio Mfg. Co., 1721 Prairie Ave., Chicago, Ill. 217.3 meters, 1380 kilocycles, 1500 watts, class B. Sun, 7 pm-1 am. Mon, 12 noon-2 pm, 6 pm-1 am. Daily ex Sun & Mon, 12 noon-2 pm, 6-7 pm, 10 pm-1 am. Central standard time.
1st Dial 2nd Dial 3rd Dial

WOO—John Wanamaker, Philadelphia, Pa. 508.2 meters, 590 kilocycles, 500 watts, class B. Daily, 10 am-1pm, 4:30-5-7:30-8 pm. Mon, Wed & Fri, 7:30-11 pm. Sunday irregular, Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WOQ—Unity School of Christianity, 917 Tracy Ave., Kansas City, Mo. 278 meters, 1080 kilocycles, 1000 watts, class A. Sun, 11 am-12:30 pm, 7-7:45, 8-9 pm. Tues, 8-9 pm. Thurs, 7-8 pm, 8-9 pm. Sat, 8-9 pm, 10-11 pm. Central standard time.
1st Dial 2nd Dial 3rd Dial

WOR—L. Bamberger & Co., 46 Bank St., Newark, N. J. 405 meters, 740 kilocycles, 500 watts, class B. Mon, Wed, Sat, 2:30-4 pm, 6:15-7:30 pm, 8-11 pm. Tues, Thurs, Fri, 2:30-4 pm, 6:15-7:30 pm. Daily, 6:45 am-8 am, gym classes. Eastern standard time. Slogan: "One of America's Great Stores."
1st Dial 2nd Dial 3rd Dial

WORD—People's Pulpit Ass'n., Wagner Road, Batavia, Ill. 275 meters, 1090 kilocycles, 5000 watts, class B. Daily ex Sun, 8-10:30 pm. Sun, 10-11 am. Central standard time. Slogan: "The Watch Tower."
1st Dial 2nd Dial 3rd Dial

WOS—Missouri State Marketing Bureau, Board of Agriculture, Jefferson City, Mo. 440.9 meters, 680 kilocycles, 500 watts, class B. Daily ex Sun, 9-10-11-12-1 pm, 2-5 pm. Mon, Wed, Fri, 8 pm. Sun, 7:30 pm. Central standard time. Slogan: "Watch Our State."
1st Dial 2nd Dial 3rd Dial

WOWL—Owl Battery Co., 901 Carondelet St., New Orleans, La. 270 meters, 1110 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WOWO—The Main Auto Supply Co., 213 W. Main St., Fort Wayne, Ind. 227 meters, 1310 kilocycles, 500 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WPAJ—Doolittle Radio Corp., 115 Crown St., New Haven, Conn. 248 meters, 1120 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WPAK—North Dakota Agricultural College, Agricultural College, N. Dak. 275 meters, 1090 kilocycles, 100 watts, class A. Mon, Wed, Fri, 7:30-8:15 pm. Daily 1 pm, weather report. Central standard time.
1st Dial 2nd Dial 3rd Dial

WPE—Goltra Barge Line, Pt. to Pt., 6500 S. Broadway, St. Louis, Mo. Central time.
1st Dial 2nd Dial 3rd Dial

WPG—Municipality of Atlantic City, Atlantic City, N. J. 299.8 meters, 1000 kilocycles, 1000 watts, class B. Daily ex Wed. Eastern time. Slogan: "World's Play Ground—Atlantic City All the Time."
1st Dial 2nd Dial 3rd Dial

WPSC—Pennsylvania State College, Dept. of Elec. Engineering, State College, Pa. 261 meters, 1150 kilocycles, 500 watts, class A. Mon, Wed, Fri, 8-10 pm. Eastern standard time. Slogan: "The Voice of the Nittany Lion."
1st Dial 2nd Dial 3rd Dial

WQAA—Horace A. Beale, Jr., Parkersburg, Pa. 220 meters, 1360 kilocycles, 500 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WQAC—Gish Radio Service, 108 E. 8th St., Amarillo, Texas. 234 meters, 1280 kilocycles, 100 watts, class A. Irregular schedule. Central standard time. Slogan: "Where Quality Alone Counts."
1st Dial 2nd Dial 3rd Dial

WQAE—Moore Radio News Station, 41 Main St., Springfield, Vt. 246 meters, 1212 kilocycles, 50 watts, class A. Sat, 11 pm-1 am, midnight ramblers. Sun, 10:30 am-7 pm, church services. Eastern time. Slogan: "Boost Springfield."
1st Dial 2nd Dial 3rd Dial

WQAF—The Sandusky Register, Sandusky, Ohio. 240 meters, 1250 kilocycles, 5 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WQAM—Electrical Co., 42 N. W. 4th St., Miami, Fla. 268 meters, 1120 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

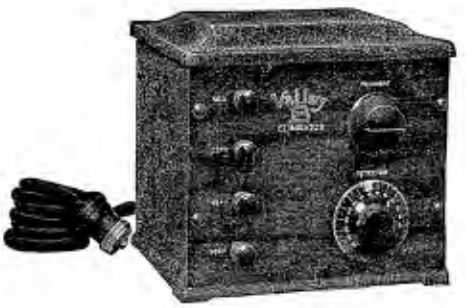
WQAN—Scranton Times, 222 Spruce St., Scranton, Pa. 250 meters, 1200 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WQAO—Calvary Baptist Church, 123 W. 57th St., New York, N. Y. 301 meters, 833 kilocycles, 500 watts, class B. Sun, 11 am-12:30 pm, 7:45-9:30 pm. Wed, 8-9 pm. Eastern time. Slogan: "The First Church Owned and Operated Radio Station in the World."
1st Dial 2nd Dial 3rd Dial

WQJ—Calumet Baking Powder & Rainbo Gardens Station, 4810 N. Clark St., Chicago, Ill. 447.5 meters, 670 kilocycles, 500 watts, class B. Sun, 10:30 am-1 pm, 3-4 pm, 8-10 pm. Mon, 11 am-12 noon, 3-4 pm, 7 pm. Tues, Wed, Thurs & Fri, 11 am-12 noon, 3-4 pm, 7-8 pm, 10 pm-2 am. Sat, 11-12 noon, 3-4 pm, 7-8 pm, 10-3 am. Central standard time.
1st Dial 2nd Dial 3rd Dial

WRAF—The Radio Club, Inc., 719 Michigan Ave., La Porte, Ind. 223.88 meters, 1340 kilocycles, 100 watts, class A. Sun, Mon, Thurs, 8:30 pm. Central standard time. Slogan: "The Voice of the Maple City."
1st Dial 2nd Dial 3rd Dial

For radio at its best you need these, too



Valley B-Eliminator

The Valley B-Eliminator is made for receiving sets of from one to eight **tubes.** Binding posts and control rheostats are mounted on Bakelite panel. **The** unit is enclosed in a handsome black case.

It costs less at the start than wet B batteries and less in the long run than **dry cells, too.** Much more satisfactory than either.

Like new B batteries every night

Here is a new and better way of supplying B voltage for radio reception.

B batteries wear out. They cannot be the same two nights in succession. As they decrease in strength, volume decreases, too. Furthermore, they become noisy as they wear out.

The absolutely ideal B battery current can be obtained only by the use of fresh new B batteries every night. The same ideal results can now be obtained by the use of the Valley B-Eliminator as your source of B voltage.

In its performance, the Valley B-Eliminator is like a new set of B batteries every time you tune in and every second you are tuned in.

The Valley B-Eliminator is more than a substitute for B Batteries. It is a new and better way of supplying B voltage for radio reception. It operates on the house lighting circuit and provides B current *at a constant voltage all the time.*

Hence reception is always at its best. There is never any decrease in the strength of signals and none of the frying noises or hum which are due to low B batteries. Volume is maintained. Reception is uniformly good.

The charger with ten points of superiority

The Valley Battery Charger has a reputation for results. It is based on principles which were proven successful long before radio became popular.

It is the only charger needed for all radio batteries:—6 volt A batteries; 24, 48, 72 or 96 volt B batteries; and 2 volt batteries.

It has ten points of superiority

1 No bulbs.

2 No liquids.

3 Quiet in operation.

4 Cannot harm your battery.

5 Efficient. Takes about a dime's worth of current for a full charge.

6 Correct 6-ampere charging rate enables you to recharge your battery overnight.

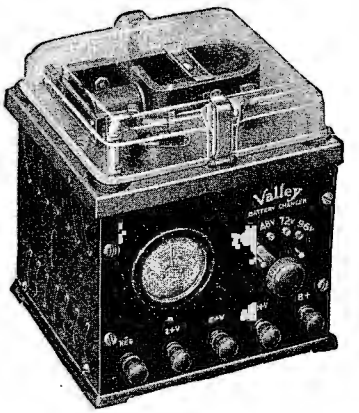
7 Ammeter mounted flush with panel shows if battery is receiving charge and if charging rate is correct.

8 Special switch for B batteries. Voltages: 24, 48, 72, 96.

9 Has only two wearing parts, the contacts, which can be replaced easily and cheaply. Average life of these contacts about two years.

10 Built in handsome black case with grained and engraved Bakelite panel and clear glass top which shows simple patented working parts. Harmonizes with the finest receiving set.

These features are all essential. Be sure of them by getting only a Valley Battery Charger.



Valley Battery Charger

VALLEY ELECTRIC COMPANY, *Radio Division*, ST. LOUIS, U. S. A.

Branches in Principal Cities

Valleytone Receiving Sets	Valley Battery Chargers	Valley B-Eliminators

Valley Electric

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

WRAK—Economy Light Co., 1105 Ludington St., Escanaba, Mich. 256 meters, 1170 kilocycles, 100 watts, class A. Mon & Fri, 8:30 pm. Central standard time. Slogan: "The Gateway to Cloverland."
1st Dial 2nd Dial 3rd Dial

WRAM—Lombard College, Galesburg, Ill. 244 meters, 1230 kilocycles, 100 watts, class A. Mon, Fri, 7:30-9 pm. Central standard time.
1st Dial 2nd Dial 3rd Dial

WRAV—Antioch College, Yellow Springs, Ohio. 263 meters, 1140 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WRAW—Avenue Radio & Electric Shop, 460 Schuylkill Ave., Reading, Pa. 238 meters, 1260 kilocycles, 10 watts, class A. Daily ex Sun, 7 pm. Thurs, 7-10 pm. Eastern standard time. Slogan: "The Schuylkill Valley Echo."
1st Dial 2nd Dial 3rd Dial

WRAX—Flexon's Garage, Gloucester City, N. J. 268 meters, 1120 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WRBC—Immanuel Lutheran Church, Valparaiso, Ind. 278 meters, 1080 kilocycles, 500 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WRC—Radio Corporation of America, 3308 14th St., N. W., Washington, D. C. 468.5 meters, 640 kilocycles, 500 watts, class B. Daily ex Sat & Sun, 9 am-11 pm. Sat, 1 pm-12 midnight. Eastern standard time. Slogan: "The Voice of the Capital."
1st Dial 2nd Dial 3rd Dial

WREC—Wooten's Radio & Elec. Co., Coldwater, Miss. 254 meters, 1180 kilocycles, 10 watts, class A. Daily, 4-5 pm. Sat, 9:30-10:30 pm. Central standard time. Slogan: "Most Powerful Ten-Watt Station in the World."
1st Dial 2nd Dial 3rd Dial

WREO—The Reo Motor Car Co., Lansing, Mich. 285.5 meters, 1050 kilocycles, 500 watts, class B. Tues, Thurs, 8:15-10 pm, music. Sat, 10-12 pm, dance. Eastern standard time. Slogan: "Watch Reo."
1st Dial 2nd Dial 3rd Dial

WRHF—Washington Radio Hospital Fund, 525 11th St., N. W., Washington, D. C. 256 meters, 1170 kilocycles, 50 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WRHM—Rosedale Hospital, Inc., Minneapolis, Minn. 252 meters, 1190 kilocycles, 50 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WRK—Doron Bros. Elec. Co., Hamilton, Ohio. 270 meters, 1110 kilocycles, 200 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WRL—Union College, Schenectady, N. Y. 360 meters, 833 kilocycles, 500 watts. Eastern time.
1st Dial 2nd Dial 3rd Dial

WRM—University of Illinois, Urbana, Ill. 273 meters, 1100 kilocycles, 1000 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WRMU—A. H. Grebe & Co., Inc., Motor Yacht "Mu I," New York. N. Y. 236 meters, 1270 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WRNY—Experimenter Publ. Co., Madison Ave. & 45th St., New York, N. Y. 258.5 meters, 1160 kilocycles, 500 watts, class A. Daily ex Sun, 12 noon-2 pm, 7:20-10 pm. Sat only, 12 midnight-1 am. Mon, Tues & Thurs, 10:30-11:30 pm. Sun, 3-5 pm. Eastern standard time. Slogan: "The Novelty Station."
1st Dial 2nd Dial 3rd Dial

WRW—Tarrytown Radio Research Laboratory, Tarrytown, N. Y. 272.6 meters, 1100 kilocycles, 500 watts, class A. Mon, 7-8-9-11:30 pm. Tues, Thurs, Fri, Sat, 9-11:30 pm. Wed, 10-11:30 pm. Sun, 8-9 pm, 10:30-11:30 pm. Eastern standard time. Slogan: "Everything in Radio."
1st Dial 2nd Dial 3rd Dial

WSAC—Clemson Agricultural College, Clemson College, S. C. 336.9 meters, 890 kilocycles, 500 watts, class B. Eastern time.
1st Dial 2nd Dial 3rd Dial

WSAG—Gospel Tabernacle, St. Petersburg, Fla. 266 meters, 1130 kilocycles, 500 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WSAI—The U. S. Playing Card Co., Cincinnati, Ohio, 325 meters, 920 kilocycles, 5000 watts, class B. Sun, 3-3:30 pm. Mon, Wed, 10-12 midnight. Tues, Thurs, 7-10 pm. Sat, 8-10 pm, 12 pm-2 am. Central standard time.
1st Dial 2nd Dial 3rd Dial

WSAJ—Grove City College, Grove City, Pa. 229 meters, 1310 kilocycles, 250 watts, class A. Irregular schedules. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WSAN—Allentown Call Publ. Co., Inc., Allentown, Pa. 229 meters, 1310 kilocycles, 100 watts, class A. Tues, Thurs, 8:15 pm. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WSAP—The City Temple, New York, N. Y. 263 meters, 1140 kilocycles, 250 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WSAR—Doughty & Welch Elec. Co., 46 N. Main St., Fall River, Mass. 254 meters, 1180 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WSAU—Camp Marienfeld (Robt. Y. Howard), Chesham, N. H. 229 meters, 1310 kilocycles, 10 watts, class A. Daily 1-2 pm. Eastern standard time. Slogan: "Where the White Mountains Begin."
1st Dial 2nd Dial 3rd Dial

WSAV—Clifford W. Vick Radio Construction Co., 1406 Honston Ave., Houston, Texas. 248 meters, 1210 kilocycles, 100 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WSAZ—Chase Elec. Shop, Pomeroy, Ohio. 244 meters, 1230 kilocycles, 50 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WSB—The Atlanta Journal, c/o Biltmore Hotel, Atlanta, Ga. 428.3 meters, 700 kilocycles, 1000 watts, class B. Daily, 12-1 am-2:30, markets; 3-3:30, baseball; 5-6 pm, news, markets; 8-9 pm ex Wed, 10:45 pm. Sun, 11 am, chnrch services, 5-6 pm, 8 pm, services. Central standard time. Slogan: "The Voice of the South."
1st Dial 2nd Dial 3rd Dial

WSBC—World Battery Co., 1219 S. Wabash Ave., Chicago, Ill. 209.7 meters, 1430 kilocycles, 200 watts, class A. Daily ex Mon, 8-11 pm. Central time.
1st Dial 2nd Dial 3rd Dial

WSBF—Stix, Baer & Fuller, 6th & Washington Ave., St. Louis, Mo. 273 meters, 1110 kilocycles, 250 watts, class A. Daily at noon-3 pm. Mon, Wed, Fri, 7:30-9 pm, Tues, 8-9, 11:15-12:30 pm. Mon, 12 pm-1 am. Thurs & Fri, 11 pm-1 am. Sun, 9-11 pm-1 am. Central standard time.
1st Dial 2nd Dial 3rd Dial

WSDA—The City Temple, New York City, N. Y. 263 meters, 1140 kilocycles, 250 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WSKC—Worlds Star Knitting Co., Bay City, Mich. 261 meters, 1150 kilocycles, 100 watts, class A. Mon, 9-11 pm. Wed, 9-11 pm. Eastern standard time. Slogan: "Where the Summer Trails Begin."
1st Dial 2nd Dial 3rd Dial

WSMB—Saenger Amusement Co. and Maison Blanche Co., 1401 Tulane Ave., New Orleans, La. 319 meters, 940 kilocycles, 500 watts, class B. Mon, Wed, Thurs, Sat, 8:30-11 pm. Central standard time. Slogan: "America's Most Interesting City."
1st Dial 2nd Dial 3rd Dial

WSMH—The Shattuck Music House, 207 Washington St., N. Owosso, Mich. 240 meters, 1250 kilocycles, 10 watts, class A. Wed, 8 pm. Sat, 10 pm. Sun, 10 am, church services. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WSMK—The S. M. K. Radio Corp., 812 Gibbons Hotel, Dayton, Ohio. 275.2 meters, 1090 kilocycles, 500 watts, class A. Daily ex Sun, 12 noon-12:30 pm, 4-4:30 pm. Daily ex Sun, Tues, 8-10:30 pm. Central standard time. Slogan: "The Home of Aviation."
1st Dial 2nd Dial 3rd Dial

WSOE—School of Engineering of Milwaukee, 415 Marshall St., Milwaukee, Wis. 245 meters, 20 kilocycles, 500 watts, class A. Daily ex Sat & Sun, 5:15 pm, news & sports; 5:30 pm, musical; 5:45 pm, story lady; 6:00 pm, weather report; 6:05 pm, markets, 2 pm on Sat. Daily ex Sun, 8 pm, 11 pm, music. Sun am, church services. Central standard time. Slogan: "In the Land of the Sky Blue Waters."
1st Dial 2nd Dial 3rd Dial

WSRF—Harden Sales & Service, Broadlands, Ill. 233 meters, 1290 kilocycles, 10 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WSRO—Radio Company (Harry W. Fährlander, 409 High St., Hamilton, Ohio. 252 meters, 1190 kilocycles, 100 watts, class A. Wed, Fri, Sun nights, 9-12 pm, dance. Central standard time. Slogan: "We Sell Radio Only."
1st Dial 2nd Dial 3rd Dial

WSUI—State University of Iowa, Capitol & Washington Sts., Iowa City, Iowa. 483.6 meters, 620 kilocycles, 500 watts, class B. Central standard time.
1st Dial 2nd Dial 3rd Dial

WSY—Alabama Polytechnic Institute, Auburn, Ala. 250 meters, 1200 kilocycles, 500 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WTAB—Fall River Herald Pub. Co., 231 Pocasset St., Fall River, Mass. 266 meters, 1130 kilocycles, 100 watts, class A. Mon, Thurs, 10:45 am. Tues, Thurs, 7 pm. Daily, 6:15-7:15 pm. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WTAG—Penn Traffic Co., Washington St., Johnstown, Pa. 209 meters, 1430 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WTAD—Robt. E. Compton, 412 Wabash Ave., Carthage, Ill. 286 meters, 1270 kilocycles, 50 watts, class A. Daily ex Sun, 10-11 am. Thurs, 9-11 pm. Central standard time.
1st Dial 2nd Dial 3rd Dial

WTAL—Toledo Radio & Elec. Co., 316 Jackson St., Toledo, Ohio. 252 meters, 1190 kilocycles, 10 watts, class A. Daily ex Sun, 7:30-8:30 pm. Eastern standard time. Slogan: "The Gateway to the Sea."
1st Dial 2nd Dial 3rd Dial

WTAM—Willard Storage Battery Co., 246 E. 131st St., Cleveland, Ohio. 398.4 meters, 770 kilocycles, 2500 watts, class B. Mon, 12:15-1:15 pm, 6-7 pm, 8-9 pm, 9-11 pm, 11-12 midnight. Tues, Thurs, Fri, 12:15-1:15 pm, 6-7 pm. Wed, 12:15-1:15 pm, 6-7 pm, 8-10 pm, 11 pm-1 am. Sat, 12:15-1:15 pm, 6-7 pm, 8-9 pm, 9-12 pm. Eastern standard time. Slogan: "The Voice from the Storage Battery."
1st Dial 2nd Dial 3rd Dial

WTAP—Cambridge Radio & Elec. Co., Cambridge, Ill. 242 meters, 1240 kilocycles, 50 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WTAQ—S. H. Van Gordon & Son, Osseo, Wis. 254 meters, 1180 kilocycles, 100 watts, class A. Fri & Sun, 8 pm. Central standard time. Slogan: "The Voice of the Wilderness."
1st Dial 2nd Dial 3rd Dial

WTAR—Reliance Elec Co., Inc., 519 W. 21st Ave., Norfolk, Va. 261 meters, 1150 kilocycles, 100 watts, class A. Daily ex Sun, 6:30 pm. Eastern standard time. Slogan: "Down in Old Virginia."
1st Dial 2nd Dial 3rd Dial

WTAS—Villa Olivia Radiophone Sta., Elgin, Ill. 302.8 meters, 990 kilocycles, 1500 watts, class B. Daily ex Sun & Thurs, 8-10:30 pm. Sun & Thurs, 8-12 pm. Central standard time. Slogan: "Willie, Tommie, Annie and Sammie."
1st Dial 2nd Dial 3rd Dial

WTAT—Edison Elec. Illuminating Co. (Portable), 39 Boylston St., Boston, Mass. 244 meters, 1230 kilocycles, 100 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WTAW—Agricultural & Mechanical College of Texas, College Station, Texas. 270.3 meters, 1110 kilocycles, 500 watts, class A. Wed & Fri, 8 pm. Sun, 10:40 am. Athletic events played at College Station. Central standard time.
1st Dial 2nd Dial 3rd Dial

WTAX—Williams Hardware Co., Streator, Ill. 231 meters, 1300 kilocycles, 50 watts, class A. Mon, 9-12 midnight. Central standard time. Slogan: "Tappa Kegga Nails."
1st Dial 2nd Dial 3rd Dial

WTAZ—Thomas J. McGuire, Lambertville, N. J. 261 meters, 1150 kilocycles, 15 watts, class A. Eastern time.
1st Dial 2nd Dial 3rd Dial

WTG—Kansas State Agricultural College, Manhattan, Kans. 273 meters, 1100 kilocycles, 50 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WTHS—Flint Senior High School, Crapo St., Flint, Mich. 218 meters, 1370 kilocycles, 250 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WTIC—The Travelers Insurance Co., 700 Main St., Hartford, Conn. 348.6 meters, 860 kilocycles, 500 watts, class B. Daily ex Sat, Sun, 7 pm. Mon, Wed, Thurs, 8:30 pm. Tues, 11 pm. Fri, 12 pm. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WWAD—Wright & Wright, Inc., 2215 N. Broad St., Philadelphia, Pa. 250 meters, 1200 kilocycles, 100 watts, class A. Mon, 7:45 pm. Thurs, 7:00 pm. Sun, 9:30 pm. Eastern time. Slogan: "Penn City Station."
1st Dial 2nd Dial 3rd Dial

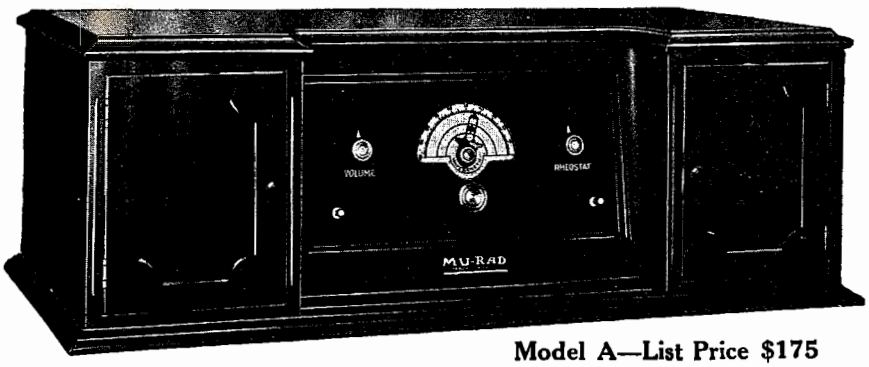
WWAE—Electric Park (L. J. Crowley), Plainfield, Ill. 242 meters, 1240 kilocycles, 500 watts, class A. Central time.
1st Dial 2nd Dial 3rd Dial

WWI—Ford Motor Co., Dearborn, Mich. 266 meters, 1130 kilocycles, 500 watts, class A. Wed, 8-9:30 pm. Eastern standard time.
1st Dial 2nd Dial 3rd Dial

WWJ—The Detroit News, Detroit, Mich. 352 meters, 850 kilocycles, 500 watts, class B. Daily 8 am, exercises; 9:30 am, household editor; 11:55 time signals; 12 noon, weather, music; 3 pm, orchestra; 4-6 pm, baseball; 6-7 pm, concert; 8-11 pm, music. Sun, 11 am, church service; 2 pm, 7:20, 9:15 Roxy. Eastern time.
1st Dial 2nd Dial 3rd Dial

WWL—Loyola University, New Orleans, La. 275 meters, 1090 kilocycles, 100 watts, class A. Sat, 7:30-8:30 pm. Central standard time.
1st Dial 2nd Dial 3rd Dial

Radio's Greatest Achievement



Model A—List Price $175

THOSE persons who have delayed buying a Radio Receiver in the belief that "something newer and better" would appear, as well as those who have Radios but are not satisfied with results hitherto obtainable, will find the New Mu-Rad a revelation in the art of radio reception.

This remarkable receiver is the culmination of 8 years of study and laboratory experimentation of the Mu-Rad engineers, plus the knowledge gained by the mistakes and the progress of the entire radio industry.

The Mu-Rad Transcontinental Receiver

is a distinct advance in radio—a year or two ahead of the times. Its ideal circuit embodies two stages of tuned Radio Frequency, a Detector and two stages of Audio Frequency.

Great progress has been made by Mu-Rad engineers in eliminating lost energy in the circuit and in balancing the circuit so as to secure a degree of selectivity hitherto unknown in a Radio Receiver.

Coast-to-Coast reception **all year around** is made possible with this receiver and the quality of reception is extraordinary.

Mu-Rad Model B—$125

Ask Your Nearest Dealer for Demonstration

ONE DIAL CONTROL

A revolutionary feature of the New Mu-Rad is its one dial control. There is only one dial to tune. A slight movement of this beautiful Gold Finish dial brings in one station after another—clear across the continent—without interference from local stations. The dial can be accurately "logged." Stations will always come in at the same dial setting. It's as simple as turning a doorknob.

A Child Can Operate It

MU-RAD RADIO CORPORATION

Factory
Asbury Park, N. J.

Sales Office
Newark, N. J.

Telephone Broadcasting Stations Listed by States

State, City, Call

Alabama:

Auburn, WSY
Birmingham, WBRC
Montgomery, WIBZ

Alaska:

Juneau, KFIU

Arizona:

Phoenix, KFAD, KFCB
Tuscon, KFDH

Arkansas:

Arkadelphia, KFWD
Bentonville, KFVX
Camden, KFVC
Conway, KFKQ
Fayetteville, KFMQ
Hot Springs, KTHS
Little Rock, KFMB

California:

Avalon, KFWO
Bakersfield, KDZB
Berkeley, KRE
Burlingame, KFQH
Chico, KFWH
Eureka, KFVU
Fresno, KMJ
Hollywood, KFQZ, KFVF, KFWB, KNX
Holy City, KFQU
Long Beach, KFON
Los Angeles, KFI, KFPG, KFPR, KFSG, KHJ, KJS
Oakland, KFUS, KFWM, KGO, KLS, KLX, KTAB, KZM
Pasadena, KPPC
Sacramento, KFBK,KFVK
San Diego, KDPT, KFBC, KFVW
San Francisco, KFRC, KFUQ, KFVZ, KFWI, KGTT, KJBS, KPO, KUO
San Leandro, KFUU
San Pedro, KFVD
Santa Ana, KFAW
Santa Rosa, KFNV
Stockton, KJQ, KWG
Taft, KFQC
Upland, KFWC

Colorado:

Boulder, KFAJ
Colorado Springs, KFUM
Denever, KFAF, KFDL, KFEL, KFUP, KFVR, KLZ, KOA
Greeley, KFKA
Gunnison, KFHA

Connecticut:

Hartford, WTIC
New Haven, WDRC, WPAJ
Storrs, WABL, WCAC

Delaware:

Wilmington, WHAV

District of Columbia:

Washington, WBES, WCAP, WRC,WRHF

Florida:

Fulford-by-the-Sea, WGBU
Miami, WQAM
Miami Beach, WMBF
St. Petersburg, WCBK, WHBN, WIBC, WJBB, WSAG
Tampa, WDAE
Winter Park, WDBO

Georgia:

Atlanta, WDBE, WGST, WSB
Columbus, WHBV
Macon, WMAZ
Savannah, WEBZ

Hawaii:

Honolulu, KGU

Idaho:

Boise, KFAU, KFDD
Kellogg, KFEY
Moscow, KFAN

Illinois:

Batavia, WORD
Broadlands, WSRF
Cambridge, WTAP
Carthage, WCAZ, WTAD
Chicago, KYW, WAAF, WBBM, WBCN, WDBY, WEBH, WENR, WFKB, WGES, WGN, WGO, WHBM, WHT, WIBJ, WIBL, WIBM, WIBO, WJAS, WLS, WLTS, WMAQ, WMBB, WOK, WQJ, WSBC
Decatur, WBAO
Elgin, WCEE, WTAS
Evanston, WEHS
Galesburg, WFBZ, WRAM
Harrisburg, WEBQ
Joliet, WCLS, WIBD, WJBA
Lake Forest, WABA
LaSalle, WJBC
Monmouth, WBBU
Mooseheart, WJJD
Plainfield, WWAE
Rockford, KFLV
Rock Island, WHBF
Spring Valley, WGBD, WGBW
Streator, WTAX
Sycamore, WOCG
Tuscola, WDZ
Urbana, WRM
Zion, WCBD

State, City, Call

Indiana:

Anderson, WEBD, WHBU
Culver, WIBH
Evansville, WGBF
Fort Wayne, WHBJ, WOWO
Greencastle, WLAX
Greentown, WJAK
Indianapolis, WFBM
LaPorte, WRAF
Logansport, WHBL, WIBW
Seymour, WFBE
South Bend, WGAZ
Valparaiso, WRBC
West Lafayette, WBAA

Iowa:

Ames, WOI
Atlantic, KFLZ
Boone, KFGQ
Burlington, WIAS
Cedar Falls, KFJX
Cedar Rapids, KFLP, WJAM, WKAA
Council Bluffs, KOIL
Davenport, WOC
Des Moines, WHO
Fort Dodge, KFJY
Iowa City, KFQP, WSUI
Lamoni, KFFV
LeMars, KFCY
Marengo, KFOL
Marshalltown, KFJB
Oskaloosa, KFHL
Shenandoah, KFNF, KMA
Sioux City, KFMR, WEAU

Kansas:

Independence, KFVG
Junction City, KFJC
Lawrence, KFKU
Manhattan, KFVH, KSAC, WTG
Russell, KFQO
Wichita, KFOT, WEAH

Kentucky:

Louisville, WHAS, WLAP

Louisiana:

Baton Rouge, KFGC
New Orleans, WAAB, WAAC, WABZ, WBBS, WCBE, WOWL, WSMB, WWL
Pineville, KFWU
Shreveport, KFDX, KWH, WGAQ

Maine:

Bangor, WABI
Ellsworth, WHBK
Orono, WGBX
Portland, WCSH

Maryland:

Baltimore, WCAO, WCBM, WFBR, WGBA

Massachusetts:

Boston, WDBR, WEEI, WNAB, WNAC, WTAT
Bridgewater, WFBN
Fall River, WSAR, WTAB
Mattapoisett, WBBG
Medford Hillside, WARC, WGI
New Bedford, WIBH
South Dartmouth, WMAF
Springfield, WBZ
Taunton, WAIT
Webster, WKBE
Worcester, WCBT, WCTS, WCUW

Michigan:

Berrien Springs, WEMC
Dearborn, WWJ
Detroit, KOP, WCX, WGHP,WWJ
East Lansing, WKAR
Escanaba, WRAK
Flint, WFDF, WTHS
Grand Rapids, WBDC, WEBK
Houston, KFMW
Lansing, WREO
Mt. Clemens, WABX
Owosso,WSMH
Petoskey, WBBP
Port Huron, WAFD

Minnesota:

Breckenridge, KFUJ
Collegeville, WFBJ
Minneapolis, KFDZ, KFMT, WAMD, WCCO, WHDI, WLB, WRHM
Northfield, KFMX
St. Cloud, WFAM
St. Paul, KFOY, WCCO
Virginia, KFUZ
Welcome, KFVN

Mississippi:

Coldwater, WREC
Hattiesburg, WCBG
Meridian, WIBP
University, WCBH

Missouri:

Butler, WNAR
Cape Girardeau, KFVS
Carterville, KFPW
Independence, KLDS
Jefferson City, WOS
Kansas City, KWKC, WDAF, WHB, WOQ
Kirksville, KFKZ
Moberly, KFFP

State, City, Call

St. Louis, KFQA, KFUO, KFVE, KFWF, KSD, WEW, WIL, WMAY, WPE, WSBF
Springfield, KFUV

Montana:

Butte, KFUY
Havre, KFBB
Helena, KFCC, KFSY
Missoula, KUOM

Nebraska:

Belden, KFQY
David City, KFOR
Hartington, KFRZ
Hastings, KFKX
Lincoln, KFAB, WFAV
Norfolk, WJAG
Omaha, KFCZ, KFEQ, KFOX, KUPR, WAAW, WNAL, WOAW
University Place, WCAJ

New Hampshire:

Chesham, WSAU
Hanover, WFBK
Laconia, WKAV, WKY

New Jersey:

Atlantic City, WHAR, WPG
Camden, WABU, WFBI
Elizabeth, WIBS
Gloucester City, WRAX
Lambertville, WTAZ
Newark, WAAM, WBS, WCBX, WGCP, WNJ, WOR
New Brunswick, WEBA
North Plainfield, WEAM
Paterson, WODA
Salem, WDBQ
Trenton, WOAX

New Mexico:

Albuquerque, KFLR, KFVY
State College, KFRY, KOB

New York:

Brooklyn, WBBR, WHAP
Buffalo, WEBR, WGR
Canton, WCAD
Cazenovia, WMAC
Flushing, WIBI
Freeport, WGBB
Ithaca, WEAI
Jamestown, WOCL
Kingston, WDBZ
Lockport, WMAK
New York City, WBAY, WDBX, WEAF, WEBJ, WEBL, WFBH, WFBM, WGBS, WHN, WIBT, WJY, WJZ, WLWL, WMCA, WNYC, WQAO, WRMU, WRNY, WSAP, WSDA
Richmond Hill, WAHG, WBOQ, WGMU
Rochester, WABO, WHAM, WHEC
Schenectady, WGY, WRL
Syracuse,WFBL
Tarrytown, WRW
Troy, WHAZ
Utica, WIBX

North Carolina:

Asheville, WABC
Charlotte, WBT
Raleigh, WFBQ

North Dakota:

Agricultural College, WPAK
Devils Lake, KDLR
Fargo, WDAY
Grand Forks, KFJM, KFRL

Ohio:

Akron, WADC
Bellefontaine, WHBD
Cambridge, WEBE
Canton, WHBC
Cincinnati, WAAD, WHAG, WHBR, WKRC, WLW, WMH, WSAI
Cleveland, KDPM, WDBK, WEAR, WHK, WTAM
Columbus, WBAV, WCAH, WEAO, WMAN
Dayton, WDBS, WEBT, WSMK
Elyria, WGBL
Granville, WJD
Hamilton, WRK, WSRO
Lima, WOAC
Newark, WBBA
Pomeroy, WSAZ
Sandusky, WQAF
Springfield, WCSO, WNAP
Toledo, WABR, WIBK, WTAL
Wooster, WABW
Yellow Springs, WRAV

Oklahoma:

Bristow, KFRU
Chickasha, KFGD
Fort Sill, KFRM
Norman, WNAD
Oklahoma City, KFJF
Tulsa, WLAL

Oregon:

Astoria, KFJI
Corvallis, KFDJ
Hood River, KQP
Portland, KFEC, KFIF, KFJR, KFWV, KGW

State, City, Call

Pennsylvania:

Allentown, WCBA, WSAN
Altoona, WFBG
Arnold, WCBU
Butler, WBR
East Pittsburgh, KDKA
Grove City, WSAJ
Harrisburg, WABB,WBAK, WHBG
Haverford, WABQ
Johnstown, WGBK, WHBP, WTAC
Lancaster, WDBC, WGAL
Oil City, WHBA
Parkersburg, WQAA
Philadelphia, WABY, WCAU, WFBD, WFI, WHBW, WIAD, WIBG, WIP, WLIT, WNAT, WOO, WWAD
Pittsburgh, KQV, WCAE, WJAS
Pottsville, WDS
Reading, WRAW
Scranton, WGBI, WQAN
State College, WPSC
Wilkes-Barre, WBAX, WBRE

Philippine Islands:

Manila, KZKZ, KZRQ, KZUY

Porto Rico:

San Juan, WKAQ

Rhode Island:

Cranston, WDWF, WKAP
Providence, WCBR, WEAN, WGBM, WJAR

South Carolina:

Charleston, WRBY
Clemson College, WSAC
Greenville, WGBT

South Dakota:

Brookings, KFDY
Rapid City, WCAT
Vermillon, WEAJ
Yankton, WNAX

Tennessee:

Chattanooga, WDOD
Knoxville, WFBC, WNAV
Laurenceburg, WOAN
Memphis, WGBC, WHBQ, WMC
Nashville, WCBQ

Texas:

Amarillo, WDAG, WQAC
Beaumont, KFDM
Beeville, KFRB
Brownsville, KFWP, KWWG
College Station, WTAW
Dallas, WFAA
Denison, KFQT
Dublin,KFPL
El Paso, WDAH
Fort Worth, KFJZ, KFQB, KFRO, WBAP
Galveston, KFLX, KFUL
Greenville, KFPM
Houston, KFVI, KPRC, WEAY, WSAV
San Antonio, WCAR, WOAI
San Benito, KFLU
Waco, WJAD

Utah:

Ogden, KFUR, KFWA
Salt Lake City, KDYL, KFOO, KFPT, KFUT, KSL

Vermont:

Burlington, WCAX
Springfield, WQAE

Virginia:

Norfolk, WBBW, WTAR
Richmond, WBBL
Roanoke, WDBT
Thrifton, WGBG

Washington:

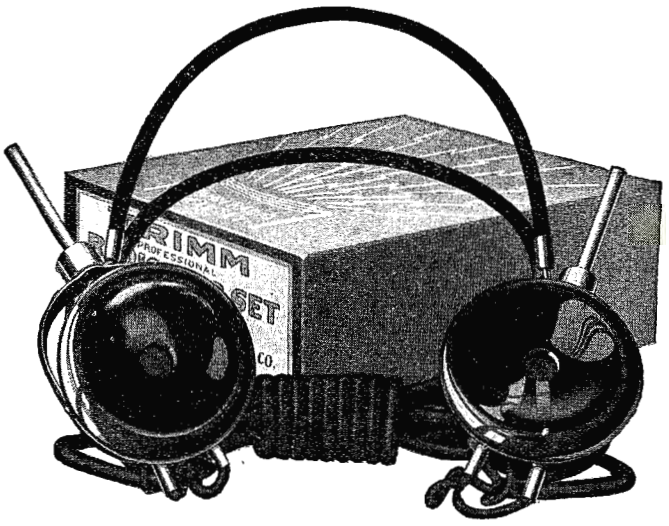
Everett, KFBL
Lacey, KGY
North Bend, KFQW
Olympia, KFRW
Pullman, KFAE, KFRX
Seattle, KFOA, KHQ, KJR, KTCI, KTW
Spokane, KFIO, KFPY
Tacoma, KFBG, KGB, KMO
Vancouver, KFVL
Walla Walla, KFCF
Yakima, KFIQ

West Virginia:

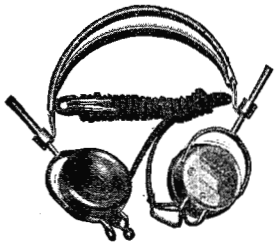
Martinsburg, WIBE
Weirton, WIBR

Wisconsin:

Ashland, WJBD
Beloit, WEBW
Fond du Lac, KFIZ
LaCrosse, WABN
Madison, WHA, WIBA
Marshfield, WGBR
Menominie, WGBQ
Milwaukee, WHAD, WKAF, WSOE
Osseo, WTAQ
Poynette, WIBU
Stevens Point, WHBB, WLBL
Superior, WEBC
West De Pere, WHBY



Hear Those Distant Stations With a Professional Headset



Dependable Headset

Absolutely the best metal case headset on the market, regardless of price. Aluminum case, highly polished, is very light in weight and comfortable to use. Coils are wound to a resistance of 2400 Ohms. Permanent forged Tungsten Steel magnet of the highest grade. This headset will give you more genuine satisfaction than many others selling at twice its price.

TRIMM
Superior Reproducers

HEADSETS	
Professional - -	$5.50
Dependable - - -	4.40
PHONODAPTERS	
Giant Unit - -	$10.00
Little Wonder -	4.50
SPEAKERS	
Home Speaker -	$10.00
Entertainer - -	17.50
Cabinette - - -	17.50
Concert - - -	25.00
Chello - - -	30.00

With a Professional Headset you are able to tune in far away stations with a clearness and distinctness that makes them sound as loud as locals.

Be sure you get a good headset (a Trimm Headset) when you complete your radio receiving equipment. A cheap, inefficient, poorly made headset will not get any stations you cannot tune in on a loud speaker. That's why you need the Professional Headset.

The Donald B. MacMillan Polar Expedition is equipped with Professional Headsets for the 2nd consecutive year. They use the Professional Headset because they found it was the best by test.

The Professional Headset at its low price of $5.50 costs but little more than cheaper headsets, and it's more than worth it. Resistance is 3000 Ohms. Bakelite cases, very light in weight. Forged Tungsten Steel magnet guaranteed for a lifetime.

All Trimm Reproducers are guaranteed to give a lifetime of perfect satisfaction. The Trimm line is complete; there is a Reproducer to meet every need, to fit every purse. Ask for the genuine TRIMM

TRIMM
RADIO MANUFACTURING COMPANY
24 So. Clinton St.
CHICAGO
U.S.A.

MEMBER RMA

Broadcasting Stations of Canada

Call Signal	Owner and Location of Station	Wave Length Metres	Power Input Watts
CFAC	The Calgary Herald, Calgary, Alta	434.5	2000
CFCA	Star Publishing & Printing Co., 18 King St. W., Toronto, Ont	356.9	2000
CFCF	Marconi Wireless Telegraph Co. of Canada, Ltd., Canada Cement Bldg., Phillips Square, Montreal, P. Q	410.7	7500
CFCH	Abitibi Power & Paper Co., Ltd., Iroquois Falls, Ont	499.7	500
CFCK	Radio Supply Co., Ltd., 10229-101 St., Edmonton, Alta	516.9	400
CFCN	W. W. Grant Radio Ltd., 708 Crescent Rd. N. W., Calgary, Alta	434.5	3000
CFCQ	Radio Specialties Ltd., 791 Dunsmuir Ave., Vancouver, B. C	410.7	40
CFCU	Jack V. Elliot Ltd., 123 King St. W., Hamilton, Ont	340.7	2000
CFKC	D. J. Fendell, Patricia Theatre Bldg., Thorold, Ont	248	150
CFQC	The Electric Shop Ltd., 144 Second Ave. N., Saskatoon, Sask	329.5	500
CFRC	Queen's University (Dept. of Electrical Engineering), Fleming Hall, Queen's University, Kingston, Ont	267.7	2000
CFXC	Westminster Trust Co., Columbia & Begbie Sts., New Westminster, B.C.	291.1	80
CFYC	Radio Corporation of Vancouver, Ltd., Royal Oak Ave., Municipality of Burnaby, B. C	410.7	2000
CHNC	Toronto Radio Research Society, 46 Lauder Ave., Toronto, Ont	356.9	2000
CHUC	International Bible Students' Association, Cor. Main & 2nd St., Saskatoon, Sask	329.5	200
CHXC	J. R. Booth, Jr., 28 Range Rd., Ottawa, Ont	434.5	1200
CHYC	Northern Electric Co. Ltd., 121 Shearer St., Montreal, P. Q	410.7	2000
CJCA	The Edmonton Journal Ltd., Journal Bldg., Edmonton, Alta	516.9	5000
CJCD	The T. Eaton Co. Ltd., Queen St. W., Toronto, Ont	356.9	100
CJCF	The News Record, 39 South Cameron St., Kitchener, Ont	329.5	300
CJGC	London Free Press Ptg. Co., 440 Richmond St., London, Ont	329.5	200
CKAC	La Presse Publishing Co. Ltd., cor. St. James St. & St. Lawrence Blvd., Montreal, P. Q	410.7	7500
CKCD	Vancouver Daily Province, 142 Hastings St. W., Vancouver, B. C	410.7	6000
CKCK	Leader Publishing Co. Ltd., Regina, Sask	475.9	2000
CKCL	The Dominion Battery Co. Ltd., 20 Trinity St., Toronto, Ont	356.9	2000
CKCO	Dr. G. M. Geldert, 282 Somerset St. W., Ottawa, Ont	434.5	400
CKFC	First Congregational Church, Vancouver, B. C	410.7	200
CKLC	Wilkinson Electric Co. Ltd., 2119 Seventh Ave. N. W., Calgary, Alta	434.5	200
CKOC	Wentworth Radio Supply Co. Ltd., Hamilton, Ont	340.7	200
CKY	Manitoba Telephone System, Sherbrooke St., Winnipeg, Man	384.4	2000
CNRA	Canadian Nat'l Railways, Moncton, N. B	312.3	2000
CNRC	Canadian Nat'l Railways, Calgary, Alta	434.5	1000
CNRE	Canadian Nat'l Railways, Edmonton, Alta	516.9	5000
CNRM	Canadian Nat'l Railways, Montreal, P. Q	410.7	7500
CNRO	Canadian Nat'l Railways, Ottawa, Ont	434.5	2000
CNRR	Canadian Nat'l Railways, Regina, Sask	475.9	2000
CNRS	Canadian Nat'l Railways, Saskatoon, Sask	329.5	500
CNRT	Canadian Nat'l Railways, Toronto, Ont	356.9	2000
CNRV	Canadian Nat'l Railways, Vancouver, B. C	291.1	2000
CNRW	Canadian Nat'l Railways, Winnipeg, Man	384.4	2000
CHIC	Northern Electric Co. Ltd., Toronto, Ont	356.9	2000
CJYC	DeForest Radio Corporation Ltd., Toronto, Ont., Soarboro Station, Ont.	291.1	2000
CFCT	Geo. W. Deaville, Victoria, B. C	329.5	2000

KODEL RADIO

The Emblem of KRC *Worth in Radio*

Setting a New Radio Standard

LOG·O·DYNE "BIG FIVE" $90.00

Five tubes, self-balanced tuned radio frequency; sloping panel gold engraved; beautiful, massive, Adam brown mahogany cabinet; compartment for batteries; stations already logged for easy tuning.

Radio for years to come will not offer a better receiver than the LOGODYNE Big Five. Combining the utmost in performance with striking beauty of cabinet design, the LOGODYNE Big Five represents a triumph in radio engineering and artistry of manufacture.

No receiver could better express or exemplify the high standard to which the entire KODEL RADIO line is built—for KODEL RADIO is, without a doubt, the best that radio offers.

Free *Send for the new edition of our free booklet "The Secret of Distance and Volume in Radio". Gives helpful interesting information on radio operation.*

THE KODEL RADIO CORPORATION
510 East Pearl Street Cincinnati, Ohio

WKRC
Owners of Kodel Broadcasting Station WKRC on the Alms Hotel. Send for program.

LOGODYNE "Big Five" Console Model—the Aristocrat of Radio; built-in loud speaker; compartment for batteries and charger a masterpiece in furniture design. $275

LOGODYNE "Standard Five" Console Model—beautiful brown mahogany; built-in loud speaker; compartment for A and B batteries and charger..... $165

LOGODYNE "Standard Five"—five tubes self-balanced tuned radio frequency; gold engraved panel and sub-panel; battery compartment; handsome brown mahogany cabinet..... $70

KODEL "Gold Star" Models—Radio's greatest set values; Three Tube "Gold Star" Model. $30

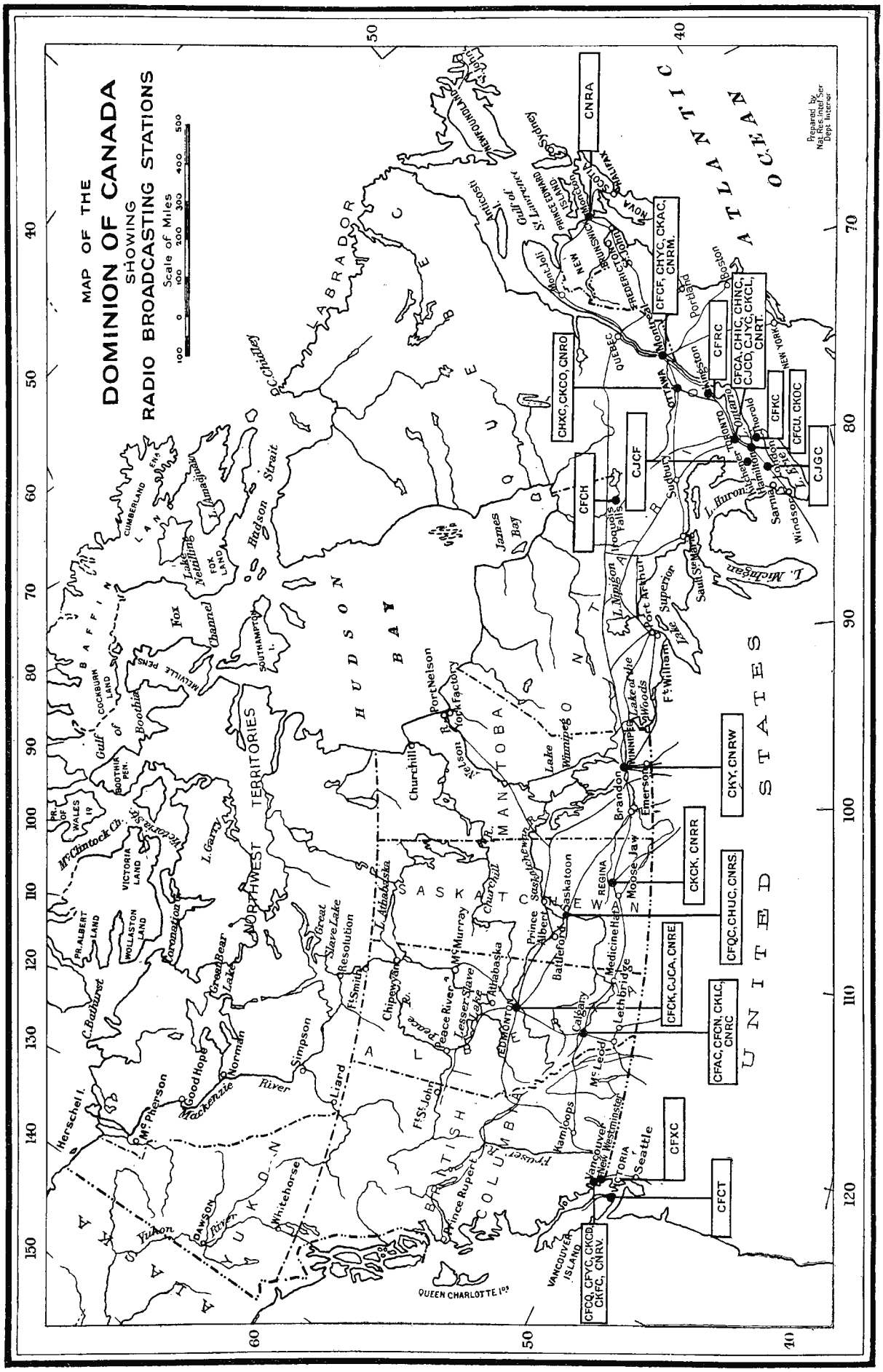
Two Tube "Gold Star" Model.. $20

One Tube "Gold Star" Model... $12

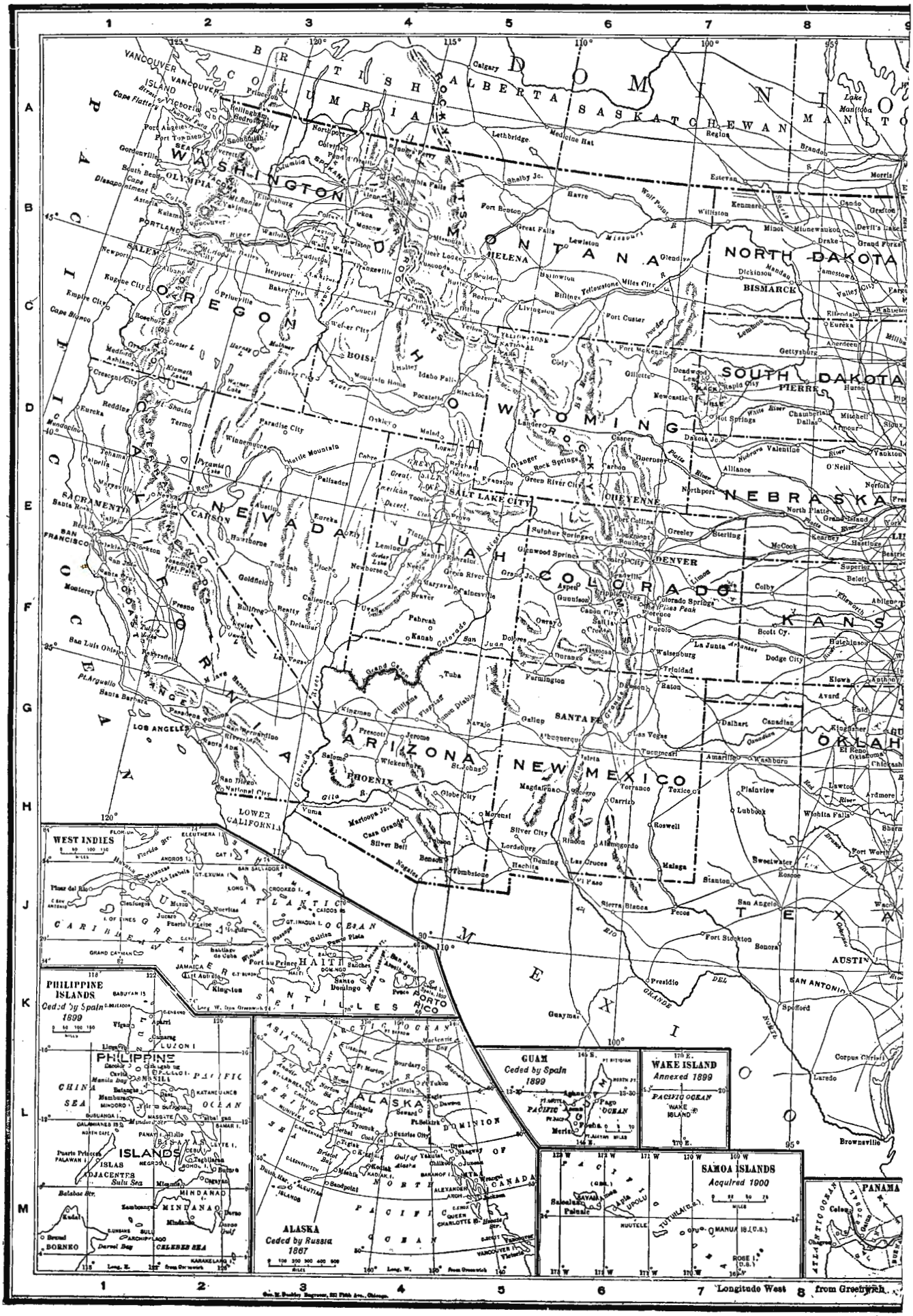
"Gold Star" Crystal Set..... $ 6

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

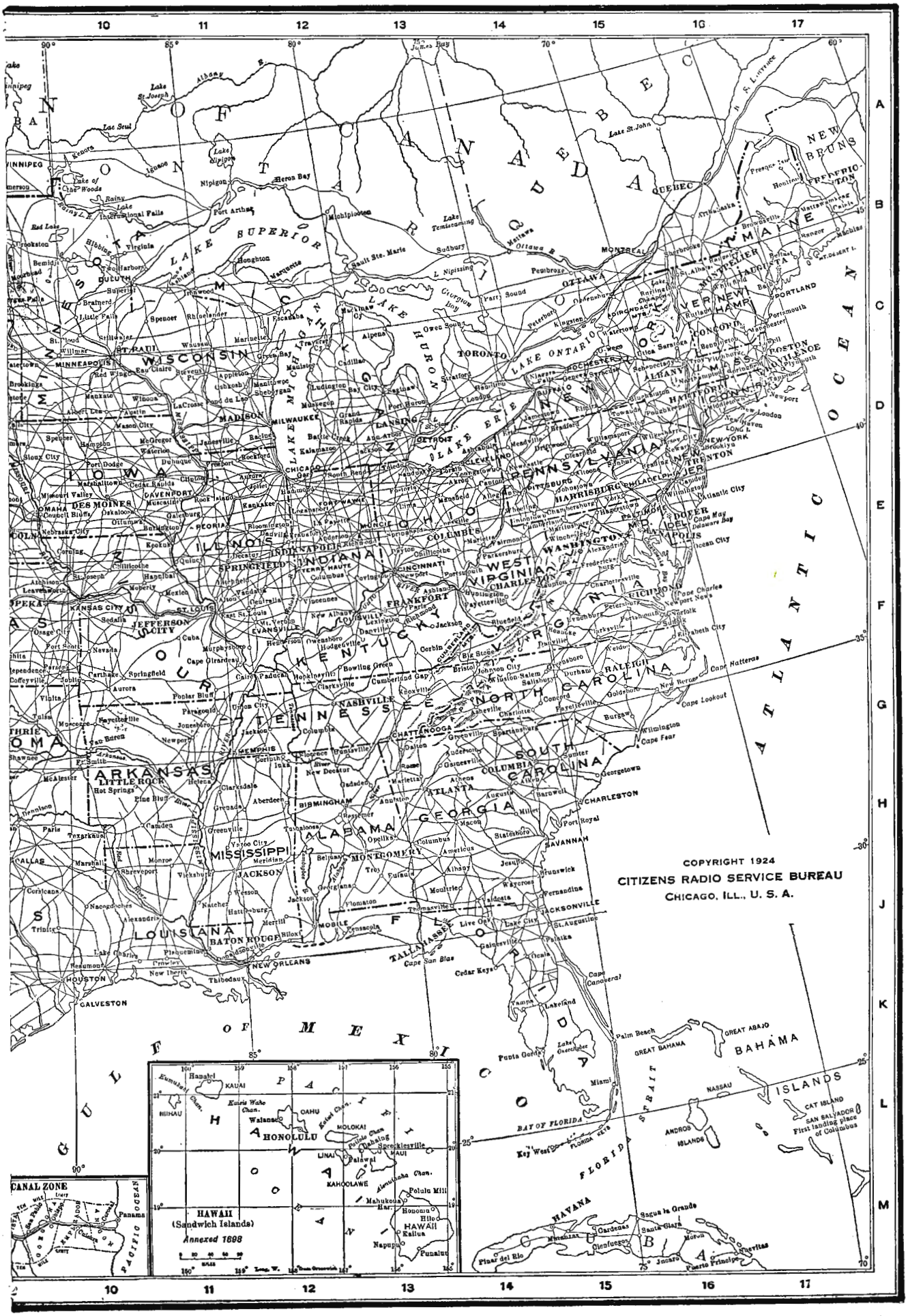
Radio Map of Canada



MAP OF THE



UNITED STATES



Foreign Radio Broadcasting Stations

	Call	Wave-length, meters	Power, watts
AUSTRIA			
Graz		700	.....
Vienna: Radio Hekaphone, War Ministry	OHW	600	1000
Oesterrichische Radioverkehrs A. G.	RAVAG	.....	5000
BELGIUM			
Brussels: Societe Belge Radio Electrique	SBR	265-410	1500
Haeren	BAV	900-1100	4000
CZECHOSLOVAKIA			
Bratislava: Projected (owners not reported)		.....	.....
Brunn: Komarov	DKB	1800	1000
Kashau: Projected (owners not reported)		.....	.....
Prague: Radio Journal, Prague-Kbely	OKP	1800	1000
Prague-Strasnice (owners not reported)	PRG	430-560	1000
Projected (owners not reported)	PQR	1000	.....
Ushorod: Projected (owners not reported)		.....	.....
DENMARK			
Lyngby: State Telegraph System	OXE	2400	2500
Copenhagen: Radio Club, supported by government		775	.....
Ryvang: Ministry of War and Danmarks Radio Union		1025	.....
FINLAND			
Helsingfors: Radkola, Youth's Society		300	250
Skatudden: Military, publicly supported..."Radio Division"		420	1000
Tammerfors: Nuoren Voiman Liiton Radiohdistys	3NB	300	250
FRANCE			
Abbeville: Ministere des Postes, Telegraphes et Telephones		900	.....
Agen: (Owners not reported)		.....	.....
Bordeaux: Lafayette Station (owners not reported)		.....	.....
Dijon: (Owners not reported)	FND	900	.....
Issy-sur-Moulineaux: Ministere des Postes, Telegraphes et Telephones		1600	.....
Lille: Coupleaux Freres		.....	.....
Lyon: Ministere des Postes, Telegraphes et Telephones	YN	470	500
Societe Lyonnaise de Radiophonie		287	2000
Nice: Ministere des Postes, Telegraphes et Telephones		460	.....
Montpellier: Societe Languedocienne de T.S.F.		186	100
Paris: Eiffel Tower, Army	FL	2650	5000
Ecole Superieure des P.T.T.	ESP	450	2000
Societe Francais Radio-Electrique	SFR	1780	10000
(Owners not reported)	8AJ	1780	.....
Petit Parisien		340	500
Clichy (owners not reported)		1780	15000
Tours: Ministere des Postes, Telegraphes et Telephones	YG	2500	500
Toulouse: (Owners not reported)	MRD	1525	.....
GERMANY			
Berlin: Magdeburger Platz (under construction; operators not reported)		.....	5000
Konigswusterhausen (operators not reported)	LP	330	5000
Vox Haus (operators not reported)		425	1500
Telefunken		290	2000
Bremen: (Operators not reported)		330	.....
Breslau: Schlessische Rundfunk, A.G.	LP	415	1500
Cassell: (Operators not reported)		292	.....
Dresden: (Operators not reported)		280	.....
Eberswalde: (Operators not reported)		.....	4000
Frankfurt: Sud-West Deutsche Rundfunk Dienst	LP	440	1500
Hamburg: Nordischer Rundfunk, A.G.	LP	392	1500
Hanover: (Operators not reported)		296	.....
Konigsberg: Ostmarken Rundfunk, A.G.	LP	460	1500
Leipsig: Mitteldeutscher Rundfunk, A.G.	LP	452	1500
Muenster: (Operators not reported)		407	1000
Munich: Deutsche Stunde in Bayern	LP	485	1500
Norddeich: (Operators not reported)	KAV	.....	.....
Nuremburg: Relay (operators not reported)		340	.....
Stettin: Relay (projected; operators not reported)		.....	.....
Stuttgart; Suddeutsche Rundfunk Dienst	LP	443	1500
HUNGARY			
Budapest: Postoffice	HB	950	900
Csepel: Postoffice	MTI	950	250
IRELAND, FREE STATE			
Dublin: Government (projected)		.....	.....
ITALY			
Milan: Unione Radiofonica Italiana (projected)		.....	.....
Naples or Palermo: Unione Radiofonica Italiana (projected)		395	.....
Rome: Unione Radiofonica Italiana	IRO	425	1600
LATVIA			
Riga: (Projected; owners not reported)		480	2000
LITHUANIA			
Kovno: (Under construction; owners not reported)		.....	.....
NETHERLANDS			
Amsterdam: W. Boosman	PXG	1050	.....
Vas Dias Persbureau	PCFF	1950	.....
The Hague: Nederlandsche Radio Industri	PCGG	1070	400
Hilversum: Nederlandsche Seintoellen Fabrick	NSF	1050	1000
(Owners not reported)	HDO	1050	.....
Ijmuiden: Middelraad	PCMM	1050	.....
Vossegat: (Owners not reported)	BE	.....	.....

	Call	Wave-length, meters	Power, watts
NORWAY			
Oslo: (Owners not reported)	OSLO	.....	.....
POLAND			
Government		.....	.....
Government		.....	.....
PORTUGAL			
Lisbon: Aero Lisboa		370-410	.....
RUSSIA			
(NOTE: It is reported that there are some fifty radio broadcasting stations in Russia in Europe, as well as a large number of stations in Russian Asia now under construction. Information is available only on the following, however.)			
Moscow: (Owners not reported, probably Soviet Government)		1500	.....
Nizhni-Novgorod: (Owners not reported, probably Soviet Government)		83	25000
SPAIN			
Alcoy: (Projected; owners not reported)		.....	.....
Barcelona: Emisiones Radio Barcelona	EAJI	325	1500
Cartegena: (Owners not reported)	EBX	1200	.....
Madrid: (Owners not reported)	PTT	310	1000
Emisiones Radio Iberica	RI	392	1500
(Under construction; owners not reported)	EGC	1650-2200	2000
San Sebastian: (Projected; owners not reported)		.....	.....
Seville: Radio Club	EAJ5	350	.....
Valencia: Radio Club (projected)		.....	.....
Zaragoza; (Projected; owners not reported)		.....	.....
SWEDEN			
Boden: Radiojanst	SASE	2500	.....
Goteborg: Radiojanst	SASB	290	.....
Malmo: Radiojanst (temporary)	SASC	270	1500
Stockholm: Radiojanst	SASA	440-470	.....
Sundsvall: Radiojanst*	SASD	680	.....
*This is the most northern station reported.			
SWITZERLAND			
Basel: (Under construction; owners not reported)		.....	.....
Geneva: Station T.S.F. Cointrin	HB1	1100	500
International Experanto Association		.....	.....
Hoengg: Swiss Radio Association		515-650	.....
Kloten: (Owners not reported)	HBK	1100	1000
Lausanne: Champ de l'Air	HB2	460-1100	500
Zurich: Zurich University		650-515	1000
TURKEY			
Constantinople: Anatolian Electric Co. (projected)		.....	.....
UNITED KINGDOM			
Birmingham: British Broadcasting Co., Ltd.	5IT	475	500
Bournemouth: British Broadcasting Co., Ltd.	6BM	385	1100
Chelmsford: British Broadcasting Co., Ltd.	5XX	1600	15000
Croyden: British Broadcasting Co., Ltd.	GED	900	.....
Daventry: British Broadcasting Co., Ltd. (projected to replace Chelmsford)		.....	.....
Hull: British Broadcasting Co., Ltd. (Relay)	6KH	335	1500
Leeds-Bradford: British Broadcasting Co., Ltd. (Relay)	2LS	346-310	1500
Liverpool: British Broadcasting Co., Ltd. (Relay)	6LV	318	1500
London: British Broadcasting Co., Ltd.	2LO	365	3000
Manchester: British Broadcasting Co., Ltd.	2ZY	376	1500
Newcastle: British Broadcasting Co., Ltd.	5NO	400	1100
Nottingham: British Broadcasting Co., Ltd. (Relay)	5NG	322	1500
Plymouth: British Broadcasting Co., Ltd. (Relay)	5PY	335	1500
Sheffield: British Broadcasting Co., Ltd.	6FL	303	1500
Stoke-on-Trent: British Broadcasting Co., Ltd. (Relay)	6ST	306	1500
Cardiff: British Broadcasting Co., Ltd.	5WA	351	1500
Swansea: British Broadcasting Co., Ltd.	5SX	485	1500
Aberdeen: British Broadcasting Co., Ltd.	2BD	495	1100
Dundee: British Broadcasting Co., Ltd. (Relay)	2DE	331	1500
Edinburgh: British Broadcasting Co., Ltd. (Relay)	2EH	328	1500
Glasgow: British Broadcasting Co., Ltd.	5SC	420	1500
Belfast: British Broadcasting Co., Ltd.	2BE	435	.....
YUGOSLAVIA			
Belgrade: Compagnie Generale de T.S.F.	HFF	1625	5000
Zagreb: Radio Club (under construction)		.....	.....
Rakovitza: (Owners not reported)		1650	.....
ALASKA			
Anchorage: Chovin Supply Co.	KFQD	280	100
Juneau: Alaska Electric Light and Power Co.	KFIU	226	10

	Call	Wave-length, meters	Power, watts
COSTA RICA			
San Jose: Government (under construction)		.....	.....
CUBA			
Habana: Cuban Telephon Co.	PWX	400	.....
Pedro Zayas	2DW	300	.....
Alberto S. de Bustamante	2AB	240	.....
Mario Garcia Velez	2OK	360	.....
Frederick W. Borton	2BY	260	.....
Frederick W. Borton	2CX	320	.....
Westinghouse Electric Co.	2EV	220	.....
Roberto E. Ramires	2TW	230	.....
Heraldo de Cuba	2HC	275	.....
Luis Casas	2LC	250	.....
E. Sanchez de Fuentes	2KD	350	.....
Fausto Simon	2MN	270	.....
Manuel G. Salas	2MG	280	.....
Raul Parez Falcon	2JD	150	.....
Alvara Daza	2K	200	.....
Julio Power	2HS	180	.....
Oscar Collado	2OL	290	.....
Amadeo Saenz	2WW	210	.....
Colon: Leopoldo E. Figueroa	5EV	360	.....
Tuinucu: Frank H. Jones	6KW	340	.....
Frank H. Jones	6KJ	275	.....
Cienfiegos: Antonio T. Figueroa	6CX	170	.....
Eduardo Terry	6DW	225	.....
Jose Ganduxe	6BY	300	.....
Valentin Ullivari	6AZ	200	.....
Stgo. de Cuba: Alberto Ravelo	8BY	250	.....
Andres Vinnet	8FU	225	.....
Pedro C. Anduz	8DW	275	.....
MEXICO			
Chihuahua: Compania Telefonico	CZF	525	500
Mazatlan: Rosseter y Cia	CYR	440	250
Mexico City: El Buen Tono	CYB	360	500
El Universal	CYL	510-360	500
Excelsior Parker	CYX	333	500
Secretaria de Guerra	CYG	.....	100
La Ligua del Radio	CYZ	400	100
Partido Liberal Avanzido	CYA	540	100
Ministerio de Communicaciones	CYC	.....	.....
Departmento de Aviacion, Ministerio de Guerra	CZA	510	100
Fabrica Nacional de Vestuario	IJ	.....	.....
F. C. Steffenex	IR	250	.....
Fuerza Aerea Mexicana	FAM	500	.....
Departmento de Education	CZE	450	500
Monterey: Constantino Tarnava, Jr.	CYO	280	200
Oaxaca: Enrique Corrilela		450	50
Saltillo: Colegio Ateneo Fuente		450	135
San Luis Potosi: (Owners not reported; operations suspended)		.....	50
Tampico: Alberto Isack y Cia		.....	.....
Casa Sagaon		.....	.....
El Mundo (projected)		.....	.....
Vera Cruz: Manuel Angel Fernandez		.....	50
PORTO RICO			
San Juan: Radio Corporation of Porto Rico	WKAQ	360	500
Dr. Roses Artan	WGBO	275	10
SAN SALVADOR			
El Salvador: (Projected; owners not reported)		.....	.....
ARGENTINA			
Buenos Aires: Radio Nacional	LOY	.....	1000
Association Argentina de Broadcasting	LOR	350-410	500
Francisco J. Brusa	B-1	.....	.....
Departmento Nacional de Higiene	C-3	.....	.....
Grand Splendid Theater	LOW	.....	1000
Radio Cultura	LOX	375	500
Francisco J. Brusa	LOV	.....	.....
Departmento Nacional de Higiene	C-2	.....	.....
Facultad de Ciencias Medicas	C-1	.....	.....
Sociedad Radio Telefonico	A-1	.....	.....
Senores Bocci Hermanos	AI1	.....	.....
Tucuman: Radio Club		.....	100
Mendoza: (Owners not reported)		.....	.....
BRAZIL			
Rio de Janeiro: Praia Vermelha-National Telegraph Service	SPE	300-600	500
Radio Sociedad de Rio de Janeiro (Marconi)		450	6000
Cia. Radiotelegraphica Brasiliera (projected)		380	.....
Bello Horizantes: National Telegraph Service		.....	500
Cia. Radiotelegraphica Brasiliera (projected)		350-850	.....
Bahia: Radio Sociedade do Bahia (projected)		250-450	.....
Cia. Radiotelegraphica Brasiliera (projected)		350-850	.....
Goyanna: Benedicto Rabello (projected)		.....	.....
Para: Radio Club de Para* (projected)		.....	.....
Pernambuco*: Radio Club de Pernambuco		310	.....
Cia. Radiotelegraphica Brasiliera		350-380	.....
Porto Alegre: Radio Sociedade Rio Grandense	RSR	381	80
Sao Paulo: Sociedade Radio Educadora (projected)		.....	2000
Sociedade Radio Educadora		310	1000
Cia. Radiotelegraphica Brasiliera (projected)		320	.....
Radio Educadora Paulista		350	.....
Radio Club de Sao Paulo		350	.....
Radio Bondeirantes		.....	10000
Rio Grande do Sul: (Projected)		.....	.....

*Pernambuco stations are nearest to equator reported. Para station, when operating, will be closer.

CHILE			
Sanitago: Radio Corporation of Chile and dealers	CRC	400-460	250-600
Mercurio (projected)		.....	.....
Vina del Mar: Antonio Cornish Besa	ACB	400	50
ECUADOR			
Gauyaquil: El Telegrapho (projected)		.....	.....
PERU			
Lima: Cia. Peruana de Telefonos, Ltda. (under construction)	OAB	360	1500
URUGUAY			
Montewideo: Radio Sud Americana and General Electric, Montevideo Branch		.....	500
El Dia		.....	.....
VENZUELA			
Caracas: Coronel Acturo Santana (projected)		.....	.....
CEYLON			
Ceylon Amateur Wireless Association (projected)		.....	.....
CHINA			
Shanghai: The Evening News		.....	.....
Macao: Potrtugese		.....	.....
Kowloon: Radio Communication Co., Orient, Ltd. (under construction)		.....	50
Dairen: (Projected; owners not reported)		.....	.....
Mukden: Government (projected)		.....	25000
Tientsin: Gesho Electric Road†		.....	500
Peking: East Railway		.....	500

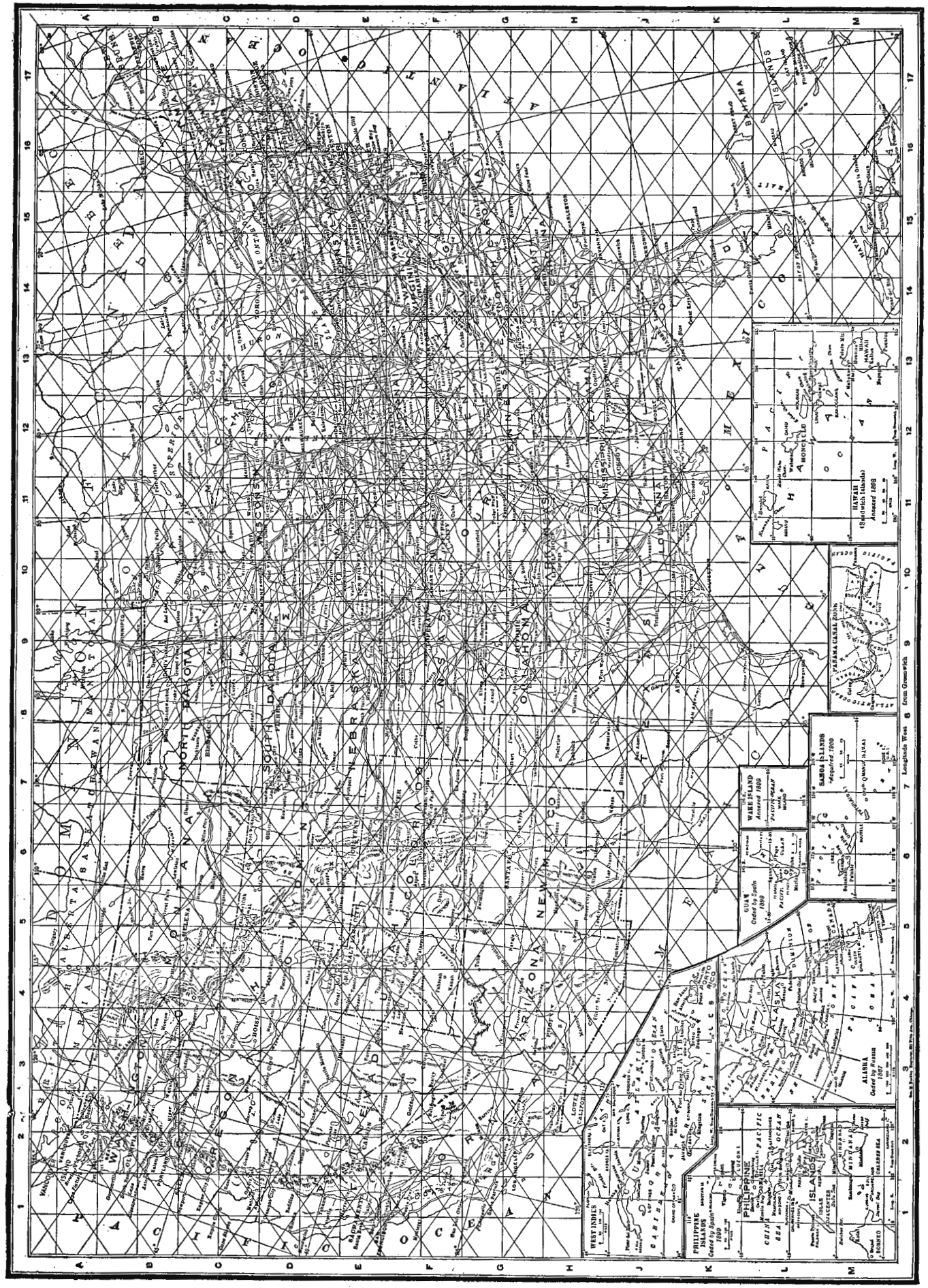
†Stations built for broadcasting but at present employed in transmitting.

HONGKONG			
Victoria: Radio Communication Co., Orient, Ltd.		.....	10
Hongkong Hotel Co.		.....	100
Government		350-360	1500
INDIA			
Bombay: Bombay Presidency Radio Club	2FV	400	1500
Madras: Madras Presidency Radio Club (projected)		.....	.....
Calcutta: Radio Club of Bengal	2BZ	800	500
	5AF	425	.....
Rangoon: Radio Club of Burma (projected)		.....	.....
JAPAN			
Nagoya: Nagoya Radio Broadcasting Co. (projected)		.....	.....
Osaka: Osaka Radio Broadcasting Co.		385	500
Osaka Radio Broadcasting Co. (projected)		385	1500
Tokyo: Tokyo Radio Broadcasting Co.		375	1000
PHILIPPINES			
Manila: Far Eastern Radio Co.	KZRQ	222	500
Radio Corporation of the Philippines	KZKZ	270	500
F. Johnson Elser	KZUY	370	100
AUSTRALIA			
Adelaide: Marshall & Co.	5MC	273	500
Central Broadcasting Co.	5CL	375	5000
E. J. Hume	5DN	313	500
Sydney: Farmer & Co., Ltd.	2FO	1100	5000
Broadcastings Sydney, Ltd.	2BL	350	1500
Burgin Electric Co.	2BE	316	100
Electrical Utilities Supplies Co.	2UE	293	250
A.W.A.	2WA	462	500
Newcastle: H. A. Douglas	2HD	333	50
Perth: West Australian Farmers, Ltd.	2WF	1250	5000
Melbourne: Broadcasting Co. of Australia	3LO	1729	5000
Wangaratta Sports Depot	3HW	300	100
Associated Radio Co. of Australia	3AR	480	1600
Mildura: R. J. Egge	3EO	520	100
Hobart: Associated Radio Co. of Australia	7ZL	390	3000
Brisbane: Queensland Government Bureau of Agriculture	4QG	385	5000
Newcastle: Broadcasters Sydney, Ltd. (projected)		429	.....
HAWAII			
Honolulu: Marion A. Mulrony	KGU	270	500
NEW ZEALAND			
Dunedin*: Radio Supply Co.	4YO	370	500
British Electrical and Engineering Co.	4YA	310-370	300
Otago University	4XO	140	.....

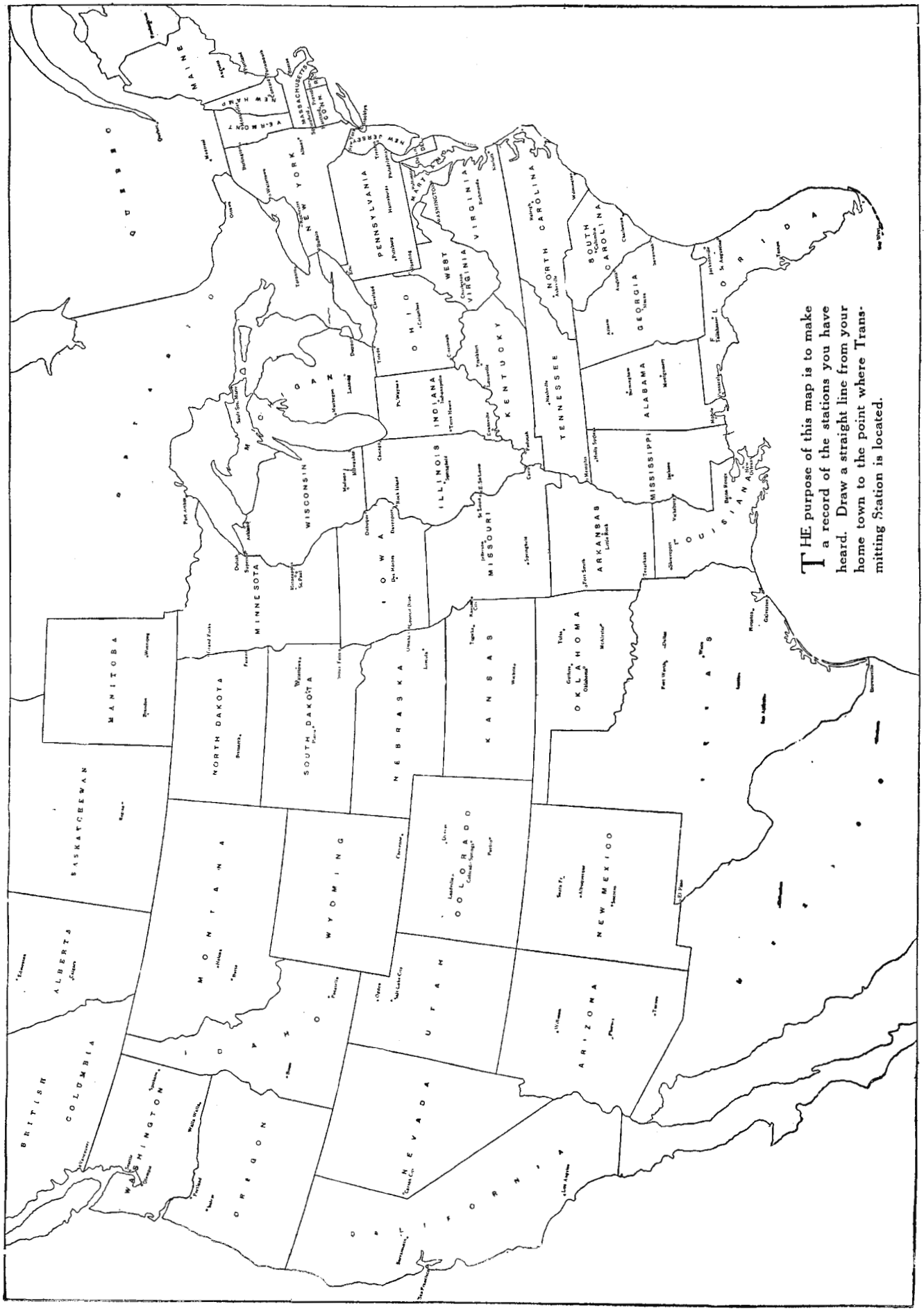
*Dunedin is the most southern broadcasting city reported.

Auckland: Auckland Radio Service	1YA	260	200
La Gloria Gramophone Co., Ltd.	1YB	260	50
Newcombe, Ltd.	1YL	260	500
Wellington: Dominion Radio Co.	2YK	275	500
Broadcastings Limited	2YB	275	15
Gisborne: Gisborne Radio Co.	2YM	335	500
ALGERIA			
Algiers: (Owners not reported)	8AY	200	500
CANARY ISLANDS			
Teneriffe: (Owners not reported)		.....	100
Santa Cruz: (Projected; owners not reported)		.....	.....
EGYPT			
Alexandria: Bourse (projected)		.....	.....
FRENCH MOROCCO			
Casablanca: Radio Club de Maroc	CNO	250	500
TUNISIA			
Tunis: French Army		.....	.....
UNION OF SOUTH AFRICA			
Grahamstown: (Owners not reported)		400	.....
Durban: Town Council		350-400	500
Cape Town: Cape Publicity Association	WAMG	400	500
Johannesburg: Associated Scientific and Technical Societies	JB	450	500

DISTANCE CHART



BLANK RECORDING MAP



A New-Type Radio

—*that offers 4 extraordinary improvements*

MODERN electrical science has discovered a new principle in radio. A principle that offers four vital improvements in broadcast reception.

That accomplishes greater distance, greater clarity.

That brings in stations 1,000 miles away in the dead of August. Coast to coast in Winter as clearly as if the broadcaster were in the same room.

This set is not offered you for sale—first we'll lend you one to hear.

Simply fill in the coupon below, and let us provide an evening's entertainment in your home. Learn what we have accomplished. Then, if it measures up to your ideals, buy it.

A secret it took 12 months to learn

The story of what happened is briefly told.

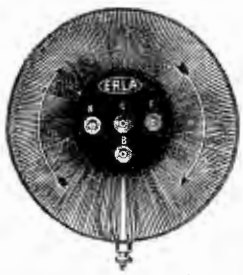
We tested 154 radio sets and found four great opportunities for betterment.

12,587 radio fans had already given us their utmost ideals of the master receiver. Somehow we believed their ideals could be attained.

Famous engineers worked day and night in our laboratories for many months. Step by step we accomplished things that others thought impossible.

We built 73 experimental radio sets. And tore them down.

Then we made another—based on a new and entirely different principle, found in no other radio set regardless of price.



New Erla Balloon Circloid Coupler and Transformer

It gave the results we wanted.

Hundreds of radio fans tested it—and told us so! At last we had it.

A radio set supreme!

A new radio principle

Erla receivers offer a greatly improved system of radio frequency amplification that is made possible by a new and revolutionary coil—the Erla Balloon Circloid!

This remarkable coil is the heart of Erla Circloid Five Receivers and it is not found in any other set, no matter how costly.

Note these four great advantages:

First. It offers greater distance. Coast to coast—Canada to the Gulf in Winter. On reasonably clear evenings, one thousand to fifteen hundred miles in Summer.

De Luxe Console

Quartered and matched figured walnut panels. French Huguenot finish. Supreme excellence is in materials and construction throughout. Built-in horn and loud speaker. Complete, excepting tubes and accessories, $142.50. Standard Console of identical design, in two-tone dark walnut, $113.50.

Second. It raises radio to the heights of musical excellence. Ends for good and all the crackling and metallic vibration so long considered inevitable. Stops "fuzziness." Gives to each tone its full, natural expression with the finest shades of meaning.

Even the subtlest grace notes are clear, pure, wonderfully faithful. And high soprano "C"—the "difficult" note that in most sets is seldom if ever free from distortion—comes in with full, rich beauty of expression. Marvelously clear—marvelously life-like.

Third. Instantaneous selectivity. Stations separated only by a few meters wave length can be tuned in or out with surprising ease. Gets any station previously logged within 20 seconds by the stopwatch. No more overlapping. No fuss or bother.

Fourth. It has exceptional volume. Brings in distant stations when desired, with volume enough to fill a concert auditorium.

Priced as low as $69.50

The Erla establishes an entirely new standard of radio enjoyment. Its improvements are fundamental—and permanent. Its results are astounding the radio world. And Erla prices, too.

As leading parts makers we are equipped to manufacture in enormous quantity.

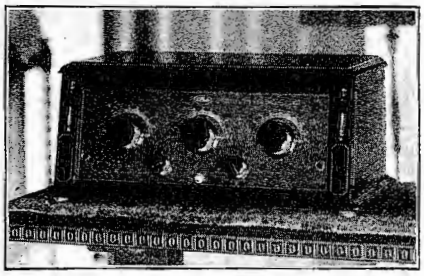
Now, because of huge sales, we are able to offer the Circloid Five—with all of the great improvements—at prices very much lower than the average.

There's an Erla for as little as $69.50, exclusive of accessories. And many other cabinet and console models. Each one an example of fine furniture and craftsmanship.

Now we ask you to test it

It has taken us a long time to perfect this ideal radio receiver. Step by step its supremacies have been attained. Today we believe it is the best radio set in existence.

Now we ask you to test it. Regardless of what you want, the Erla will exceed your expectations.



Erla Standard Cabinet

Rich, two-tone dark mahogany, 5-tube, $69.50. De luxe model, in quartered French walnut, $77.50.

Present the coupon to your nearest radio dealer—or mail it direct to us. We simply urge that you do yourself the justice of learning what we have accomplished.

Made by ELECTRICAL RESEARCH LABORATORIES, CHICAGO

ERLA

This sign identifies authorized Erla distributors and dealers. All are equipped to give *complete* radio service.

FREE—This Unique Test

ELECTRICAL RESEARCH LABORATORIES,
Dept. 3-B, 2500 Cottage Grove Avenue, Chicago, Ill.

Gentlemen:

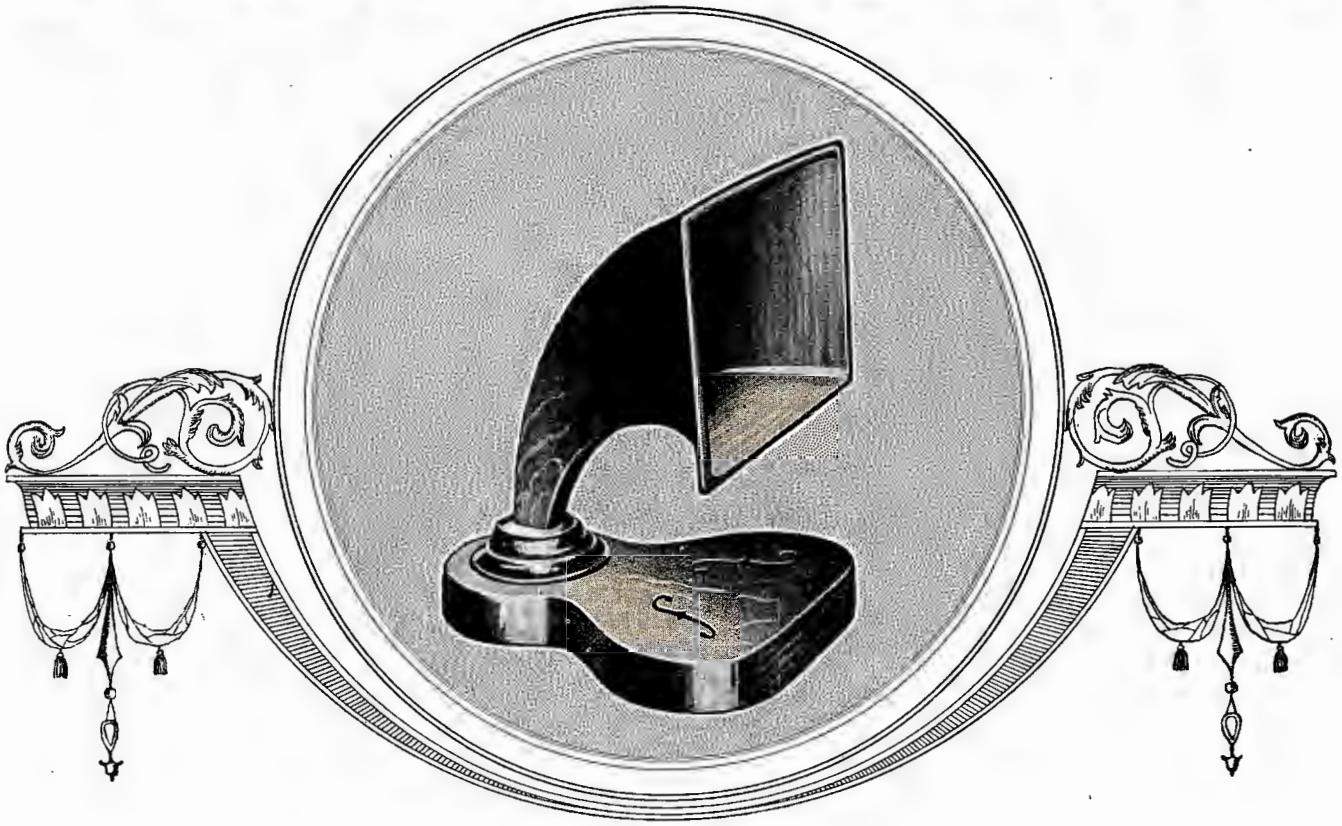
☐ Please have my local Erla dealer lend me a set for an evening.
☐ Please send me your interesting radio catalog

Name.....

Address.....

City.....County.....State.....

TIMBRETONE



An Investment in Good Entertainment

The choice of a TIMBRETONE Loud Speaker for your radio receiving set means absolute assurance of good entertainment this winter.

TIMBRETONE means good music and clear reception. No metal sounds or other distortion. Constructed entirely of wood.

Have your dealer demonstrate the TIMBRETONE to you today. You will readily appreciate its excellent tonal qualities and the beauty of its design.

To dealers we have an attractive proposition. Let us send you complete literature today. It means actual dollars to you.

Be sure to see and hear the TIMBRETONE

Made in Hoosick Falls, N. Y.
by the

TIMBRETONE MANUFACTURING COMPANY

Some of the People You Often Hear —But Seldom See

J. L. PERRON
Minister of Highways
CKAC

WILFRED MANTON
Young Announcer
CKFC

F. STIRLING
Announcer
CFXC

R. H. COMBS
Director
CHNC

H. W. ARLIN
Announcer
KDKA

ALICE LINDSEY WEBB
"Book Chat Lady"
KFAE

"STATIC"
Spanish Announcer
KFDM

"MAGNOLENE MIKE"
Chief Announcer
KFDM

LANNIE W. STEWART
Announcer
KFPW

A. R. MEIER
Announcer M. R. A.
KFQO

HERBERT C. COLBURN
Owner and Operator
KFUU

WILLIAM R. FISHER
Announcer
KFUU

H. C. MAILANDER
Chief Announcer
KFWA

NORMAN MANNING
"The Live Wire"
KFWB

CHARLIE WELLMAN
"Don't Go 'Way Folks"
KFWB

HOWARD I. MILHOLLAND
Chief Announcer "HM"
KGO

DICK HALLER
Chief Announcer
KGW

DOC REYNOLDS
Chief Operator
KLS

MRS. DOC REYNOLDS
Chief Announcer
KLS

S. BAILEY
Chief Announcer
KLX

PAUL HOFFMAN
KNX
"The Town Crier"

RALPH K. CLARK
Announcer R. K. C.
KOA

INA RAINS
Housewives' Matinees
KOA

RALPH FREESE
Announcer "RF"
KOA

G. RALPH CROWDER
Announcer
KOA

CLAIR MORRISON
Chief Announcer
KPO

SAM PICKARD
Announcer
KSAC

G. C. ARNOUX
Announcer G. C. A.
KTHS

E. L. OLDS
Announcer ELO
KTHS

A. W. (SEN) KANEY
Announcer
KYW

L. (STEVE) TRUMBULL
"World Crier"
KYW

WALTER WILSON
"Uncle Bob"
KYW

H. A. (SHORTY) FALL
Assistant Director
KYW

WALTER C. EVANS
Chief Engineer
KYW

W. (SCOOP) WEATHERBEE
Director
KYW

MRS. ANNA J, PETERSON
"Table Talks"
KYW

P. A. LEONHARDT
Physical Director
KYW

GERALD C. GROSS
Manager and Director
WABQ

CHARLES GREENE
Operator
WABQ

FRANK C. ISELY
Chief Announcer
WABW

W. E. BRANCH
Announcer
WBAP

THE HIRED HAND
Sub-Announcer
WBAP

MARLDEAN BORRESEN
Announcer
WBBM

WM. H. McDONNELL
Co-Owner and Announcer
WBCN

RICHARD SMITH
Announcer
WBDC

F. R. MUELLER
Director
WBES

H. A. VAN EATON
Operator
WBES

W. M. JOHNSON, JR.
Announcer
WBES

J. H. DE PEW
Chief Announcer
WCBD

S. C. GLADDEN
Announcer
WCBH

PAUL JOHNSON
Chief Announcer
WCCO

E. E. FLOYD
Announcer
WDBE

H. K. CARPENTER
Announcer
WEAR

G. F. HOUSTON
Announcer
WEAR

ROBERT D. BONIEL
Announcer
WEBH

PAUL N. PEARCE
Announcer
WEMC

MISS LEATHA WENKE
Lady Announcer
WEMC

C. M. FISCHBACH
Announcer
WFBE

J. VAN DE WALLE
Owner
WFBE

MRS. J. VAN DE WALLE
Hostess
WFBE

H. H. THURBER
Announcer
WFBM

W. C. LANE, JR.
Announcer
WFBQ

QUINN RYAN
Chief Announcer
WGN

O. E. BECKER
Chief Announcer
WGR

KOLIN HAGER
Chief Announcer
WGY

EUGENE E. DENNISON
Chief Announcer
WHAR

GEORGE CAREY
Announcer
WHBY

F. WILLIAM BOETTCHER
Engineer
WHN

N. DEAN COLE
"Old King Cole"
WHO

BILLY KNIGHT
"Little Ole Professor"
WIL

JOAQUIN AGUSTY
Announcer
WKAQ

RALPH C. HODGKINSON
Announcer "R. C. H."
WKAR

EUGENE S. MITTENDORF
Director and Announcer
WKRC

FRED SMITH
Studio Director
WLW

GEORGENE FAULKNER
"The Story Lady"
WMAQ

ROBERT S. WHITNEY
Announcer
WMAQ

JUDITH C. WALLER
Director
WMAQ

CLYDE HAGER
Announcer
WMBB

A. V. LLUFRIO
Chief Announcer
WMCA

RALPH C. POWELL
Chief Operator
WMCA

MAJOR J. J. FANNING
Director
WNAC—WNAB

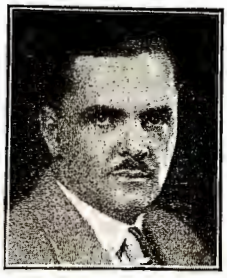
CHARLES E. BATHE
Announcer
WNAD

GENE ROUSE
Announcer
WOAW

EUGENE KONECKY
Announcer
WOAW

LESTER PALMER
Announcer
WOAW

REV. R. R. BROWN
Pastor
WOAW



STANLEY W. BARNETT
Announcer "B. W. S."
WOC

JOSEPH M. BARNETT
Announcer
WOR

ADOLPH OSCHMAN
Chief Engineer
WQAN

TOM V. NEALON
Chief Announcer
WQAN

JERRY SULLIVAN
Announcer "Chi-CAGO"
WQJ

ROY E. DAVIS
Announcer
WRRO

P. A. GREENE
Announcer
WSAI

HANFORD BILLINGS
Announcer
WTIC

WALTER JOHNSON
Assistant Announcer
WTIC

Lloyd Grennell
KFPY

Grace Sorenson
WOAW

Kay Ronayne
WEBH

Radio Dog "Bob"
WFBE

Mary L. Casey
KYW

Olcott Vail
WHN

Margaret Longheed
CFXC

Hazel O'Neil
WMBB

Erwin Swindell
WOC

Lee Sims
KYW

Hiel Melville
KFUU

Albert Kiglovich
KFWB

S Norton
WNAD

E. La Reeve
WBCN

J. B. Lampe Dell Lampe
WMBB

Kathryn Reece Haun WLW

Gold Medal Quartette
WCCO

Arthur Linick KYW

Marie Winters
WBBM

Raymond Dettlaff
WHAD

F. Blatchford
CHNC

Ninon
KPO

P. Oberg
WCCO

Billie Dunn
KFWB

Laura Gaudet
WTIC

Kath. Fisher
KFWA

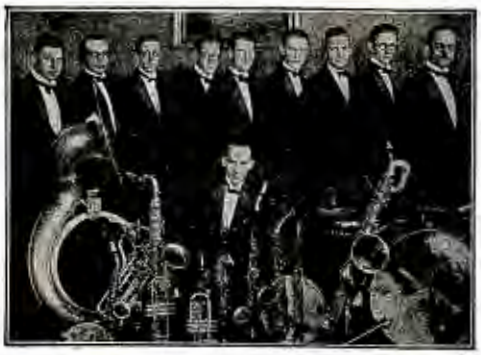
E. Harold Dana
KPO

Arthur Comby
WWAD

Merle "Big Boy" Yagle
WBCN

Etherical Quartette KFRU

Patricia Kavanaugh KFUU



Movieland Orchestra KFWB

R. Agulnick
WMBB

Rassmussens Harmony Kings
WGBR

Ollie Yettru
WGY

Beatrice Hoel
WOAW

Finney Briggs
WBCN

Jean Starr
KFPY

Eleanor Duncan
CFXC

Lindy's Chord Choppers
WBES

R. Greene
WGY

Breffni Beggs
KFWB

Tom Owens
WBCN

Ida Bailey Allen
WMCA

A. M. Biddle
KDKA

REMLER

TWIN-ROTOR CONDENSER

PATENT PENDING

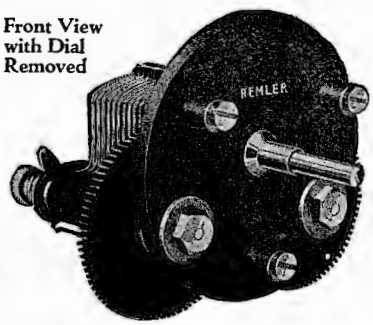
Types 630 and 631

Showing 360-degree Recording Dial

Development of the Remler Twin-Rotor Condenser has marked a distinct advance in the efficiency of the Variable Condenser. This Remler unit, original in design, brings into play a tuning range heretofore unattainable. Among the outstanding features of this unit are: the use of twin rotors in place of the usual rotor and stator construction, allowing the attainment of straight line wave length characteristics in compact form; unusually large bearing surfaces, insuring smooth running; correctly designed reduction gearing, eliminating clicks or back lash; 360-degree dial motion, allowing easy tuning on short wave stations and attainment of the highest ratio of maximum to minimum known, 165 to 1. (Type 631).

Top View of Condenser

Front View with Dial Removed



The Remler 360° Recording Dial

The Remler 360-degree Recording Dial is a fitting index to the advanced character of this unit throughout. The dial is four inches in diameter with a large Bakelite knob, and is equipped with a removable paper chart. A permanent record of the adjustment for each station is kept simply by writing its call letters in the space provided opposite the reading at which the station is obtained. Extra charts included with each unit, and a change may be made by unscrewing Bakelite knob.

Rear View, Showing Twin-Rotors

A Dozen Remler Reasons Why

1. Highest ratio of maximum to minimum known, 165:1 (Type 631).
2. Twin-Rotors allow attainment of straight-line wave lengths.
3. Thirty-five divisions on the dial cover the 200-300 meter range. Most condensers crowd this range into ten divisions.
4. Full 360-degree dial (tunes from maximum to minimum).
5. Twin-Rotors move together in smooth unison.
6. Plate surfaces embossed, insuring absolute evenness. Plates .015 inch thick.
7. Proper placing of insulation minimizes resistance to radio-frequency currents.
8. Plates perfectly aligned. Spacing is checked by applying 1100 volts A. C. to terminals.
9. Each unit factory-tested for capacity at broadcast wave lengths.
10. Radio-frequency currents are confined to brass—a low-resistance metal.
11. Bearing construction insures perfect mechanical operation.
12. A permanent record of dial settings is easily kept by writing call letters or wave lengths on the renewable paper charts. Molded Bakelite knob screws over four-inch dial.

No. 630—Remler Twin-Rotor Condenser, Minimum .000003, Maximum .00035, Complete with Dial.....**$5.00**

No. 631—Remler Twin-Rotor Condenser, Minimum .000003, Maximum .0005, Complete with Dial.....**$5.00**

San Francisco **REMLER RADIO MFG. COMPANY** Chicago

Apparatus That — R — *Radiates Quality*

The Citizens Radio Call Book 45 Kilocycle Superheterodyne

This Receiver Was Constructed and All Illustrations Made in the Laboratory of the Citizens Radio Call Book

THE superhetrodyne is universally recognized as the last work in radio reception. It is selective and sensitive and simple to operate, taking into consideration the multiplicity of units necessary to complete the circuit.

With a discriminating public quality is a prime requisite in the modern receiver. In this article we will describe a receiver that

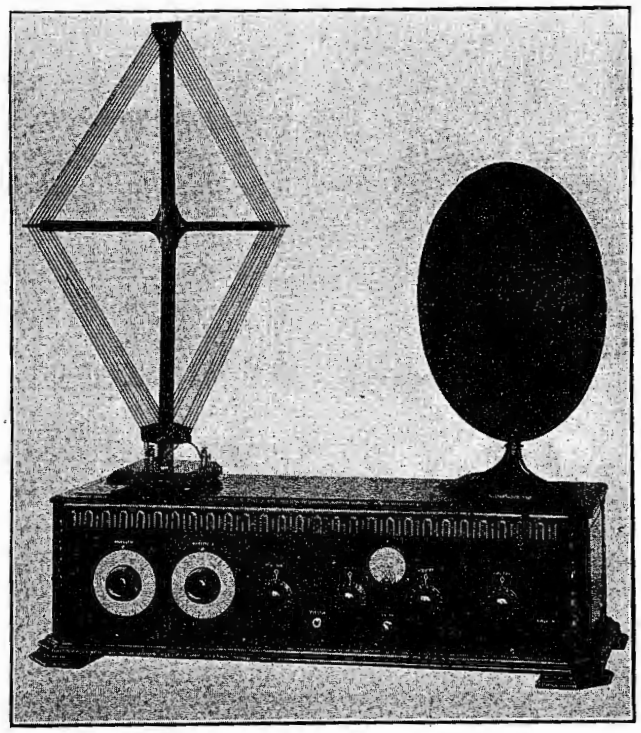


Photo A. Front view showing loop and loud speaker

has all of these advantages and if properly constructed will give perfect reception.

The superheterodyne requires careful attention to the selection of parts and the circuit to be employed. Forty-five kilocycles is universally recognized as excellent for intermediate frequency amplification. The Remler type 600 transformer for inter-tube coupling insures high voltage step up ratio and uniform primary impedance over an efficient frequency range. A Remler type 610 transformer is used between the last intermediate frequency tube and the detector.

The oscillator coupling unit is a type 620 Remler. This is very compact and can be conveniently mounted on the panel or baseboard. In this instance it is mounted on the baseboard as once the correct adjustment of the rotor is found it is unnecessary to change it. Each lead is numbered on the coupler and corresponds with the numbers in the schematic diagram and graphic illustration. Pigtail connections are used on the rotor and a uniform output will be obtained over the entire range of broadcasting station wavelengths.

The wavelength and oscillator condensers are of the Remler 630 type. These condensers have two sets of movable rotor plates, which turn on insulated shafts within a 90 degree arc. A bakelite gear train keeps all metallic connections back of the panel. This reduces body capacity effects and insures sharp tuning. The plates are of corrugated sheet brass soldered at the shaft and tops. This is a low loss condenser and has "straight line" characteristics. Pigtail connections prevent any possibility of poor connection noises. By using these condensers, it is unnecessary to shield the panel to eliminate body capacity effects.

Six UV-199 or C-299 tubes are used for the superheterodyne unit. The filaments of the first and second intermediate frequency tubes are controlled by a No. 656 25-ohm Frost rheostat. The remaining four tubes use a 10-ohm No. 658 rheostat of the same make.

The impedance coupled amplifying unit uses three UV-201A or C-301A tubes, whose filaments are controlled by a 6-ohm No. 650 Frost rheostat. A 500,000 ohm potentiometer made by the Central Radio Laboratory is also used in this unit as a volume control.

It is necessary to use the correct amount of filament voltage on the small tubes at all times. In this connection a model 55 Jewell double scale voltmeter is employed. This meter is provided with a switch on the front of the instrument. When the switch is pointed towards "A" the filament voltage reading of the U-199 or C-299 tubes will be indicated. When the switch is pointed towards "B" a voltage reading will be taken from the "B" batteries by reading the lower scale.

Two No. 616 Frost gang sockets are used for the UV-199 or C-299 tubes. This is a non-microphonic socket mounted on sponge rubber cushions. The bakelite bases should be firmly secured to the baseboard. The three UV-201A or C-301A tubes use No. 618 shock absorber sockets. All sockets are raised one inch from the baseboard, making it convenient to run the leads.

In order to make the filament circuit as simple as possible, one

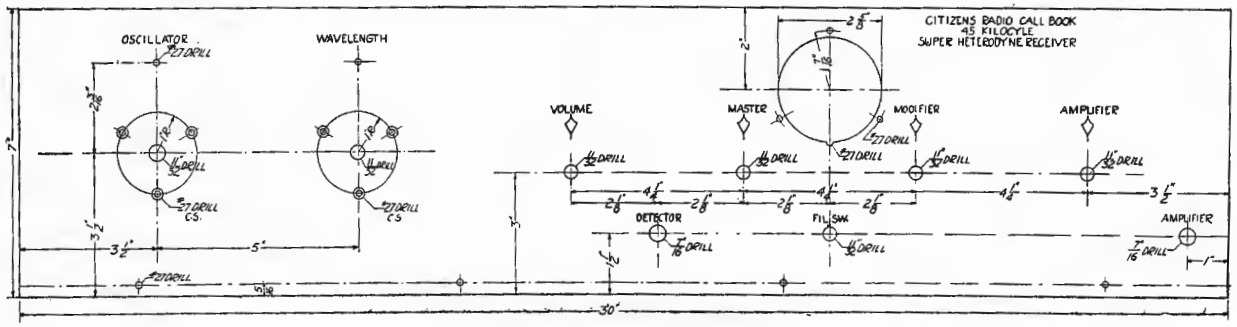


Figure 1. Panel and engraving layout

six-volt storage battery is used to light all the tubes.

The small tubes will not stand more than four and one-half volts on the filament. In order to cut the six-volt battery down to the right voltage a one-half ampere Daven resistance is inserted in series with the 10-ohm rheostat. Care must be taken to see that no more than four and one-half volts are applied across the filaments of these tubes. Use your voltmeter frequently to make sure that you are right at all times. DO NOT remove any of the small tubes without first turning off the rheostat. The 10-ohm rheostat controls the filament voltage reading of the small tubes. The best results will be obtained at approximately 3½ volts when the tubes are new.

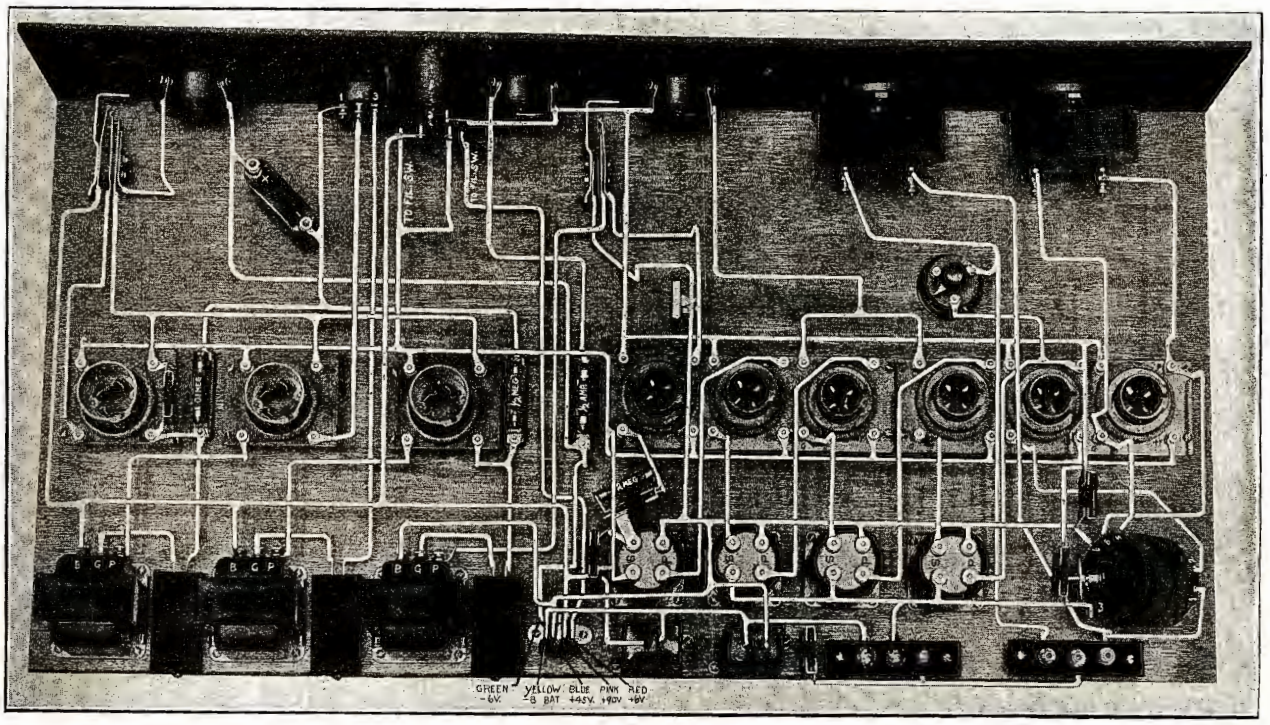


Photo B. This is a specially built receiver showing all connections

fication at all frequencies. The autoformers used in this set will show no drop in amplification between 25 and 6000 cycles.

In all tests with this circuit a disc type lour speaker worked the best. Speech and musical sounds are composed essentially of between 50 and 5000 vibrations per second. There are, of course, frequencies below 50 and above 5000, but they are not important from the standpoint of quality; that is, if they are eliminated the effect of the naturalness of the sound would be scarcely noticeable.

Most types of amplifiers and loud speakers at present reproduce most efficiently sounds about two octaves above middle "C." Above and below this pitch the response is much less. At

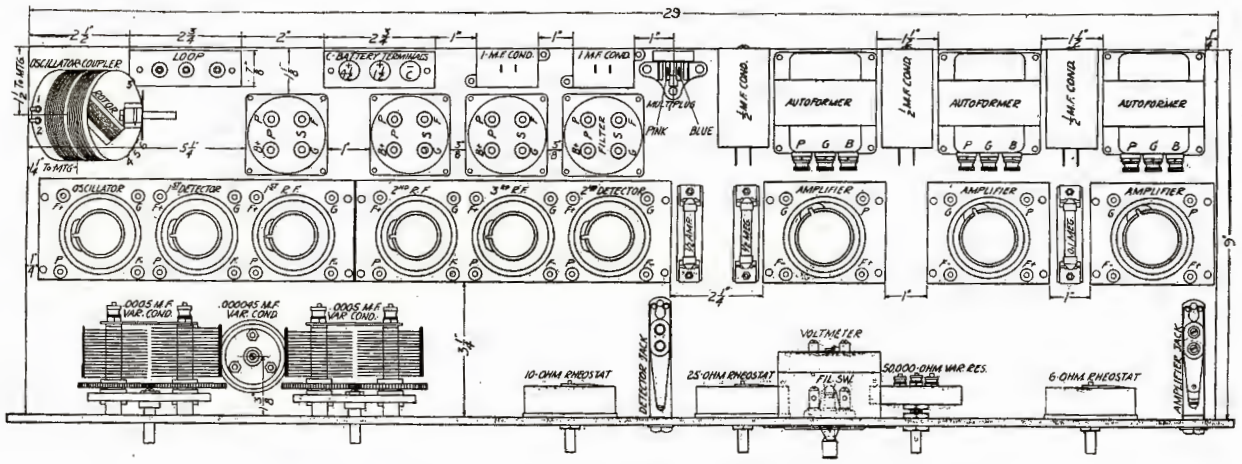


Figure 2. Baseboard layout. Follow these dimensions carefully

For conveniently disconnecting the batteries a type BM Jones multiplug and cable is used. The color scheme for making the proper battery connections is indicated in the illustrations.

The Impedance Coupled Amplifier

This is where this receiver differs from the average. Whereas there are many excellent types of audio frequency amplifying transformers on the market, it is difficult to obtain uniform amplification at all frequencies. The autoformers used in this set will show no drop in amplification between 25 and 6000 cycles.

In all tests with this circuit a disc type lour speaker worked the best. Speech and musical sounds are composed essentially of between 50 and 5000 vibrations per second. There are, of course, frequencies below 50 and above 5000, but they are not important from the standpoint of quality; that is, if they are eliminated the effect of the naturalness of the sound would be scarcely noticeable.

Most types of amplifiers and loud speakers at present reproduce most efficiently sounds about two octaves above middle "C." Above and below this pitch the response is much less. At 200 and at 5000 cycles practically no sound will be heard. This difference between the efficiency at about 1000 cycles and other points above and below is responsible for the harsh or "tinny" quality so frequently experienced in the average receiver.

The impedance coupled amplifier is so nearly uniform in efficiency throughout the audible range of frequencies that all of the notes from the lowest qualities of the human voice and of musical instruments are preserved. Good quality depends not

only upon the amplifier but also the loud speaker used.

This amplifier is capable of handling, practically without distortion, all of the frequencies necessary for the accurate reproduction of sound. The maximum possible volume of such undistorted sound will, however, depend upon the capacity of the vacuum tubes as well as the autoformers. When an attempt is made to increase the output beyond that which the amplifier is designed to deliver, it will not be a faithful reproduction of the original sound and a rasping effect will result.

Here is where the volume control is used to advantage. This consists of a 500,000-ohm Central Radio Laboratory potentiometer with the middle point connected to grid of the second amplifying tube. The different stages do not employ separate jacks as the modifier can be varied to totally eliminate the strongest signal without detuning the receiver. This controls the desired amount of signal strength at all times and prevents the overloading of the tubes.

The entire nine tubes will not consume more than fifteen milliamperes from the "B" batteries and the volume control can be varied from maximum to minimum with a fluctuation of only about one milliampere.

Resistance coupled amplification will give the same quality as impedance coupled amplification; but will not give as much amplification per stage. Three stages of impedance coupled amplification will give more volume than two stages of transformer coupled amplification; or four stages of resistance coupled amplification.

Do not attempt to use a "B" eliminator with impedance coupled amplification as you will have a continuous hum in the receiver.

The autoformers have three binding posts with markings as shown in the graphic illustration. The ratio is about 1 to 1½.

We have selected one-half microfarad as the best capacity for the grid stopping condensers. A greater volume limit can be obtained by reducing this capacity; but smaller capacities have a tendency to reduce the amplification of the bass notes. A lower resistance leak on the third stage will increase the volume limit but will also reduce the amplification.

The most uniform results will be obtained by using a one-half megohm resistance on the first stage and a 0.1 ohm resistance on the last stage. The middle binding post of the 500,000-ohm potentiometer is connected to the grid of the center tube. A .002 microfarad fixed condenser is placed across the negative filament and grid of the last tube. This is very important as it prevents feed back oscillations.

The Why of the "Super"

For the best results, a long range receiver is greatly dependent on radio frequency amplification. At long wavelengths this is simple compared to the shorter wavelengths used in broadcasting. Short wavelength receivers employing radio frequency amplification are subject to intercircuit coupling and will oscillate at the slightest provocation.

These difficulties are overcome with the superheterodyne. The voice modulations from the broadcasting station are transferred to a new carrier wave created by the oscillator. This new carrier wave is of a lower frequency where intercircuit capacity effects practically disappear.

Various frequencies for intermediate frequency amplification will give results; but if a frequency higher than 50 or 60 kilocycles is selected internal capacity effects will cause instability and distortions. If a frequency below 30 kilocycles is used the two dial settings on the oscillator condenser will be too close together; especially at low wavelengths where the change per degree causes a much larger change per kilocycle.

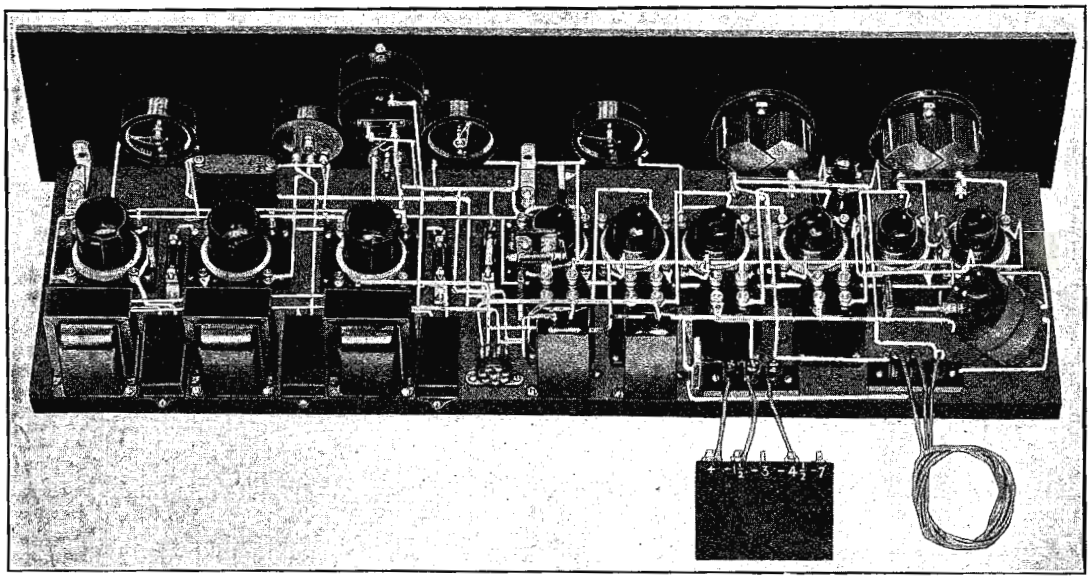


Photo C. Rear view of completed receiver

The intermediate frequency amplifier is the heart of the superheterodyne and the best results are obtained when all of the transformers match. A filter transformer is very necessary when the higher wavelengths are used, and in this case it is best used in the output, that is immediately preceding the final detector tube.

The intermediate frequency transformers are broadly tuned so that they will cover a wide range of wavelengths and it is necessary to have a sharply tuned air core transformer to determine the frequency at which the amplifier will function and to exclude all other frequencies.

Also due to the higher impedance of the longer wave transformers to audio frequency impulses, such an amplifier will amplify static and other disturbances and become very disagreeable when carried through three stages. This is overcome by the air core filter transformer, which will have a tendency to suppress the audio frequencies. The filter transformer is also best used after the intermediate transformers in this circuit on account of the regenerative loop circuit. The secondary of this transformer is shunted with a .00025 MF fixed condenser. As this capacity is very critical, try different values until the best results are obtained.

In place of the grid leak and grid condenser usually used on the first detector tube, rectification is obtained by biasing the grid with a 4½ volt "C" battery through the center tap of the loop. This reduces the plate current and increases the selectivity of the loop circuit.

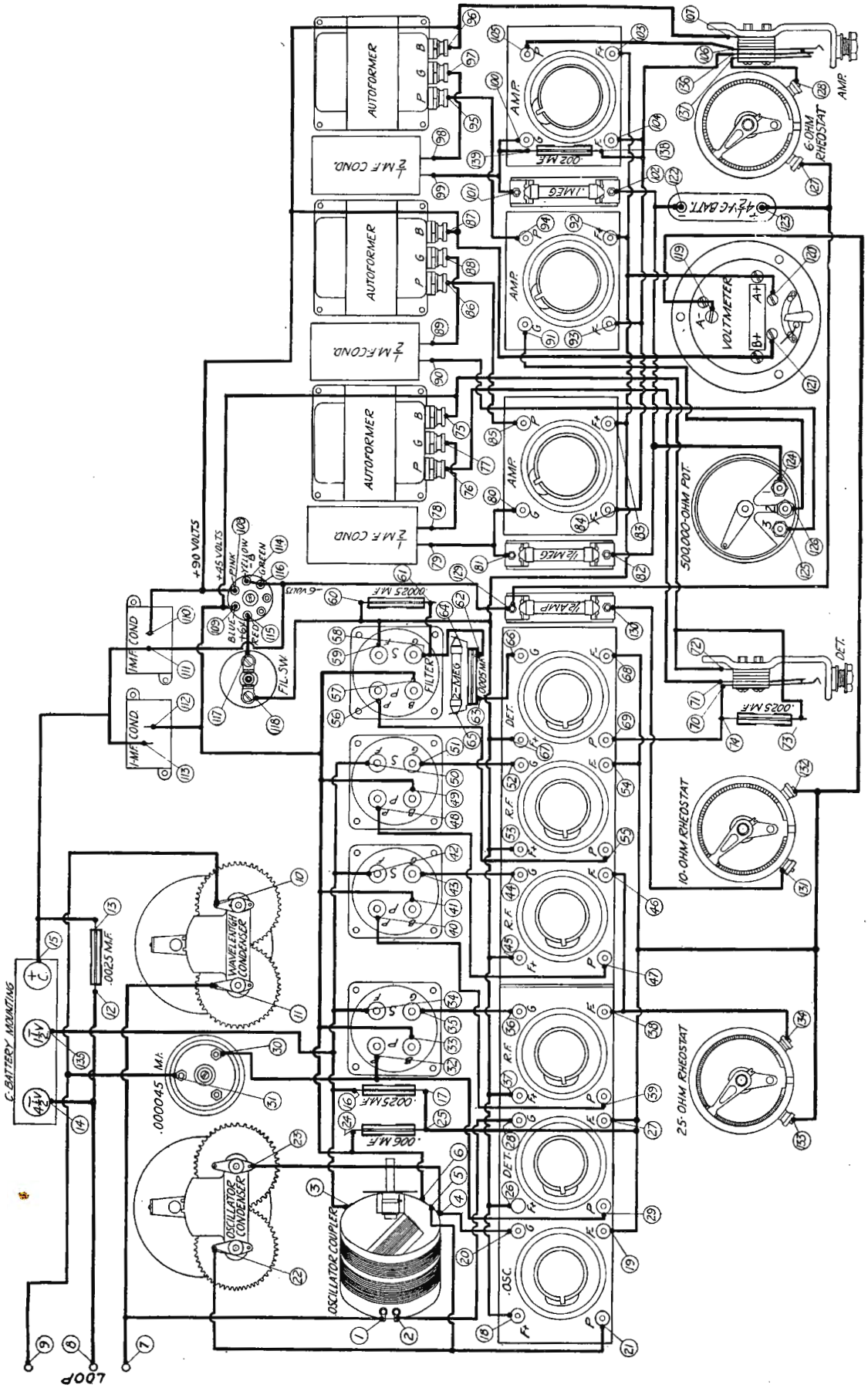


Figure 3. Graphic illustration. Check all wiring against this diagram. The numbers correspond with Figure 4

The last detector tube employes a grid leak of two megohms resistance and a grid condenser of .0005 miscrofarads capacity. The increased value of the grid condenser is due to the low frequency of the intermediate frequency amplifier.

The fixed condensers in this circuit play a very important part for successful operation. The values are all given in the schematic diagram and graphic illustration.

By mounting a 2¾ inch bakelite strip on the baseboard the 7½ volt tapped "C" batter can be easily replaced. The 4½ volt "C" battery used in the impedance coupled amplifier is mounted in such a place that it can be easily renewed. By removing a little of the paper covering at the base of the battery two lugs can be soldered on and bent over so that the battery can be firmly secured to the baseboard with a couple of small wood screws. Always keep your "C" batteries fresh, as this reduces the consumption of the "B" batteries.

The small tubes require only 45 volts "B" battery and the large tubes take 90 to 120 volts.

List of Parts

These parts or their equivalent will give satisfactory results:

1—7"x30" cabinet.
1—7"x30"x3/16" Radio Panel and Parts drilled and engraved panel.
2—⅞"x3" Formica strips.
1—9"x29"x¾" wood baseboard.
2—No. 631 .0005 MF Remler variable condensers with dials.
1—No. 620 Remler oscillator coupler.
3—Remler No. 600 transformers.
1—Remler No. 610 transformers.
1—Frost 10 ohm No. 658 rheostat.
1—Frost 25 ohm No. 654 rheostat.
1—Frost 6 ohm No. 650 rheostat.
2—Frost No. 616 3 gang sockets.
3—Frost No. 618 sockets.
1—Frost No. 608 push pull battery switch.
1—Frost No. 234 double circuit jack.
1—Frost No. 224 filament control jack.
1—Frost No. 141 phone plug.
3—Daven No. 50 grid leak mountings.
1—Daven 2 megohm grid leak.
1—Daven ½ megohm grid leak.
1—Daven 0.1 megohm grid leak.
1—Daven ½ ampere resistance unit.
3—Thordarson autoformers.
1—Central Radio Laboratory 500,000 ohm potentiometer.
100—Kellogg soldering lugs.
3—Kellogg ½ MF fixed condensers.
2—Kellogg 1 MF fixed condensers.
1—Dubilier .006 MF condenser.
1—Dubilier .002 MF condenser.
3—Dubilier .0025 MF condensers.
1—Dubilier .0005 MF condenser.
1—Dubilier .0005 MF condenser, with grid leak mounting.
1—Jones type BM multiplug and cord.
3—Jones color plugs.
1—Chelten .000045 MF baseboard variable condenser.
4—Kurz-Kash 2" rheostat dials.
1—Jewell No. 55 double scale voltmeter.
4—dozen ½" No. 5 round head nickle plated wood screws.
10—No. 5 1⅜" round head nickle plated wood screws.
15—No. 5 1" round head nickle plated wood screws.
1—package Kestner solder.
1—Fiat loop.
100—feet No. 12 tinned copper wire.
1—Western Electric 540 AW loud speaker.
2—Eveready 45 volt 772 "B" batteries.
1—6 volt storage battery.
6—UV-199 or C-299 tubes.
3—UV-201A or C-301A tubes.
3—Eby "C" battery binding posts.
1—Rayovac No. 531 R 4½ volt "C" battery.
1—Rayovac No. 551 7½ volt tapped "C" battery.

Construction Data

Of course, the first step is to assemble all of the parts mentioned in the above list. Substitution can be made if necessary, but we recommend that the best parts and material only be used in the construction of this receiver. After you have selected the parts that you intend to use, check the list over to see if you have missed anything.

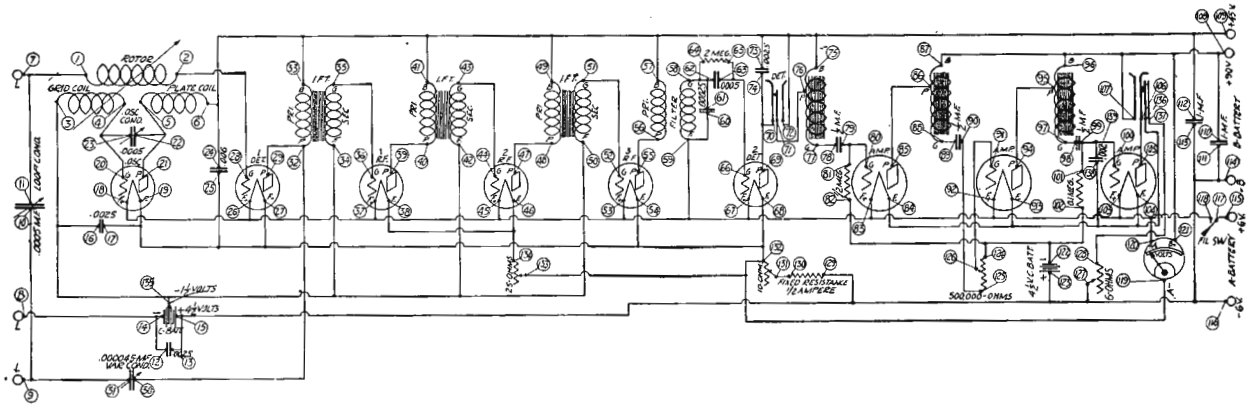


Figure 4. Schematic diagram. The numbers correspond with Figure 3

In building a receiver of this calibre you will naturally be interested in the appearance of the panel. A view of this is shown in Photo A. If you intend to drill it yourself, follow the dimensions in Figure 1. A complete panel drilled and engraved can be obtained from the Radio Panel and Parts Corp., 59 Warren Street, New York, N. Y. If you desire to have your local radio shop do the job for you show them a copy of Figure 1.

By following the dimensions carefully as shown in Figure 1, it will be very easy to mount the parts on the panel before attaching the complete unit to the baseboard.

The parts to be mounted to the panel are as follows: The two Remler variable condensers, the rheostats and potentiometer, the two jacks, filament battery switch and double scale voltmeter. This part of the set can now be laid to one side and the remaining apparatus mounted on the baseboard.

The proper place to mount the parts on the baseboard is indicated in Figure 2. Follow these dimensions very carefully as they have been arranged to use the minimum amount of space. The wiring will be easier if the sockets are mounted first. Then connect all positive filament terminals and wire up the superheterodyne unit before starting on the impedance coupled amplifier.

When wiring up the receiver, consult Figure 3. This is a graphic illustration showing every lead. You will notice that the apparatus in this illustration is arranged almost like the receiver itself. Check each lead to make sure that you are making the correct connection.

A great many of the radio fans who will build this circuit do not care to work from a graphic illustration, so we have drawn the same in schematic diagram form as shown in Figure 4. All connections in the two illustrations are numbered and correspond. If you have difficulty in finding a connection in one diagram you can easily locate it in the other.

In case any confusion is caused by either of the diagrams, we have built a special receiver showing every connection in the entire receiver. This is indicated by Photo B. Of course, this is way out of proportion and is shown as a guide for wiring only.

When the wiring has been completed, check each lead back against Figure 3 to make sure that you are right.

Now that you have completed the wiring and assembling of the receiver, it is advisable that one more precautionary measure be taken to make absolutely sure that all is well. Connect the 6 volt storage battery first across the "B" battery leads of the superheterodyne and then the impedance coupled amplifier. If the tubes DO NOT light up you are safe. If they DO, investigate before connecting the "B" batteries.

Connect the loop, using the same color on each lead to correspond with the same color on the Jones plugs. Connect the 7½ volt "C" battery, using the marked binding posts as a guide as short leads as possible. Connect all batteries to the Jones multiplug.

Now check up on the voltages of the "A" and "B" batteries, using the switch on the voltmeter. The rheostat marked "Master" will control the filament voltage on the small tubes. With a fully charged storage battery this will work the best at about 35. The rheostat marked "Volume" controls the filaments of the first two radio frequency tubes. DO NOT remove any of the tubes without first tuning the rheostat to the "off" position. The rheostat marked "Amplifier" is not very critical and will work normally at about 60.

Testing

This circuit consists of essentially five component parts; the tuned regenerative loop circuit with first detector, the oscillator. the intermediate frequency amplifier, the second detector and the impedance coupled amplifier.

The first consideration in testing is to see that you have good tubes. Most radio stores have meter devices to test the tubes before you buy them. We have selected the small tubes for the superheterodyne unit, as the minimum amount of load will be imposed on this part of the receiver. The larger tubes are used in the audio frequency amplifier, as they can produce considerable volume without distortion.

The usual method is to switch the tubes around until the best results are obtained. Be sure that you have good detector tubes and a good oscillator, as a great deal depends on the first tube for selectivity. A 5 watt power tube can be used to advantage in the last stage of the impedance coupled amplifier, but this is not absolutely necessary, as sufficient volume will be obtained without it.

If you are in close proximity to a high powered broadcasting station you can easily test the loop and first detector circuit. Insert a pair of head telephones in the plate circuit of the first detector and point the loop directly at the sending station. Signals should be faintly heard. This will also show if the primary of the first intermediate transformer is open or not. Change tubes until the best results are obtained.

By using a buzzer driver the first detector and oscillator can be tested at the same time. At a certain setting of the oscillator condenser the buzzer should become mushy. Change oscillator tubes until you find a good one.

The intermediate frequency amplifier and the second detector are usually tested at the same time. Insert the first six tubes and test the complete superheterodyne unit by plugging in on the detector jack. The Chelten midget condenser should be adjusted just before the point of oscillation.

In tuning this receiver there are only two main controls for finding the different stations. It will take some little time for the novice to properly tune this set; but once it is learned, it is really very simple.

When the circuits controlled by the two condensers are in resonance, regardless of whether or not they happen to tune to a signal a certain amount of noise can usually be heard, particularly in a noisy location or if any static is present.

The adjustment of the oscillator condenser is the more critical of the two, as its proper setting determines the selectivity of the receiver. It will be noticed that one or two degrees on this condenser will completely tune out a station, while the loop condenser can be varied several degrees after the oscillator condenser setting if found.

The oscillator condenser will have two different dial settings for each wavelength and the lower the wavelength the closer together these settings will be.

When "logging" the stations heard, it is best to record both of these dial settings, as sometimes the lower dial setting for the higher wavelengths may interfere with the dial settings for the lower wavelengths, and vice versa. When both dial settings for a given wavelength are known you can select the one that gives the best results. The smaller capacities in the oscillator condenser are usually the most selective. The different stations will always be found in the same place, providing the wavelengths of the stations do not change; with an occasional variation of one or two degrees.

If a 370 meter station comes in at 80 degrees on the oscillator condenser and 100 degrees on the wavelength condenser and a 390 meter station comes in at 88 degrees on the oscillator condenser and 105 degrees on the wavelength condenser, a 380 meter station will be heard at approximately half way between the two dial settings.

The wavelength condenser is used to tune the loop circuit and controls the incoming signals. This is very easy to control, as it is not as critical as the oscillator condenser.

The loop used with this receiver is of the Fiat center tapped type. A greater amount of selectivity can be obtained by properly adjusting the loop, especially if you are located in close proximity to a high powered broadcasting station. The loop will be found to be very directional and one end of it will be found to be more "live" than the other.

When two stations are on wavelengths only a few meters apart, it will be found advantageous to point the "dead" end of the loop towards the interfering station. The "live" end can be best determined on a distant station.

Also, if you wish to tune out a local interfering station, turn it broadside against that station irrespective of the fact whether or not the loop is pointing directly towards the station you wish to receive. In many cases, it is possible to separate two stations only one meter apart by a careful adjustment of the loop.

Sometimes when listening to a distant station it will be noticed that the best results are obtained when the loop is not pointing directly at that station. This is no fault of the receiver, but is due to the peculiarities of your locality.

When interference is bad, try varying the oscillator coupler and the midget variable condenser, as the proper settings are critical to obtain the maximum selectivity. If this has no effect, try different tubes in the oscillator and first detector.

If howling occurs, reduce the volume control, as you may be overloading the first and second intermediate amplifying tubes. If the midget variable condenser is set too near the point of oscillation, this will also cause the receiver to howl.

If the volume is low when the modifier is turned on full, check up on the battery potentials and change the tubes around in the amplifier. If this does not remedy the trouble have all of the tubes tested, as one "sour" tube will spoil the quality and signal strength of the entire receiver.

Take good care of your receiver, as it is a delicate instrument. It should be housed in a good cabinet with a dust proof lid. Even then, it should be dusted off with a small dry paint brush to keep the transformers, sockets and baseboard clean. Run a pipe cleaner between the plates of the condenser occasionally. Remove the tubes from their sockets from time to time and see that the contacts are bright and clean. Test your batteries frequently.

REMLER
RADIO PARTS

REMLER PARTS BELONG IN EVERY RADIO CIRCUIT

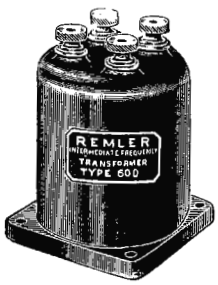
INTO the development of Remler Radio Parts has gone real inventive genius backed by the most thorough radio knowledge and the widest research experience. A part that merely performs its task well, is not sufficiently high-grade to meet Remler standards. Each Remler part must perform its work superbly, and give the user new service, new satisfaction and new reception records.

Every Remler part is carefully tested by experts before it leaves our factory. Precision methods of manufacture render this testing almost unnecessary, but we are determined that every Remler unit shall reach the customer in perfect condition, and that—once installed in a circuit—it shall "stand the gaff" under severest service conditions.

A Remler part is expensive to make but inexpensive to own. Efficient methods applied to quantity production have made Remler prices—quality considered—unbelievably low.

Intermediate Frequency Transformer

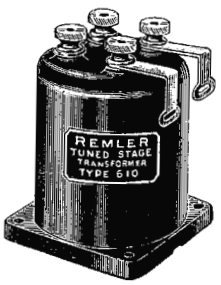
In radio receiving circuits necessity often arises for several stages of amplification at a fixed and predetermined intermediate frequency. This Remler quality unit uses a properly designed iron core and special type of winding to insure maximum amplification with stability of operation; windings mounted on Bakelite casting—parts completely housed in a beautiful Bakelite case—terminals lettered to designate proper connection in circuit. Every unit carefully matched to a single laboratory standard before leaving factory.



Remler Type 600 Intermediate Frequency Transformer.....Price $6.00

Tuned Stage Transformer

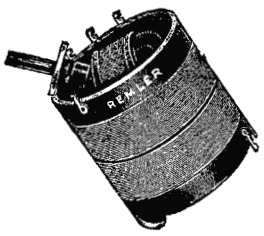
A special air core transformer, for use between the last intermediate frequency tube and the second detector. Uses a tuned secondary to obtain selectivity in the intermediate frequency amplifier. Matched to a laboratory standard with accurate tuning condenser. Windings mounted on Bakelite casting—parts housed in compact Bakelite case—terminals marked to insure correct connection—clips for condenser mounting included.



Remler Type 610 Tuned Stage Transformer.....Price $5.00

Balanced Winding Coupling Unit

Designed for use as an oscillator coil system and coupling unit. Balanced winding permits use of special oscillator circuit having uniform output over entire broadcast wave length range. Pigtail connections, 180 degree coupling, table or panel mounting, green silk covered wire over Bakelite tubing. Height, 3¾ inches.



Remler Type 620 Coupling Unit.....Price $3.00

San Francisco **REMLER RADIO MFG. COMPANY** **Chicago**

Apparatus That *Radiates Quality*

How to Build the Browning Drake Receiver

This Receiver Was Constructed and All Illustrations Made in the Laboratory of the Citizens Radio Call Book

SELECTIVITY is the prime factor to be taken into consideration when building the modern receiver. In addition to this each unit must be working at maximum efficiency.

This remarkable receiver was designed by G. H. Browning and F. H. Drake of Harvard University. After very careful mathematical calculations over 90% of the amplification was actually proven by laboratory tests.

It is not a trick hookup. In addition to being scientifically correct it is also very simple to construct. About half as many connections are necessary as the ordinary five tube receiver.

developed after months of experimenting and exhaustive mathematical calculations. The maximum signals are obtained only with a certain inductive relation between the primary inductance and the coupler. In order to produce the correct amplification, the construction has to be very exact to obtain the minimum capacity effect between the primary and secondary coils.

List of Parts

The following parts or their equivalent will give satisfactory results:

1—7"x24"x3/16" Formica Panel.

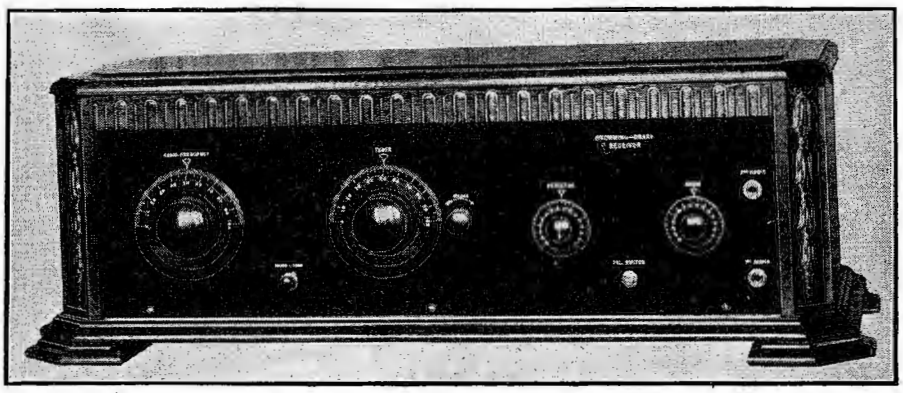


Photo A—Front view of complete receiver

An additional feature is the antenna that can be used. If it is desired to have an inside aerial, a single wire of only twenty feet in length will be very satisfactory. If an outside aerial can be conveniently installed, thirty feet of single wire will produce excellent results. The writer "logged" 63 stations in a single evening using an inside aerial while seven local broadcasting stations were in operation.

1—1"x5"x3/16" Strip Formica.
1—1"x2"x3/16" Strip Formica.
1—8"x23"x¾" Wood Baseboard.
1 National Regeneraformer Kit complete with Vernier Dials and Condensers.
1 General Radio 30 ohm Rheostat No. 301.

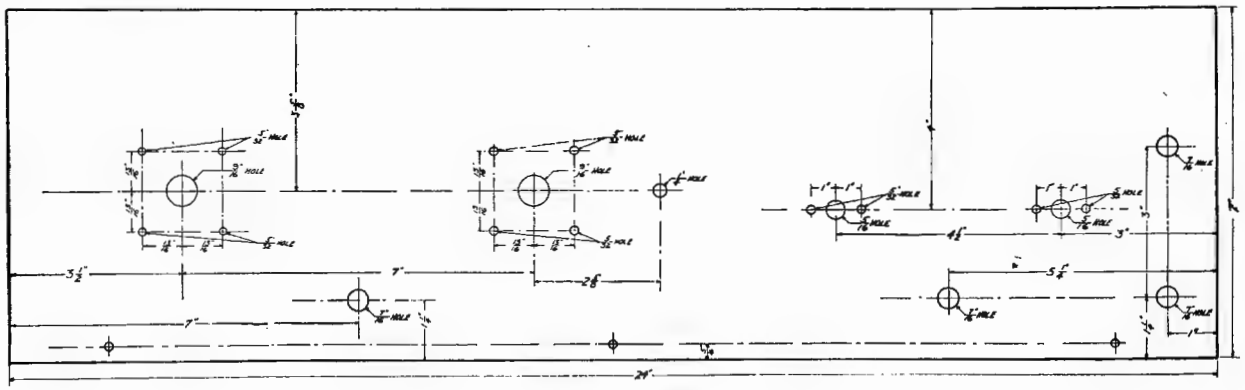


Figure 1—Panel layout showing size of holes to drill

It is simple to operate. Once a station is tuned in, it will always be found at the same dial settings, providing the wavelength of that particular station does not change. Detailed instructions of how to tune this circuit will be described later.

It is economical to construct and operate. The average five tube receiver draws from 20 to 30 milliamperes from the "B" batteries. Using one C-299 or UV-199 tube and three C-301A or UV 201A tubes only 10 milliamperes plate current will be consumed in this circuit.

Do not attempt to wind these coils yourself. This circuit was

1 General Radio 10 ohm Rheostat No. 301.
1 Culver-Stearns A battery Filament Switch.
2 General Radio No. 231-A Audio Frequency Amplifying Transformers.
1 Six Volt UV199 or C299 Amperite.
1 X-L Variodenser Model G.
1 Carter No. 3 Jack Switch.
1 Carter Closed Circuit Jack No. 102A.
1 Carter single Filament Control Jack No. 103.
1 Benjamin UV199 or C299 Socket.

3 Benjamin 201A or 301A Sockets.
1 Dubilier No. 601—.0001 Condenser.
1 Dubilier No. 601—.00025 Grid Condenser.
1 Daven—2 megohm Grid Leak.
7 Eby Marked Binding Posts.
2 Kurz-Kash 2" Dials, ¼" shaft for Rheostats.
4 dozen large Kellogg Soldering Lugs.
3 dozen 5x⅝" Round Head nickel plated Wood Screws.

variable condenser "Tuner." Above the wavelength switch "Short-Long." Above the tickler control with an arrow curved towards the right "Volume." Above the 30 Ohm rheostat "Detector." Above the 10 Ohm rheostat "Audio." Above the "A" battery switch "Filament Switch." Above the lower jack "1st Audio" and above the upper jack "2nd Audio." The name of the circuit can be engraved in a convenient place "Browning-Drake Receiver."

The engraving as suggested above is not absolutely necessary, but

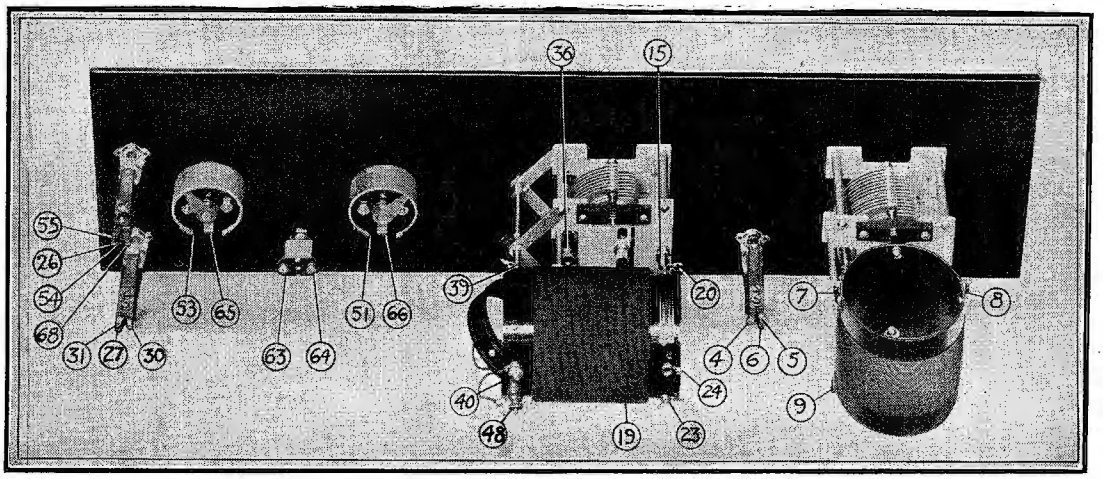


Photo B—This view shows assembly of parts on panel

30 feet No. 12 Round Bus Wire.
1 8"x24" Cabinet.
1 package Kester Radio Solder.
2—45 volt Everready "B" Batteries.

Construction

The first step is to have the 7x24 panel drilled and engraved. Figure 1 shows the size of the holes necessary to fit the apparatus specified and the correct distance apart so that the panel will have a neat and uniform appearance. If you do not have the facilities to do this yourself, tear out Figure 1 and take it to the nearest radio shop and have the panel drilled in accordance with these dimensions.

Engraving is a matter of taste; but each variable unit should be labeled so that the operator will understand which instrument should be varied to obtain the desired results. We suggest the following: Above the dial of the left hand variable condenser facing the front of the panel "Radio Frequency." Above the dial of the right hand

it gives the completed receiver a much neater appearance. Almost any radio shop will do this for you at 5 cents a letter.

Next mount the Regenaformer Kit, rheostats, jacks, filament switch and wavelength switch on the panel as shown in photo B. If you have followed carefully the instructions regarding drilling as indicated in Figure 1, these parts will fit very nicely. After this has been done put the complete unit to one side and start on the baseboard.

Now obtain a piece of board that will not warp 8"x23"x¾". If

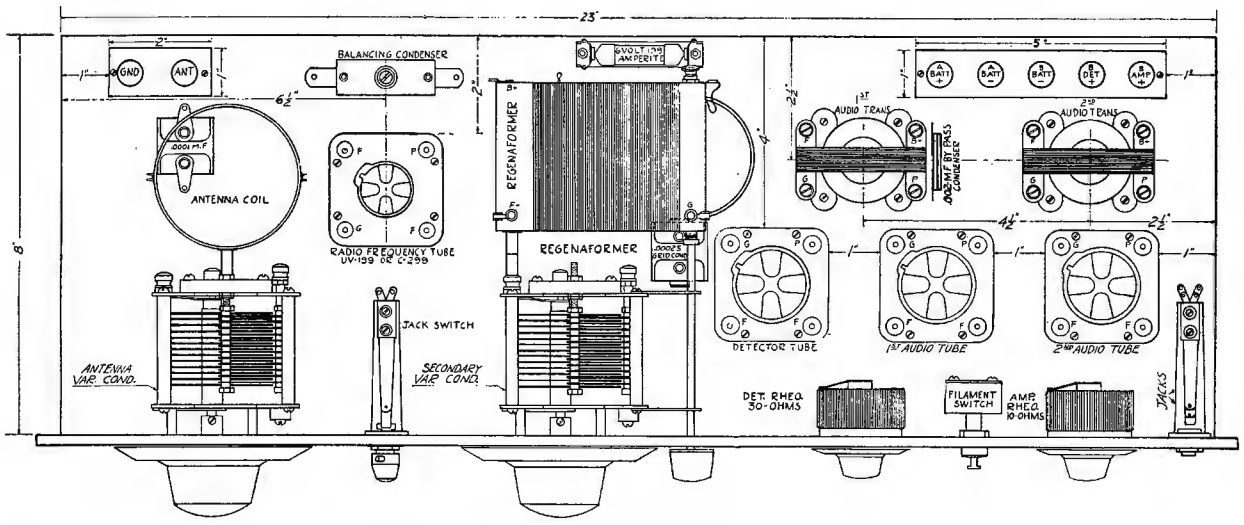


Figure 2—Top view showing arrangement of all parts. Refer to dimensions when mounting apparatus on baseboard

you wish to make the baseboard moisture proof, paint it all over with a real hot solution of paraffin. This will also make it a better insulator.

Consult photo C. Mount the sockets, two audio frequency transformers, fixed .0001 MF condenser, XL variodenser, fixed .00025 MF grid condenser and grid leak, UV 199 Amperite, and the two small Formica strips with binding posts mounted.

For the correct dimensions, refer to Figure 2. This will show exactly how far apart to mount each unit so when the panel is secured

to the baseboard all of the parts will then be in their proper places.

Make the connections as indicated in photo C. If this is done now, it will be much simpler than if you wait until the panel is attached.

Wiring

In order to make this as simple as possible, we have numbered each connection. These numbers all correspond in the schematic diagram, graphic illustration and in the photographs. If you do not understand

Then connect a six volt battery to the "B" battery terminals. Insert the tubes in their sockets. Turn on the rheostats. If the tubes DO NOT light up, you are safe to make the first tests with your new receiver.

Neutralizing

This is not hard to do, as the Variodenser can be adjusted with a screwdriver. Insert the tubes and connect the "A" and "B" batteries.

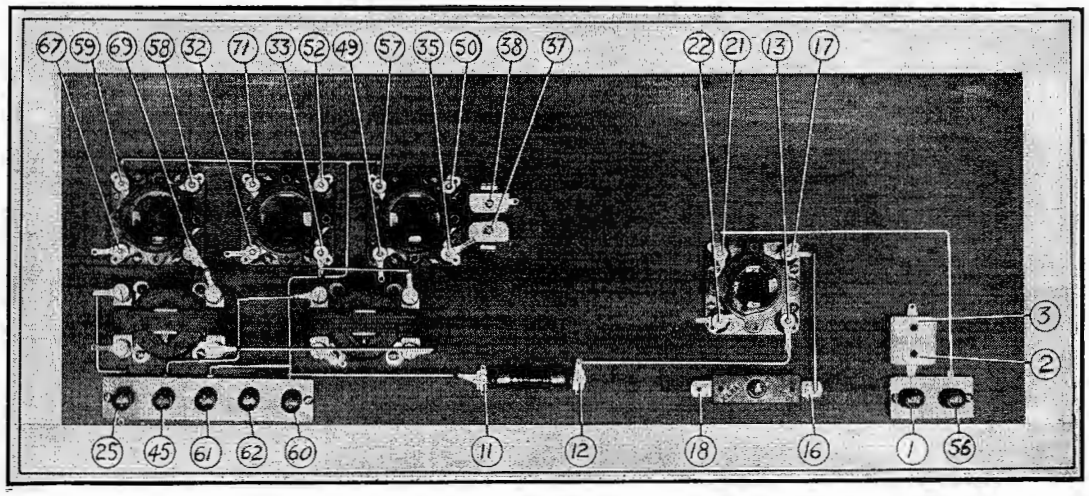


Photo C—Wiring and parts mounted on baseboard before panel is attached

Figure 3, no trouble should be experienced in finding the desired connection in Figure 4.

No. 12 round bus wire was selected for its neatness in appearance and you will find that it will hold its shape very nicely. Make sure all connections are solid and test each one before going on to the next. You don't need ten pounds of solder but a good hot iron and

Tune in a local station. Fix the tickler just before the point of oscillation. Now remove the radio frequency or UV 199 tube and place a small piece of paper on one of the filament terminals so that the tube can be inserted in its socket without lighting. Adjust the Variodenser until the MINIMUM signal is heard. You will notice when making this adjustment that the receiver is

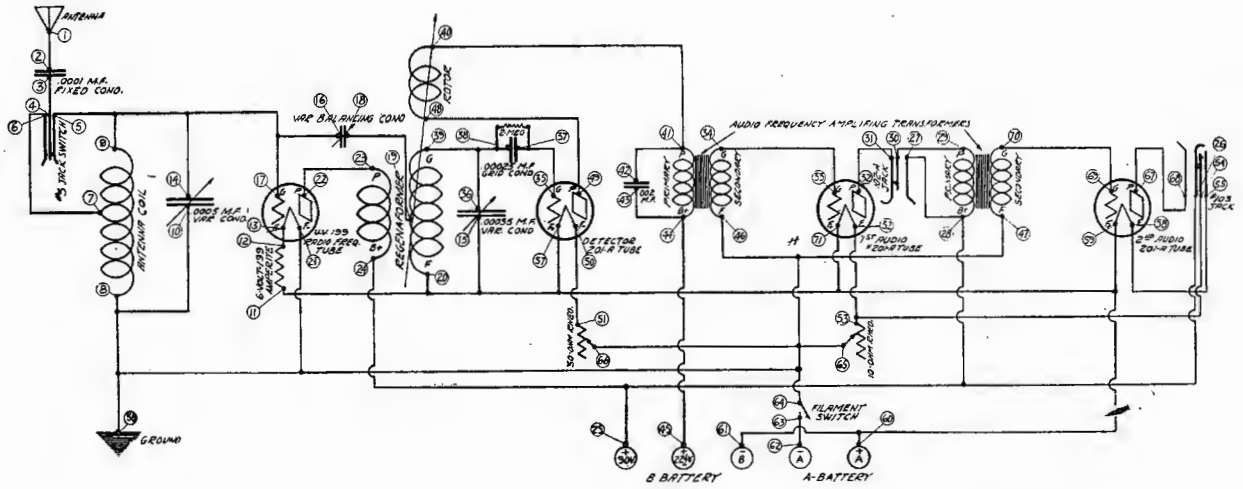


Figure 3—Schematic diagram. Numbers correspond with photographs and graphic illustration

heat the lug, as well as the wire, before removing the iron. In bending the wire measure each lead and always make the bends at right angles. Now assemble the baseboard and the panel with all of the parts mounted and the connections made as shown in photo C.

Photo D gives the remaining connections necessary to complete the wiring, and photo E shows a rear view of the receiver after all of the wiring has been done.

Take Figue 4 and check every lead on the now completed receiver. Go over this several times to make absolutely sure that you are right. You will have no trouble in recognizing each connection in this illustration.

easily affected by body capacity; so use a long handled screwdriver or a piece of Formica sharpened at the end. It is very important that this adjustment be correct, as it has a big effect on the selectivity of the receiver. Remove the paper from the filament terminal of the radio frequency tube.

Tuning

This circuit has several distinct advantages. When properly neutralized, it will not radiate nor cause any interference with other receivers in the neighborhood.

It is extremely selective and will bring in distant stations during local broadcasting. The tickler is to be used as in any regenerative

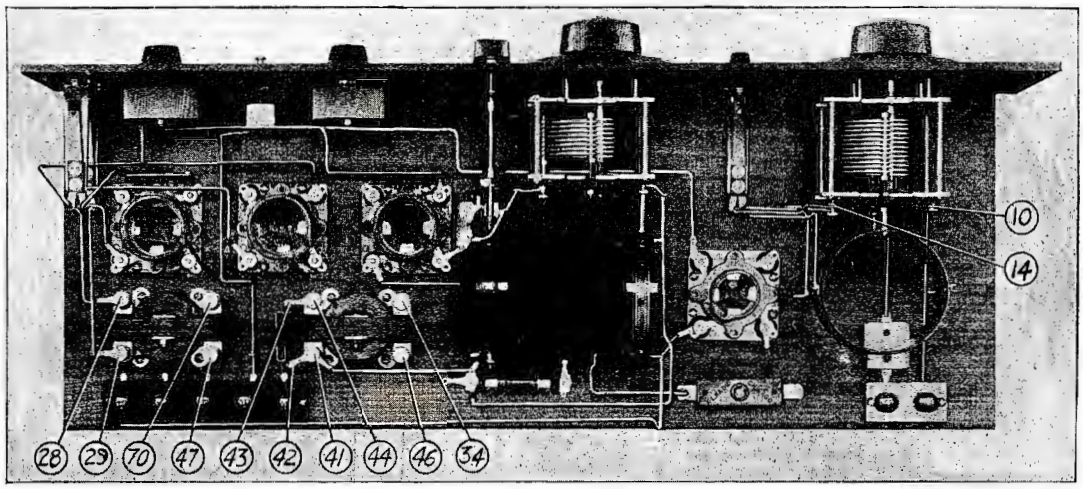


Photo D—Remaining connections not shown in photo C

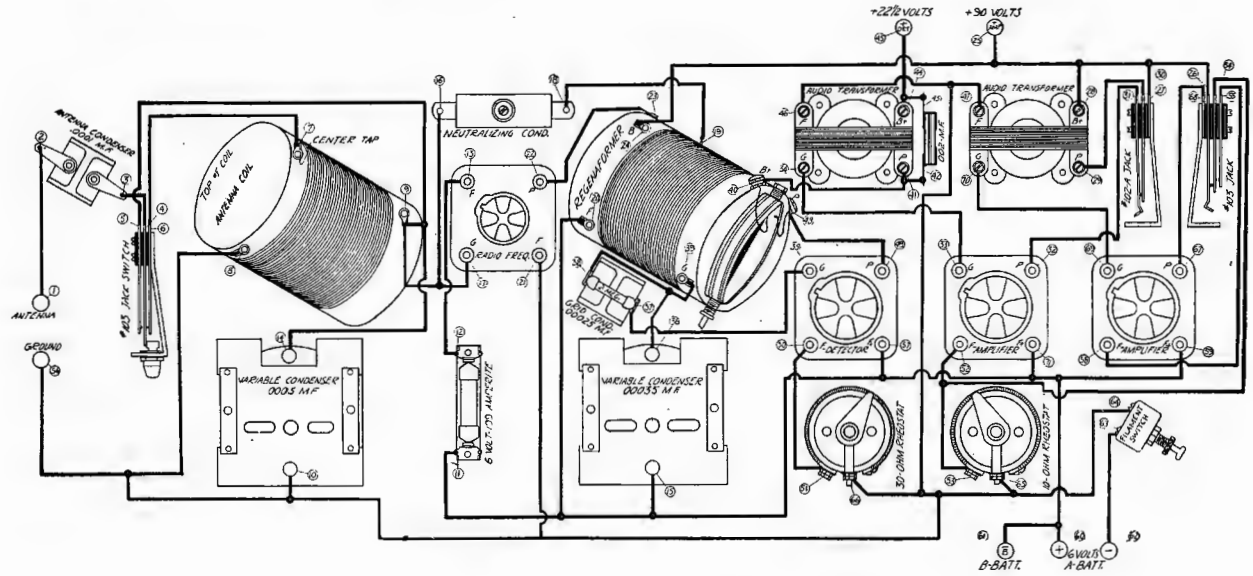


Figure 4—Graphic illustration showing all connections

receiver, to increase or decrease the volume of the signals. If the receiver tunes broadly, this is an indication that your antenna is too long.

To tune in a distant station, adjust tickler until receiver is oscillating and the carrier wave is picked up. Then reduce tickler coupling and readjust condensers for maximum signal. With a fully charged six-volt battery, the rheostats will be normally used at about 70 degrees on each dial. When a certain station is received, the dial settings remain the same and as long as the wavelength does not change, it will always be found in the same place.

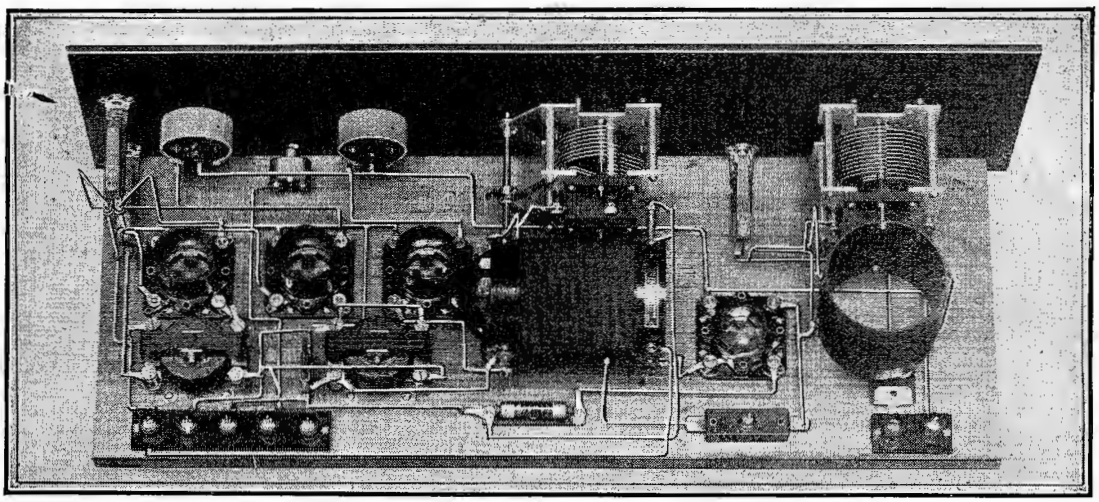
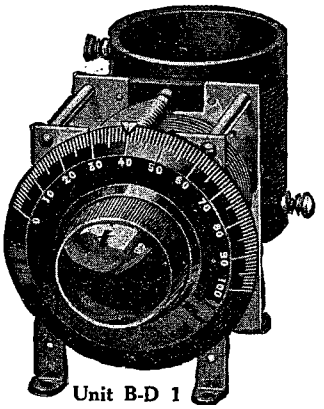


Photo E—Rear view of receiver with all connections made

NATIONAL



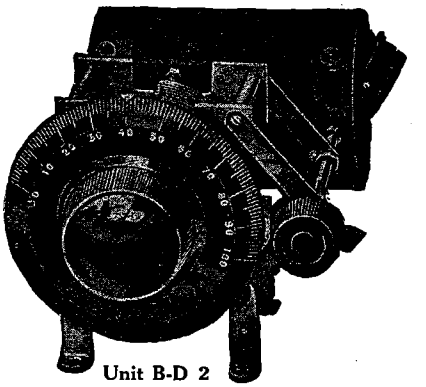
Unit B-D 1

Tuning Units

Embodying the Wonderful

Browning Drake

TRANSFORMER AND NATIONAL CONDENSER



Unit B-D 2

DESCRIPTION

The National B-D 1 consists of a coil wound with No. 20 DSC wire on a thin bakelite form, mounted on a .0005 mf National condenser with a four inch Velvet Vernier dial. The losses in both the coil and condenser have been reduced to a minimum by extreme care in their design. The coil is provided with a center tap so that it may be used as an antenna tuning unit; a wave meter, or wave filter.

When used as an antenna tuning system with an antenna of about 50 or 60 feet connected to the top of the coil through a .0001 mf condenser (the .0005 condenser being connected across the whole coil) the wave length range is from 200-580 meters. If a long antenna is used such as to 60 to 150 feet, it should be connected to the middle tap through a .0001 mf condenser to cover the above range. This unit makes an excellent wavemeter. When the condenser is connected across the whole coil a wavelength spectrum from 150-560 meters may be covered. When using the condenser across half the coil the spectrum comes in from 95 to 340 meters.

Used as a wave filter the National unit B-D 1 is simply placed close to the tuning coil of the set used and helps materially in cutting out interference from local stations while others are tuned in.

The National unit B-D 2 combines the famous Browning-Drake transformer in a tuned radio frequency unit of the highest efficiency. The Browning-Drake transformer is mounted on a .00025 mf National Condenser with a four inch Velvet Vernier dial, and is composed of a "slot" primary winding, a single layered secondary on a bakelite form, and a variable tertiary coil. The system is designed to procure a maximum inductive coupling with a minimum capacity coupling and with the secondary and variable condenser so chosen to cover the broadcast range with a maximum over all efficiency. The losses in the whole system have been reduced to a minimum, and the transfer of energy from primary to secondary has been shown to be about 90% of the maximum theoretical value.

The tertiary coil has various uses, such as a stabilizer in connection with two stages of tuned radio frequency amplification, or as a variable coupling coil.

The secondary when in parallel with the .00025 Natonal Condenser tunes over a spectrum of from 200 to 550 meters, When used across the first tap, the range covered is from 140 to 440 meters.

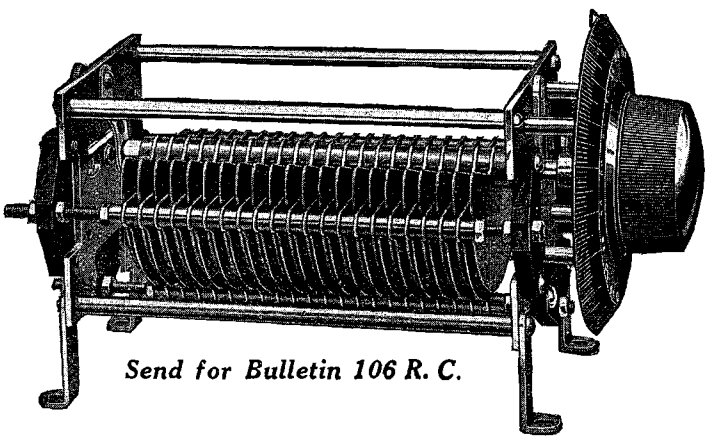
The units B-D 1 and B-D 2 may be combined into a single circuit set with wave filter. The connections in this case are shown in The Christian Science Monitor of February 19, 1925. The degree of selectivity may be varied at will with this combination by means of the tertiary coil.

UNIT BD-1—Price $9.25
1 National Antenna Coil mounted on
1 .0005 National DX Condenser with
1 4-in. Velvet Vernier Dial

UNIT BD-2—Price $12.75
1 National Regenaformer, mounted on
1 .00025 National DX Condenser with
1 4-in. Velvet Vernier Dial

1 Set of Angle Brackets for Mounting

PRICE OF KIT:
$22.00



Send for Bulletin 106 R. C.

NATIONAL COMPANY, Inc.
CAMBRIDGE, MASS.

HIGH VOLTAGE TRANSMITTING CONDENSERS

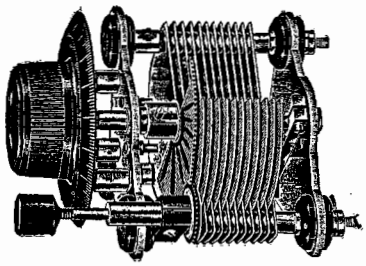
Type 150-3000 (.00015MF)
3/16-in. Spacing, 3000 V. Flashover
Fine for 5W and Normal 50W Sets
Price $7.50

Type 450-3000 (.00045MF)
Same as Furnished N. R. R. L.
Price $16.50

Type 100-6000 (.0001 MF)
3/8-in. Spacing, 6000 V. Flashover
Fine for Overloaded 50W and 250W Sets
Price $11.50

S-p-e-c-i-f-i-e-d!

by This Publication for Their New Low Cost HOME-BUILT RECEIVER



HEATH .00025 VARIABLE CONDENSER

Elsewhere in this issue is described a new hookup combining efficiency in radio reception with economy of cost. Included in the list of parts is the Heath Radiant .00025 Variable Condenser—another tribute to the quality of the condenser that aided in the success of the A. C. Dayton and Marconi Receivers.

Two points of vast superiority have influenced set manufacturers to select Heath Condensers when only the best would do: **permanently flat plates,** stamped under huge presses to absolute flatness and tempered to prevent warping; and the micrometer geared vernier that reduces ordinary adjustments to hairbreadth distinction.

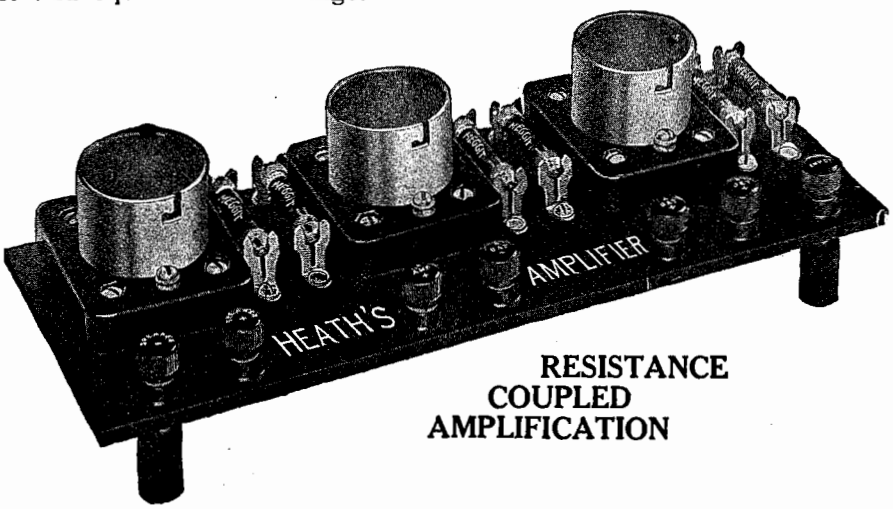
Heath Radiant Resistoformer

A three-stage resistance coupled amplifier that can be used in all types of radio sets which use a tube detector. It produces a tone quality hitherto unequalled.

This amplifier replaces the usual two-stage transformer coupled amplifier in the set and produces at least equal volume and equal distance range.

See the New Heath Resistoformer at Your Dealer's

The apparatus has Heath resistance sockets and binding posts mounted on the upper side of the hard rubber base while the condensers and inter-stage wiring are concealed beneath. The Heath sockets are supplied with sponge rubber shock absorbers to prevent microphonic noises sometimes caused by vibration.



RESISTANCE COUPLED AMPLIFICATION

Write for Literature

Heath Radio and Electric Mfg. Co.

206-210 First Street **Newark, N. J., U. S. A.**

How to Build a Receiver for $27.27

This Receiver Was Constructed and All Illustrations Made in the Laboratory of the Citizens Radio Call Book

THERE are many people with limited means that would like to build their own Radio receiver. Breathes there a radio fan with soul so dead, that would not love to turn to his friend and say: "I built it myself."

The first thing you tell yourself is: "I would like to have a set that will get 'out of town' stations." So in this article, we will describe a two tube receiver that will operate a loud speaker.

There is no doubt that the cheapest and most efficient method of amplification is regeneration. There has been a great deal of agitation against regenerative receivers because they howl and disturb the neighbors. This can be eliminated with proper design. The circuit here described will not reradiate as the inductively coupled primary counteracts the energy that would ordinarily radiate from the aerial with a single circuit regenerative receiver.

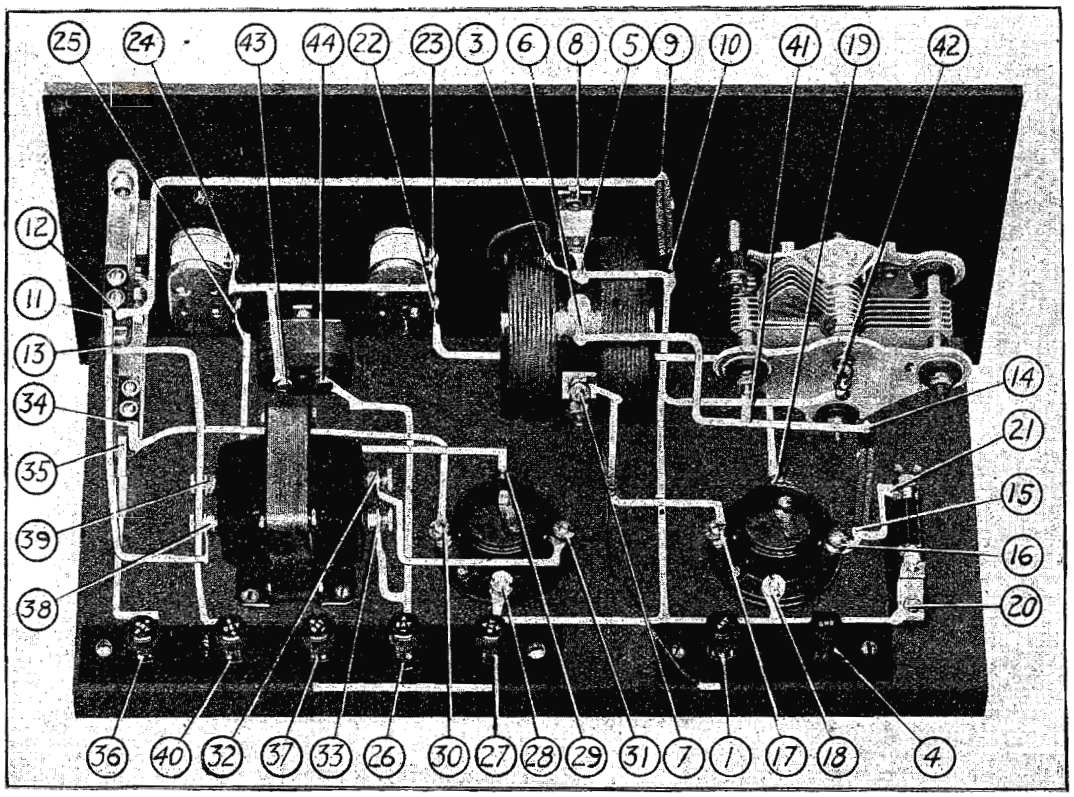


Photo A—Rear view of completed receiver

On local stations, one tube will operate a loud speaker so that the signals can be heard in all parts of an average sized room. Using two tubes, stations a thousand miles distant can be received on the loud speaker in the winter time. This is an ideal receiver for rural districts.

LIST OF PARTS

These Parts or Their Equivalent Will Give Satisfactory Results

1 7"x14" Formica panel	$ 1.96
1 7"x1"x3/16" Formica Strip	.24
1 3½"x1"x3/16" Formica Strip	.12
1 No. 268 General Radio Coupler	3.50
2 Bradleystats	3.70
2 3" Kurz Kasch Dials	1.50
1 Premier single circuit Jack, No. 133	.65
1 Premier three point Jack, No. 134	.75
2 Na-Ald No. 499 Sockets	1.00
1 Dubilier .001 MF Fixed Condenser	.35
1 Dubilier .00025 MF Grid Condenser	.35
1 Daven Grid Leak Holder	.35
1 4 Megohm Daven Grid Leak	.50
1 Heath .00025 Variable Condenser	4.50
7 Eby Marked Binding Posts	1.05
4 dozen Soldering Lugs	.20
1 Cutler-Hammer Battery Switch	.60
1 Modern Audio Frequency Amplifying Transformer	5.00
25 feet No. 12 Tinned Copper Wire	.25
8 No. 6—1" Round Head Nickle Plated Wood Screws	.10
3 No. 5—½" Round Head Nickle Plated Wood Screws	.10
6½"x13"x1" Baseboard	.50
Total	$27.27

Of course the batteries, tubes and loud speaker or head telephones are extra. If you already have a receiver no doubt you will want to use the apparatus on hand. Any of the standard makes will give satisfactory results.

Construction

Figure 1 shows the panel layout, giving size of holes to drill, and the correct distance that each hole should be apart. If you

desire to have the panel engraved, it will give the complete receiver a much neater appearance and should not cost much over a dollar. We suggest the engraving as indicated in figure 1.

The No. 268 General Radio Coupler has to be remodeled for this circuit. First remove one of the sections of the rotor, and other end is connected to the binding post of the coupler on the secondary nearest the panel.

Now mount the variable condenser, coupler, Bradleystats, battery switch and jacks on the panel. The open circuit or two spring jack goes in the top hole marked "1st stage" and the three

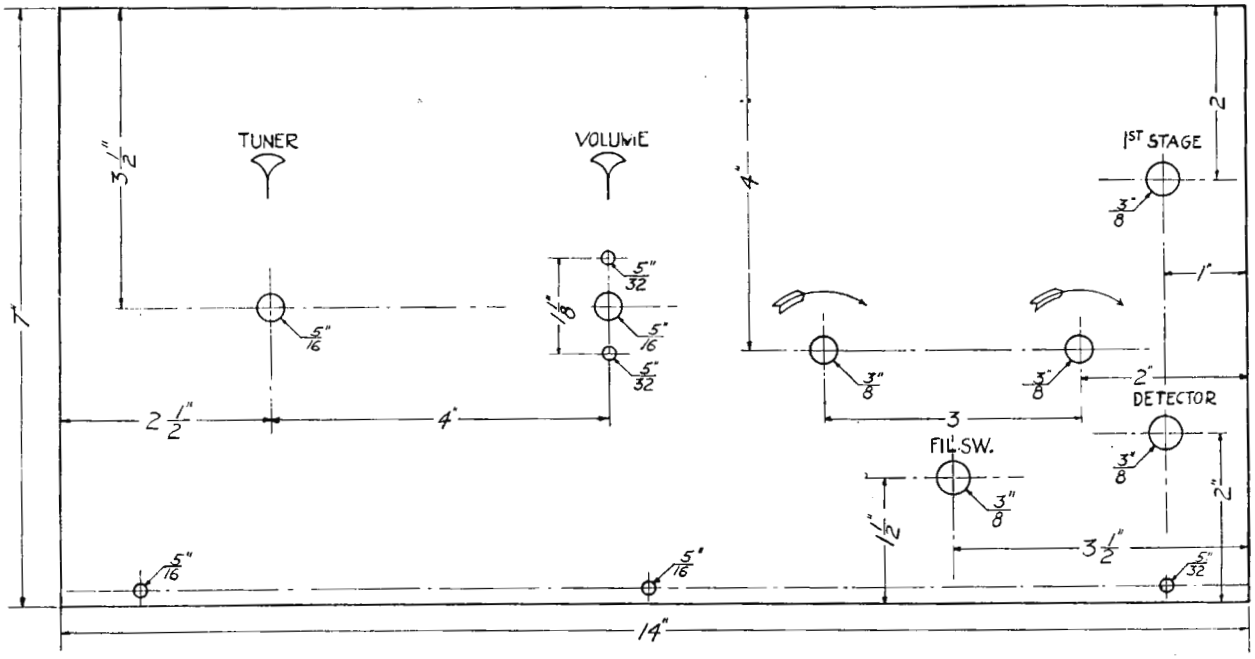


Figure 1—Panel layout showing dimensions of all drilling

be certain that good connections are made to the sliding contacts. Next wind ten turns of No. 18 stranded double silk covered flexible wire over the right hand section of the secondary coil, with the shaft pointing towards you. One end of this primary is soldered direct to the antenna binding post and the point jack goes in the bottom hole marked "detector." When the panel has been completely assembled, lay it to one side and start on the baseboard.

Figure 2 gives the dimensions of the apparatus on the baseboard. First assemble the two one inch strips, mounting the

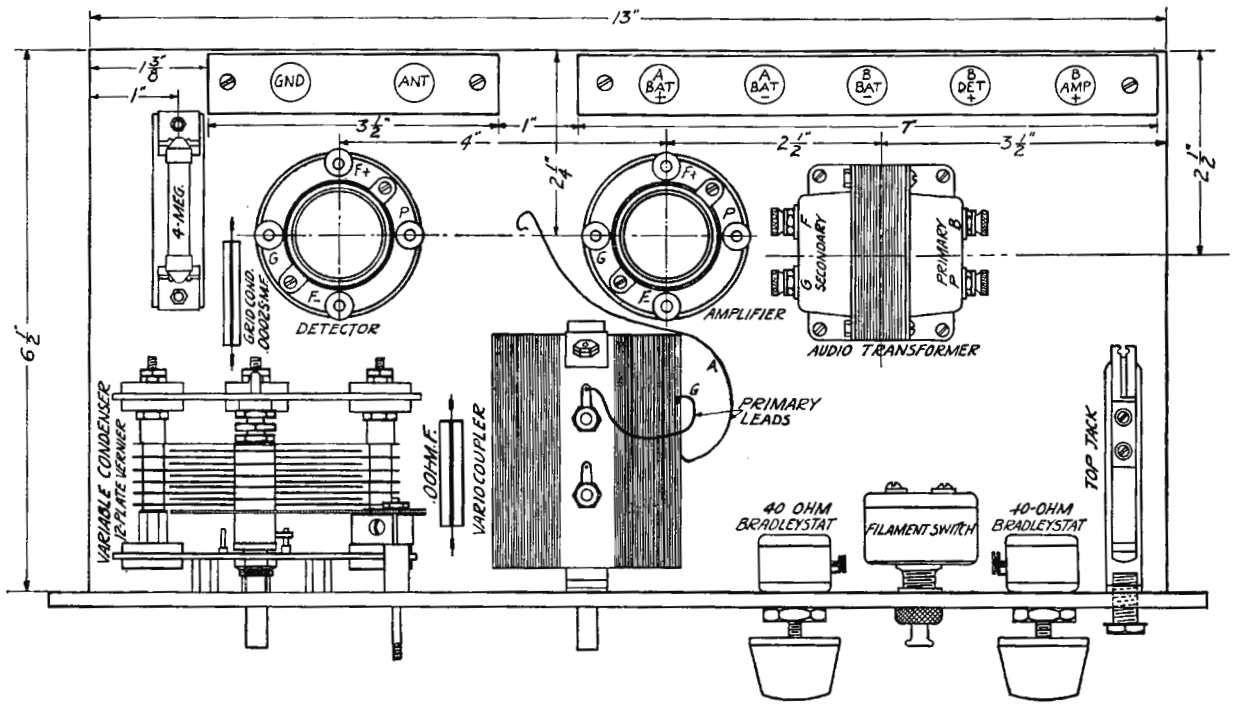


Figure 2—Baseboard layout

binding posts as indicated on the strips. If ¼" sleeves are inserted under these strips and the wood screws holding the strips are passed through them, the wiring can then be kept entirely free from contact with the baseboard. This slight elevation also makes it easier to solder the lugs to the wires. Now mount the grid leak holder, sockets, binding post strips and audio frequency transformer on the baseboard. Be careful to follow the dimensions shown in figure 2, so when the panel is secured to the baseboard, all of the apparatus will be the correct distance apart. The .001 MF condenser can be suspended to the coupler, as shown in photo "A" and the .00025 MF grid condenser can be suspended from the grid binding post of the detector tube.

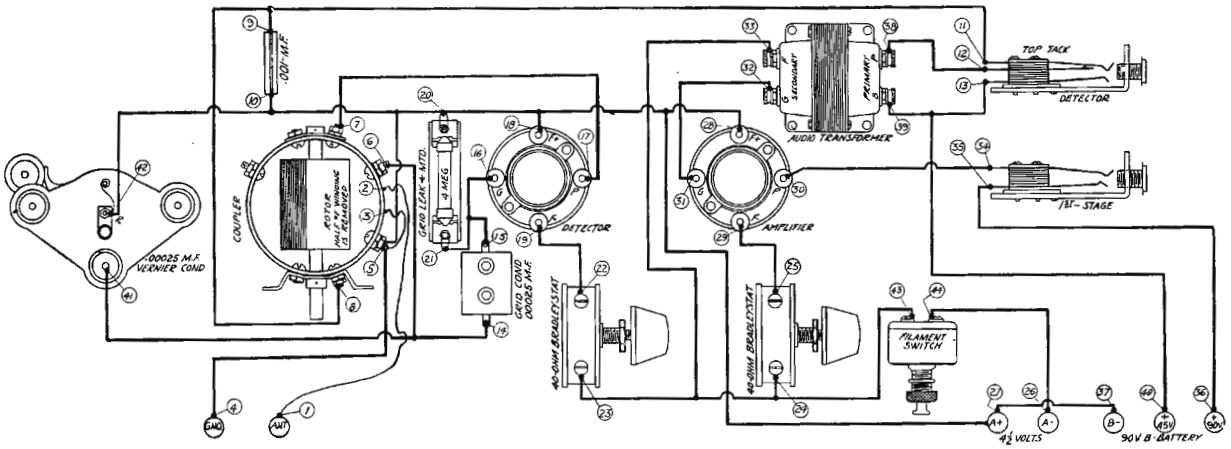


Figure 3—Graphic illustration showing all connections

Wiring

Consult figure 3. This is a graphic illustration showing every connection in the entire receiver. Each point is numbered and corresponds with figure 4. This is really very simple if you follow the diagram. Make all of your bends at right angles and be sure of each connection before going on to the next.

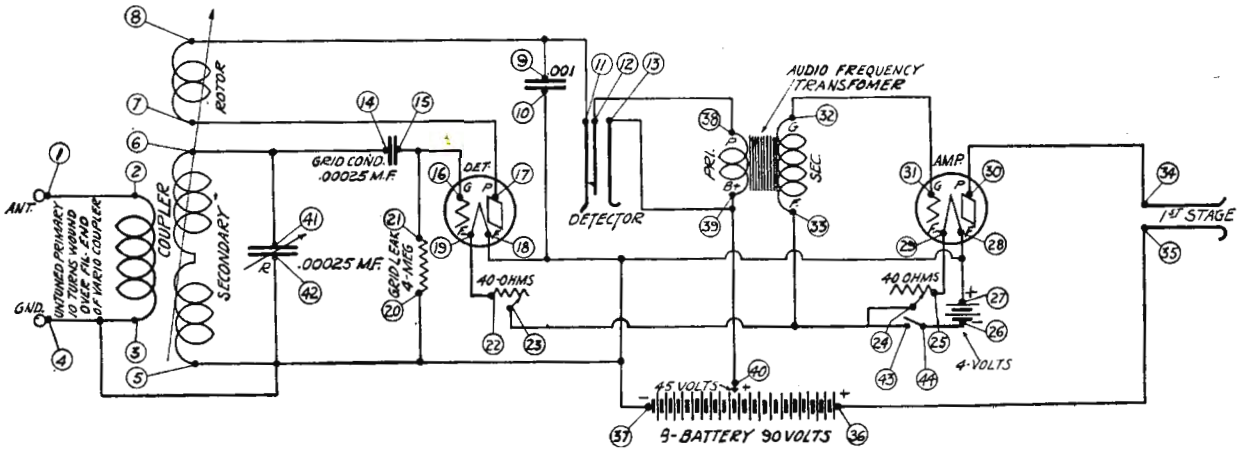


Figure 4—Schematic diagram

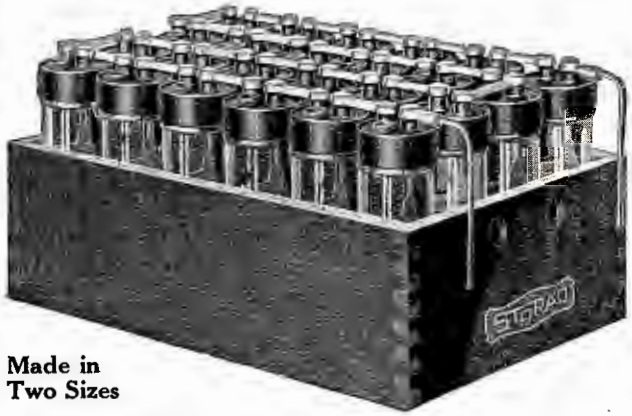
Operation

If you desire to use this receiver for local stations only, an inside aerial only ten feet in length will give very satisfactory results. For long distance reception, erect an outside antenna 75 to 100 feet in length. Be certain that you have a good ground. If you can connect to a cold water pipe in your home, this is the best ground that you can have for this circuit. Secure a ground clamp and have the connection clean.

This is an easy circuit to tune, as there are only two controls outside of the rheostats and these are not critical. The receiver will tune sharp and the condenser can be "logged" as the stations will always be found in the same place. The tickler control does not affect the wave length adjustment and is merely for volume and clearness. The loudest signals will be obtained just before the point of oscillation. When the receiver is oscillating, all signals will be mushy. To tune in a distant station, adjust the tickler so that the receiver will oscillate and tune in a carrier wave with the condenser. This will be indicated by a continuous high pitched note. Then reduce the tickler coupling until the signals are received clearly.

There is nothing new about this circuit. It merely employs an inductive coupling and regeneration in a simple manner. The old style of three circuit regenerative receiver was difficult to handle. One stage of audio frequency amplification has been added so as to bring the signals up to a point where a loud speaker can be used.

STORAD "B" BATTERIES

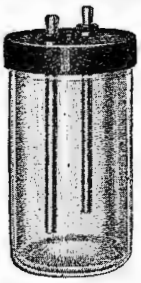


Made in Two Sizes

No. 4548—4500 milleamp. hr.—48 volt
No. 4524—4500 milleamp. hr.—24 volt

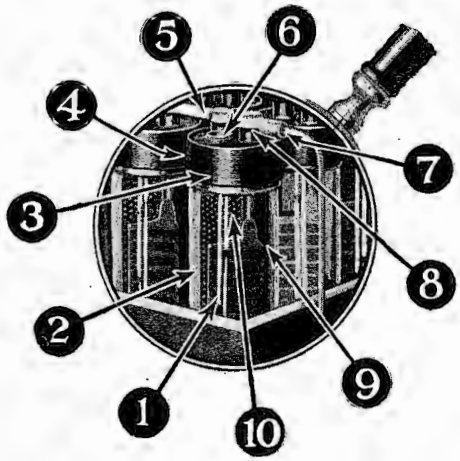
STORAD RADIO BATTERIES

Storad No. 4 Chemical Rectifier



This charger has proven to be highly satisfactory for Radio "B" Storage Battery Charging. It is simple to operate, absolutely quiet in operation and because of non-radiating characteristics causes no interference with radio reception.

10 Reasons Why STORAD EXCELS



1. Extra heavy plates (2¾ in. x ⅞ in. x 5/16 in.)
2. Heavy indestructible glass jars
3. Leak proof hard rubber screw type cap
4. Air space between cells
5. Heavy connecting links welded to plates
6. Large vent plug and filler openings
7. Welded on rubber covered cable terminals
8. Special sealed post construction
9. Large acid volume
10. Combination perforated rubber and treated wood separators

If your dealer can not supply you with Storad products, write us direct. Circulars on request

The Cleveland Engineering Laboratories Co.
2130 Superior Viaduct, N. W., Cleveland, Ohio

STORAD "A" BATTERIES

Exceptionally well built full capacity Radio "A" Batteries. Made with best quality rubber case and non-corroding rubber terminal nuts. Storad Radio "A" Batteries are furnished in three sizes:

R3—60 amp. hr. R4—80 amp. hr. R5—100 amp. hr.

Storage Batteries for Radio

Advantages in Their Use and How They Can Be Installed Conveniently

By W. K. FLEMING

THE batteries used for radio reception are divided into three classes, "A," "B," and "C." Of these the "B" battery is, of course, the most important. This is the battery supplying the relaying current from tube to tube and tube to phones or loud speaker. Since this is directly connected in both the radio and audio frequency circuits, the slightest variation will cause an undesirable irregularity of the relay current which has a tendency to make the set noisy and cut down distance reception.

It is very important in order to secure satisfactory reception that the source of "B" battery current be of constant potential without variation or pulsations of any description.

With the development of the modern receiving sets with many tubes, it has been necessary to secure a source of "B" circuit power that will stand up under the severe service requirements of these sets. Dry batteries have certain limitations which lower their desirability for use with the modern multi-tube sets. This has made it necessary to develop a storage "B" battery that will fulfill the exacting requirements of hard service. Due to their mechanical and electrical characteristics, some storage batteries have been constructed so that they will supply exactly the type of electrical energy required and give constant power over long periods of use.

Not all storage "B" batteries on the market today, however, are built to give best service under these conditions. In order that the user may know what to look for in a storage "B" battery, the following characteristics of the ideal storage "B" battery are given:

(1) The plates used must be of such capacity that they will furnish all the current which may be required at any one time by the set. They must be large enough to operate the set properly from the time the battery is fully charged until it is within 10 per cent of being fully discharged. The plate characteristics should be such that the battery will have a very low internal discharge. The best way of gauging plates for these uses is to see that they are of good size and thickness, 5/16 inch thick at least.

(2) There must be absolutely no leakage between cells, as this would introduce a varying potential which would cause noise in the set and make the battery discharge unnecessarily fast.

(3) It should be so constructed that the cells can not short circuit internally or have any internal leakage. In order to do this it is essential to use either a wood or rubber separator or preferably a combination of the two. If this construction is not used, the same undesirable results will be obtainable as above.

(4) The battery should be provided with some means of connecting to the set in order to overcome the corrosion which occurs when clips are used, as this introduces resistance and causes noise and poor reception in the set.

(5) The cells used should be very substantial, widely separated and of such size that low gravity acid can be used and water need only be added to the battery at long intervals of time.

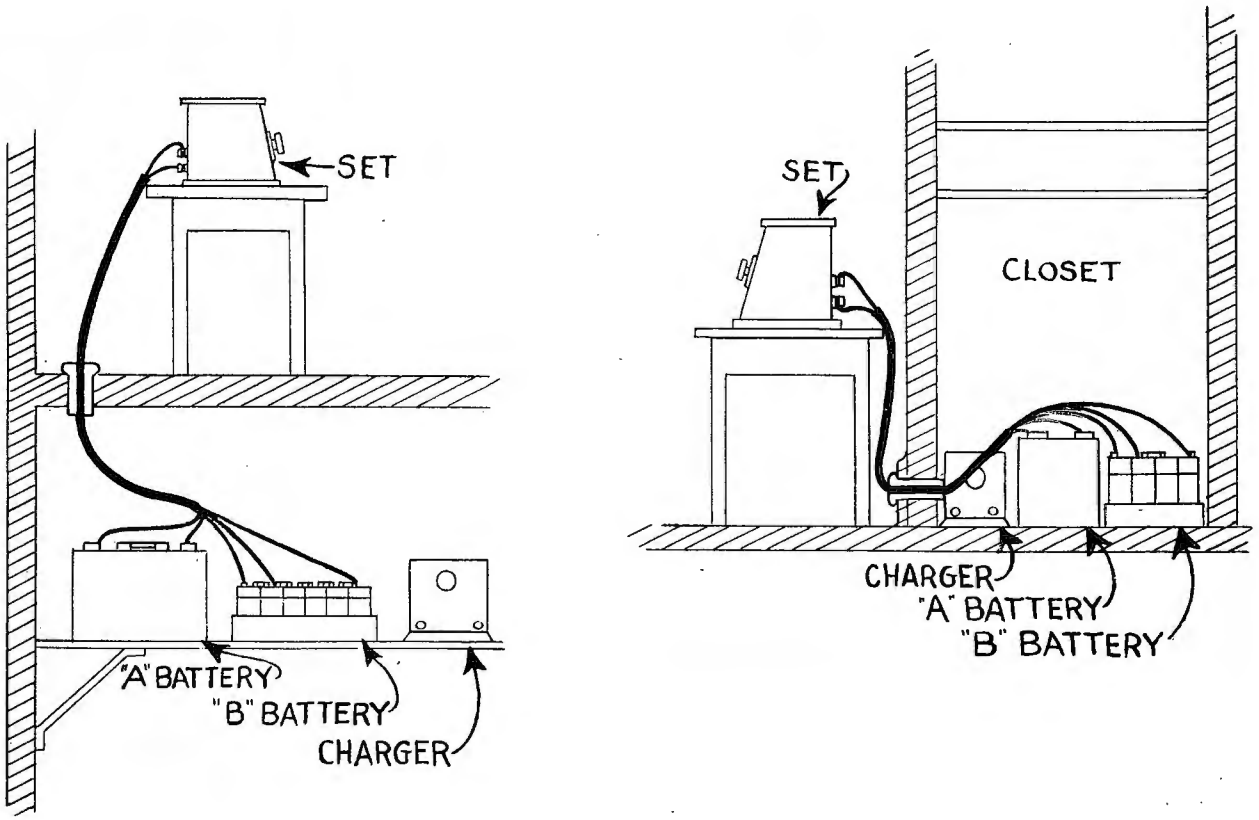


Diagram showing how to install batteries in the home

the cells should also be properly sealed so that acid does not collect on the top of the covers.

(6) It should be constructed so that the interior of the cells are discernible in order to determine when the battery needs water as well as the condition of the charge.

(7) The filler opening in the cover should be of such size that a storage battery hydrometer may be used and the cell readily filled with water when this is necessary.

(8) The entire battery should be very compact, substantial in construction, high in initial capacity and able to stand for long periods of time without discharging.

A storage "B" battery with these characteristics will give real service on any set or power amplifier.

One of the main objections with the storage "B" battery has been its size, making it hard to store in a set.

This objection can be quickly overcome by placing the batteries in the cellar, in the attic, or in a closet. Wires can be run from the batteries to the set in any part of the house. The charger for use in charging both storage "A" and "B" batteries can be installed with the batteries wherever they are placed.

A switch may be installed so that the batteries may be changed from set to charger by merely throwing the switch, making it easy to keep the batteries in a charged condition and the set always ready for use. With this arrangement it is never necessary to make any change in connections or remove the battery for charging or replacement.

The accompanying diagram shows how to set and the storage batteries necessary to operate it may be installed in any home as suggested above.

It is sometimes claimed that long wires from the battery to the set will impair reception, but experiments have proven that unless the wire is over 30 feet in length it will have no effect whatever. This is considerably longer than will be necessary to make any installation in the ordinary home.

Where rather long battery wires are used, and where sets are not already so equipped, it is desirable to attach fixed condensers of one or two microfarad capacity in the circuit across the batterv leads *at the set*—one condenser being used for each the "A" and "B" battery circuits.

Wire of No. 14 size and preferable No. 12 should be used for "A" battery circuit. Wire of 16 or 18 size may be used for the "B" battery circuit. Bunch all wires together where the batteries are at some distance from the set, and be sure to keep wires away from metal fittings used in plumbing and heating, and all other wires such as telephone and lighting circuit wires.

With these instructions and precautions storage "A" and "B" batteries can be conveniently placed in some out of the way place and the set may be placed in any part of the house with ease and without sacrificing any of the qualities of good reception.

In these days when radio has become a regular institution in millions of homes, the minds of receiving set owners are continually busied with the equally important problems of obtaining best results and maintaining a low up-keep cost.

The radio set itself requires but few replacements over several years' time. The electrical current to run the set, however, must be obtained from batteries, either dry or storage. If the radio set utilizes dry cells it is necessary to replace worn-out batteries periodically. On the other hand, if storage batteries are used, it is necessary only to have them recharged at various intervals.

Regardless, therefore, of the medium of power used, there is necessarily some expense from time to time. But even this expense may be comparatively small or large, depending on several conditions.

Chief among these conditions are the following:

1. Number and kind of tubes used in the receiving set.
2. Frequency of use of the set.
3. Type of batteries used—dry cell or storage.
4. Care of batteries.

The radio sets which are finding most popular favor today are the larger and higher powered sets. More and more the radio public leans toward sets having not only the power and efficiency to bring in distant stations, but the power to bring them in clearly on loud speakers. The set that can do this is a multi-tube set, using from four to eight vacuum tubes. Naturally, such sets draw heavily both on "A" and "B" batteries. Batteries, in spite of improvements in construction, are more quickly run down than in the early days when the single-tube, two and three tube sets were in vogue. Storage batteries must be more frequently recharged. Thus the increasing number of tubes on sets means not only greater first cost of sets but also a greater upkeep cost in power.

Anyone knows that if a pair of shoes is worn all day long every day they will wear out much quicker than the Sunday pair. The same is true of batteries. If the set is used continuously, it is necessary to replace dry cells oftener or to recharge storage batteries more frequently. No rule can be made which will cover all batteries. There are just so many hours of charge in a battery. If each tube draws ¼ ampere per hour and there are eight tubes, it is easy to see that a 120-ampere hour radio "A" battery cannot possibly keep the set going night after night without a comparatively frequent recharge. Storage batteries last longer on one charge than any dry cell "A" battery. So the frequency with which the set is used will also influence the cost of running it.

A mistake which the set owner is very liable to make after deciding to use storage batteries is in the choosing of the wrong kind of radio storage batteries.

The capacity or amount of energy which is contained in a storage battery is designated in ampere hours. There are "A" batteries on the market running all the way from 20 to 120 ampere hours of capacity. It is necessary to choose an "A" battery that has enough capacity to run the set for some weeks before requiring a recharge. Thus it would be foolish to select a battery of low capacity for a multi-tube set.

If a set owner is looking toward economical upkeep of his set, it is wise to select an "A" battery with due consideration of the number of tubes and their hourly draw of current and the number of hours a day or week in which the set is used.

Notwithstanding the fact that battery engineers are daily learning new ways of making batteries longer-lived and more efficient, there are a few simple and easily understood rules which if followed religiously will insure maximum results with very little expense of upkeep.

The level of the electrolyte should always be kept above the tops of the insulators in both "A" and "B" storage batteries. This is done by periodically adding distilled water only. It is recommended that the level of the electrolyte be kept ⅜ inch over the plates. In the "B" batteries it should be ⅛ inch over the tops of the insulators.

Noises in a receiving set may often be traced to corroded or dirty terminals and connections. Terminal posts and connections may be kept clean by covering them with a thin coating of vaseline. To secure best results and quiet operation posts should be absolutely clean and free from corrosion.

It is well to place batteries on rubber mats or on a dry shelf. They should never be placed in locations subject to extreme heat or cold or dampness.

Hydrometer and Voltmeter

The hydrometer and voltmeter are two very useful instruments to have in order to determine the state of charge of radio storage batteries.

The hydrometer is used to test the specific gravity or state of charge of a storage battery.

These directions should be followed:

1. Remove vent plugs from cells.
2. Compress bulb of syringe hydrometer.
3. Insert small soft rubber tube through vent hole into electrolyte.
4. Release bulb until sufficient solution is drawn into the tube to cause the hydrometer float to rise.
5. With the syringe in vertical position so that float does not touch sides of tube, specific gravity reading is taken on scale at level of solution.
6. Compress bulb and allow electrolyte to run back into the same cell from which it was taken.
7. Replace vent plugs.

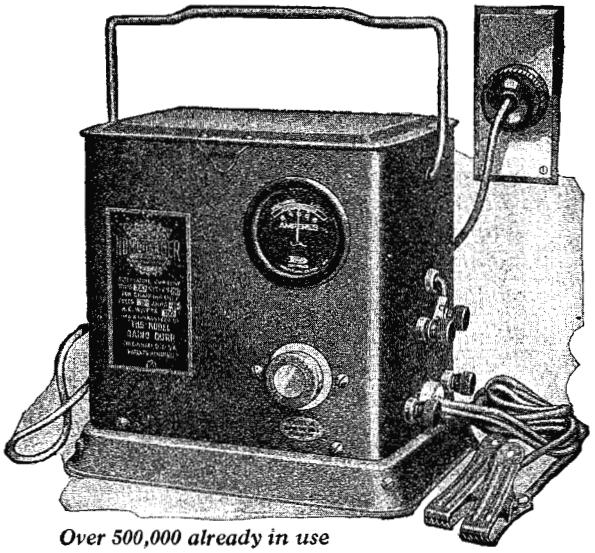
The covered wagon has gone; like the old-fashioned charger with the slow 2-ampere rate it is obsolete!

Buy nothing but an up-to-date 5-ampere charger!

The New Improved

5 AMP. A & B GOLD SEAL HOMCHARGER

$19.50



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Get This Modern Fast Charger!

Better Because:—

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No bulbs to buy or break.

Can be used anywhere—contains no acids or other harmful liquids to spill.

Approved by underwriters—trouble-proof, shock-proof and fireproof.

Beautiful cabinet in maroon and gold.

Free *Write for new edition of our instructive booklet on radio operation "The Secret of Distance and Volume in Radio"*

When you buy a charger don't let anybody sell you an obsolete, slow 2-ampere model.

The New Improved GOLD SEAL HOMCHARGER, with its full 5-ampere rate, charges your battery overnight! Does away with the long bothersome waits that were necessary when the slow inefficient chargers of last year were the best that radio offered.

And the New Improved GOLD SEAL HOMCHARGER charges both A and B batteries without additional equipment.

Be sure when you buy that you get a modern, fast charger, with a 5-ampere rate. To be *absolutely sure*, insist on the **GOLD SEAL HOMCHARGER.**

The Kodel Radio Corporation

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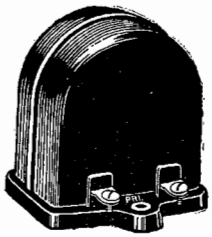
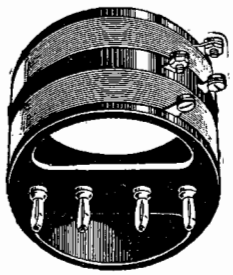
Owners of Kodel Broadcasting Station WKRC on the Alms Hotel. Send for program.

Build With
GENERAL RADIO
Quality Parts
for Super-Reception



Type 331
30 K. C. Tuned Transformer
Price $5

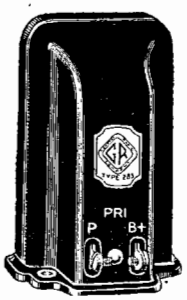


Low Loss Coils

Carefully designed to give lowest possible losses. By using the type 274-P Plugs and 274-B Mounting Bases, these coils may be used interchangeably to cover a variety of wavelengths from 50 to 600 meters.

Type 277-C (shown above).....$1.25
Type 277-D Coupling Coil..... 1.50
Type 274-B Mounting Base..... 1.00

Type 299
Vacuum Tube Socket for UV-199 Tubes
Price 50c ea.



Type 285
Audio Amplifying Transformers

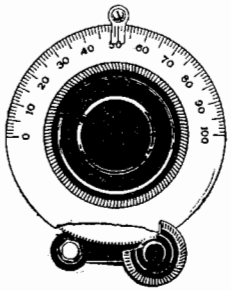
The better loudspeakers today are capable of reproducing music with all its truest refinements of tone quality. Consequently a higher standard of transformer design is necessary.

In designing the General Radio Type 285 transformers great stress has been laid upon tone quality—yet volume has been increased to a very marked degree.

Due to the special design of the core and adjustment of the coil turns these transformers are capable of high and even amplification of all tones common to speech and instrumental and vocal music.

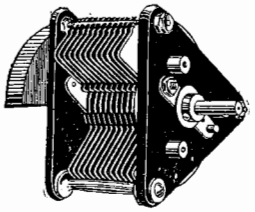
In spite of the pronounced superiority over other transformers, they sell at a popular price.

Two Ratios
6 to 1 for First Stage
2 to 1 for Second Stage
Price $6.00 ea.



Type 302
Geared Vernier Dial
Price $1.75

Type 271
Medium Frequency Transformer
Price $5



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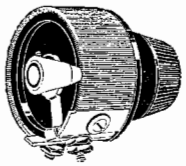
Variable Condenser

The outstanding feature of General Radio Type 247 condensers is the good interplate conductivity resulting from soldered plates. This method of assembly greatly reduces losses and assures perfect alignment of plates. Rotor plates are specially shaped to give uniform wavelength variation. Cap. .0005 MF.

Price $4.00 ea.



Type 301

10 ohm Rheostat.....$1.25
200 ohm Potentiometer..... 1.25

Ask your dealer or write for the new General Radio Catalog 922-S, which gives complete descriptions and prices of all parts

GENERAL RADIO COMPANY
Cambridge, Mass., U. S. A.

A Seven Tube Superheterodyne

FOR the experimenter who wants to construct a real superheterodyne receiver here is one which will "percolate" in true super form. An elaborate description of a receiver of this type could convey but little more information to the man capable of building one of these sets than is contained in the accompanying photograph and diagrams.

Figure 1 gives the circuit connections for this most compact of superheterodyne sets, which, as the reader will note, works with an antenna. Many prefer this to a loop. Your conditions will determine whether the antenna be outdoor or indoor; if outdoor, use a straight wire of 30 feet run; if indoor, string up at least 50 feet, or as many feet as you can put around your rooms without having the antenna loop back on itself.

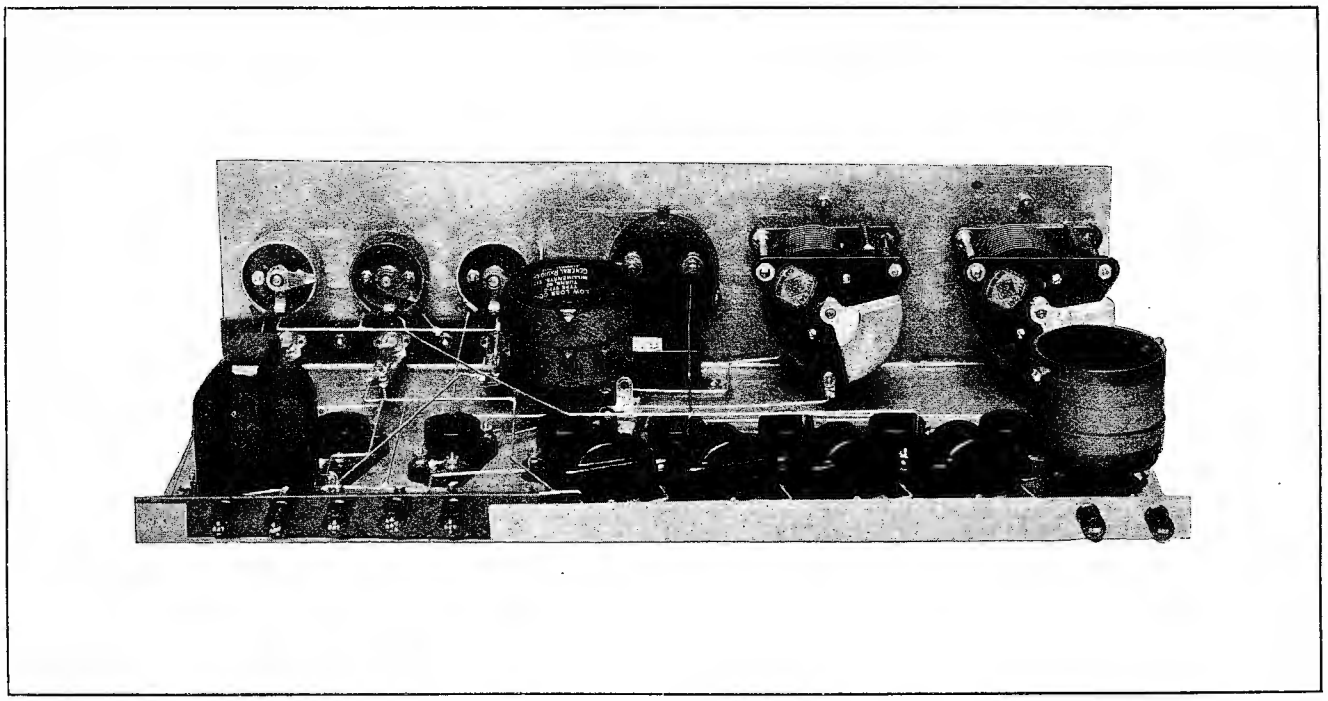


Photo A. Rear view of completed receiver.

One of the most convenient types of antenna consists of a wire strung under the eaves in the atiic. The lead in may be brought through the walls to the cellar and thence to the set. This type of antenna is both invisible and out of the way, and is considerably more efficient than a loop which is neither.

The parts required are all standard and are listed in the schematic diagram (Fig. 1). The coils D and E are included in G. R. coil Type 277D G. R. Type 277C provides the coils G.

It is necessary to add a coil of about two turns at the bottom of the antenna input coil in order to provide coupling between the detector and oscillator circuits.

If it is desired to use the set for several wavelength ranges, plug mountings should be added to the above equipment.

Figure 2 is a pictorial layout, showing all the necessary parts in position, with wiring complete. The panel is 5x18". In Fig. 2, everything above the highest dotted line is mounted on the rear terminal board, the instruments between the two dotted lines, on the base-board and those below the lower dotted lines, on the panel. Observe the 4-volt Weston meter in the center. While this is not absolutely essential, it should be included to get really satisfactory results with the set.

The panel and the base on which the parts are mounted are of metal, one piece, bent to form a subpanel and a front panel. Where you see connections grounded in the diagram you merely make that connection with the shortest possible piece of wire to the combined panel and subpanel immediately adjacent to the part of the instrument where the grounded connection is shown. For instance, you will see that "Plus A" and "Minus B" are connected to a common binding post which is fastened to the panel without any insulation, and where Plus A connects with the filaments you just loop a little wire around the plus filament socket terminals and fasten it under the head of the screw nearest to it which holds the socket to the base. This saves a great deal of extra work and helps to avoid the frequent defect in superheterodynes; namely, a loop effect in the wire itself and a general maze of wired connections.

The mounting and wiring, as shown by the diagram, precludes another bug-bear of superheterodynes in that it eliminates undesired capacity effects. But a word of caution, and that is to be certain, if you make your own combination panel and subpanel, to insulate all your binding posts except the "Plus A Minus B common connection," and make sure that the condenser connected with the oscillator coil is not grounded in any way on the panel, as only the antenna coupling condenser should be grounded.

It will be noted that tubes of the 199 type are used. In the intermediate frequency stage the larger tubes offer no practical advantage over this type. In the audio amplifier, however, if considerable volume is desired, it may be of advantage to use a storage battery tube.

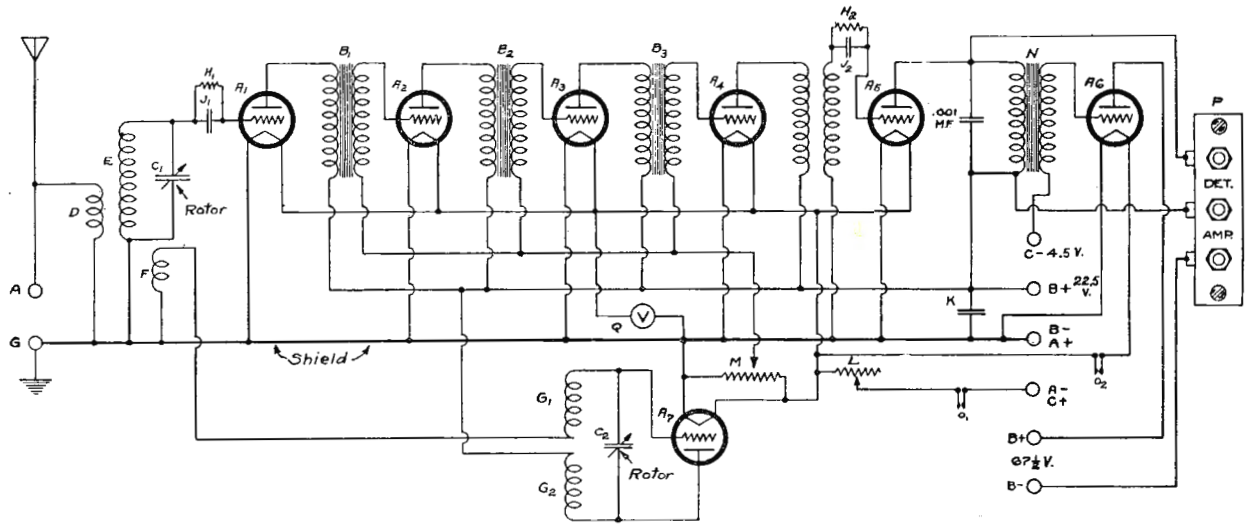


Figure 1. Schematic Diagram.

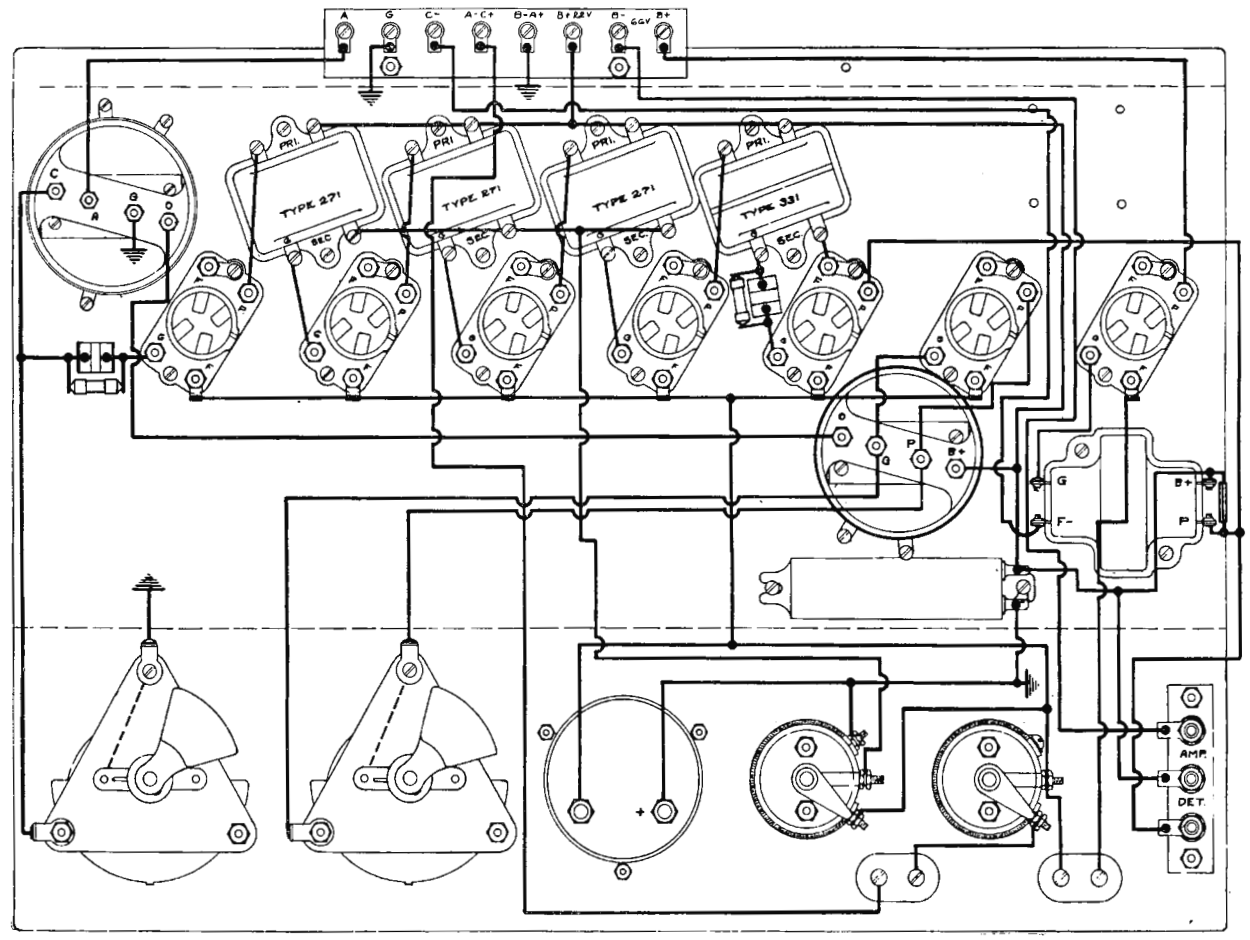


Figure 2. Graphic Illustration.

A Common Sense Hookup

THERE are a great many articles in various Radio publications today calling attention to remarkable circuits and inventions in Radio. Primarily, the circuits so designated are not of a fundamentally new nature, but are simply some existing circuits with new applications and refinements to them, and when you come right down to it, there have been very few new circuits of a worth-while nature devised since broadcasting began, and there have been few efficient circuits designed which do not make use of regeneration in one form or another.

The following article is not about a new circuit, but is simply about a circuit with refinements added to it both from the mechanical and electrical standpoint.

Each Radio season some particular circuit or complete set has come to the fore in the Radio world. Sometimes this circuit withstands the test of time and still remains in front for another year. Undoubtedly, the circuit which created more discussion, and from which there were more complete sets built than any one in the Radio season of 1924-1925, was the circuit employing a stage of tuned Radio Frequency with a regenerative detector, and it is in this connection that we wish to put before our readers the circuit told about below.

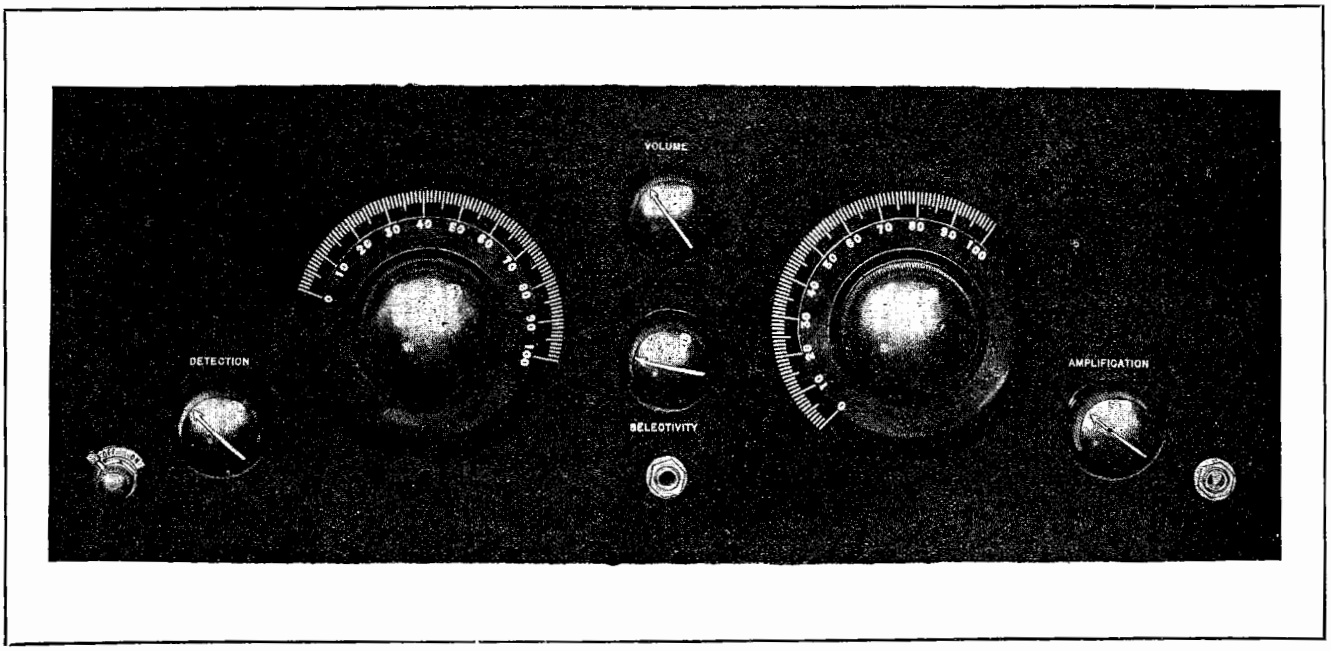


Photo A—Front view of receiver

The reasons for this circuit, which was known under various names but still comprised the fundamentals outlined above, gaining its great popularity, were due to many factors. First, the question of sensitivity, or as is commonly referred to, the "distance-getting" ability. This circuit is capable of obtaining, in most cases, more distance than many of the five-tube tuned Radio Frequency type of receivers. Secondly, this circuit offered but two tuning controls as against the usual three controls necessary in the five-tube type of receiver. Thirdly, due to the presence of regeneration in this circuit, the selectivity was higher than the average set. Fourthly, the tone quality of this circuit was excellent, provided correct Audio transformers or other means of Audio amplification was used. Fifthly, if this circuit was properly neutralized, there were none of the objections due to the ordinary single circuit "Blooper" type of regenerative set with its irritating radiation of howls and squeals.

The appeal that this circuit will hold for those Radio fans who are accustomed to quality apparatus, and are familiar in general with the construction of various sets offered to the public will be in the choice of parts used which are listed elsewhere in this article. The Radio situation at the present time might be compared with the automobile industry in that all automobiles are alike in their general characteristics; that is, they all run and have four wheels, only differing in the refinements attached to them, and the quality of material of which they are composed, together with the engineering ability which has been expended upon their design. From this we might assume that all Radio sets are alike with the same qualifications as were given for the automobile. The question of difference in Radio sets does not lie largely in the fundamentals, but lies in the treatment of detail and the mechanical workmanship of the product.

Let us first take up the Radio Frequency end of this receiver, and note that the difference in this particular part of the set is largely in the neutralizing of the Radio Frequency tube. This is accomplished largely by a somewhat different method than is ordinarily employed, and to those fans who have had serious difficulty in neutralizing a 201A type of tube, this set with its ease of neutralization will be a revelation to them. The type of neutralizing condenser is different, and has very fine adjustment, the capacity being varied by a small moulded knob on the top of the condenser case. This neutralizing condenser is placed in the ordinary position; that is, between the grid and the plate of the Radio Frequency amplifying tube. The innovation consists of the insertion of a Radio Frequency choke coil, together with its associated bypass condenser, between the negative filiment and the grid of the Radio Frequency tube through the antenna coupling coil. In effect, we have here a balanced circuit which causes neutralization perfectly. It is very interesting to neutral-

ize this set and realize how easily and quickly it can be accomplished, as all it requires is the turning down of the knob on the neutralizing condenser until perfect neutralization takes place, which is evidenced by the absence of a resonance click on the two tuning dials when operated together.

The next point of departure in the construction of this set is the Radio Frequency transformer, which has two movable elements which are commonly referred to as "rotors." One of these, the upper, represents the "tickler" or regenerative control, and the other one represents the primary of the Radio Frequency transformer and is used as a selectivity control. It is in connection with this selectivity control that we have one of the most distinctive features of this set. When the arrow on the knob of this control is in a horizontal position, the set is of the average broad tuning type. As the control is varied between a perpendicular position, the selectivity increases, and at practically a vertical setting of this knob, it has been found that seven to nine stations can be brought in with in ten degrees of the tuning dial, showing extreme selectivity, the set working as close as perhaps three metres at the lower end of the scale. This offers to the man who uses this set either a broadly tuned set, if he so desires, or an extremely sharp tuning set, which takes care of the objection on one man's part that the set is too sharp, or of the objection on another man's part that the set is not selective enough; in other words, the operator has it entirely within his control what type of tuning set he desires. This feature, we believe, is not incorporated in any of the sets available at present. This selectivity control need not be varied after once being set according to the desires of the operator and is a particularly desirable feature from the point of view of its use in different localities where receiving conditions are not alike. For instance, the use of this set in large cities where there are numerous broadcasting stations as compared to the use of this set in the country where there is very little or no local interference.

Coming next to the detection or rectification portion of this set, it is advised in most cases that the Sodion D21 type of tube be used as a detector. The reasons for this are as follows: In the first place, the D21 type of tube is very sensitive, and, secondly, the regeneration control on this set is very much more readily handled than it is with the 201A type of tube; that is, the regeneration takes place more smoothly and makes less critical the adjustment of the tickler control, which is the upper center knob shown in the front panel and referred to before as "one of the rotors in the Radio Frequency Transformer." Thirdly, the volume obtained from a Sodion detector tube is greater than that obtained from a 201A tube. If, however, it is desired to use a 201A type of tube as a detector, it necessitates only the change of the grid return lead from the secondary of the Radio Frequency transformer to the positive "A" battery lead rather than the negative. This is shown by the dottled lines on the schematic diagram.

There are two rheostats on the set; one in the lower left-hand corner, and one in the lower right-hand corner. The rheostat to the left is a 30-ohm rheostat, controlling the detector tube. The one to the right is a 10-ohm rheostat, controlling the three amplifying tubes. A switch for turning on and off the set is located in the lower left-hand corner, and two jacks, one in the lower center and one in the lower right, are respectively inserted in the plate circuit of the first Audio amplifying tube and the plate circuit of the second Audio amplifying tube. The second jack is of the filament control type which automatically turns on the second Audio amplfying tube when the jack is inserted in the same. This saves current consumption when the second Audio tube is not used.

It is believed that radio listeners today are demanding as the primary requisite in a good receiving set the ability on the part of the set to reproduce faithfully that which is transmitted from a broadcasting station, and there is no question but what in this particular set that this feature is well taken care of. The probabilities are that more time was spent on the Audio amplifying side of this set than any other portion of it, which is rather unusual, as it has been the general tendency in the past to neglect

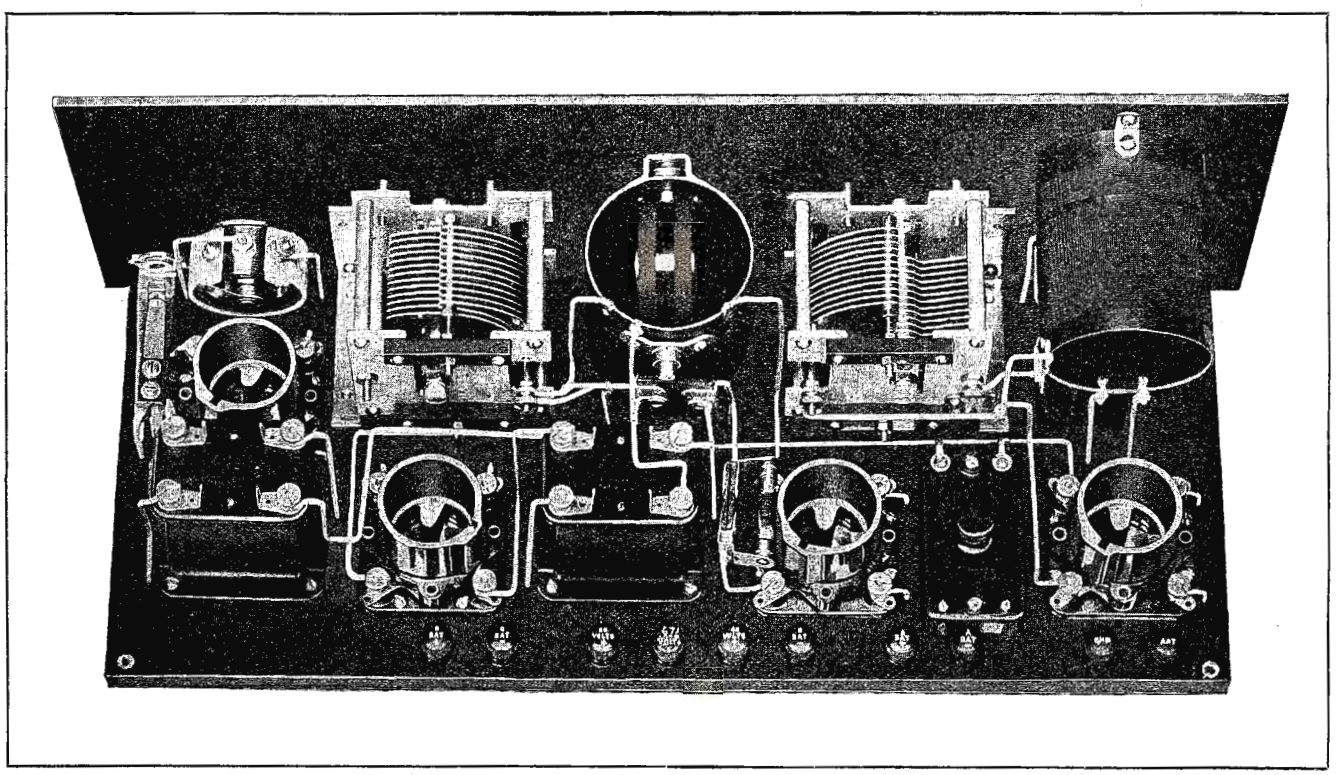


Photo B—Rear view of receiver

the Audio Frequency end of the set and spend most of the time on the development of the Radio Frequency portion of most sets.

The difference in quality of reproduction on this set can be noticeably detected by the human ear if this set is operated in conjunction with some others, as it is particularly noticeable when changing from one set to another on the same loud speaker that musical notes, particularly those occurring from two to three octaves below that of middle C or in the vicinity of 27 to 60 cycles per second, can be heard distinctly and clearly. Whereas the same piece of music heard on other sets appears to have the soft pedal placed upon it, or in some cases is entirely inaudible. These results are accomplished by the use of two low ratio transformers which are specially adapted to this circuit. In general, the volume obtained from this set on one stage of Audio amplification is sufficient to operate a loud speaker on ordinary stations. Using two stages of Audio, the volume is great enough so that music obtained from the loud speaker can be used for dance purposes or entertaining large audiences.

The set uses four quarter-ampere tubes, three 201A and one Sodion D21. In addition to these, it requires 90 volts of "B" control which it is necessary to vary at all being the top center knob which controls the volume. This can be caried according to the volume desired by the user.

List of Parts

1 Formica Panel 7x18x3/16.
1 Formica Panel 7x17x3/16.
4 Benjamin Sockets.
1 General Radio 30 ohm Rheostat.
1 General Radio 10 ohm Rheostat.
1 Samson Antenna Coupler.
1 Carter IMP Switch.
1 Samson Double Rotor Radio Frequency Transformer.
2 National .0005 Variable Condensers.
2 National 4" Velvet Vernier Dials.
2 Samson (3-1) Audio Frequency Transformers.
1 Carter No. 104 Jack.

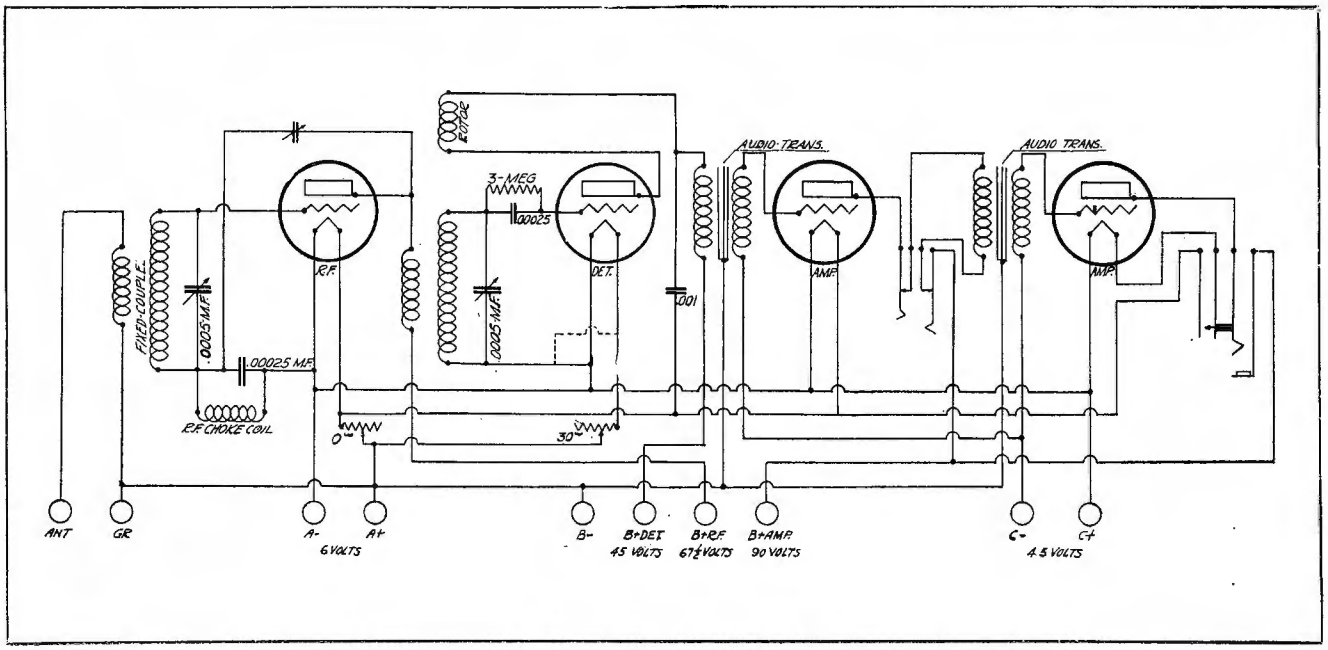


Figure 1—Schematic Diagram

battery, a 6-volt storage battery and a 4½-volt "C" battery. The miliampere consumption, using the tubes and equipment as outlined here, will not exceed 10 miliamperes, which means to the layman that "B" batteries ought to last from five to six months under normal operating conditions. This set can be used with dry cell tubes very satisfactorily, and if the constructor so desires to use his set in this manner, it is recommended that four DeForest DV3 type of tubes be used. The only difference between the set being used on dry cells and the set being used with storage battery tubes is the difference in the amount of volume obtained, but inasmuch as this set has volume to spare, it becomes a very satisfactory set to use with dry cell tubes.

This receiver is very compactly designed, it only requiring a front panel 7"x18" in length, and a base panel 7"x17", which means that it can be placed in any one of the numerous standard cabinets which the constructor can purchase readily.

In operation there are only two controls necessary, which are the two tuning controls. These can be logged and a permanent record of stations can be kept which will ensure the use of the set by anyone without a great deal of trouble, the only other

1 Carter No. 103 Jack.
4 Samson Rheostat and Coupler Knobs.
1 Dublier Fixed Condenser, .001 Capacity.
1 Dublier Fixed Condenser, .00025 Capacity.
1 Dublier Fixed Condenser with grid leak clips, .0005 Capacity.
1 Samson balancing Condenser.
1 Daven 5-megohm grid leak.
1 Samson Radio Frequency Choke Coil.
2 Samson Panel Brackets.

10 Eby Binding Posts as follows:

1 Package Kester Solder.

1 Antenna.	1 45 plus.
1 Ground.	1 67 plus.
1 A—	1 90 plus.
1 A plus.	1 C—
1 B—	1 C plus.

There's only one *safe* way to build the Counterflex

Kenneth Harkness, President Kenneth Harkness Radio Corporation; Associate Editor of Radio in the Home

"THE successful operation of the Counterflex depends just as much upon the design of the parts used in its construction as upon the hook-up itself. The parts must conform exactly to my specifications: otherwise the receiver will be unbalanced and will not operate satisfactorily. The best and safest way is to build it with the complete kit of balanced parts which I have designed for the purpose. The set you build with this kit will be an exact duplicate of my own and will perform in the same unusual manner, affording you the receiving range, volume and selectivity of a costly receiver at moderate expense.

"Genuine Harkness Counterflex Kits are manufactured ***only*** by the Kenneth Harkness Radio Corporation, under my personal supervision. No other manufacturer is authorized to make parts for my circuits, or to use my name in any manner in connection with the sale of radio products. You can recognize genuine Harkness kits by my signature and the words 'Manufactured by Kenneth Harkness Radio Corporation, Newark, N. J.' which appear on the labels of the only genuine Harkness products."

Kenneth Harkness

Complete 3-Tube Counterflex Kit with new type counterformers and all latest improvements, $36.00.

With this complete kit of genuine Harkness parts the construction of the 3-tube Counterflex receiver is made surprisingly simple. You can assemble the set in just a few moments—with only a screwdriver. You don't have to lay out the positions of the mounting holes or do any drilling. The panels are completely drilled and engraved, all ready for you to assemble the parts. To wire the set no previous experience is required. It is not even necessary to understand the usual type of circuit diagram. Special "step-by-step" wiring diagrams accompany the kit, drawn from actual photographs of the set itself. The first diagram shows how to connect the first five wires; the second gives the next five wires, and so on. Heavy lines clearly illustrate the exact positions of the wires themselves and indicate how to connect them to the terminals of the apparatus. You can't possibly make a mistake. When you connect the last wire your set will be 100 per cent perfect. Ask a reputable dealer for the genuine Harkness Counterflex Kit. If he does not stock genuine Harkness kits, send your order directly to us.

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Address.....

The Harkness Counterflex Circuit

MR. KENNETH HARKNESS, whose famous "Knock-Out" reflex circuit was the sensational success of 1924, has recently developed a new circuit which is apparently just as far ahead of the standards of today as the Harkness Reflex was in advance of its contemporaries two years ago. This new circuit, known as the "Counterflex," operates on a novel and vitally important principle which enables tremendous amplification to be secured and completely eliminates the squeals of self-oscillation. The Counterflex also employs a new type of radio frequency transformer, just designed by Mr. Harkness, which gives unusually high amplification per stage and also insures most remarkable selectivity. Many fans who have built the 3-tube Counterflex receiver claim that it has a greater receiving range, more volume and better selectivity than most 5-tube sets.

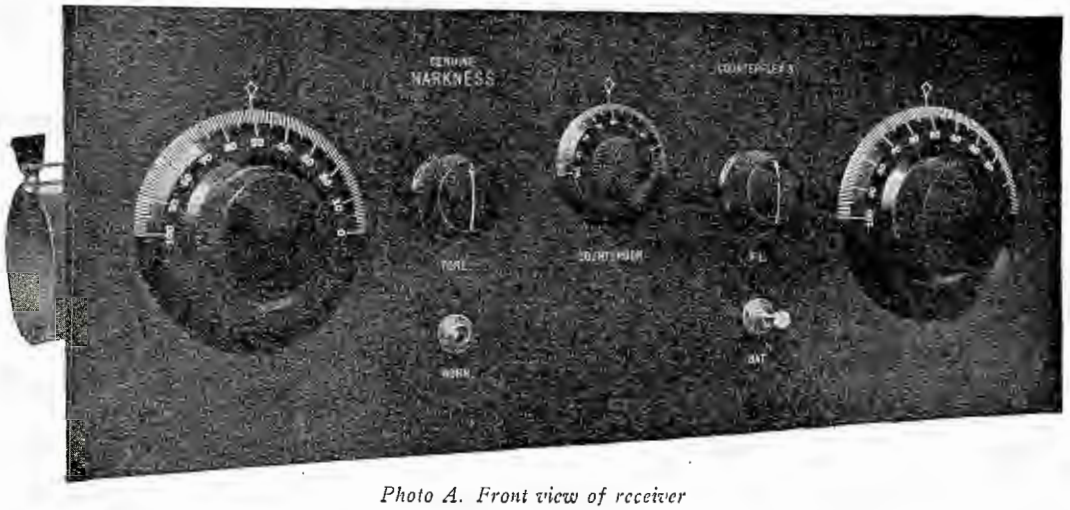


Photo A. Front view of receiver

The diagram of Fig. 1 illustrates the fundamental Counterflex circuit. The hook-up is a standard reflex arrangement (with tuned radio frequency amplification and vacuum tube detector) except for the condenser C1. This condenser is called a "Counterdon" and is used to control self-oscillation. The manner in which this condenser operates is responsible for the high efficiency of the circuit.

To appreciate the underlying priciples of this circuit it is necessary to understand the properties of a Wheatstone Bridge as the Counterflex circuit utilizes the Bridge principle to control oscillation. Fig. 2 (A) illustrates the connections of a simple bridge. P, Q, R and S are resistances and form the arms of the bridge. G is a galvanometer, the needle of which is deflected if current passes through the meter. A battery is connected as indicated. Now, if the values of the resistances P, Q, R and S are adjusted so that the ratio between R and S is the same as the ratio between P and Q, no current flows through the galvanometer G. This is the fundamental principle of the Wheatstone Bridge. When P is to G as R is to S the terminals A and B, across which the galvanometer is connected, are at exactly the same potential; there is no drop in potential between these points and no current, therefore, flows through the galvanometer. The portion of the circuit in which the galvanometer is connected is isolated, so to speak, from the remainder of the circuit. When the arms of the bridge are adjusted to produce this effect the bridge is said to be balanced.

Another form of Wheatstone Bridge is shown in Fig. 2 (B). In this case, all four arms of the bridge are capacities instead of resistances. This bridge is "balanced" when the values of the capacities are such that the ratio of C1 to C2 is the same as the ratio of C3 to C4. If an alternating e. m. f. is applied to this balanced bridge, across the terminals indicated, no current is registered by the meter A. There is no drop in potential across the terminals A and B.

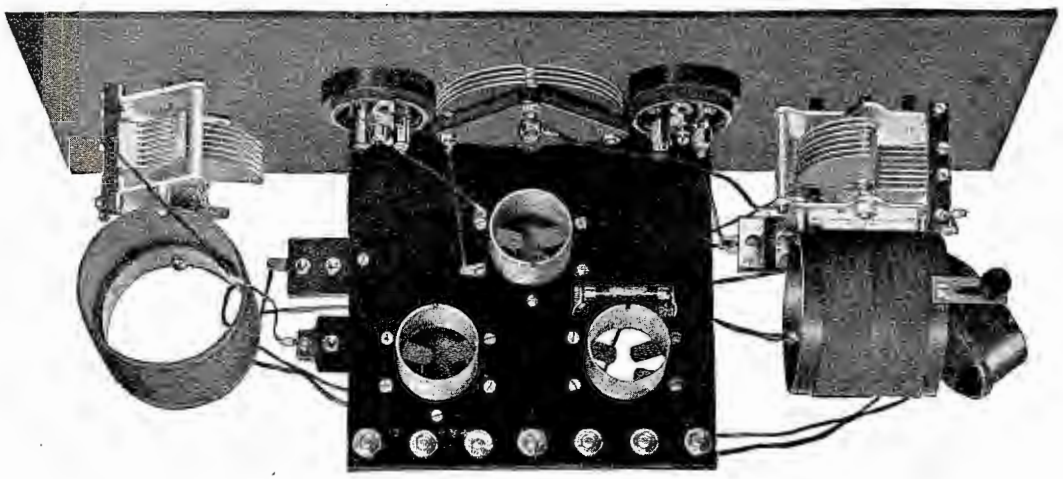


Photo B. Rear view of receiver

Now refer to Fig. 3 (A) which represents the radio frequency amplifying portion of the Counterflex circuit of Fig. 1. Incoming

signals are tuned to resonance by the L2C2 oscillatory circuit and impressed across the grid and filament of the reflex tube through the capacity C3. The latter represents the capacity of the secondary of the reflex audio transformer, together with the capacity of the fixed condenser shunted across it. Cgf is the capacity between the grid and filament of the tube. C1 is the Counterdon and Cpg is the capacity between the plate and grid of the tube. In the plate circuit L3 is the primary of the interstage radio frequency transformer and

Fig. 3 (B) shows how this feed-back is prevented. This diagram is exactly the same circuit as Fig. 3 (A). The units are merely rearranged to more clearly demonstrate that the capacities C1 and C3 combine with the capacities Cpg and Cgf to form the arms of an all-capacity bridge of the type illustrated in Fig. 2 (B). The grid oscillatory circuit L2C2 occupies the same position as the meter A. The plate circuit is connected across the terminals of the bridge as the source of alternating e. m. f. in Fig. 2 (B). Now, just as the

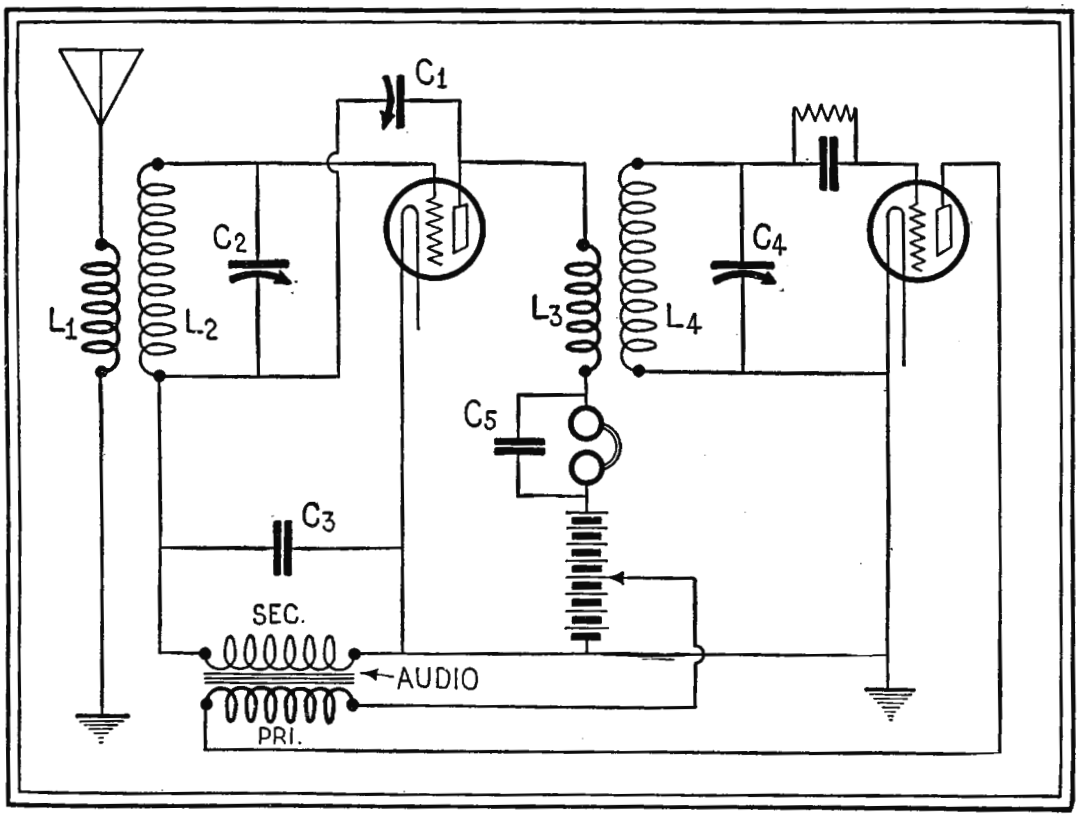


Figure 1

C5 the capacity of the telephones and fixed condenser shunted across it.

The capacity Cpg is responsible for the generation of continuous oscillations in this circuit. Energy is fed back from the plate to the grid circuit through this capacity, resulting in regenerative amplifica-

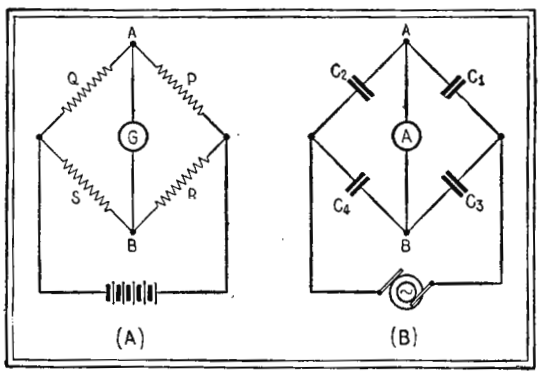


Figure 2

tion of signals or, if the feed-back is strong enough, in the generation of continuous oscillations. When an efficient interstage transformer is used, the feed-back is invariably strong enough to sustain oscillations. The object of the Counterdon C1, is *to prevent energy from being fed back from the plate to the grid circuit through the capacity Cpg.*

bridge of Fig. 2 (B) can be balanced to prevent current from flowing through the meter A, the capacity bridge of Fig. 3 (B) can similarly be balanced to prevent current oscillations from being produced in the grid circuit L2C2 when an oscillating e. m. f. is impressed across the plate and filament by oscillations induced in the coil L3. In other words, feed-back from the plate to the grid circuit, through the plate-grid capacity of the tube, can be completely eliminated. To balance the bridge it is only necessary to adjust the capacity of the Counterdon C1.

Mr. Harkness then explains the important advantages which this method of controlling self-oscillation possesses:

"In the first place, it permits the use of efficient inter-stage radio frequency transformers, which is more than can be said for a good many other systems. By an efficient transformer I mean a transformer whose primary has a high self-inductance (large number of turns) and is closely coupled to the secondary to produce high amplification per stage. It must be remembered that it is possible to construct a receiver with such inefficient transformers that it does not oscillate at all. There are, in fact, many receivers of this type on the market today but the amplification per stage is very small, particularly of the high wave-lengths. To obtain good amplification it is absolutely necessary to use efficient transformers and then employ some means of controlling the continuous oscillations which are bound to be generated.

"In the second place, self-oscillation is controlled without the introduction of resistance into the grid or plate circuits. In a great many receivers, oscillations are controlled by deliberately introducing resistance losses into one or both of these circuits by means of grid potentiometers, variable high resistances, absorption coils, high re-

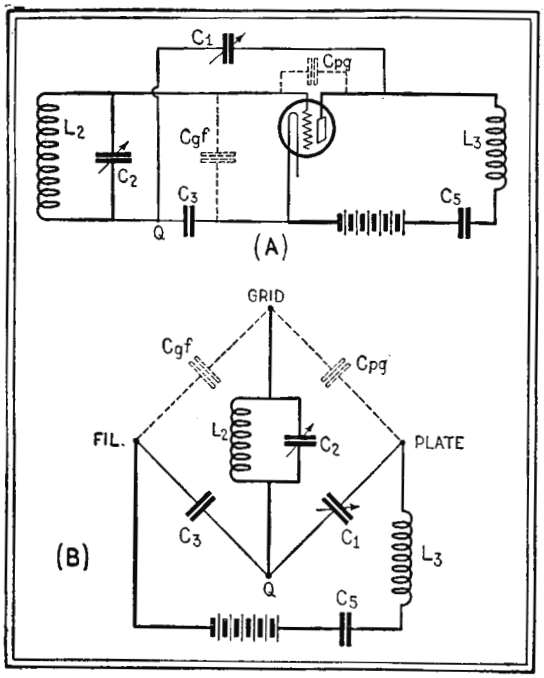


Figure 3

sistance inter-stage transformers, etc. All these, and similar methods, control self-oscillation by *dissipating energy* and are therefore comparatively inefficient. Furthermore, they reduce selectivity and cause distortion. The Counterflex method does not introduce resistance into the circuits. Instead of merely dissipating energy to offset the energy fed back from the plate to the grid circuit, the Counterflex method goes right to the source of self-oscillation and prevents energy from being fed back in the first place. It is not necessary, of course, to *completely* prevent reaction from the plate to the grid circuit. Some regeneration is desirable. This can easily be controlled in the Counterflex circuit by varying the capacity of the Counterdon.

"The third important advantage of controlling oscillation by means of this balanced capacity bridge lies in the fact that the balance is only slightly affected by changes in frequency. The amplification is fairly constant over the entire tuning range of the receiver, provided the transformers are correctly designed. There are very few other systems which possess this important advantage. In most cases, when no adjustment of the oscillation control is possible, the amplification is good at low wavelengths but very poor at high wavelengths. If the oscillation control is adjustable it is necessary to vary this control a considerable amount with each change of frequency. In the Counterflex circuit the amplification (without regeneration) is fairly even over the entire tuning range of the system. If the bridge is unbalanced to produce regenerative amplification, however, the regeneration is greater at short waves and it is necessary, therefore, to unbalance the bridge to a greater extent at high than at low waves to obtain a given amount of regenerative amplification. The amount of adjustment required, however, is small as compared with a receiver in which the amplification, without regeneration, is uneven.

"The fourth advantage is the ease with which self-oscillation can be controlled. The Counterdon is not a tiny little capacity requiring delicate and accurate adjustment. Its capacity is quite large and the balancing value is not critical.

"The fifth advantage is that the adjustment of the Counterdon does not detune the grid circuit in the slightest degree. With many other systems, variation of the oscillation control necessitates retuning of the grid circuit. This is not true of the Counterflex circuit."

The complete circuit of the latest model of 3-tube Counterflex receiver is given in Fig. 4. Photographs of this receiver also appear on these pages. It will be noticed that a variable high resistance is connected across the secondary of the reflex audio transformer. This is primarily inserted to prevent overloading of the reflex tube. The amplification of the Counterflex is so great that strong local signals would overload the tube and cause howling if this resistance were not included. When receiving distant stations this resistance can be turned to zero. The radio frequency transformers, or "Counterformers," as they are called, are of special design. They possess a very high value of *inductive* coupling and unusually low value in *capacitive* coupling. This results in high amplification and good selectivity. The coupling between the antenna and the input circuits is variable in order that the selectivity of the receiver may be adjusted to meet local conditions.

In designing the 3-tube Counterflex receiver every precaution was taken to ensure easy tuning and good quality of reproduction. There are only two tuning controls and they log alike. The tuning, therefore, is very simple.

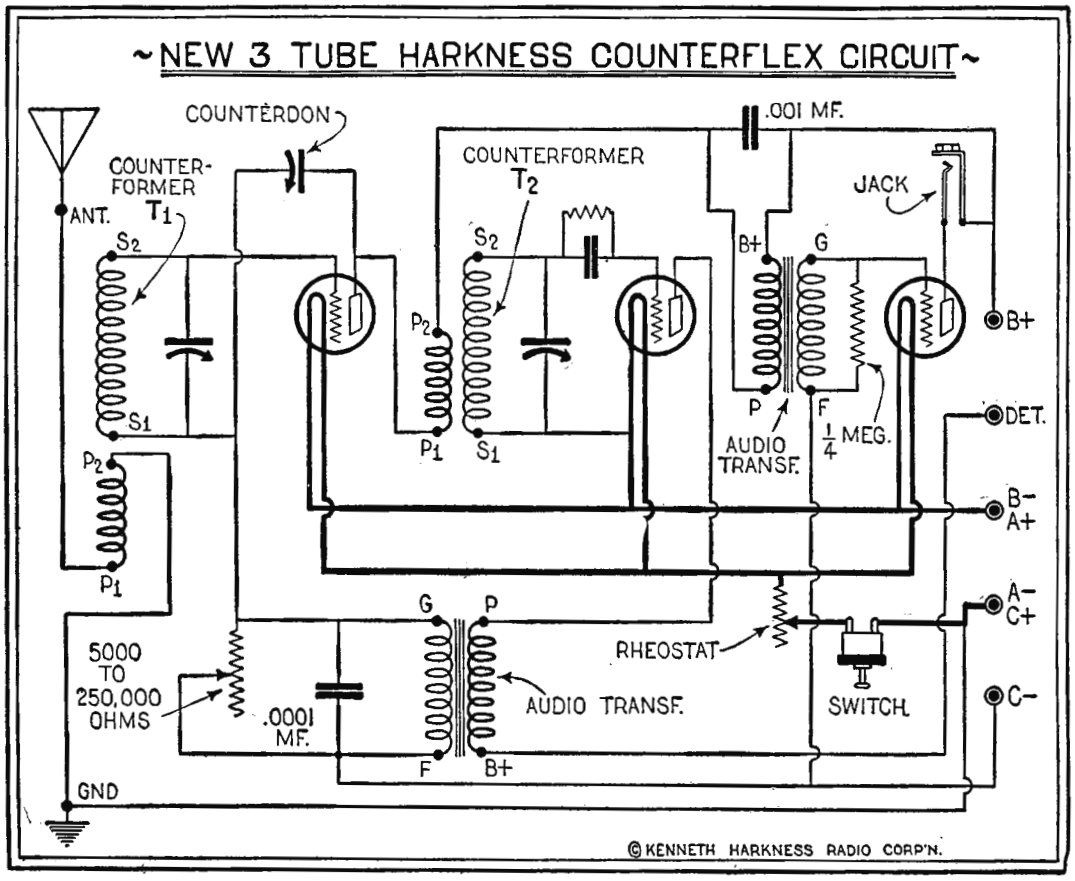


Figure 4. Schematic Diagram

"Knife-like" Selectivity

Much More Volume

Absolute Clarity

Amazing Sensitivity

Tunes Below 200 Meters and Above 550 Meters

Why Citizens Radio Call Book *Specifies* AERO COILS

In the New 6 Tube Tuned Radio Frequency Receiver

The U. S. Bureau of Standards' base for calculating dielectrics is AIR—the ***best*** dielectric. The first reason, therefore, that Aero Coils make the most efficient inductance system is that their dielectric is 95% air! This characteristic, made possible by a patented construction, so greatly diminishes the high frequency resistance of Aero Coils that they tune into resonance on a "knife's edge" and actually use the energy which other types of inductance waste.

Still sharper ***selectivity,*** more ***power*** and still greater ***sensitivity,*** result from the patented Aero Coil construction because it permits the windings to be dopeless and to be uniformly and properly ***air spaced,*** thereby lowering to an amazing minimum the distributed capacity of this super-efficient inductance.

When shunted with a good .00035 variable condenser, Aero Coils will tune below 200 and above 550 meters. Never before such ***range,*** never before such ***selectivity, power, sensitivity, volume*** or ***clarity.*** Build the "Call Book's" wonderful 6 tube set with Aero Coils—or use this inductance system in any kind of tuned radio frequency receiver or wherever an inductance coupling is required. At your dealer's or, in case your dealer cannot supply you, direct from the factory. $4.00 each or $12.00 the set of three with brackets and circuit diagrams.

AERO PRODUCTS, Inc.

Successors to HENNINGER RADIO MFG. CO.

217 North Des Plaines St., Chicago

Pacific Coast Representative: S. A. Winsor, 1221 W. 16th St., Los Angeles

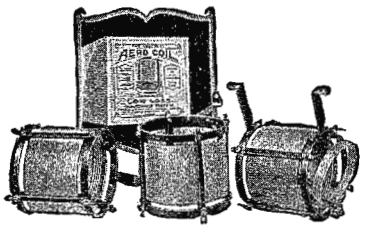
AERO COIL

All Aero-Coils embrace a patent-protected method of construction which makes possible a far more efficient inductance performance than is possible with any other type of coil.

NOW!

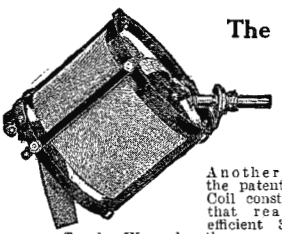
5 Aero Coil Units Meet the Inductance Requirements of Any Kind of Set

The Only Air Dielectric Solonoid Wound Inductances Having Variable Primaries in the Antenna Circuits



Tuned Radio Frequency Kit

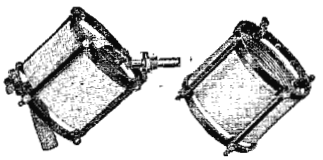
Consists of one Aero-Coil antenna inductance with variable primary and 2 Aero-Coil Radio Frequency Transformers. Tuning range below 200 and above 550 meters when shunted with a good .00035 condenser. Nickel plated brackets which fit any condenser and mounting screws included in kit. Also complete instructions and constructional data for making the most efficient tuned radio frequency receivers ever designed. **$12.00**



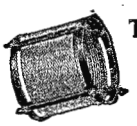
The Aero Coil 3 Circuit Tuner

Another adaptation of the patent-protected Aero Coil construction and for that reason the most efficient 3 circuit tuner ever offered. Wave length range below 200 and above 550 meters when shunted with a good .0005 condenser. This is the tuner which, in a 3 tube set, brought in Havana, Cuba, in the daytime in Chicago. **$8.00.**

The Aero Coil Radio Frequency Regenerative Kit



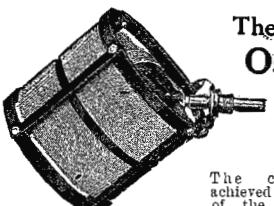
Consists of one AERO COIL 3 Circuit Tuner and one AERO-COIL Antenna Coupling Transformer. Makes the most powerful, most selective 4 tube, non-radiating set possible to build. **$11.00.**



The Aero Coil Wave Trap Unit

Also for Crystal Sets

By reason of the characteristics made possible by the Aero-Coil construction, this unit makes a very efficient wave trap. **$4.00.**



The Aero Coil Oscillator

For Super Heterodynes

The characteristics achieved through the use of the Aero-Coil principle make of this instrument the ready means to tremendously increase the efficiency of the oscillator circuit in any Super Heterodyne receiver. **$5.50.**

An Efficient Tuned Radio Frequency Receiver

This Receiver, with Illustrations, Was Prepared in the Laboratory of the Citizens Radio Call Book

HERE is a new adaptation of the principle of tuned radio frequency which as can be seen from the circuit diagram offers certain advantages which have not heretofore been common to sets of this type.

Tuned radio frequency involves certain problems and the builder of this type of set has had to satisfy himself with two or three not altogether satisfactory solutions to these problems in order to avoid the bugbear of "oscillation" and its consequent unpleasantries. This has been done in the past by using radio frequency transformers which did not permit the full utilization of the amplifying capabilities of the vacuum tube; or by incorporating the principle of neutralization which has its disadvantages as well as its advantages, or it was necessary to employ various "losser" methods.

The new set herein described can be truthfully said to measure up to an appreciably higher standard of efficiency than tuned radio frequency has heretofore been able to claim. It is more sensitive than the usual yet it has none of the disadvantages which have always made an extremely sensitive receiver, impractical for home use. Its selectivity is amazing, its distance range is surprising and the ease and positiveness with which it is tuned made it an ideal outfit for any member of the family including the technically critical experimenter and the DX fan.

If the builder will observe the regular laws of radio construction and take the ordinary precautions in the name of efficiency and follow strictly the specifications as here given, there is no reason at all why he cannot duplicate the very satisfactory results which we have obtained from this receiver in our own laboratory.

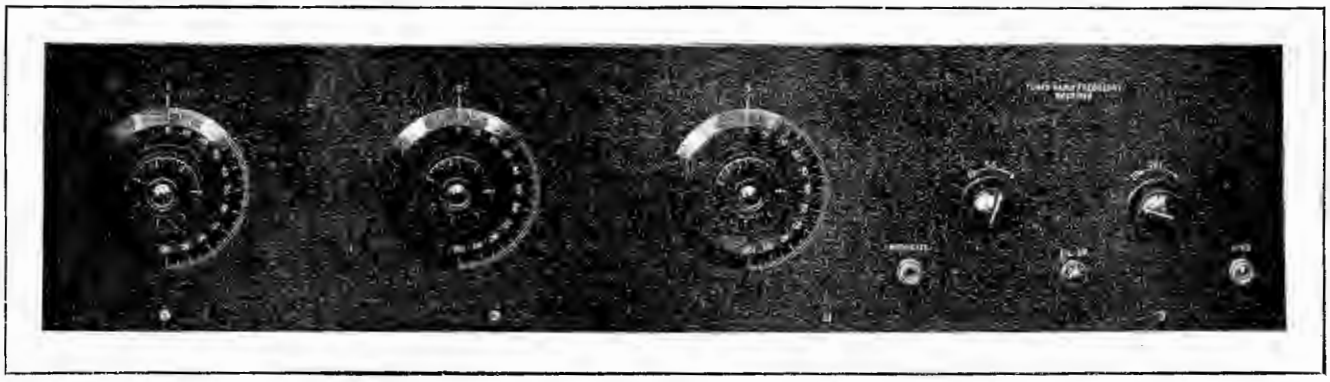


Photo A. Front view showing arrangement of dials, jacks and battery switch

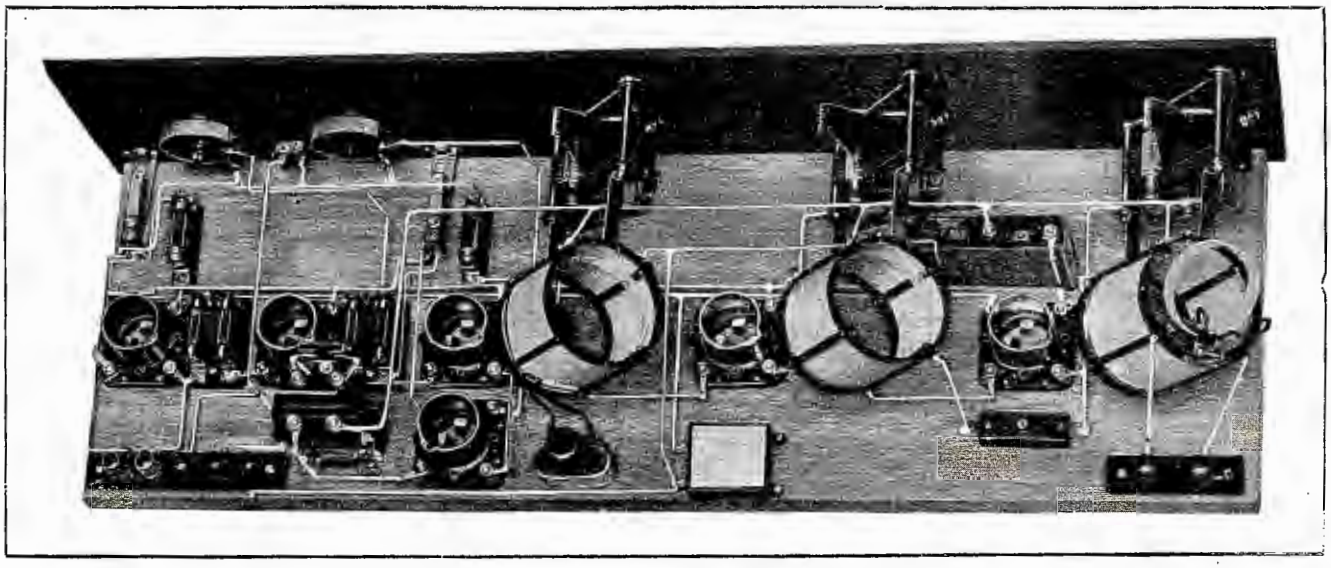


Photo B. Rear view of completed receiver

Let us analyze the receiver as follows. The efficiency of a receiver may be safely measured by the degree to which it utilizes the energy delivered to it by the antenna system and by the efficiency of the methods employed to control this energy.

The parts chosen for this receiver are built to the highest standards of electrical performance and are splendid tributes to the efforts which manufacturers are making in behalf of increasing the efficiency of their apparatus by reducing the factor of "loss." The parts for this set were chosen by actual electrical measurement and it is recommended that no substitutions be made in connection with this very critical circuit. It was only by employing the finest of low loss parts and of those only such

trol knob. Such a method of controlling oscillation is naturally more efficient in itself and naturally has far less tendency to decrease the efficiency of the set as a whole than the potentiometer or other "losser" methods, because it is not directly a part of the connected radio frequency circuit.

This oscillation control is easily made by winding a single turn of No. 14 buss wire covered with spaghetti immediately over the high potential (grid) end of the last radio frequency transformer.

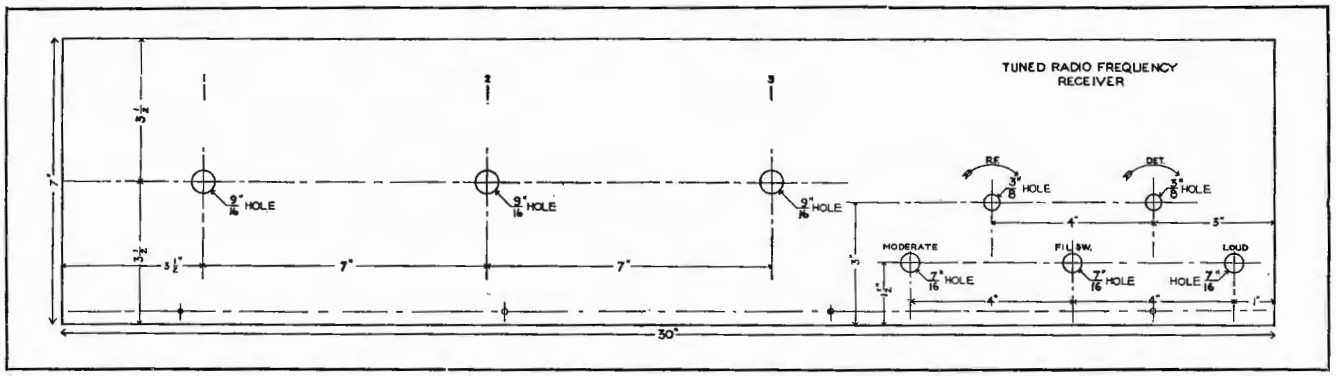


Figure 1. Panel layout showing spacing of parts and size of holes

as fit in well one with the other that we achieved the maximum of which this circuit it capable.

The amplification per stage due to the ideal characteristics of the radio frequency transformers employed makes imperative a means of most effectively using this amplification. Therefore the first step which we will take in the interest of controlling our power is to neutralize the first stage of the radio frequency amplifier. To neutralize both stages would get us no further than we would be with the standard type of neutralized radio frequency set. By neutralizing only the first stage we do not at all impair the efficiency of the receiver. In fact, we gain because there is only a certain amount of energy which the second stage can handle and this amount is as much as the first neutralized stage can deliver to it. Neutralization of the first stage also prevents radiation from the antenna.

Now we progress to the second stage and to the detector. It is with the unique oscillation control applied to the detector grid

The two ends of this single turn are then brought directly to the two binding posts on the non-inductive variable resistance which is mounted through the panel.

When building this receiver it is well to bear in mind that the extreme efficiency of the radio frequency transformers used requires that their angle of setting be as close to that permitting a zero coupling of their magnetic fields as is possible. It is suggested that the builder mount the coils on the condensers and then space the condensers 8 inches apart at the centers of their shafts. The angle of zero coupling is somewhere in the neighborhood of 57 degrees from the horizontal; this angle to be taken from the long side of the coil and not from the end. The coils come provided with suitable brackets that fit conveniently on the condensers. It will probably be necessary to bend these a little to obtain the best results. This can be determined by tuning in a distant station and varying the angle until the loudest signals are heard.

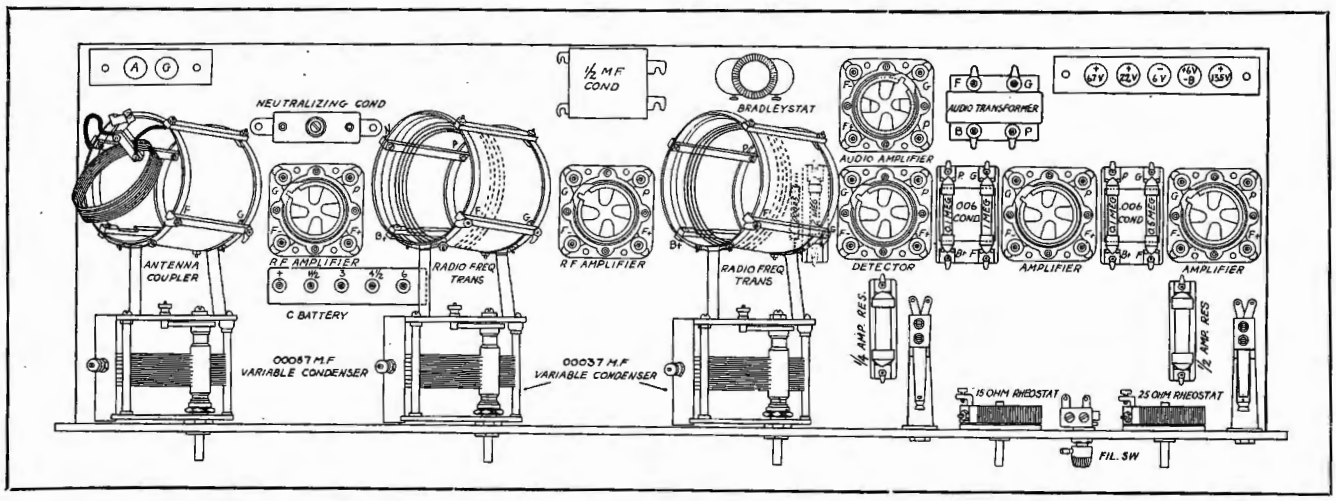


Figure 2. Baseboard layout

circuit that the feed back from the detector to the second radio frequency stage is kept always at a point just below oscillation and where the maximum sensitivity and amplification capabilities of the second radio frequency tube are obtained. With this amplification control it will be found that a station hardly audible on a set of the usual type can be brought up to tremendous loud speaker volume with a simple turn or two of the resistance con-

Observe that the condensers which we used are of the straight-line frequency type. This combination of inductance and capacity makes each of the dial divisions of a 100 point dial rotating in a 180 degree arc represent exactly 10 kilocycles. This makes tuning very easy and positive because by noting the dial reading of one station and knowing the frequency of another desired station, it is very simple to calculate where the desired station should

come in.

Vernier dials are absolutely essential for the tuning of this receiver because with the straightline frequency control there is a major station at every point on the dial and a slow motion device will be found very satisfactory.

The single stage of transformer coupled audio frequency amplification followed by a stage of resistance coupled amplification is the best method of handling the tremendous output power of this

1 Yaxley No. 3 jack.
1 Yaxley No. 10 midget switch.
1 Keystone 3½ to 1 ratio audio transformer.
1 Dubilier .00025 MF grid condenser.
1 Dubilier .5 MF fixed condenser.
1 XL variodenser.
1 Weston phone plug.
1 Daven ½ ampere resistance.

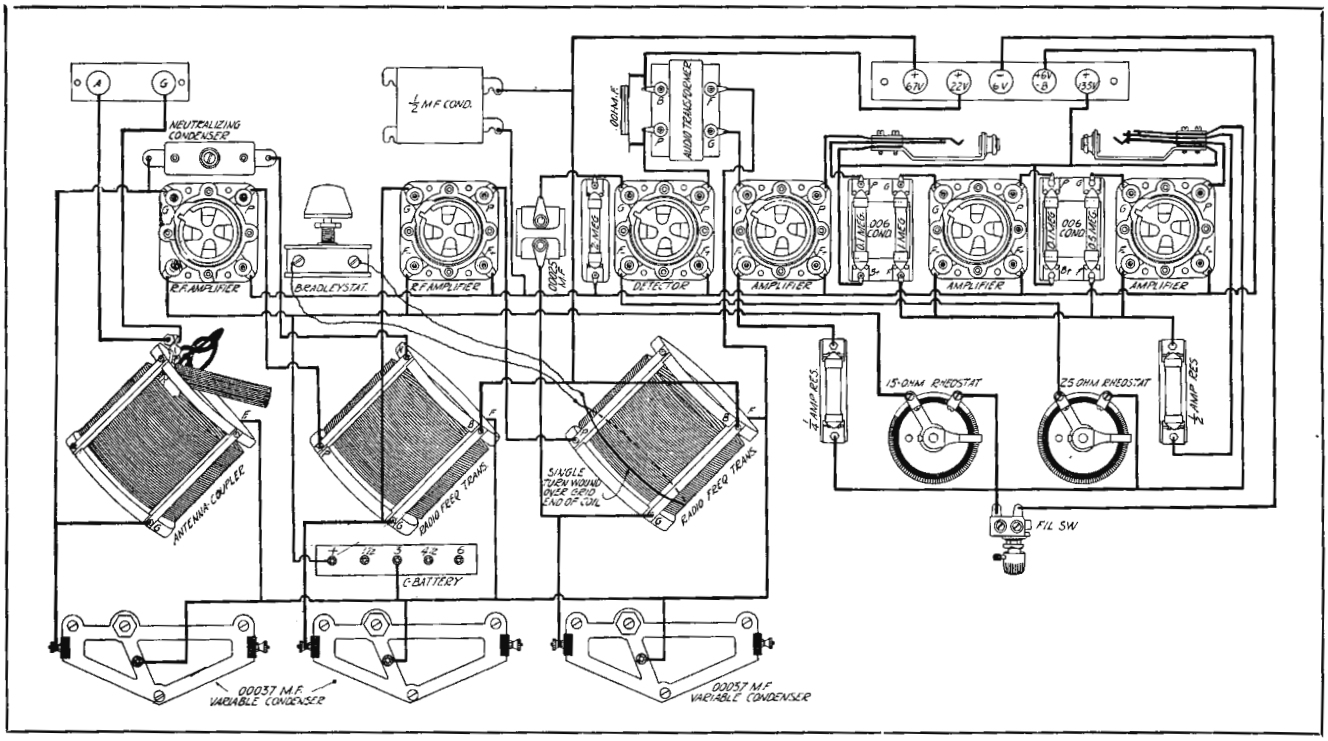


Figure 3. Graphic illustration. Check the wiring against this drawing

type of receiver and it will be found that if the specifications of this amplifier are closely followed that there will be no distortion even when the receiver is carrying its heaviest load.

These parts or their equivalent will give satisfactory results:

1 Aero-Coil antenna inductance.
2 Aero-Coil radio frequency transformers.
3 Karas .000375 MF orthometric variable condensers.
3 Eztoon vernier dials.
6 Benjamin sockets.
1 King 15 ohm rheostat.
1 King 25 ohm rheostat.
1 Bradleystat.
1 Yaxley No. 2A jack.
1 Daven ¼ ampere resistance.
1 Daven .5 megohm resistance.
2 Daven .1 megohm resistances.
1 Daven 1 megohm resistance.
3 Daven No. 50 resistance mountings.
1 Daven 3 megohm grid leak.
2 Daven resistor couplers.
1 7"x30"x3/16" radio panels and parts. drilled and engraved panel.
1 8"x29"x½" baseboard.
1 4½ volt C battery.
1 package Kester solder.
Binding posts and panels, wire, lugs, screws, etc.

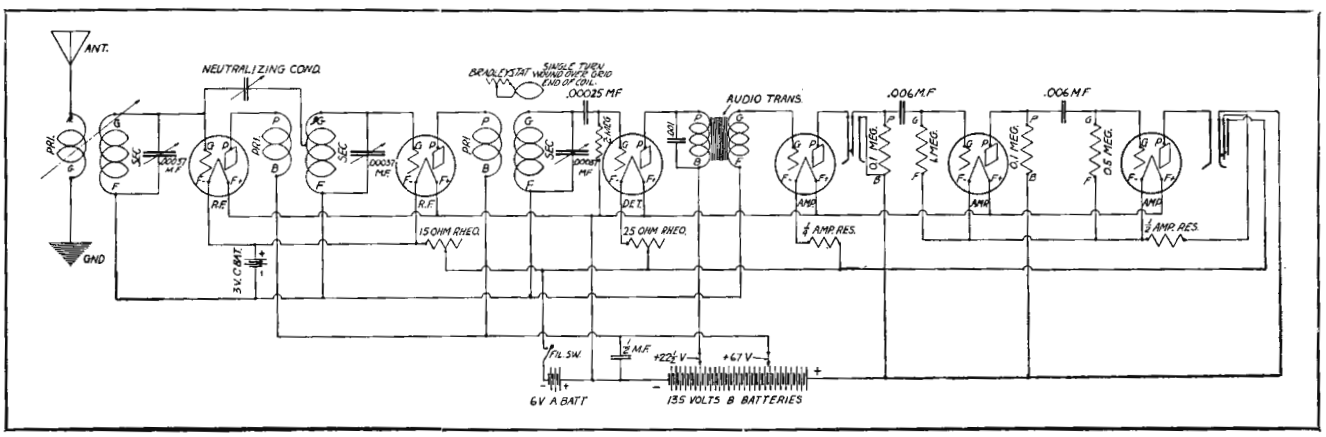


Figure 4. Schematic diagram

The Super-Autodyne

Details of a Portable or Permanent Super Using but Six Tubes—An Improved Type of the Pressley Signal Corps Circuit Is Employed

THE receiving system to be described in this article is the result of a very considerable amount of research and experiment put forth in an endeavor to produce a super-heterodyne that would give equal or better results than could be obtained with any existing type, yet which would employ a maximum of six tubes; for this number must certainly be considered the maximum allowable limit henceforth, if the word "efficiency" be used unblushingly in connection with this system of reception.

In the past, there has been no question in the mind of even the most uninformed fan but that the super-heterodyne was the ideal radio receiver, and the ultimate desire of every enthusiast has been to be the proud owner of a set containing many more brightly lit tubes than any other set in his community. Yet this has been the real drawback of the super—the necessity of using from seven to ten tubes in order to obtain truly super-heterodyne results. Therefore, the aim of receiver designers has been, not to impove results (for a super that really justifies the name will go down to the lowest noise-level—the limit of practical sensitivity), but rather to reduce the number of tubes used and at the same time retain the sensitivity, selectivity and quality of reproduction obtainable with the best of sets.

To the mind of the engineer, there are but two practical methods of attacking this problem—either make the tubes used to do more work, or raise the efficiency of each circuit of the receiver right up to the maximum limit, or do both simultaneously. The first method of attack may be considered an expedient, and boils down to reflexing—causing one or more tubes to perform various functions, such as radio and audio amplification simultaneously. This is not entirely practical, in view of the frequencies to be handled, except in one section—the frequency changer. Here, there is no reason why one tube may not be used for the first detector and oscillator, providing the separate tuning circuits may be satisfactorily isolated. Up to the present, this has been impossible, except by the second harmonic method, which will be considered later.

The next method, and the more straight-forward one, is to improve the efficiency of each section of the system so that fewer tubes will be required to give the same amplification that has hitherto been obtained. This set incorporated a regenerative first detector, thus giving the greatest possible gain obtainable for the input circuit, with but two stages of intermediate frequency amplification, for due to the careful design of the transformers employed, it was found possible to realize as much amplification with two stages as had previously been realized with three stages. In each circuit, efficiency had been increased as much as possible, and the fact that with but seven tubes receivers of this type give a fairly consistent range of two to three thousand loud-speaker miles, even under summer weather conditions, is probably the best indication that this latter method of attacking the problem is the most logical one.

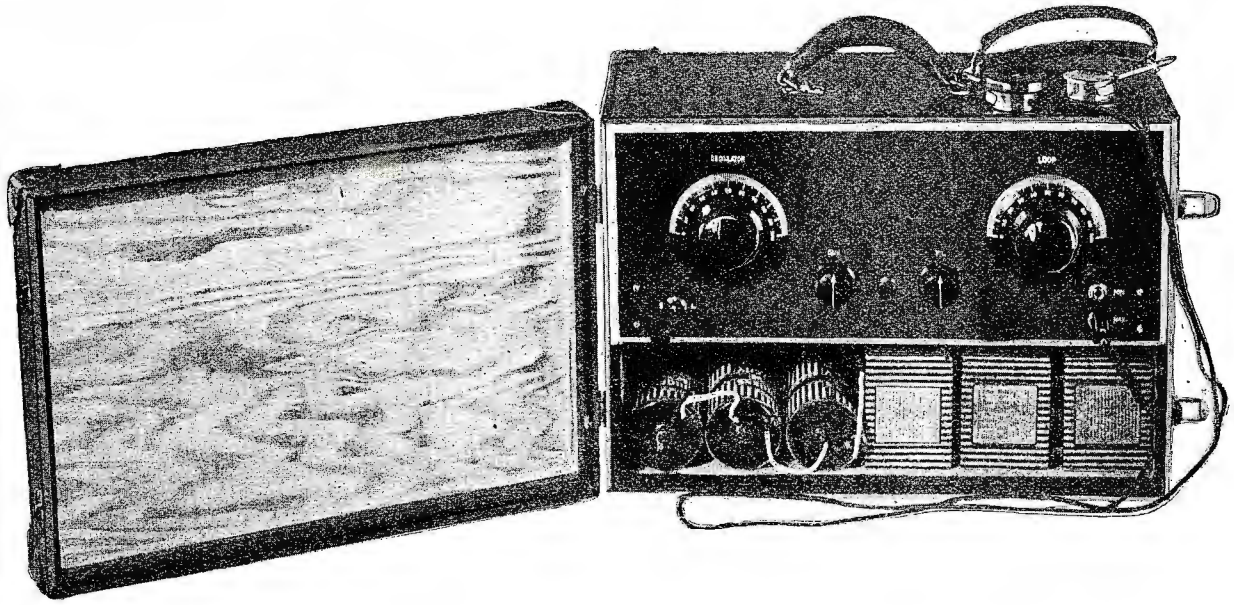


Figure 1. Front view showing arrangement of batteries

The next step was obviously to combine the detector and oscillator functions in one tube. The difficulty which has heretofore prevented the use of one tube for both detector and oscillator has been that of isolating the loop or pickup circuit from the local oscillator circuit. It has been impossible to couple a tuned pickup circuit to a tuned oscillator when the two are to operate but fifty or sixty kilocycles apart throughout the broadcast wavelength range, and not have the tuning of one section react on that of the other. Armstrong and Houck developed the expedient of the second harmonic system, whereby the oscillator working at double the desired wave, did not react greatly upon the loop circuit. Then, a harmonic of the oscillator was used for heterodyning. This meant two waves were being produced by the oscillator of sufficient power to cause radiation, which necessitated the use of a muffler tube ahead of the detector-oscillator to

prevent radiation. Thus, two tubes were still used, though the gain in signal strength was equal to or slightly better than that obtained with a good regenerative detector and oscillator. At best, the system is not entirely satisfactory for home assembly.

Then came the development by J. H. Pressley, a Signal Corps engineer, of the balanced autodyne circuit, which not only performs the required function with one tube, but does it much better than either the second harmonic autodyne with its amplifying muffler, or what has hitherto been considered about the limit for sensitivity, the regenerative detector and separate oscillator. This autodyne circuit, in actual tests, appears to give a much greater gain than any of the frequency-changing circuits previously utilized, and, at the same time, is far simpler to build and operate than any of its predecessors.

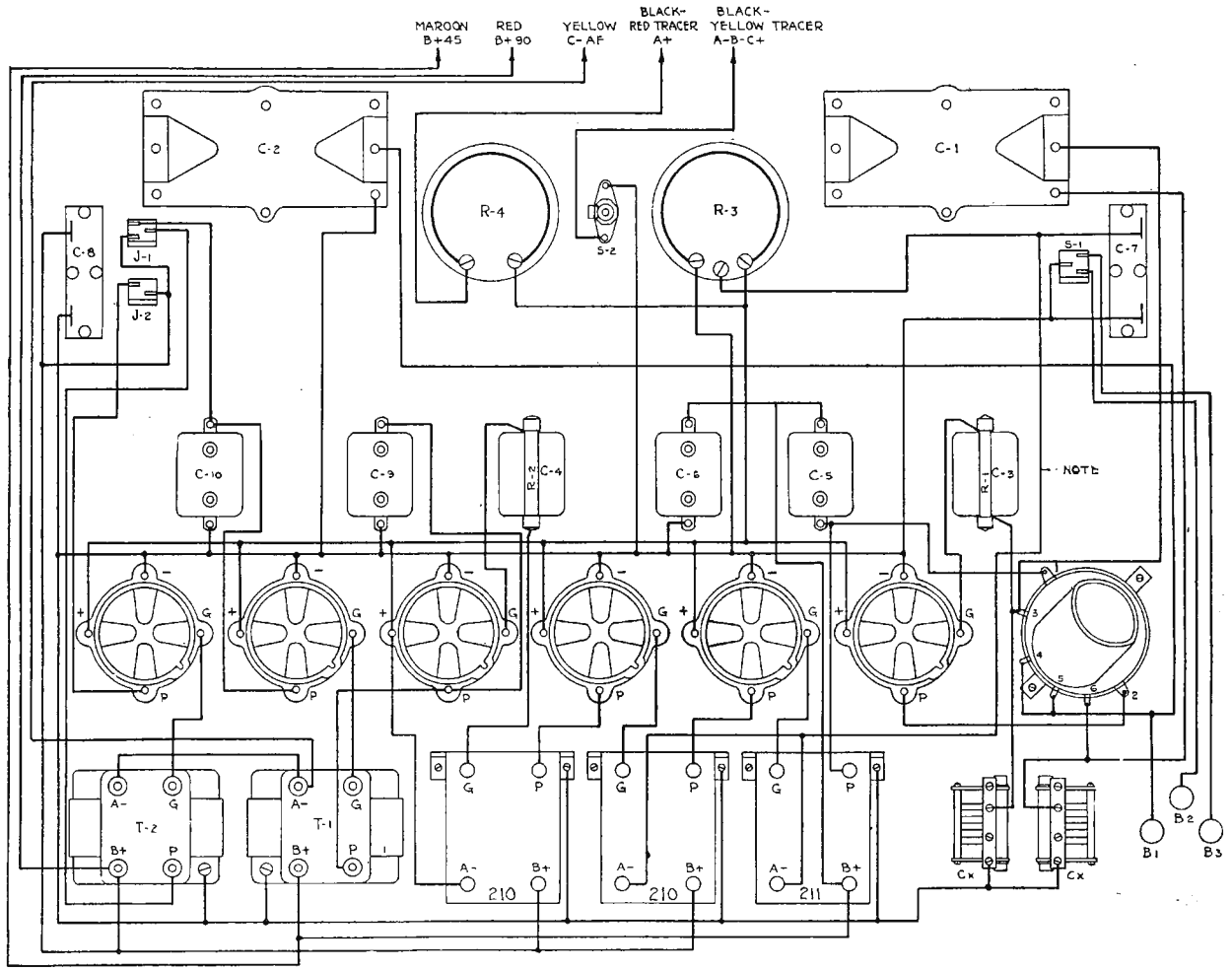


Figure 2. Graphic illustration showing each connection

The actual first tube circuit is shown at the left of Figure 1. The coils L2, L3, are theoretically equal, as are the condensers CX, CX. Actually, they cannot be made fixed and equal, so CX, CX are made adjustable, to obtain substantially a condition of equality. These units make up a bridge circuit. Since L2 equals L3, the potential across them is equal, so that it is also equal between points 3 and 4, and 5 and 6. Likewise, the potential across CX and CX is equal. Since the potential across 3 and 6 is the same for both inductance and capacity, then points 4, 5 and the join between CX, CX are at equal potential, and are also theoretically at zero potential, since these points are neutral with respect to 3 and 6, no energy in the bridge circuit can get into B1, C2, B2, since there is no potential difference across these points of the bridge. Therefore, the frequency adjustment of the bridge circuit cannot react upon that of the B1, C2, B2 circuit and vice versa.

Since the signal is fed from the loop and its tuning condenser to the oscillator, it will divide equally across the bridge arms. If a tube detector is connected across one capacity CX, the drop in potential may be used to cause rectification. It would appear that some of the signal voltage is lost by this method, but actually it is not—it is, as a matter of fact, considerably reinforced when the new component is finally fed to the amplifier, probably due to regenerative amplification. The coil L1, coupled to L2, L3, causes the bridge circuit to oscillate at a frequency determined by these coils, CX, CX and C1, which is made variable for the purpose of tuning the oscillator circuit. As previously explained, this energy cannot get into the loop circuit, so radiation is confined to what may be experienced from the oscillator coil system itself—a negligible amount. By means of this circuit, which is surprisingly efficient when it is considered that one tube delivers a stronger signal than two tubes in the conventional circuit, and is consequently much more sensitive, it is possible to eliminate one tube from the receiver and still obtain better results than with two.

The intermediate amplifier is the only other unusual feature of the receiver. It employs but two stages with special laboratory charted transformers which are a compromise between the extreme selectivity of properly designed air-core coils, and the great stability and amplification of good iron core transformers. But two core laminations are used in each transformer, of 7 mill silicon steel, one in the shape of an "F" and one an "L." The air gap formed, together with other recently developed features of the design, permits the realization of almost an ideal curve—extraordinarily high amplification over a 10,000 cycle band, with a sharp cutoff either side. The amplifier, employing two of

these transformers together with a sharply tuned filter which is provided with a laboratory adjusted tuning capacity, C5, gives a tremendous amplification, for it also employs controlled regeneration, adjustable by means of R3.

While more than two stages might be employed, two will go down to the best noise level, so that more are unnecessary. Further, there is a decided drop in amplification in adding more stages, which will react upon the preceding two, so that three stages give only slightly better results than two. This should really be written "slightly more noise," for two stages give more than enough gain. While this is not true of other transformers, it is true that the third-stage gain is very slight compared with that of the first stage, and a fourth stage is about worthless.

Before going into a description of a receiver designed along the lines outlined, it might be well to justify the use of the name "super-autodyne." "Heterodyne" is generally considered to refer to a source of external power—a separate detector and oscillator tube. "Autodyne" refers commonly to a tube performing the functions of rectification and oscillation simultaneously, so it was considered logical to call the six tube receiver a "super-autodyne"—and it certainly deserves the appellation "super," for the results obtainable are surprising. Below is a log, representing one hour's work by an operator unfamiliar with the system. The set was located 600 feet fom WGN, one-half mile from KYW, and WMAQ and many other Chicago locals were also operating. All stations were heard on the loud speaker.

	C1	C2	S1		C1	C2	S1
WCEE	19	48.5	S	KSUO	67.5	78	L
WTAS	23	61	S	WCBD	29	23	L
KDKA	23.5	65	S	WHAZ	33	30	L
WGR	31	71	S	WLW	42	41	L
WDAF	31.5	21	L	WTAC	50.5	54	L
WTAM	36	31	L	KFI	49.5	53	L
KSID	36.5	33.5	L	KSUI	48	32	L
WCCO	40.5	39	L	WJQ	50	45	L
WOS	44.5	45	L	WTAY	16	37	S
WCAP	50	53	L	WBCN	18	43	S
WSUI	53	58	L	WJJD	22.5	61	S
WEAF	55.5	58	L	WLS	28	85	S
WCX	60.5	67	L	WBAP	52	56	L
WOAW	63	70	L	WEBH	32	95	S
WGN	32	28	L				

The station separation was very pleasing on some of the unlisted lower wave stations, due to the use of the straight-line-wave length condensers. A comparison with a standard five-tube neutrodyne on a 100-foot antenna was unfavorable to the neutrodyne both on the count of selectivity as well as selectivity and volume. A standard super failed to produce any better results, as did another eight-tube super employing air-core transformers.

While the outfit will deliver about the same energy with either dry cell or storage battery tubes, the dry cell tubes will generally be sadly overloaded, and it is, therefore, suggested that UV-201-A tubes be used throughout, although even so it is possible to overload the sixth tube. This will be appreciated when it is realized that in Chicago it is sometimes possible to get volume sufficent for dancing from the west coast stations on five tubes using only a small loop, under favorable conditions.

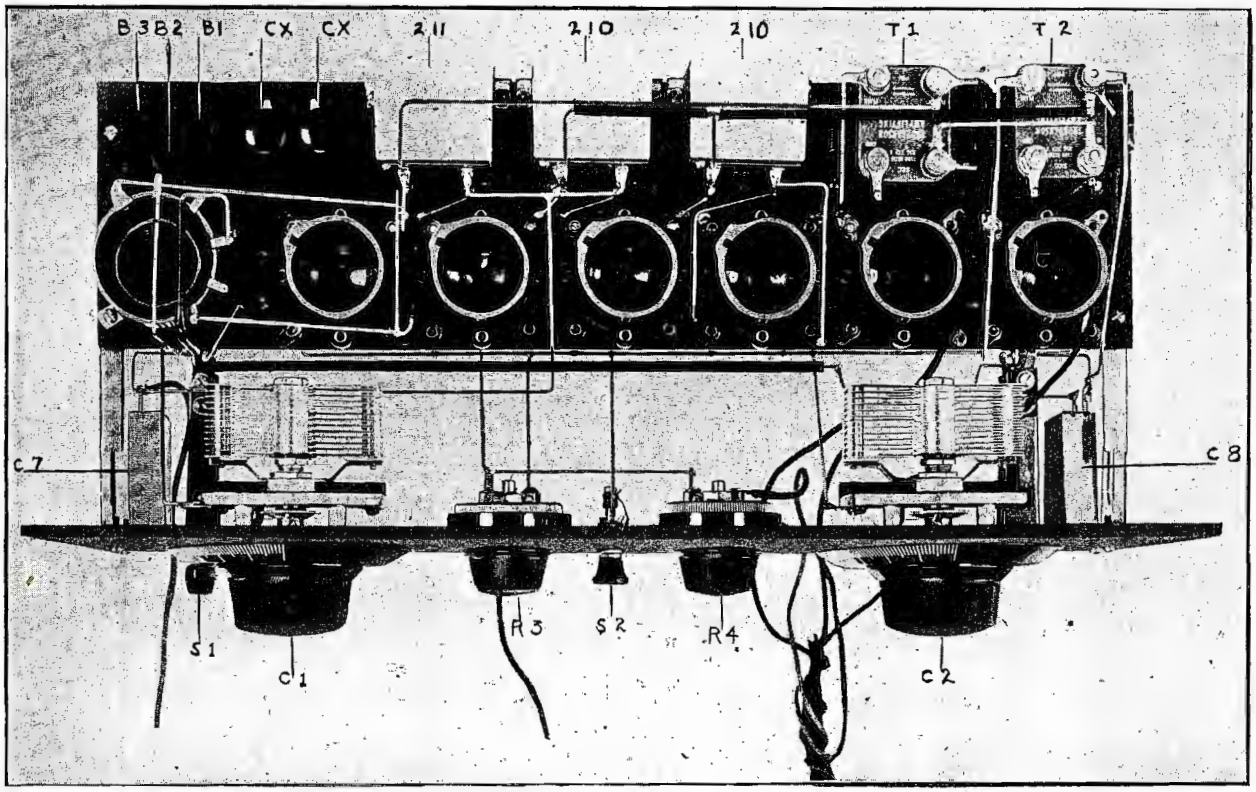


Figure 3. Top view of completed receiver

The portability of the set may be realized even with storage battery tubes by means of the leads devised by Mr. Lynch, Editor of Radio Broadcast, if a car is handy. These leads permit connection to the car battery through the dashboard light socket for the A supply. If this is not possible, it is suggested that the necessary dry batteries be carried in an old hand satchel, or even a lunch box or tool kit. Then connections can be made quickly with the color cable used for the battery leads, and the receiver set up in a few seconds time. This battery bag can also easily contain the folded loop and a small speaker, when they are not in use. Blanket straps will provide an easy means of carrying the receiver, so that the whole set can readily be managed by one man.

The advantage of this arrangement is that the same set serves for camping or traveling that is used to provide entertainment at home at other times. It is possible, if the builder

prefers to have a luggage shop make a carrying case so arranged that the receiver is at the top, the batteries below, and the loud speaker in the lower compartment with them, either at the side or in the middle. The small Amplion speaker is to be recommended for its small size and general portability, and it certainly talks up very much "bigger" than it looks.

The material required to build this receiver is listed below, with the designation letters used in the diagrams and cuts following the quantity of each item required. While it is entirely permissible to substitute any other standard parts for those listed. it is strongly recommended that the parts specified be used for several reasons. The actual space available is such that parts of larger or different dimensions could not be substituted in some instances, and in the case of the RF transformers, and SLW condenser, it would be inadvisable to substitute, since the results of the receiver depend in a large measure upon the use of the types recommended.

25 lugs

Tools required:

1—Hand drill with drills and counter-sink.
1—Soldering iron with Kester solder and non-corrosive paste.
1—Side-cutting pliers.
1—Screw driver.

As soon as the material has been procured, each item should be carefully examined to see that all screws and nuts are tight, and lugs placed as shown in the photographs, so that those on the various instruments will point in the best directions for short leads. Socket springs should be adjusted to give the desired tension.

The actual assembly of the receiver is extremely simple, providing a standard socket gang and a drilled panel are used. If this is not done, it will be necessary to drill up a sub-base and panel to take the instruments. The front panel may be grained

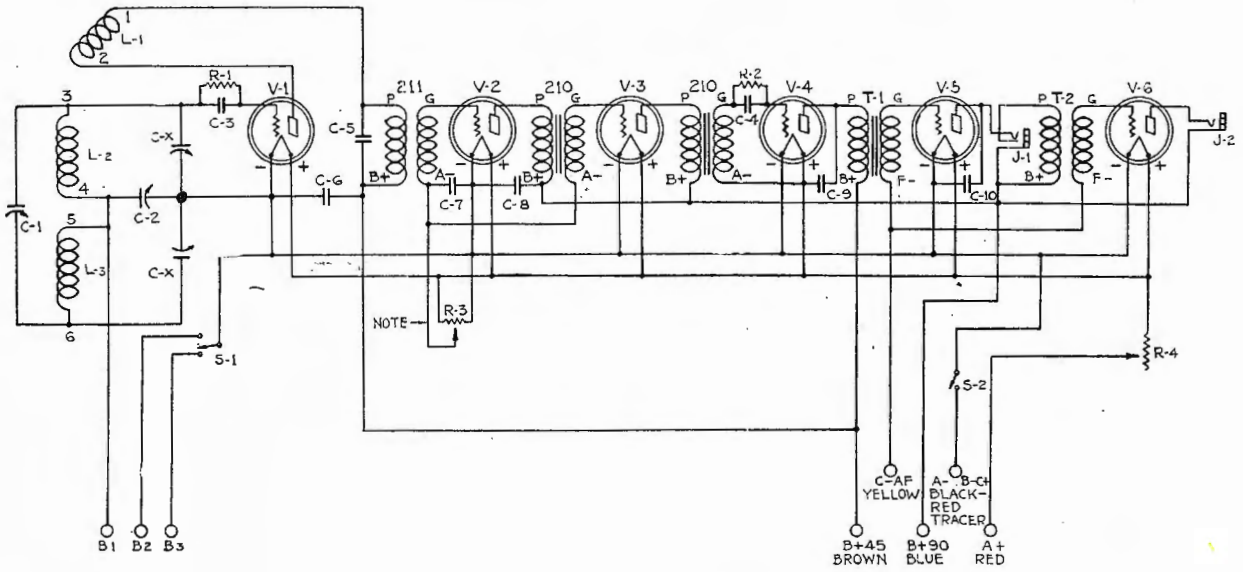


Figure 4. Schematic diagram

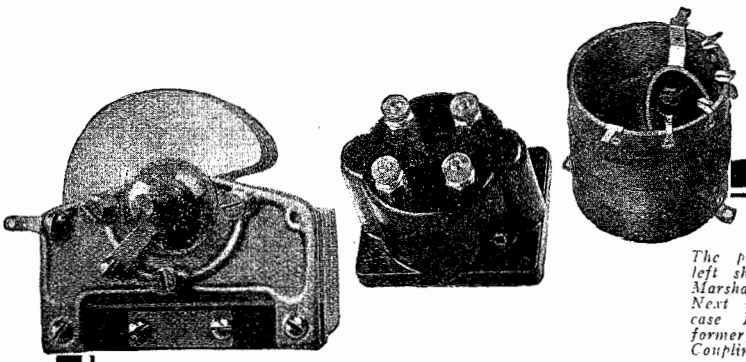
2—C1, C2, SM-305 S. L. W. condensers.
2—4" National velvet vernier dials
1—R4, U. S. L. 6 ohm rheostat.
1—R3, U. S. L. 240 ohm potentiometer.
3—B1, B2, B3, insulated top binding posts.
1—J2, Carter 101 jack (1 spring)
1—J1, Carter 102-A jack (3 spring).
1—C5, 211, SM-211 filter with matched tuning capacity.
2—210, 210, SM-210 chartered intermediate transformers.
1—L1, L2, L3, SM-101B coupling unit.
1—SM or Benjamin 6 gang socket shelf (536-201-A, #537-199).
2—T1, T2, Thordarson 3½:1 or 2:1 transformers.
2—C7, C8, SM or Dubilier .5 condensers.
2—C3, C4, Muter .00025 condensers with clips.
2—C9, C10, Muter .002 condensers.
1—C6, Muter .0075 condensers.
2—CX, CX, Continental .000025 condensers.
1—R1, SM or Muter .5 meg leak.
1—R2, SM or Muter 2 meg leak.
1—S1, Carter No. 3 jack switch (S. P. D. T.).
1—S2, Benjamin 8630 switch (S. P. S. T.).
1—SM color cable (5 leads) #701.
1—Pair Benjamin #8629 shelf brackets.
1—Bakelite panel, 7"x18"x⅛".
Small parts: 29 6/32 R. H. N. P. Machine screws ¼"
2 6/32 R. H. P. N. Machine screws 1½"
31 6/32 nuts
10 bus-bar

if desired by rubbing with fine sandpaper and oil until all traces of the original finish has been removed. Indicating marks for the condensers can be scratched with a scriber and filled with white.

If Figures 2 and 3 are carefully studied, no difficulty should be encountered in mounting parts, following the designations shown which are also given in the parts list. As the parts are mounted, the wiring may be started and put in progressively on the base and panel, then the two joined together and the final connections made. It is necessary to use a well tinned soldering iron, with rosin core solder and some non-corrosive paste.

After the receiver has been wired, the necessary batteries should be connected to it, the rheostat just turned on, and the autodyne tube inserted in its socket. The phones must be connected to the set, the switch S1 set at "L," C1 at 40, and C2 varied rapidly throughout its scale. A plunk will be heard, indicating an unbalanced bridge circuit. With one condenser CX set all in, turn the other slowly out, rotating C2 meanwhile. If the plunk does not disappear, reverse the operation, leaving the other balancing condenser all in to start with. Once the plunk has been balanced out for all settings of C1 and C2, condensers CX, CX should never be touched. If squealing, or clicking is experienced at low settings of C1, it will be necessary to use a smaller grid leak at R1. This leak will generally vary between .25 and .5 megohms. Squealing may also be caused by improper adjustment of the potentiometer, which should always be set just positive of the oscillating point of the amplifier, which will be evidenced as a "plunk," heard as R3 is turned toward its negative end.

SUPER SM PARTS



The photo at the extreme left shows the new Silver-Marshall S-L-W Condenser. Next is the new Bakelite-case Intermediate Transformer; and last the 101B Coupling Unit.

Setting New Radio Standards!

The famous line of Silver-Marshall parts is daily creating new standards of electrical excellence and efficiency in thousands of homes and laboratories where the best parts are demanded.

The new S-M Straight-Line-Wavelength condenser is Silver-Marshall's most recent contribution to Radio. Entirely silver-plated, its losses are lower than laboratory standards, and the mechanical design is unique and original. The S-L-W Plates mean ***real*** station separation and real selectivity.

It is interesting to note that S-M Parts have been recommended by such authorities as M. B. Sleeper, Volney D. Hurd and McMurdo Silver for use in the season's best receivers. Their excellence is well-attested to by the fact that from the entire market they have been chosen solely for their outstanding merit.

The New Line of S-M Super Parts

S-L-W CONDENSER
A new straight-line-wavelength condenser that insures real selectivity and separation because of unique design. Entirely silver-plated! And losses lower than laboratory standards. Prices, No. 305, .0005, $6.00; No. 306, .00035, $5.75; No. 307, .00025, $5.50.

BAKELITE-CASED
210 and 211 Intermediate Transformers. The famous S-M Transformers, in an attractive Bakelite housing, increasing efficiency by 30%! Each transformer supplied with its own characteristic curve. Supplied in sets of two 210's and one 211. Each, $8.00.

No. 101B Coupling Unit, one of the best known of the S-M line. Wound with double green silk-covered wire on Bakelite tubing. Highly efficient and approved by experts everywhere. Each, $2.50.

Just Out! The new S-M Self-Compensating Inductances, for Single Control Sets. The only inductances to be so built. Also, the new S-M Cushioned Sockets for UX Tubes. Send for descriptive circulars of these latest lines.

SILVER—MARSHALL, Inc.

110C So. Wabash Ave., Chicago, Ill.

ANNOUNCING
New Models of
U.S.TOOL CONDENSERS

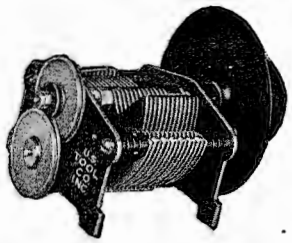
Used in the New Roberts Circuit

Unexcelled for Distance, Selectivity, Volume

The new Roberts Circuit employs all of the modern developments in radio receiving. Its extraordinary efficiency is the result of reflexing, regeneration and proper tube-neutralization.

U. S. Tool Condensers were specified in this circuit because they are recognized by engineers to embody the best that can be procured in condensers.

If you want distance and selectivity—use U. S. Tool condensers.



MODEL 8

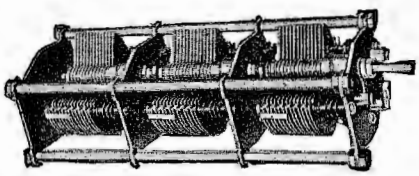
An efficient condenser made with new and patented one-piece stator, guaranteed to give sharp tuning at the lower broadcasting wave lengths.

Capacity,	Max., .00025;	Min., .0000076,	$2.70
	Max., .00030;	Min., .000008,	2.85
	Max., .00035;	Min., .0000086,	2.95
	Max., .00050;	Min., .000011,	3.75

MODEL 9

Same as Model 8, but with Vernier and Kurz-Kasch Dial.

Capacity,	Max., .00025;	Min., .0000076,	$3.75
	Max., .00030;	Min., .000008,	3.85
	Max., .00035;	Min., .0000086,	4.10
	Max., .00050;	Min., .000011,	4.75



MULTIPLE CONDENSERS
For Single Control Receivers

Two or three units operating on one dial provide the same efficiency with greater simplicity of tuning.

Write for Literature

U.S.TOOL CO.,INC. AMPERE, N.J.

The Roberts Four-Tube Receiver

This Receiver Constructed and All Illustrations Prepared in the Laboratory of the Citizens Radio Call Book

THIS receiver was designed by Walter Van B. Roberts, who has conducted many experiments with various circuits. It bears his name and has been very popular during the last year.

The outstanding features of this circuit are tuned radio frequency, regeneration, reflexing, neutralization and push pull amplification.

The tuning coils are of "low loss" design as it is necessary to bring the infinitesimal currents received from the antenna to the grid of the detector tube without waste or leakage.

We have always been told that regeneration reduces the apparent resistance of a receiver. However, when the natural resistances of a receiver and the other causes of signal losses are reduced to a minimum then regeneration produces sensitivity and volume little short of miraculous. Resistance losses have been purposely and necessarily introduced in radio frequency receivers to prevent oscillation and squealing. Potentiometers, positive grid returns and few turn coupling-coil primaries are all means of preventing self oscillation and do so by reducing the efficiency of the tube action. This is how three tubes do the work which one tube alone will do in a real "low loss" circuit.

Like the tire advertisements "Most Miles per Dollar" is the slogan for many of us. We also want other good qualities in our radio receiver but the man who builds his own and especially the novice, can not afford to buy a hundred dollars worth of parts to build a radio set. A regenerative receiver can be built at a much lower cost than any other set of equal sensitivity. Since it costs but little more to build the best possible receiver using "low loss" methods the following practical suggestions with the "reasons why" are offered the reader.

Let us summarize the advantages of the regenerative receiver built on the "low loss" plan. They are:

1st. SELECTIVITY—This is the ability to prevent "cross-talk" between stations and to bring in distant stations while locals are operating. This is inherently a matter of the design of a receiver.

2nd. VOLUME—Volume can be obtained in the output of a receiver only if losses are low and the whole set is working at peak efficiency.

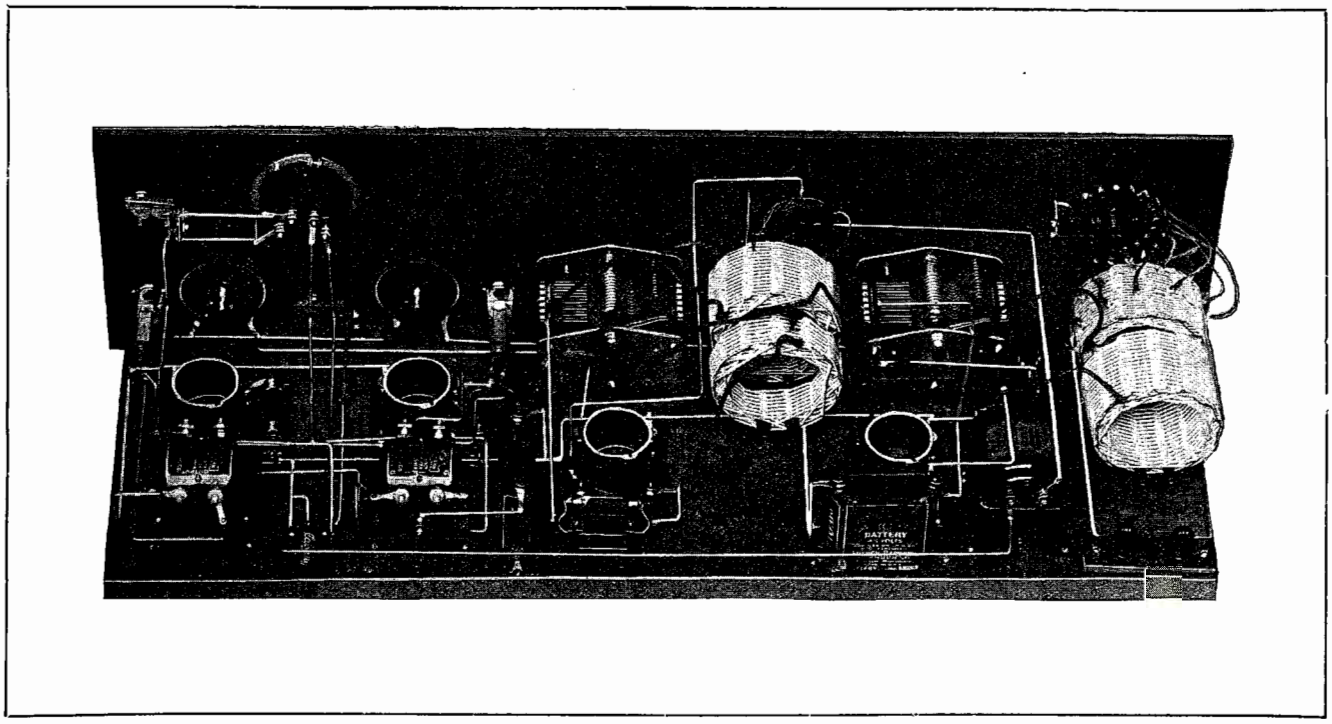


Photo A. Rear view of completed receiver

3rd. DISTANCE—DX—The same conditions which produce volume usually give sensitivity. The infinitely weak impulses from distant stations must not be lost by dielectric absorption or eddy current losses or bypassed by the distributed capacity of the coils. They must also be concentrated at one point on the dial to be heard at all.

4th. CLARITY—After all is said and done this point is the most important. Clarity means absence of distortion. Multi-tube receivers accumulate and multiply tube and battery noises. Regeneration itself produces a lower pitch than amplification circuits, and this lower pitch seems to harmonize with head phones and loud speakers to perfection. Regenerative distortion, or "too much tickler" shold never occur in a "low loss" low resistance receiver.

When we come to efficiency in the coil or tuning unit we find difficulty. Coils have for years been wound on rubber, fibre and bakelite tubes, with the turns touching each other, each turn

forming a miniature condenser with the preceding one. These coils have been plentifully supplied with heavy binding posts and cast metal parts. The wire used has been quite small, No. 22 or No. 24, which have a high resistance or the almost equally useless "Litz." The ideal inductance would have windings of

1—Yaxley filament switch.
1—Yaxley No. 3 jack.
1—Yaxley No. 2A jack.
2—6-volt 201-A amperites.
4—Rauland sockets.

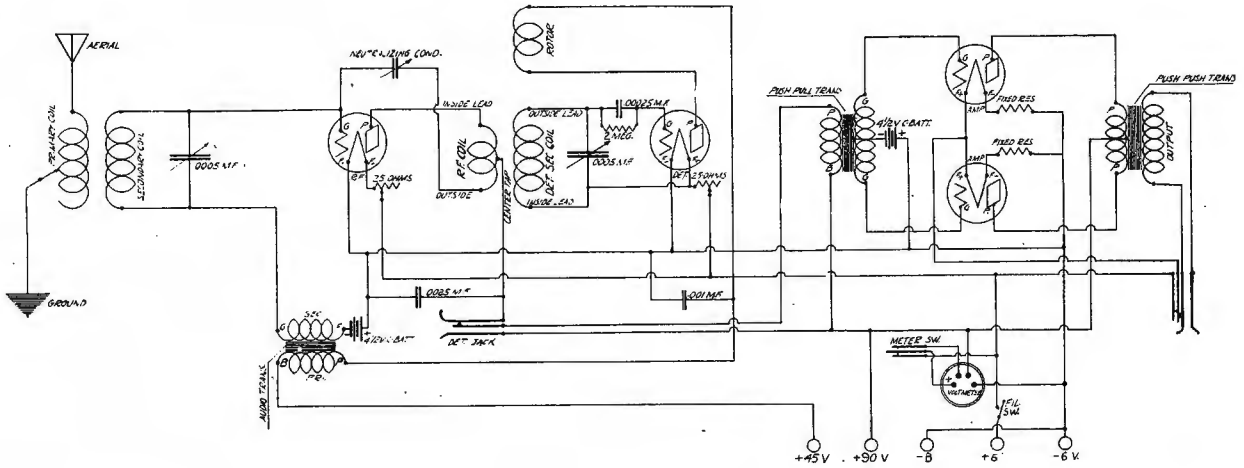


Figure 1. Schematic Diagram

no resistance suspended in free air by silk threads, and with each turn separated from its neighbor to avoid self capacity. We cannot build receivers this way but we can improve matters considerably.

Photo A shows a rear view of the completed receiver. Figure

2—Rauland push pull transformers.
1—Karas Harmonik audio transformer.
1—XL neutralizing condenser.
1—Sangamo .00025 MF condenser with grid leak mounting.
1—Sangamo .005 MF condenser.

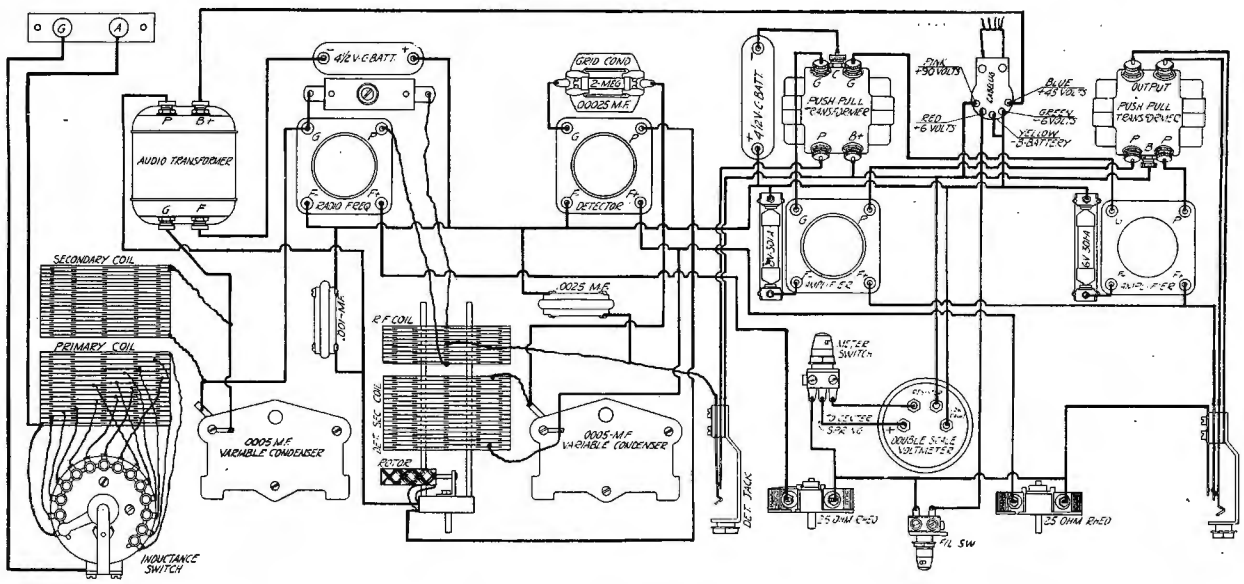


Figure 2. Graphic Illustration

1 is a schematic diagram showing all connections and Fig. 2 is a graphic illustration.

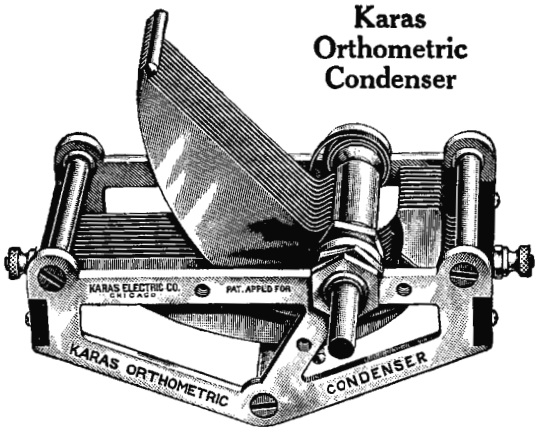
LIST OF PARTS

1—7"x26"x3/16" Formica panel.
1—3"x1"x3/16" Formica stup.
1—8½"x25"x¾" wood baseboard.
2—Eby. marked binding posts.
2—U. S. Tool .0005 MF variable condensers.
1—Set Perfection Radio Mfg. Co. Roberts Super Coils.
1—Yaxley 15 point inductance switch.
1—Sangamo .0025 MF condenser.
2—Branston 4" vernier dials.
3—Doz. soldering lugs.
50—ft. No. 12 tinned copper wire.
3—Doz. No. 5x½ R. H. N. P. wood screws.
1—Weston 2¼" double scale voltmeter.
1—Jones cabelug.
1—Package Kester solder.
1—Weston phone plug.
2—Howard 25-ohm rheostats.

All Hook-ups Marvelously Improved by KARAS Precision Instruments

Karas' two great contributions to radio development are available to home builders everywhere. And builders who demand the very maximum of perfection in their sets are insisting on Karas Harmonik Audio Frequency Transformers and Karas Orthometric Condensers. Dealers in most large cities and many smaller towns are supplied. But if YOU cannot secure Karas products locally, use the coupon below to order direct. Remember, the exclusive superiority of Karas instruments is backed up by our positive Money-Back Guarantee.

Karas Orthometric Condenser



Spreads Stations Evenly Over the Dial—
No Crowding Whatever

The Karas Orthometric Condenser positively separates all adjoining wavelengths by EQUAL distances on the dial, giving you full benefit of the 10 kilocycle frequency separation fixed by the government. Ordinary condensers jam 70 of the 100 Government allotted wavelengths into the first 30 points on the dial—even straight-line-wavelength condensers crowd 57 of them below 30. But with Karas Orthometrics, each point on the dial corresponds to one of the 100 allotted wavelengths.

The result is marvelous simplicity in tuning—and better, clearer reception—all the side bands without interference.

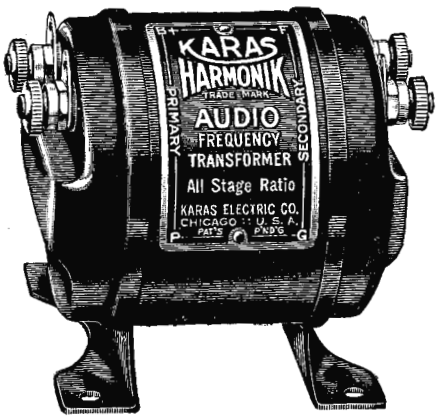
Brings in KDKA at 53

Not at 17—or 28, but at 53, where it belongs, leaving lots of room for the 52 wavelengths that must come in below it. The Karas Orthometric is a "precision job"—entirely of brass. Every joint soldered. Plates patent-leveled and securely bridged. Made in 3 sizes of accurate rating: 23 plate, .0005 Mfd., $7.00; 17 plate, .00037 Mfd., $6.75; 11 plate, .00025 Mfd., $6.50.

Get them from your dealer, or use the coupon

KARAS ELECTRIC COMPANY
4054 N. Rockwell St., Chicago

For More Than 30 Years Makers of PRECISION Electrical Apparatus



Karas Harmonik Audio Transformers
Magically Improve
The Musical Quality of Your Reception

Tens of thousands of discriminating radio "fans" discovered that fact last season. Karas Harmoniks, in their first year, revolutionized old ideas of the musical qualities possible in radio reception.

Karas Harmonik amplification brings out low bass tones in their full beauty, because Karas scientific design amplifies all audio frequences—low, high and medium, with equal volume.

Karas Harmonik amplification reproduces in your home, ALL the beauty of radiocast music, because it brings out the vital harmonics and rich overtones which are the distinguishing characteristics of musical tones.

What good is selectivity, or distance, if musical beauty is lost? You cannot realize the musical possibilities of your radio until you hear radio reception amplified through Karas Harmonik Transformers. It is easy to put Karas Harmoniks in your new set—and just as easy to install them in place of the old transformers if you keep your old set. Get them from your dealer. If he is out of them, order direct on the coupon below.

Price is $7.00 each, backed by our unconditional Money-Back Guarantee.

Karas Electric Co.,
4054 N. Rockwell St., Chicago.

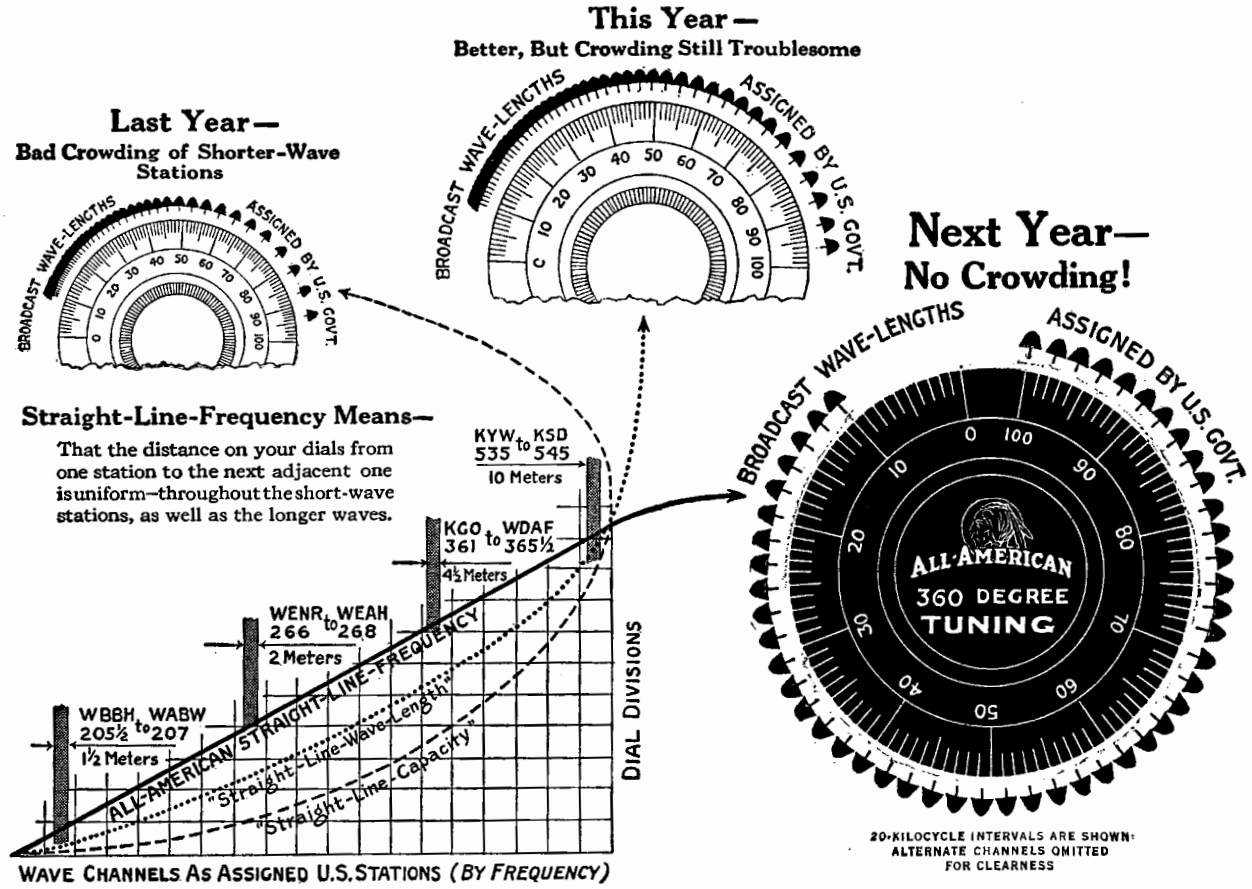
I enclose $..... for which please ship me, postage paid, the instruments checked below. It is understood that I have the privilege of returning these goods, for full refund, within 30 days, if they do not prove entirely satisfactory.

.....Karas Harmonik Audio Transformers ($7.00 each).

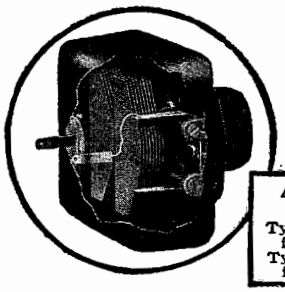
.....Karas Orthometric Condensers: Size.....
(23 plate, $7 each; 17 plate, $6.75; 11 plate, $6.50)

Name.....

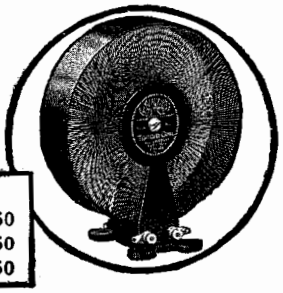
Address.....



ALL-AMERICAN
STRAIGHT-LINE-FREQUENCY
TUNING



All-American Straight-Line-Frequency Condensers
Type C-35 Max. 350 micromicrofarads (Min. 10.5 mmf.) $4.50
Type C-50 Max. 500 micromicrofarads (Min. 11.8 mmf.) 5.00



All-American Toroid Coils
Type T-1 Antenna Coupler $3.50
Type T-2 R.F. Transformer 3.50
Set of 3 Coils complete .. 10.50

Ease and certainty in tuning—no more crowding of short-wave stations—no need to buy vernier dials—no gears or other back-lash makers—body capacity absolutely *not distinguishable*—electrical efficiency unsurpassed—on one-half the panel space: that is the ALL-AMERICAN Straight-Line-Frequency Condensers.

New power for distance reception through close coupling—tuning of arrow-like sharpness—elimination of all oscillation worries through the self-enclosed endless magnetic field—non-radiating reception: that is ALL-AMERICAN Toroid Coils—Antenna Coupler and Radio Frequency Transformers. *See them at your dealer's.*

A new edition of the famous RADIO KEY BOOK, together with complete information about the new ALL-AMERICAN Straight-Line-Frequency TUNING, is yours for 10 cents, coin or stamps. Send for it today sure!

ALL-AMERICAN RADIO CORPORATION, E. N. Rauland, *President*, 4217 W Belmont Ave., CHICAGO

OWNING AND OPERATING STATION WENR—266 METERS

ALL-AMERICAN
Pioneers in the Radio Industry

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

A Super-Heterodyne for the Music Room

This Receiver Was Constructed and All Illustrations Made in the Laboratory of the Citizens Radio Call Book

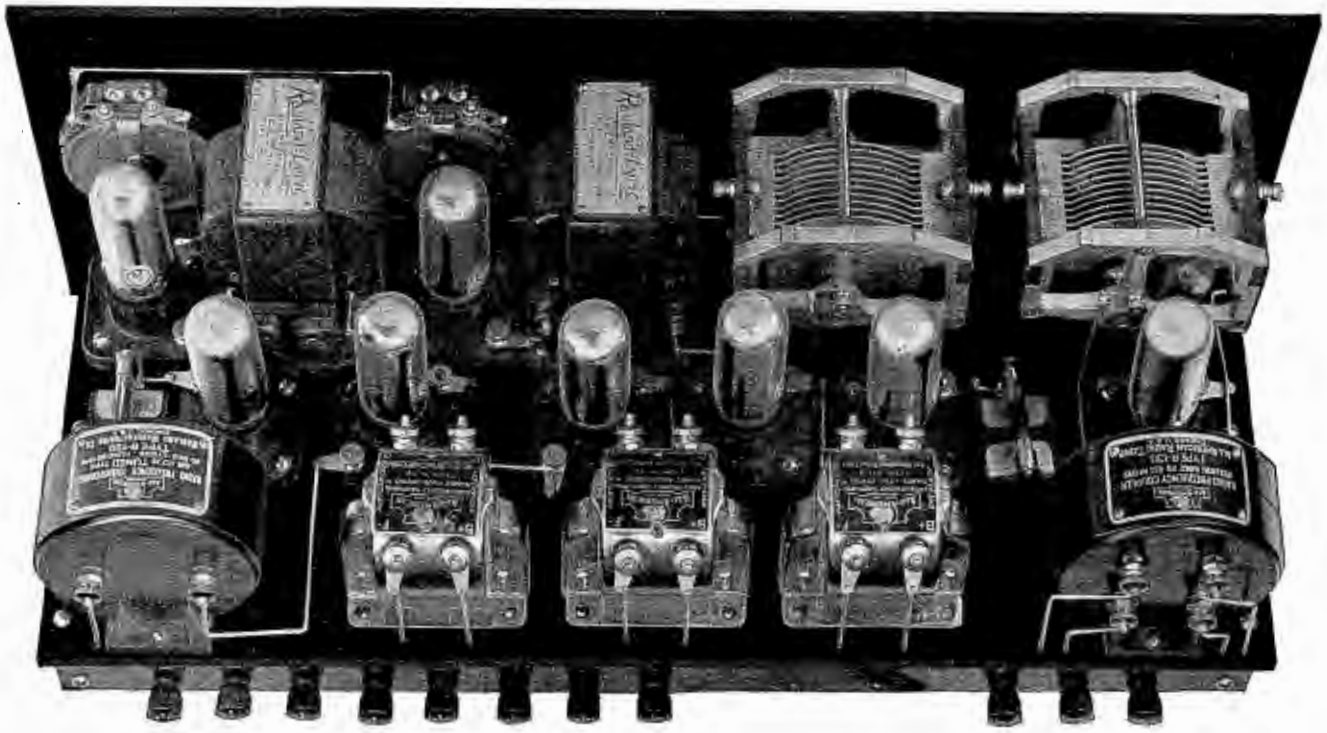
The set described in this article is presented not as anything radical in principle, but rather for the builder who wishes a thoroughly perfected design, which he can construct with absolute assurance that all problems and difficulties likely to arise have been taken care of in the wiring directions. He will have, when finished, a set that is suitable in every respect to place in a decorative cabinet for service in the most fastidious home. This means, of course, that tone quality is paramount, but that reliability of operation, and freedom from noises of all kinds, are combined with that standard of sensitiveness which we have come to expect in any Super-Heterodyne worthy of the name—the ability to receive any signal which exists in sufficient strength to be distinguishable from "static." As regards selectivity, this is also to be taken for granted in any really good Super. The set here described will tune out at Chicago any one of the eighteen or twenty local stations and bring in distant signals with ease. In conformity with the purpose for which it was designed—namely, that of making tone quality supreme—the reader will find that clearness of tone, even in distance reception, is very much above the average.

From the first glance at the top-view photograph, the two most striking characteristics of the set are—first, its clean appearance, due to the subpanel construction which shifts nearly all wiring down below the subpanel, and, second, the fact that the instruments are fitted together so closely, with practically no waste space whatever. The latter feature will sound suspicious to many experimenters who have had trouble in the past with inter-stage leakage coupling which could be remedied only by spacing certain parts farther apart. Such readers may be assured that the present design has been worked out with full knowledge of the causes and remedies for leakage coupling between stages. There is not a quieter set to be found anywhere. It is, in fact, almost impossible to produce squeals or howls of any kind, no matter what one does to the dials—excepting, of course, where outside noises come in, such as heterodyning whistles.

Complete Instructions for the Builder

The wiring directions are given in greater detail than is usual for several reasons. It is believed that this set, being of a somewhat conservative type, will be of interest to many of our less advanced readers. A more important reason is that there is only a limited amount of space underneath the subpanel and unless a great deal of spaghetti tubing is to be used, the placing of wires has to be done according to a definite plan previously worked out.

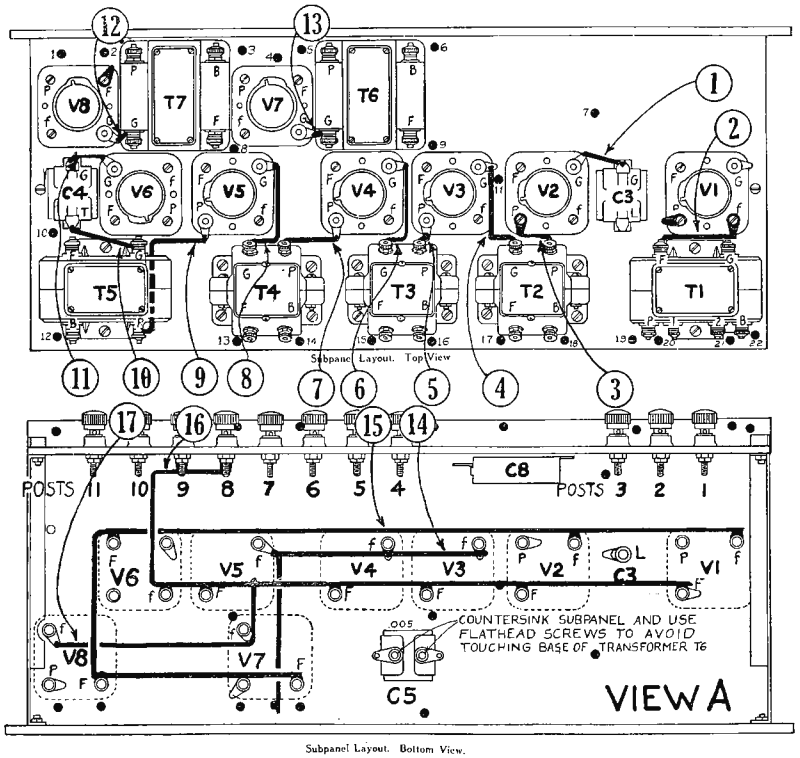
In order to make the steps in wiring absolutely plain and clear, the wiring has been divided into three parts, and each is shown on a separate drawing—these three views being marked A, B and C. Each operation is numbered so that one may be sure just where he left off when interrupted, and may check off each wiring operation by number as it is completed. It will be noticed that on each one of the three views, the numbers run directly around the picture; there is never any hunting for the place on the drawing where the next wire is to go.



The unusual neatness of this layout is largely due to the absence of conspicuous wires, nearly all these being placed underneath.

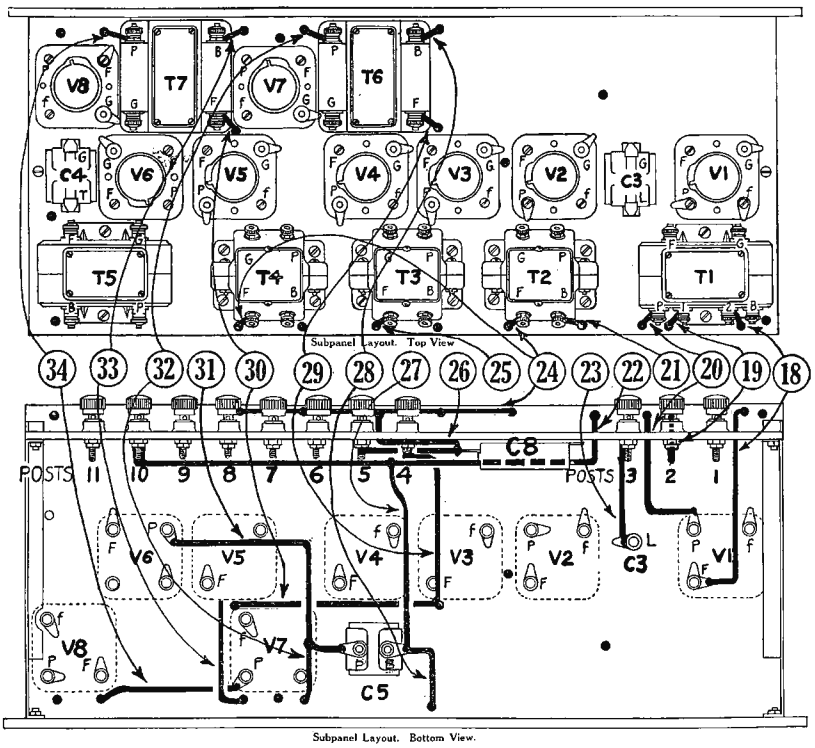
Parts Required

The following is a list of the parts used in the set shown in the photograph. In some cases, substitution of other parts can be made at will; in some cases substitution is almost out of the question. Between these two extremes it is hard to draw a line. The usual condition is that one may be fairly sure that another similar part will work, but will never be quite sure, in case of trouble, that the substitution is not responsible for it. It should be remembered that the detailed wiring directions given below will not be generally applicable to parts other than those recommended; if substitutions are made the builder must therefore be careful to check his wiring by the schematic diagram. It is believed that all of the parts mentioned are readily obtainable, and that they are all reliable as regards uniformity of manufacture, this being one of the prime requisites of parts for such purposes. The parts for the set proper will cost from $70 to $75.

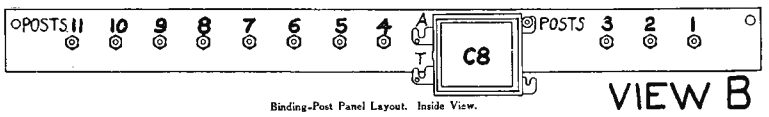


Subpanel Layout. Bottom View.

In these drawings the wires are numbered consecutively "right around the picture." Here we have the first wires to be connected: those which go entirely on top of the subpanel, and the filament wiring on the bottom. Given on this view also are the positions of the 22 holes to be drilled in the subpanel for wires which pass through it.



Subpanel Layout. Bottom View.



Binding-Post Panel Layout. Inside View.

In this view are shown the wires which run between points on the top and the bottom of the subpanel.

Reference Number	Pieces	Name of Part
	1	Front Panel, 7"x18"x$\frac{3}{16}$".
	1	Sub-panel, 7"x17"x$\frac{1}{8}$".
	1	Binding Post Panel, 1$\frac{3}{8}$"x17"x$\frac{3}{16}$".
C1, C2	2	Bremer-Tully Type L (23-Plate) Variable Condensers, .0005 mfd.
R1	1	Carter 30-ohm Rheostat.
R2	1	Carter 6-ohm Rheostat.
	1	Pair Benjamin No. 8629 Shelf-Supporting Brackets.
C6	1	Chelten No. 850 Midget Variable Condenser, .000045 mfd.
C7, C8	2	Dubilier Type 656 By-Pass Fixed Condensers, 1 mfd.
	1	Brass Angle Bracket.
J1, J2	2	Carter No. 101 Single Circuit Jacks.
	1	Carter "Imp" Switch.
C5	1	Dubilier Fixed Condenser, .005 mfd.
T6, T7	2	Rauland-Lyric (All-American) Audio Transformers.
V1, V2, etc.	8	All-American or Pioneer Sockets for UV199 or C299 Tubes.
C3, C4	2	Dubilier Fixed Condensers with Grid-Leak mounting clips, .00025 mfd.
C9	1	Dubilier Fixed Condenser, without Grid-Leak mounting, .00025 mfd.
C3	1	Daven 2-Megohm Grid Leak.
C4	1	Daven 5-Megohm Grid Leak.
T1	1	All-American Type R-130 Radio Frequency Coupler.
T2-3-4	3	All-American Type R-110 Long-Wave Radio Frequency Transformers.
T5	1	All-American Type R-120 10,000-Meter Sharp-Tuned Radio Frequency Transformer.
	2	Vernier Dials.

11 Binding Posts Marked as Follows:

Post No.	Marked	Post No.	Marked
1, 2, 3	LOOP	8	A BAT. +
4, 5	C BAT —	9	B BAT. —
6	C BAT +	10	B DET. +
7	A BAT. —	11	B AMP. +

Accessories recommended would include:

- 8 UV-199 or C-299 Tubes, tested for oscillation.
- 1 4-Volt Storage Battery and Charger.
- "B" Batteries totaling 90 volts.
- 1 4½ volt "C" Battery, with 3 volt tap.
- 1 Carter Loop.

Assembling the Set

When the drilling of the three panels has been completed (See View C) the front panel parts should all be mounted upon it. Then the remaining parts are attached to the subpanel and the binding-post panel and these latter two are assembled on the Benjamin brackets. Before mounting any of the tube sockets, each one is to have one or more of the binding posts reversed as shown. It is important that exactly the right screws be reversed in each case, and that a soldering lug be inserted under the screw head in each of the four places where lugs are shown solid black in View A—two on socket V1 and one each on sockets V2 and V8. All of the reversed screws should have nuts tightened against the contact spring before being mounted on the subpanel; an additional hex nut below the subpanel holds the soldering lug in position there. The reversed binding posts also serve to attach the sockets to the subpanel, no additional screws being necessary.

A schematic diagram is given for the use of readers who may care to study the circuit used. The builder, whether he is a beginner or an expert, will probably find it clearer and better to work entirely from the three wiring views.

VIEW A: WIRES ON TOP AND BOTTOM OF SUBPANEL

Wire No.

1 **V2**-G to **C3**-G
2 **V1**-f to **T1**-F
3 **V2**-P to **T2**-P
4 **V3**-G to **T2**-G
5 **V3**-P to **T3**-P
6 **V4**-G to **T3**-G
7 **V4**-P to **T4**-P
8 **V5**-G to **T4**-G
9 **V5**-P to **T5**-P
10 **C4**-T to **T5**-G
11 **C4**-G to **V6**-G
12 **V8**-G to **T7**-G
13 **V7**-G to **T6**-G

NOTE—Nearly all of the wiring operations can be seen at once on the proper drawing, and no description is necessary. For reference and comparison, however, the entire 58 operations are here listed.

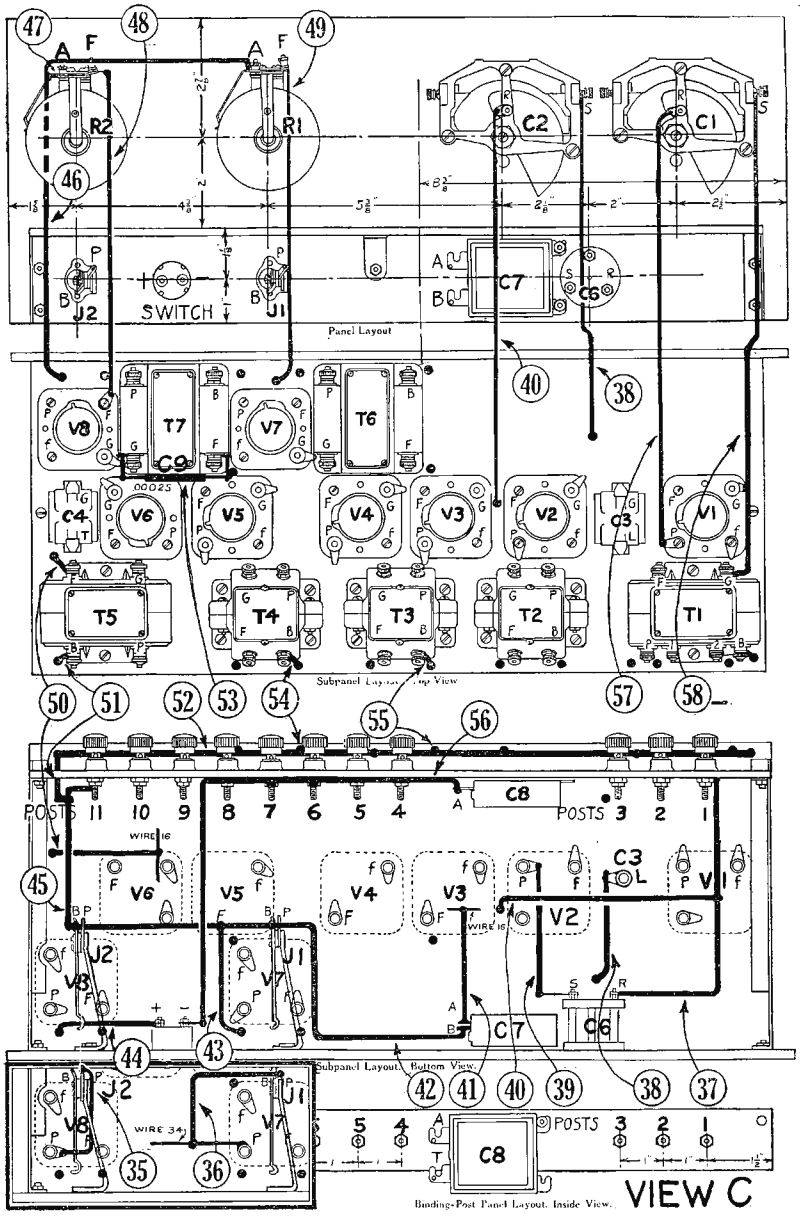
14 **V3**-f to **V4**-f to **V5**-f and over to 1/8" from edge, leaving loose end till later; keep close to subpanel
15 **V1**-f to **V2**-f to **V6**-F to **V8**-F to **V7**-F, bending up lugs and running 3/8" from subpanel
16 **V1**-F to **V2**-F to **V3**-F to **V4**-F to **V5**-F to **V6**-f to Post 9 to Post 8, running 3/8", then 7/8" from subpanel
17 **V8**-f to **V7**-f to Wire 16, running close to subpanel

VIEW B: WIRES RUNNING FROM TOP TO BOTTOM OF SUBPANEL

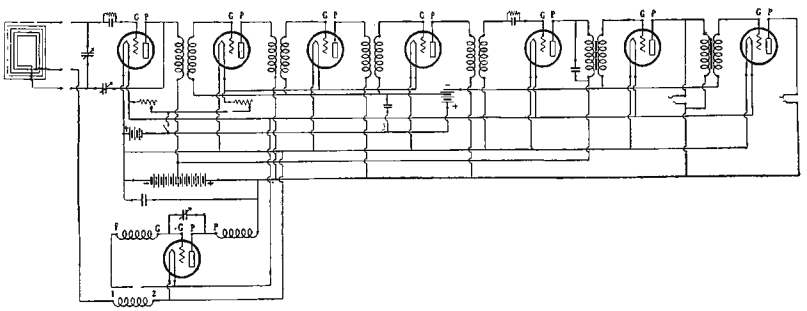
18 **T1**-2 through hole to **V1**-F, close to subpanel
19 **T1**-1 through hole to Post 2
20 **T1**-P through hole to **V1**-P, close to subpanel
21 **T2**-B down 1/8" below subpanel and cut off
22 Post 10 to join Wire 21; keep close to subpanel
23 **C3**-L to Post 3, running 7/8" from subpanel
24 **T2**-F under subpanel to **T4**-F; insulate with tubing the portion of this wire under subpanel
25 **T3**-F through hole and joining Wire 24; cut tubing at proper point
26 Junction of Wires 24 and 25 to **C8**-T and to Post 5
27 **C5**-B to Wire 22; run 5/8" from subpanel
28 **T6**-B down 5/8" below subpanel and to Wire 27
29 **T6**-F down 7/8" below subpanel and to Post 4
30 **T7**-F down 3/8" below subpanel and to Wire 29
31 **V6**-P to **C5**-P, 7/8" below subpanel
32 **T6**-P down 7/8" below subpanel and over to Wire 31
33 **T7**-B down 1 1/4" below subpanel, bend over about 3" toward binding posts, and cut off, leaving loose end until later
34 **T7**-P through subpanel and to **V7**-P; keep close to subpanel

VIEW C: WIRING AFTER PANEL IS ATTACHED TO SUBPANEL ASSEMBLY

35 **V8**-P to **J2**-P
36 **J1**-P to Wire 34
37 **C6**-R to Post 1, running 1" from subpanel
38 **C2**-S through subpanel and along close to it, to **C3**-L
39 **C6**-S to **V2**-P, close to subpanel
40 **C2**-R down 1" below subpanel and to join Wire 37; insulate vertical portion with tubing
41 **C7**-A to Wire 16
42 **J2**-B to **J1**-B to **C7**-B
43 Join loose end of Wire 33 to Wire 42
44 Switch (plus side) to hole near corner of subpanel and cut off
45 Post 11 to end of Wire 42
46 End of Wire 44 up through subpanel, behind **R2** (keep close to panel) and over to **R1**-A
47 **R2**-A to Wire 46, holding Wire 46 away from metal of rheostat
48 **R2**-F to **V8**-F
49 **R1**-F down through subpanel to join loose end of Wire 14
50 **T5**-F down 7/8" below subpanel and to Wire 16
51 **T5**-B through subpanel to join Wire 45
52 **T1**-B through subpanel and along close to it to join Wire 51; insulate with tubing
53 Connect .00025 Condenser **C9** from **T7**-G to **T7**-F
54 **T4**-B through subpanel to join Wire 52; cut tubing at proper point
55 **T3**-B through subpanel to join Wire 52; cut tubing at proper point
56 **C8**-A to Post 6 to Post 7 to Switch (minus side); run 1 3/4" from subpanel
57 **C1**-R to **V1**-P
58 **C1**-S to **V1**-G to **T1**-G



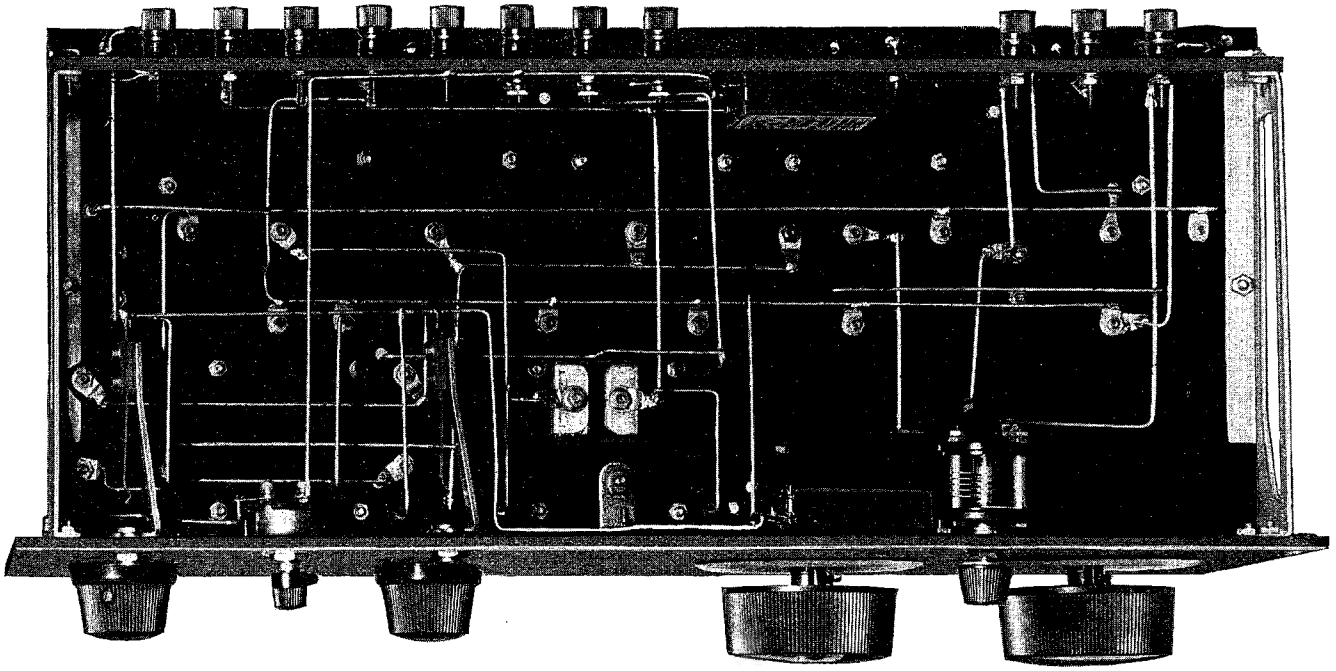
Wires here shown are connected after the panel is attached to the subpanel. On this view also are given such dimensions as are necessary for drilling the front and binding-post panels. The drilling of the subpanel is an important part of the job, but no dimensioned layout is given for it because it is much easier to lay the instruments out themselves on the subpanel, with a sheet of white paper between. Use a ruler to line up the various parts, and compare their spacing with the photograph. Then mark the holes required with a pencil on the sheet of paper, and use it for a drilling template. There are also 22 holes where wires go through the subpanel; locate these at the same time, by reference to View A.



The wiring diagram follows the conventional Super-Heterodyne practice in nearly all particulars; it is given only for reference by readers who are interested, and does not need to be used in building or making the set.

Hints on Easy Wiring

At the time the sockets are being mounted, soldering lugs should be attached and turned in the right direction at the lower end of each of the reversed binding posts; this saves much time in soldering. Some of these lugs are bent up, as shown in the wiring directions, so that the wires run along about ⅜ inch from the subpanel. All these lugs should be bent up while the socket wrench is pressed tightly over the nut; then when the job is completed the nut will still be accessible for final tightening with a socket wrench. Lugs which are shown as lying flat against the subpanel should preferably be bent away from it about 1/16 inch to avoid injury to the panel while soldering. In a number of places it will be found very helpful to use extra long lugs, such as V5-f on view A, at the G posts of transformers T6 and T7 (where lugs can then be joined directly without the use of wire) and on all of the eleven binding posts on the small panel. These directions may seem to go too greatly into detail, but if they are carefully followed, a neat and rugged wiring job will be obtained. Particularly, wires should never be run over the ends of the screws so as to prevent access with a socket wrench.



When wired strictly according to the detailed instructions given in the drawings, the set presents a neat appearance below, in spite of a rather large number of wires in a small space.

Wiring Instructions

It is possible to wire up the set with considerably fewer pieces of wire than the directions specify, but this has been purposely avoided in order to give an easier job, with less time to be spent in bending long pieces of wire into peculiar shapes. Moreover, the wiring has been arranged in such a way that any instrument in the entire set can be removed and disconnected without disturbing any other—a matter not so easy to take care of in a set where so much apparatus is concentrated into such a small space.

It may be found after completing the wiring that some of the contact springs are loose—particularly those on the reversed binding posts, held by nuts inside the sockets. These nuts can be tightened without difficulty. Simply loosen the nut underneath the subpanel and press the screw tightly upward, at the same time tightening the screw from above with a screwdriver.

Testing and Tuning

It is well before connecting the "B" batteries to insert tubes and connect "A" battery voltage to the "B" battery terminals. Then, if none of the tubes light when the switch and rheostats are turned on fully, it is safe to connect the "B" battery to its proper terminals. Connect the "B" Battery with 90 volts to Post 11, and 45 volts to Post 10; the "C" Battery with -3 volts to Post 5, and -4½ volts to Post 4.

The three binding posts marked "loop" are for connection to any tapped loop, suitable for use with a .0005 condenser. Loops are usually tapped at the center, but somewhat better results are sometimes obtained by having a few more turns between Posts 2 and 3 and not quite so many between Posts 1 and 2. The feed-back provided by the tapped loop is controlled by the small variable condenser, C6. When it is set at minimum capacity there is no appreciable regeneration. When the set is working properly, this condenser may be moved part way in, which will improve the selectivity and sensitiveness to a marked degree. If too much capacity is introduced, a click will be heard, indicating an oscillating condition.

While it is of course advisable to have a loud speaker of the highest grade in order to bring out the fullest excellence of tone, it will be found that even with ordinary speakers, the tone quality is excellent indeed. This is due to the fact that the audio frequency transformers used are of a recent type, designated as "laboratory grade," and designed to go far towards correcting the deficiencies of loudspeakers in amplifying the higher overtones. Such a correction cannot be accomplished by resistance coupling, nor by any other type of amplifier whose curves are not subject to the designer's control, as is that of a transformer. An added advantage of the use of extra-fine transformers is, of course, that all of the amplification which tubes of the dry-cell type will stand is readily obtained by using only two tubes after the second detector.

The use of a single-circuit jack in the first stage is in the interests of simplicity in wiring, and is adopted also in view of the fact that the average owner of this kind of a set will seldom use his first stage jack at all; the natural procedure is to leave the plug in the last jack, since the tone quality is not noticeably different, and volume control is so easy with the first rheostat. The second rheostat, controlling the oscillator, detectors and audio tubes, is not at all critical, and should be turned up just enough to show that the detectors are working to full advantage.

A small "C" battery can be attached to the inner end of the three binding posts and thus made a part of the set, if this is preferred, rather than to run leads out from the binding posts.

The tuning dials are operated as usual in Super-Heterodynes, the loop condenser at the right tuning much as in any ordinary radio set, and the oscillator condenser at the left showing the two sharp resonant points for each wave length, separated by an interval of sixty kilocycles—twice the intermediate frequency used.

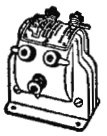
The feature of this set which will appeal most to the seasoned experimenter, outside of its unusual tone quality, is the freedom from oscillation and other disturbances in operation. It is eminently adapted in usefulness, as well as in size and appearance, to adorn the home of the listener who has arrived at the point where nothing less than a Super satisfies his idea of radio enjoyment.

There's an All-American

Standard Audio Frequency Transformers

Exclusive machinery, precision methods and scientific design have made All-American Audios the largest selling transformers in the world. Since 1919 they have satisfied the demand for an instrument that could be relied upon for clear tone quality. Today they are standard on all the better sets.

Type R-12, Ratio 3 to 1 . $4.50
Type R-21, Ratio 5 to 1 . 4.75
Type R-13, Ratio 10 to 1 . 4.75



Power Amplifying (Push-Pull) Transformers

To secure great loud speaker volume, even on distant stations, simply add to any set a stage of All-American Power Amplification. Tone quality is kept perfect because the signal current is divided between two tubes, which neutralizes distortion.

Type R-30 Input $6.00
Type R-31 Output 6.00

Universal Coupler

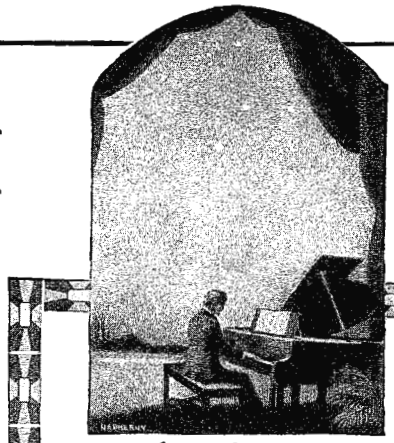
The All-American Universal Coupler sets a new standard of efficiency, either as an antenna coupler or as a radio frequency transformer in tuned stages. It brings about a very high degree of selectivity in reflex receivers.

Type R-140 . . . . . $4.00

Self-Tuned Radio Frequency Transformers

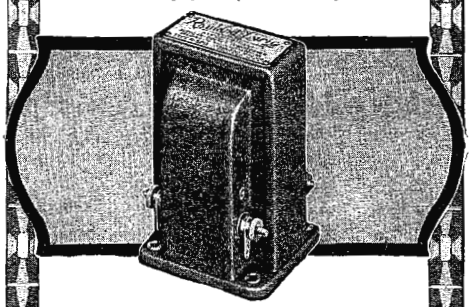
Effectively amplifying all frequencies within the broadcast range. Each transformer is designed to match the characteristics of a particular type of tube.

Type R-199 . . . . . $5.00
Type R-201A 5.00



Artistry

What is the secret of the marvelous superiority of Rauland-Lyric reproduction, as compared with any other system of "coupling?" The answer is no mystery. Rauland-Lyric does indeed bring out the low frequencies or bass notes—which can also be accomplished by other methods. But it *also* does what *only an ultra-fine transformer can do*—it puts *extra power* into the higher harmonics transmitted by the modern broadcaster. In effect, it actually extends the frequency range of the loudspeaker. *There is no amplifier like Rauland-Lyric.*

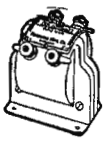


Rauland-Lyric is a laboratory-grade audio transformer designed especially for music lovers. The price is nine dollars. Descriptive circular with amplification curve will be mailed on request.

Rauland-Lyric
AN
ALL-AMERICAN
TRADE MARK
TRANSFORMER
The Choice of Noted Music Critics

For Every Circuit

Long-Wave (Intermediate Frequency) Transformer



Transmits faithfully all frequencies passed to it by the filter or tuned transformer. Amplifies frequencies from 15 to 75 kilocycles (4,000 to 20,000 meters) without distortion of the side bands.

Type R-110 . . . . . $6.00

10,000 Meter (30 Kilocycle) Transformer (Filter Type)

Has a steep amplification peak well rounded off at the top to pass an intermediate frequency of 30 kilocycles together with entire side bands present in modern broadcasting.

Type R-120 . . . . . $6.00

Radio Frequency Coupler (Oscillator Coupler)

The All American Coupler makes possible a uniform output at any frequency within its range—from 150 to 650 meters. Like the Type R 120 transformer, this coupler, housed in a Bakelite case, is unaffected by dust or moisture.

Type R-130 . . . . . $5.00

Standard Base Tube Socket

One piece Bakelite body—no pressure on locating pin of tube—contact made with sides of prongs—short circuits impossible—strongly built. Fits 201 A and all other tubes with "navy type" base.

Type R-25 . . . . . $0.75

"199" Base Tube Socket

A neat, rugged, one piece Bakelite socket, with heavy contact springs of best phosphor bronze, roughened to insure good contact. Binding posts are readily reversible, for use in sub-panel sets, with wiring underneath the sub-panel. Fits all UV 199 and similar tubes.

Type R-26 . . . . . $0.50

All-Amax Semi-Finished Receivers

Complete receiving sets with extra ordinary range, volume and selectivity. All parts mounted on panel and baseboard, with full instructions for wiring. "Wire it in One Evening."

All-Amax Junior (one tube) . . . $22.00
All-Amax Senior (three tube) . . 42.00

ALL-AMERICAN RADIO CORPORATION, 4217 Belmont Avenue, Chicago, Illinois

E. N. Rauland, President

MEMBER RMA

OWNING AND OPERATING STATION WENR—266 METERS

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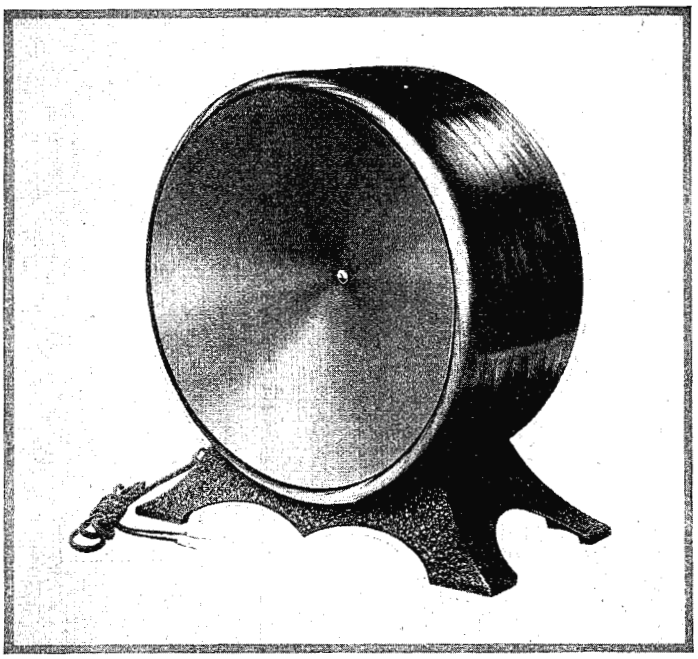
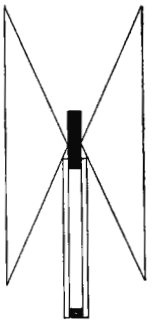
Largest Selling Transformers in the World





Section of the New Acme ***Double Free-Edge Cone*** Loud Speaker, showing the two ***free-edge cones.***

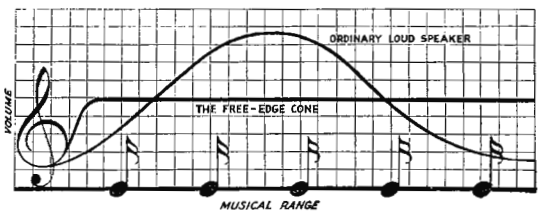
After 5 Years and 256 Experimental Models

Acme is proud to put its name on this Loud Speaker

HERE in our laboratories at Cambridge, our radio engineers and sound experts have been at work, ever since broadcasting started, striving to perfect an ideal type loud speaker.

Two years ago, after having made, studied and tested 203 models, we obtained a very good horn type loud speaker. But our radio and sound engineers determined to go ***even further.*** After 23 months more of experimenting; making and testing 53 additional loud speaker models they at last developed the ACME ***Free-Edge Cone*** Loud Speaker.

As far as it is humanly possible to judge we feel certain that we have the finest loud speaker ever produced. This new type loud speaker does away with inherent resonance common in other types. Because of this improvement the new Acme now brings out the low notes and soft overtones never before obtainable in any loud speaker.



Note the equal volume over the musical range with the ***free-edge cone*** in contrast to the ordinary loud speaker.

The latest development in radio reproduction is the cone type loud speaker but the ***double free-edge cone*** is a further advancement because resonance is eliminated and faithful reproduction obtained over the whole musical range.

Claude Hairs

President, Acme Apparatus Company. Cambridge, Mass.

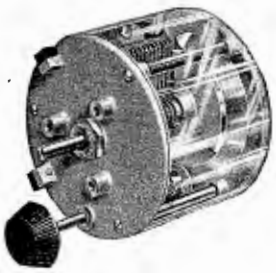
Price $25.00

ACME

~for amplification

Now—More Amplification *Without Distortion*

—thanks to these 4 Acme products



ACME
"Lowest Loss" Condenser

The new Acme Condenser has these advantages—Low loss, sharp tuning—practically all current on antenna can now be used.

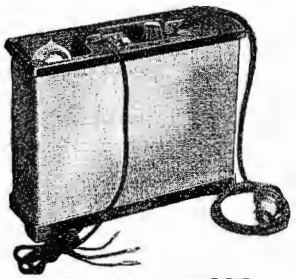
In addition to the fundamental advantages of the new Acme Condenser of exceedingly sharp tuning and minimum losses it has many new improvements and innovations in structure and equipment. Price, $5.50.

See the new 9th edition of the book, "Amplification without Distortion," which gives complete details and also contains many diagrams and helpful hints on how to build and get the most out of a set.

***The New* ACME**
MA-2 Audio Transformer
(closed type)

This new MA-2 Acme Audio Amplifying Transformer gives even more amplification than the famous Acme A-2, until now the one supreme transformer in the field.

The new MA-2 has a ratio of 5 to 1 and a primary impedance of such a high order that more low notes come through than with even the famous A-2 itself. The amplification curve is both high and flat and of much greater range. The MA-2 is sealed in an enameled metal box to prevent mechanical damage. Price, $5. For full particulars see "Amplification without Distortion" booklet.



***The New* ACME**
B-eliminator—No Hum or Distortion

Elimination of B batteries by rectifiers has always been accompanied by alternating current hum and distortion due to modulation or variation of the voice and music at power supply frequencies. Now all this is gone.

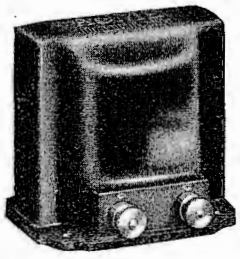
The new Acme B-eliminator produces neither hum nor distortion. There is no filament to burn out. The rectifying tube handles both sides of the wave and will run indefinitely.

Two amplifier voltages are available. Cords are provided for lamp socket and set. Dimensions for E-1 are 10¾ inches long by 3½ wide by 8½ high.

Type E-1—110 volts 60 cycle, $50.

Type E-2—110 volts D. C., $20.

See booklet "Amplification without Distortion."



The New* ACME *Z-2
Audio Amplifying Impedance

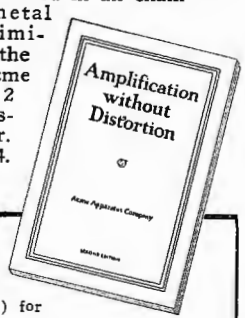
To sufficiently amplify the extremely low and extremely high frequencies with the same magnitude as the middle frequencies Acme has produced the Z-2 Audio Amplifying Impedance which for this purpose takes the place of transformers.

The Acme Z-2 gives equal amplification over the widest range of frequencies at of course a sacrifice in volume which requires more stages, usually three impedance to two transformers.

The Acme Z-2 has such low resistance that no higher B-battery voltage is necessary than used with transformer amplifiers. The unit is sealed in an enameled metal box similar to the new Acme MA-2 transformer. Price, $4.

9th Edition Just off the Press—send for your copy now

OVER 200,000 copies of this famous book, "Amplification Without Distortion," have been sold at 10c each. The 9th edition, with even more complete information on the construction and improvement of sets, is now ready. Use coupon.



Acme Apparatus Company
Dept. 03, Cambridge, Mass.

Enclosed find 10c (stamps) (coin) for one copy of 9th edition of "Amplification without Distortion."

Name.....

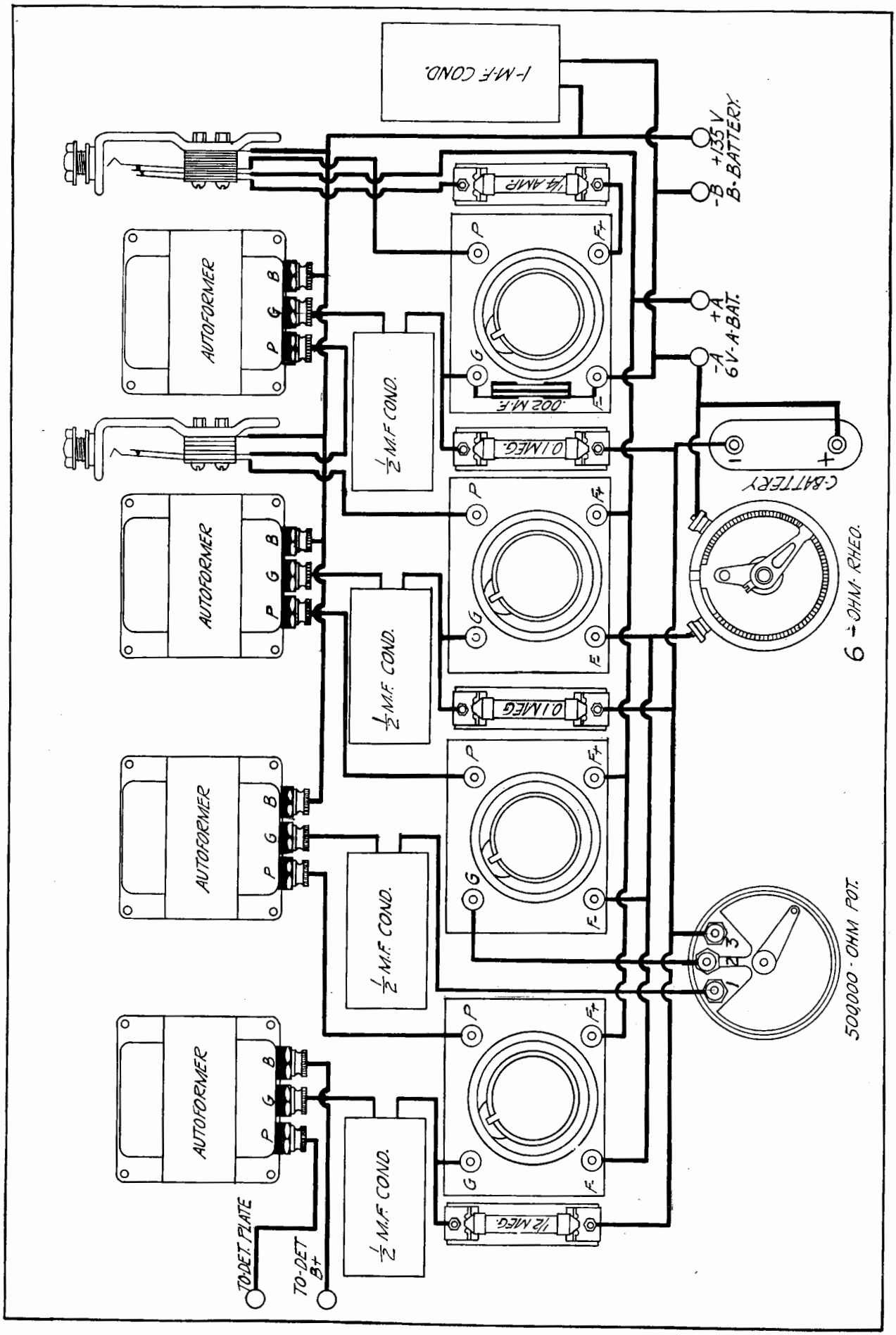
Street.....

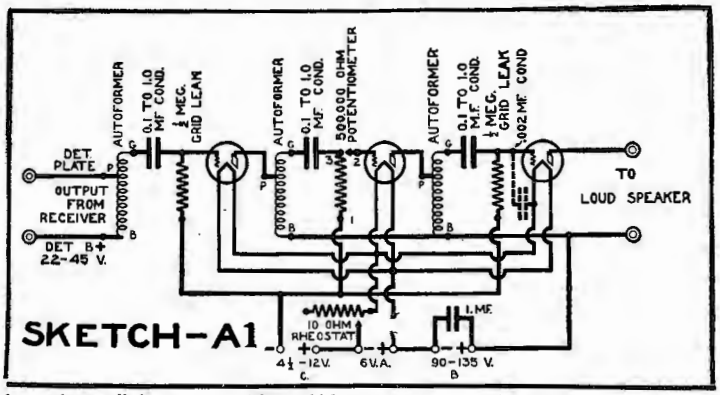
City.....State.....

ACME
~for amplification

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

4 Stage Impedance Coupled Amplifier





The Autoformer is an all frequency amplifier—which means it will amplify with even magnitude, ALL notes within range of human ear. This has been accomplished by an ingenious adaption of capacities, impedances and resistances—developed and perfected by the Thordarson laboratories. Only Thordarson builds the Autoformer. Described in the column at the right.

Thordarsons are Absolutely Uniform!

They always "match up" perfectly

One reason that leading builders of fine sets use *more* Thordarsons than all competitive transformers combined is because Thordarsons run *absolutely alike, absolutely uniform;* always "match up" perfectly; always amplify *evenly.*

The following statement was made recently by a prominent set maker (name on request): "Any radio manufacturer who is sincerely desirous of producing an instrument of the volume necessary and of a tone superior to anything else on the market, must be absolutely forced to use Thordarson transformers sooner or later." Follow the lead of the leaders—build or replace with Thordarsons. They are unconditionally guaranteed. Any store can supply you. If dealer is sold out, order from us.

THORDARSON *Super* TRANSFORMERS

Standard on majority of quality sets

SUB-PANEL MOUNTING TYPE THORDARSONS NOW ON SALE

They permit a neater assembly, the shortening of leads and the concealing of wiring—as in factory built sets. Same ratios—same prices—as standard type Thordarsons. If dealer cannot supply order from us.

SUPER-HET BUILDERS! TAKE NOTE OF THIS GOOD ADVICE

For the "Best" 45,000 Cycle Super-Heterodyne, "RADIO" and other leading authorities recommend in highest terms the Thordarson 2:1 ratio transformers. Take no others!

Use Thordarsons for Power Amplification, Too

Thordarson Power Amplifying Transformers equal in tonal purity our justly famous audio transformers. They give best results when preceded by two stages using Thordarson 3½:1 Audio Frequency Transformers. May also be used as 4½:1 a. f. transformers by disregarding center taps—or as a coupling transformer for loud speakers. Bulletins on request.

The Thordarson INTER-STAGE Power Amplifying Transformer with a pair of Thordarson Power Amplifying Transformers provides two stages of power amplification. Although two stages of this amplification involve the use of four tubes, the quality of the reception more than compensates for the additional expense. Bulletin on request.

Thordarson Types and Prices

Thordarson Radio Transformers include: Audio Frequency (sub-panel or top mounting types) 2:1, $5; 3½:1, $4; 6:1. $4.50. Interstage Power Amplifying, $8 each. Power Amplifying, pair $13. Autoformers, $5 each. All Thordarson Products are unconditionally guaranteed. Dealers everywhere. We ship direct upon receipt of price if dealer cannot supply.

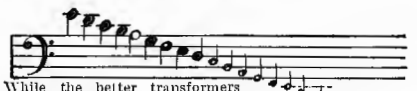
THORDARSON ELECTRIC MANUFACTURING CO.

Transformer specialists since 1895

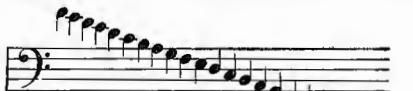
WORLD'S OLDEST AND LARGEST EXCLUSIVE TRANSFORMER MAKERS

Chicago, U.S.A.

What becomes of the bass notes in your set?



While the better transformers amplify quite evenly over the entire upper and middle registers of the musical scale, from about 60 cycles downward there is a pronounced loss of amplification, as indicated above. Poorer transformers begin to drop off in amplification even higher on the scale with the result that lowest notes disappear entirely.



There is no variation in amplification over the entire range of musical frequencies with Thordarson **Autoformers.** No note is too low—no note is too high to be fully amplified by the Autoformer. In addition there are three other advantages.

Four Great Improvements

Full amplifications of those *bass* notes hitherto largely "lost"! Greater clarity on *all* signals! Improved reception of *distant* programs! Better volume *control!*

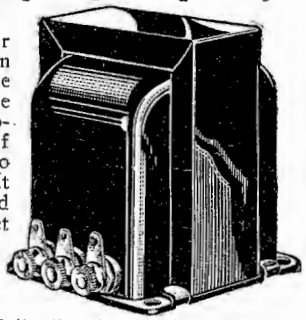
These are the four advantages achieved by this latest Thordarson development—the Autoformer. Thordarson has succeeded in utilizing, for the benefit of your radio set, the same principle used in the line amplifiers adopted by the more recent high-powered broadcasting stations. The excellent quality of these stations (due to perfect amplification) offers conclusive proof of Autoformer effectiveness.

Unconditionally Guaranteed

THORDARSON *Autoformer*

Trade-Mark Registered

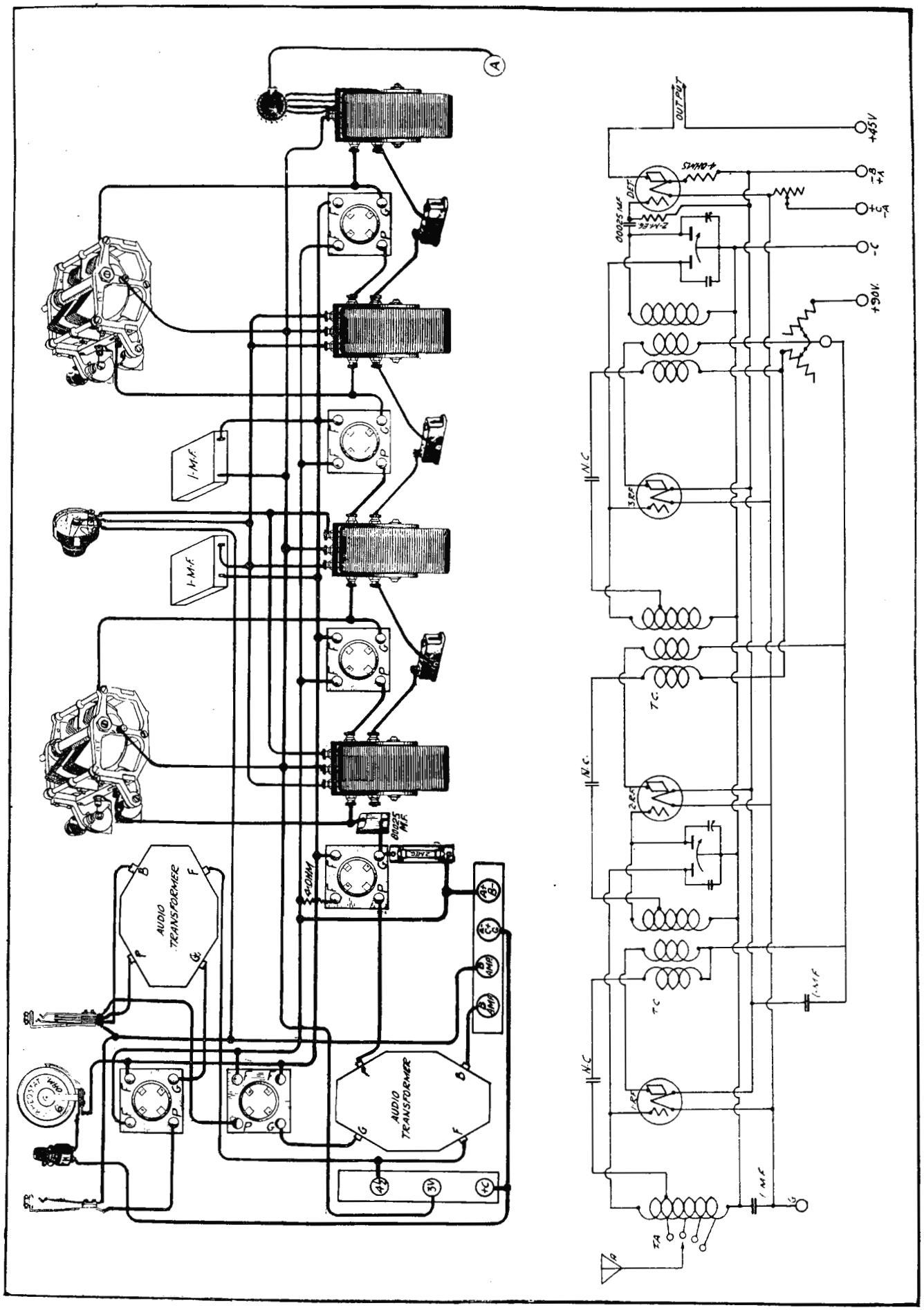
All Frequency Amplifier

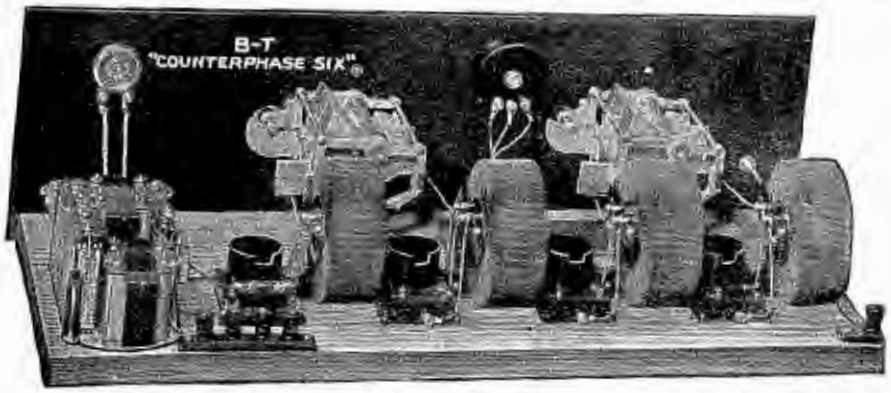


Autoformer amplification is for those who seek the finest reproduction of programs to be had. It may be used with any set in place of the regular audio transformer hook-up. Full directions, with diagrams, for building a Thordarson Autoformer Amplifier are supplied with each instrument. Or

Write for the Autoformer Hook-up Bulletin—Just Out!

Counterphase Six





The Climax of Our Achievements

The heart of the "COUNTERPHASE." A coil that reduces local pick-up to minimum. Eliminates inter-coupling and stray feed backs. Made in kits for the "COUNTERPHASE" and as follows:

Type TA (Antenna Coupler) $4.00
Type TC (Interstage R.F. Transformer) 4.00
Type T-4 (for 4-tube sets) 4.00

All the efficiency of the well known B-T "Lifetime" Condenser now available in Tandem. One dial controls two condensers. Close balance between units obtained by the sensibly designed B-T trimming arrangement. You always get the best if you buy B-T Condensers.

Price LD-13 (capacity .00025) $9.00
Price LD-17 (Capacity .00035) 9.50

Kits for building the "COUNTERPHASE" contain essential parts and complete blue prints, building instructions and easy wiring form.

Kit No. 6 (for building 6 tube "COUNTERPHASE") $38.00
Kit No. 5 (for building 5 tube "COUNTERPHASE") 28.50

Achievements that began with broadcasting,—the B-T reputation for designing best circuits and apparatus rests on an unbroken series of continued successes.

The first 3-circuit tuner, the first 3-circuit transformer, the first vernier condenser and the "NAMELESS" circuit are our achievements of the past. In their day they represented the best apparatus of their kind.

But as an engineering organization we know that the best thing we have ever done is the B-T "COUNTERPHASE" and the parts we have designed for it. The achievement of a long cherished dream, the sixth tube where it belongs, as a third stage of radio frequency amplification. Only two tuning controls and distant stations with a short indoor antenna. Selective to the point where added sharpness would cause distortion by cutting off the side bands.

Yet anyone can build this master set.

B-T instructions and blue prints show the way clearly step-by-step to the finished job. A typical B-T touch is the wiring cable furnished with each kit that makes all radio frequency connections correctly, quickly.

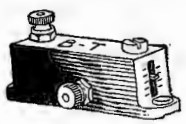
The "COUNTERPHASE" can also be made with two stages of R. F. and requires the regular antenna.

Kits on sale at all reliable dealers. Write for Descriptive Circulars.

The Newest Thing in Radio. Is always found in the B-T magazine, "BETTER TUNING." News direct from the manufacturer's laboratory. 10c per copy or 50c per year. Issued bi-monthly.

The B-T Tuning Control combines exterior beauty with mechanical efficiency. Smooth easy action without backlash. No strain or pull on condenser shaft. Works with both right or left turning instruments. Reads in dial numbers, and either wave lengths or station call letters.
Price B-T Tuning Control, each $2.50

B-T variable high resistances do not become impaired, noisy or change in value through continuous service. They do not act as a choke to radio frequency currents. A unique mechanical arrangement does not subject the resistance element to wear. Made as variable high resistances, potentiometers and modulators, resistances from 400 to 500,000 ohms.
Price $2.00

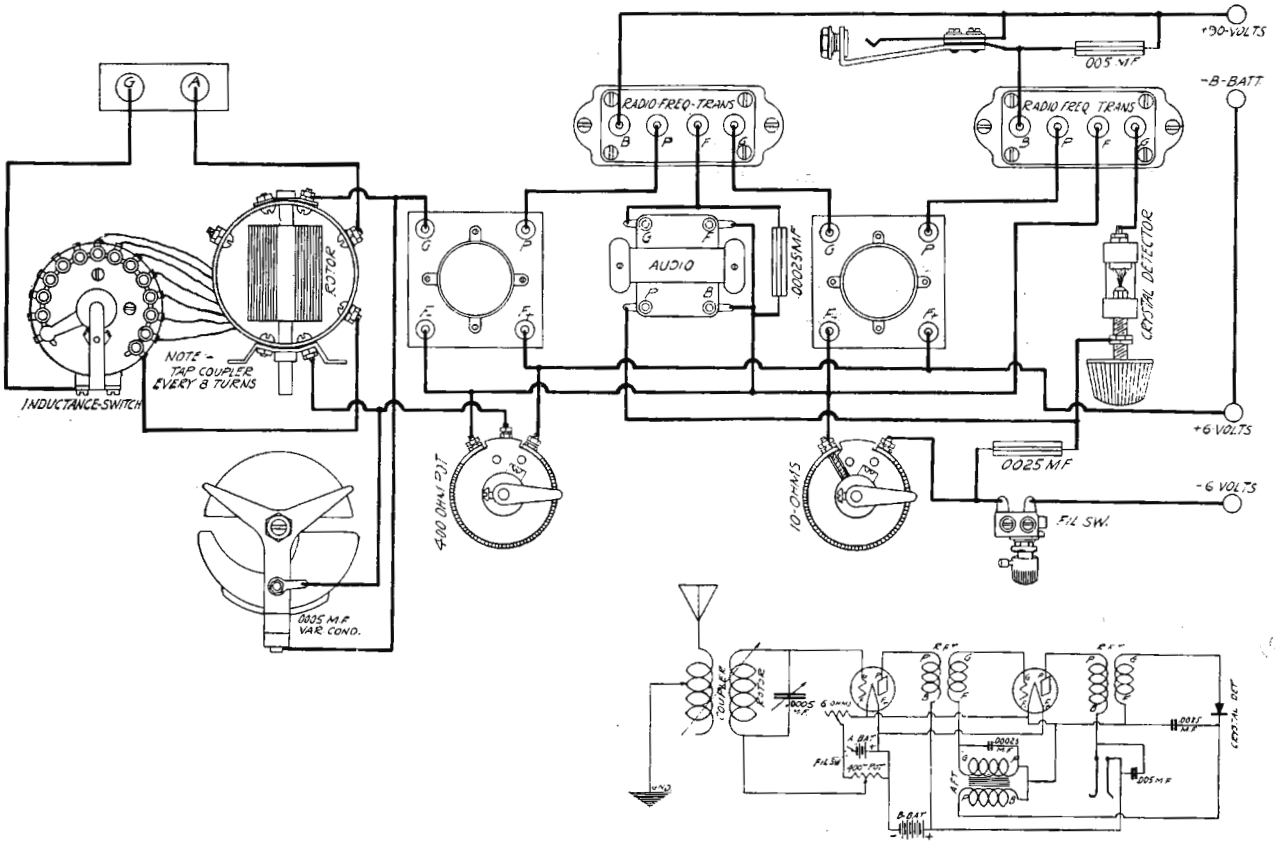


The B-T Mikro-Mike Condenser has a capacity range from ½ M. M. F. to 30 M. M. F. Change in capacity takes place over twelve full turns of the adjusting screw. The capacity curve is logarithmic, insuring equal ease of the adjustment over the whole capacity range.
The indicator at one end of the condenser casing shows relative adjustment.
Price, Mikro-Mike Condenser 90c

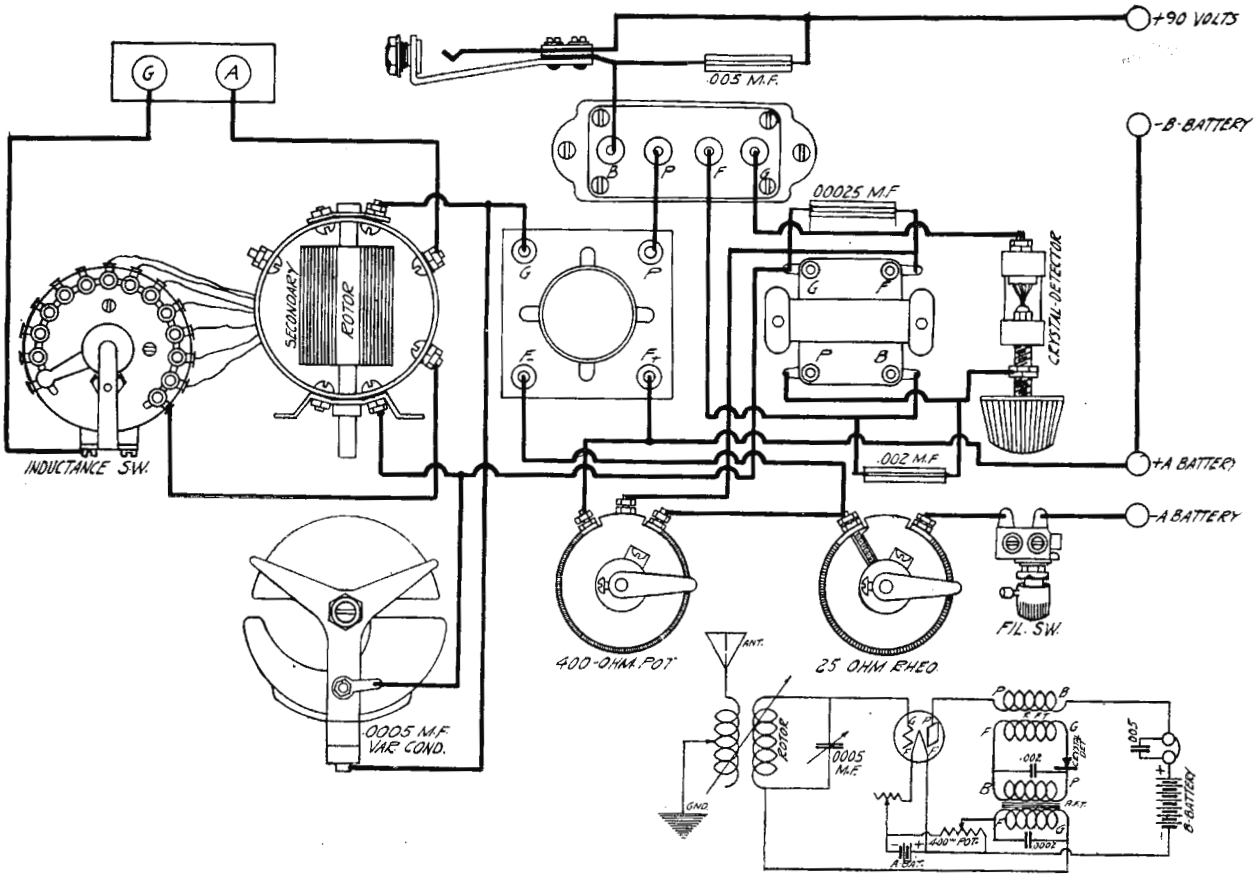
BREMER-TULLY MFG. CO.

532 South Canal Street **Chicago, Illinois**

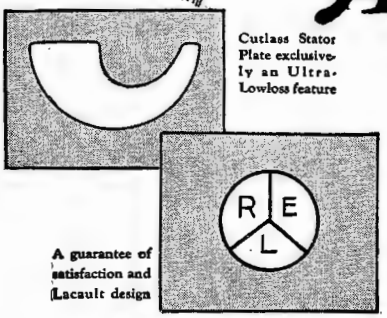
2 Tube Reflex



1 Tube Reflex



As positive as Big Ben



Cutlass Stator Plate exclusively an Ultra-Lowloss feature

A guarantee of satisfaction and Lacault design

SET Big Ben at seven and at seven o'clock you're bound to get the alarm.

Just so, the Ultra-Lowloss condenser can be set at any wave-length—the corresponding station will come in clear and sharp. You know instantly where to turn, once a station of known wavelength is located. Makes tuning easy—direct—positive. Special Cutlass Stator Plates spread wavelengths evenly over a 100 degree scale dial so that each degree represents approximately 3½ meters.

Ultra-Lowloss condensers are designed by R. E. Lacault, originator of the famous Ultradyne Receivers, and built upon scientific principles which overcome losses usually experienced in other condensers.

At your dealer's, otherwise send purchase price and you will be supplied postpaid.

Design of lowloss coils furnished free with each condenser for amateur and broadcast wavelengths showing which will function most efficiently with the condenser.

To Manufacturers Who Wish to Improve Their Sets

Mr. Lacault will gladly consult with any manufacturer regarding the application of this condenser to his circuit for obtaining best possible efficiency.

ULTRA-VERNIER TUNING CONTROL

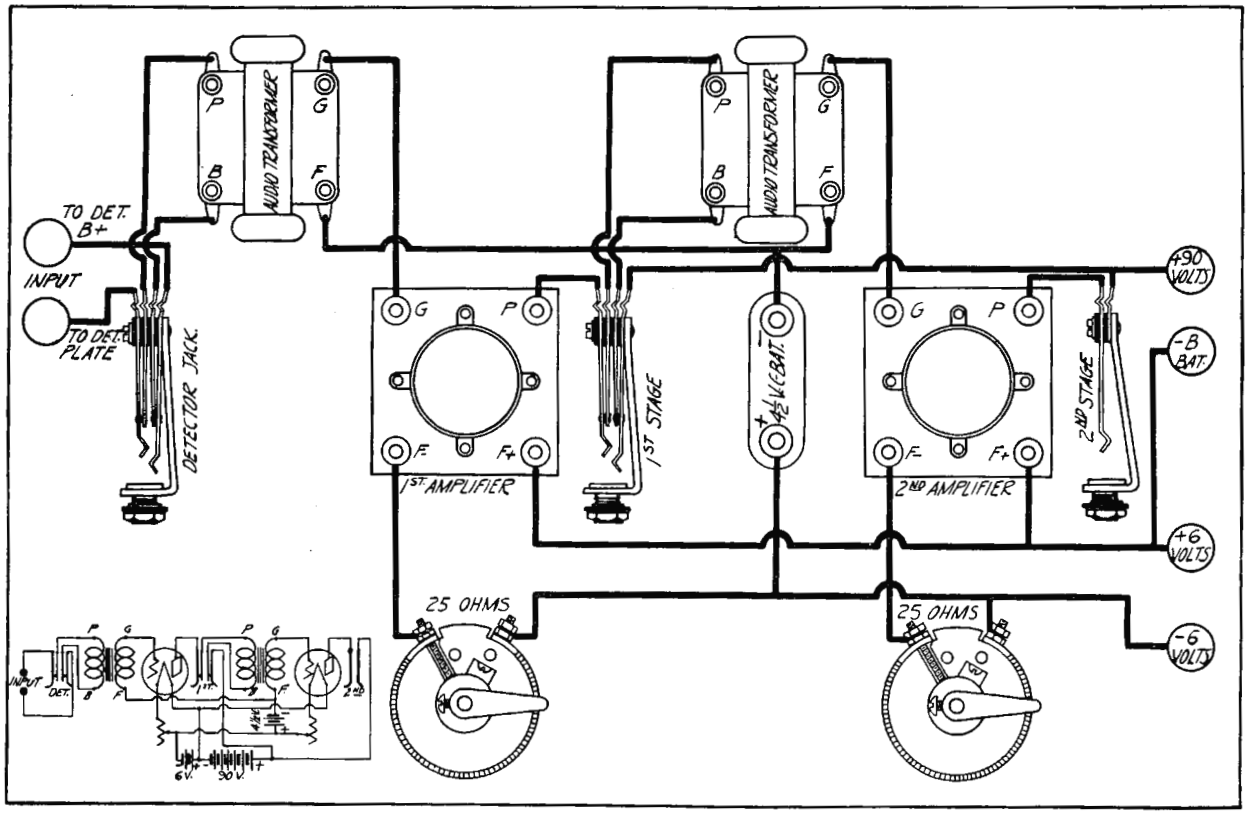
Simplifies radio tuning. Pencil-record a station on the dial—thereafter, simply turn the finder to your pencil mark to get that station instantly. Easy—quick to mount. Eliminates fumbling, guessing. Furnished clockwise or anti-clockwise in gold or silver finish. Gear ratio 20 to 1.

Silver $2.50 Gold $3.50

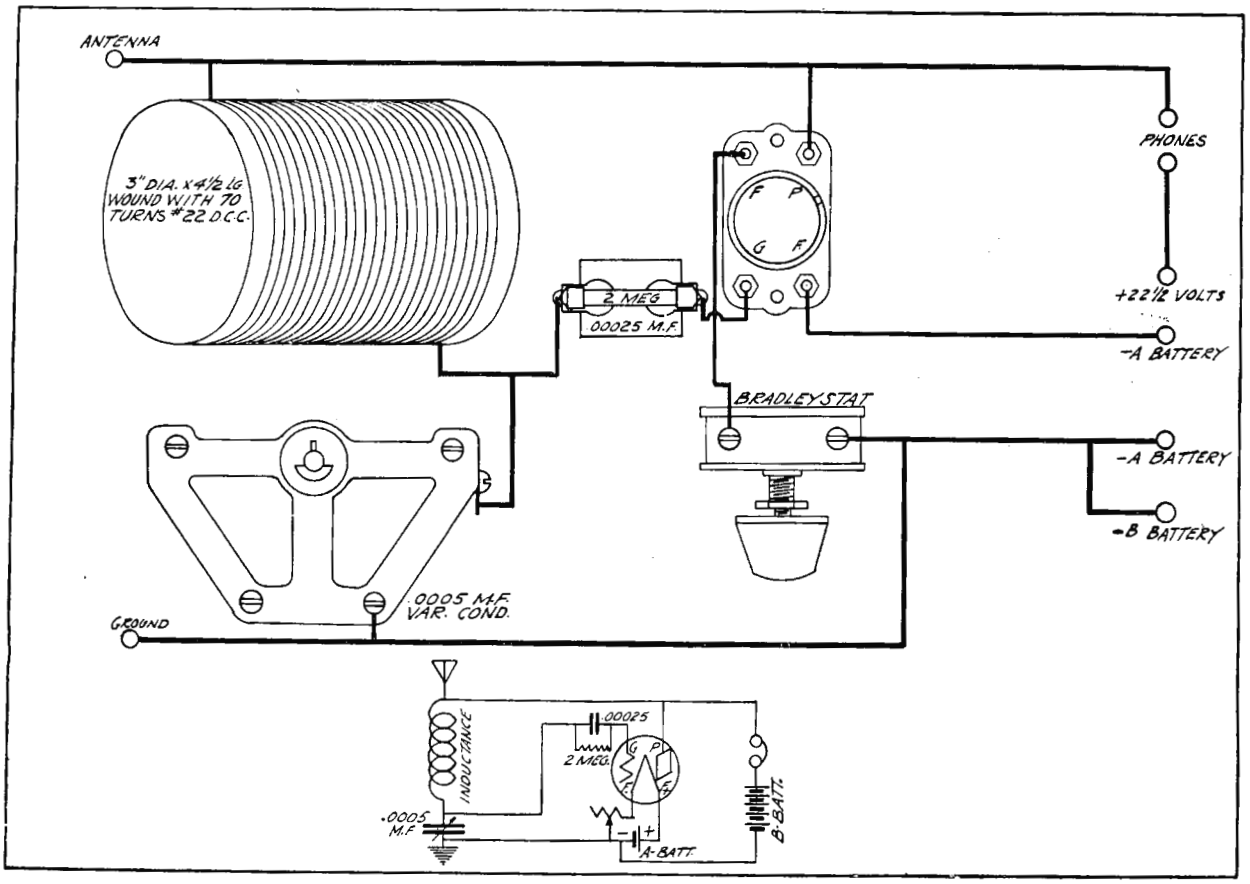
ULTRA-LOWLOSS CONDENSER

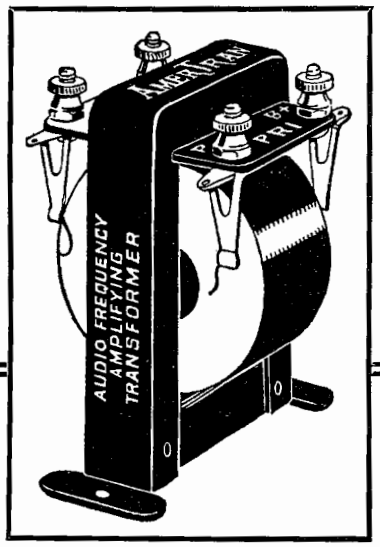
PHENIX RADIO CORPORATION, 114-G E. 25th St. NEW YORK CITY

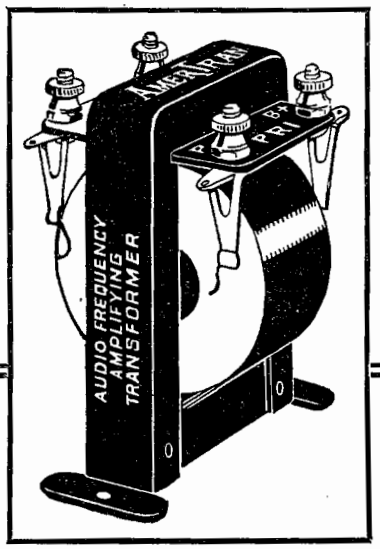
Two Stage Audio Frequency Amplifier



Ultraudion







AmerTrans continue from month to month as one of the *best* selling audio transformers.

There is ample volume, and the "tone-keen" characteristic of AmerTrans furnishes a pleasant, distinct reception value—most appreciated by the critical listener. In fact, there is not a more efficient and permanent working part in any set than a pair of AmerTrans.

This is important to remember when a receiver is to be kept in use for years without exchange and with a minimum number of replacements.

AmerTrans are made in two types, one quality—A F 6, ratio 5:1, and A F 7, ratio 3½:1. Price of either model, $7.00.

Buy Them By the Pair From an Authorized AmerTran Dealer.

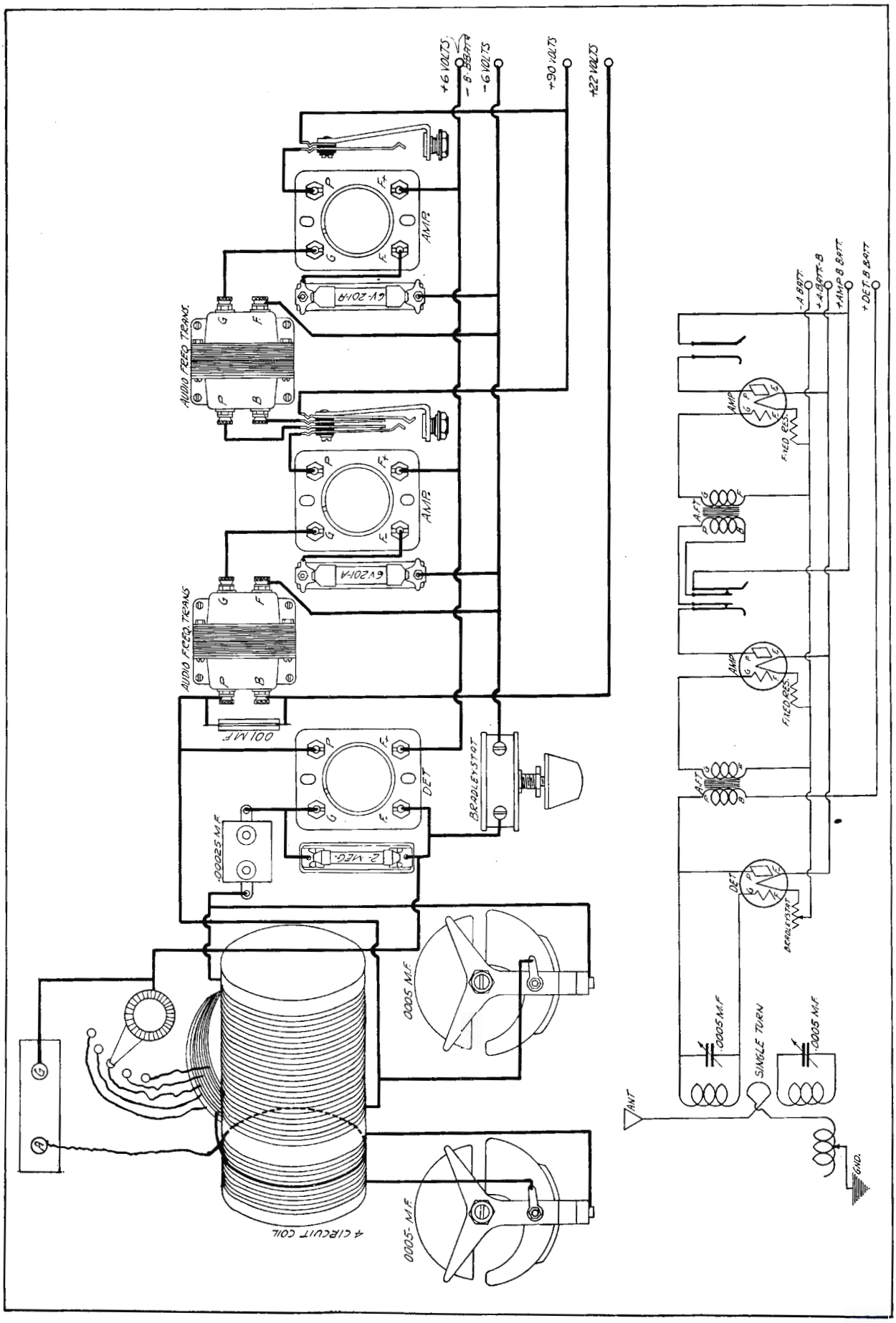
AMERICAN TRANSFORMER COMPANY

180 Emmet Street **Newark, N. J.**

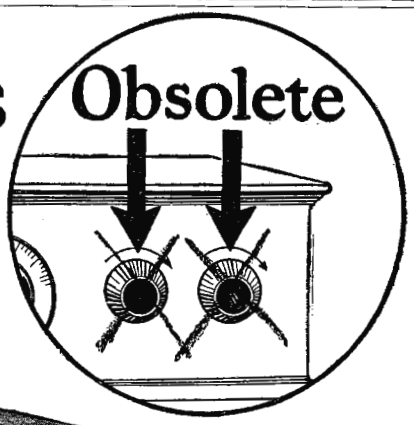
"Transformer builders for over twenty-four years"

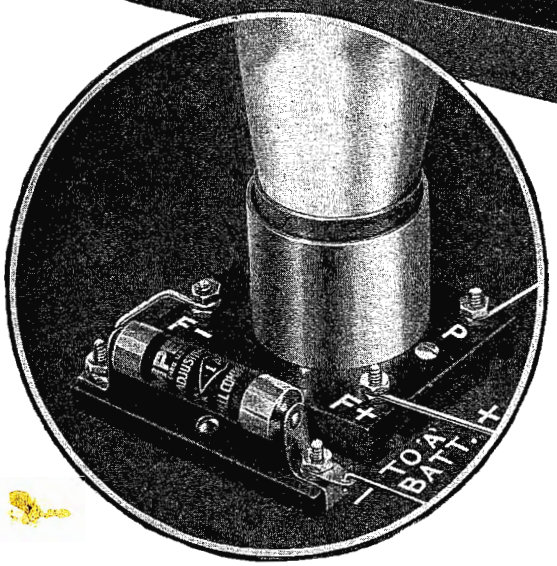
AMERTRAN
TRADE MARK REG. U.S. PAT. OFF.

Four-Circuit Tuner



8 improvements at ONE stroke





PRICE $1.10 EVERYWHERE

Write for
FREE
Hook-Ups

The Self-Adjusting Rheostat

1. Eliminates hand rheostats—thereby simplifying control and giving compactness.
2. Greatly simplifies set wiring, therefore makes for greater efficiency.
3. Prolongs life of tubes from two to three times.
4. No moving parts—therefore no grinding noises.
5. Permits use of any type of tubes or any combination of tubes.
6. No filament meters necessary.
7. Brings the most out of each individual tube—automatically—no guessing.
8. Makes perfect tube operation absolutely fool-proof.

AMPERITE operates on the thermo-electric principle. Contains a specially treated filament hermetically sealed in a glass tube and surrounded by an inert gas. This filament has the unique property of automatically changing in resistance as the "A" battery voltage changes—so that a practically constant current is maintained in the tube filament. Consequently the tubes are constantly operated at maximum efficiency. No knob to turn. Nothing to get out of order. Amperite mounts conveniently inside the set. Really takes the place of a good hand rheostat, a delicate meter and an expert operator.

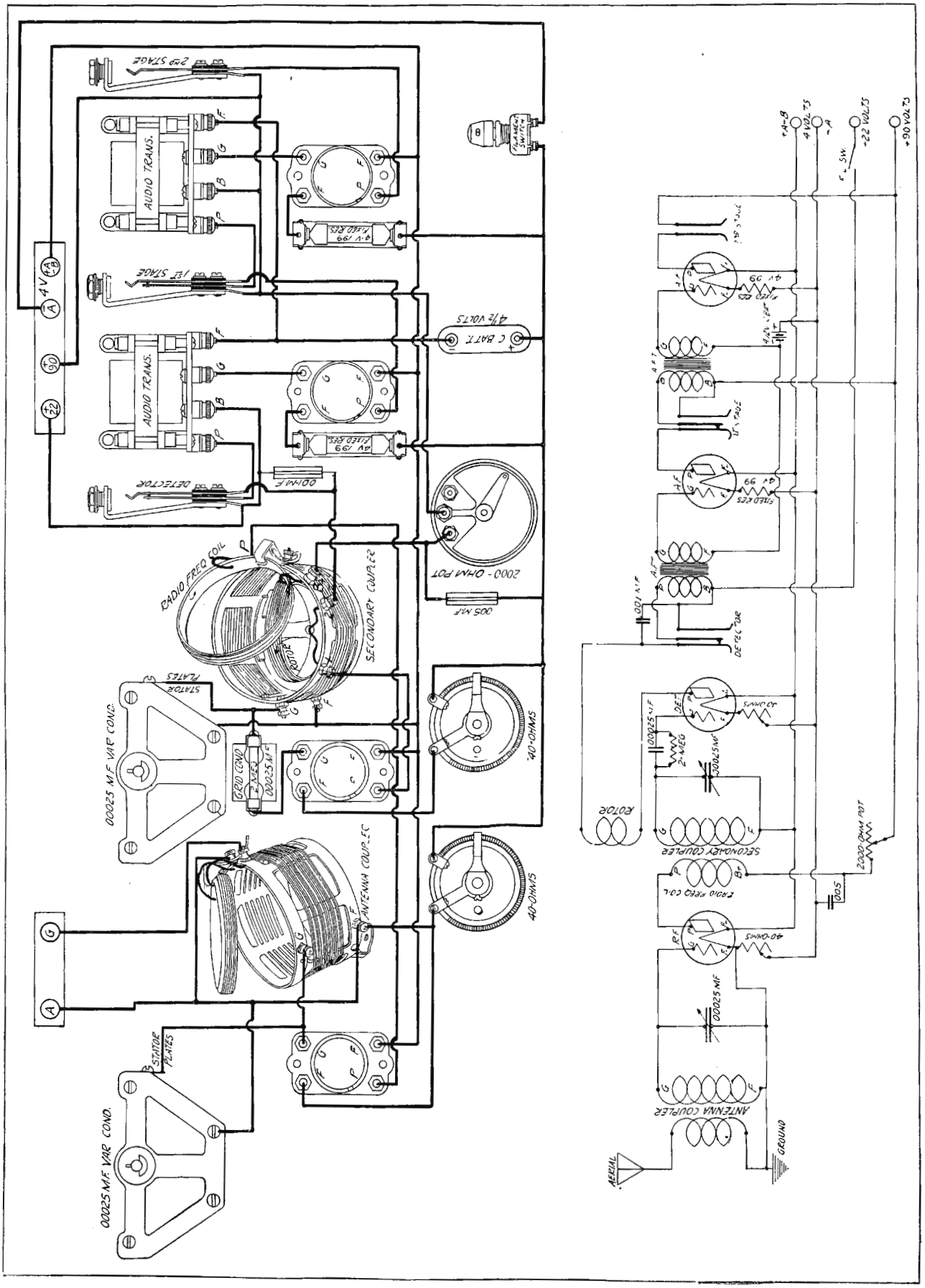
Thoroughly approved by every prominent laboratory. Used as standard equipment in such sets as **Somerset, Ultradyne, Hoyt Augmentor, Pfanstiehl, Roberts, Browning, Drake, Cockaday** and numerous others. Perfect for every circuit. Fully guaranteed.

RADIALL COMPANY
Dept. R.C.B.-2, 50 Franklin St., New York

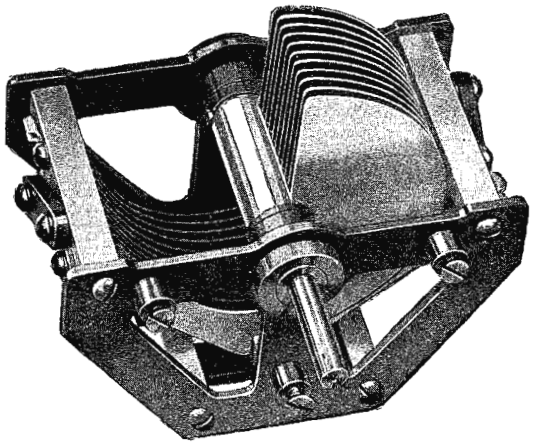
AMPERITE
REG. U.S. PAT. OFF.

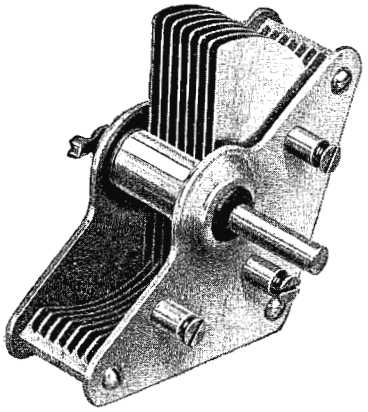
"means right amperes"

4 Tube Nonreradiating Regenerating Receiver



The Quality of Your Receiver Is Measured by the Quality of Your Condensers





The Superiority of These Straight Line Frequency Condensers is Immediately Evident!

Every time you tune-in your set, the unalterable fact impresses itself upon you. There are many more high-frequency, low wave-length stations. That is why ordinary condensers crowd a great number of stations at one side of the dial and leave the other end practically open, affording selectivity on high wave-length stations only. **Now** all that trouble is eliminated by the new DUPLEX **Straight Line Frequency** Condensers. Their specially designed rotor plates space the stations over the entire dial, enabling you to receive, clearly and distinctly, the many stations that were formerly just an unintelligible jumble of sound.

DUPLEX STANDARD

As before, the utmost in condenser quality and workmanship — but with an **improved design**. Takes no more space than the previous model—fits the same mounting holes. Has all the precision, accuracy and low losses that always have distinguished the DUPLEX STANDARD—and **now** it adds super-selectivity, due to its straight line frequency curve.

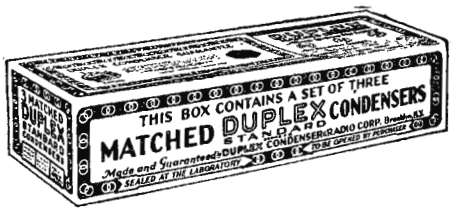
DUPLEX JUNIOR

Even a better value than before. Unquestionably "the best at the price." Die-cast rotor, forced-in stator plates and Bakelite insulation are among its features, formerly found only in the higher-priced condensers. And **now** the straight line frequency model replaces the previous model without the need for redrilling the panel or altering wiring.

DUPLEX MATCHED CONDENSERS

always read alike. Only one number to log.

They give one-dial simplicity to a three-dial set while retaining full selectivity.



DUPLEX MATCHED CONDENSERS

are made to Bureau of Standards specifications for lowest losses and best electrical characteristics. Rugged construction assures dependability.

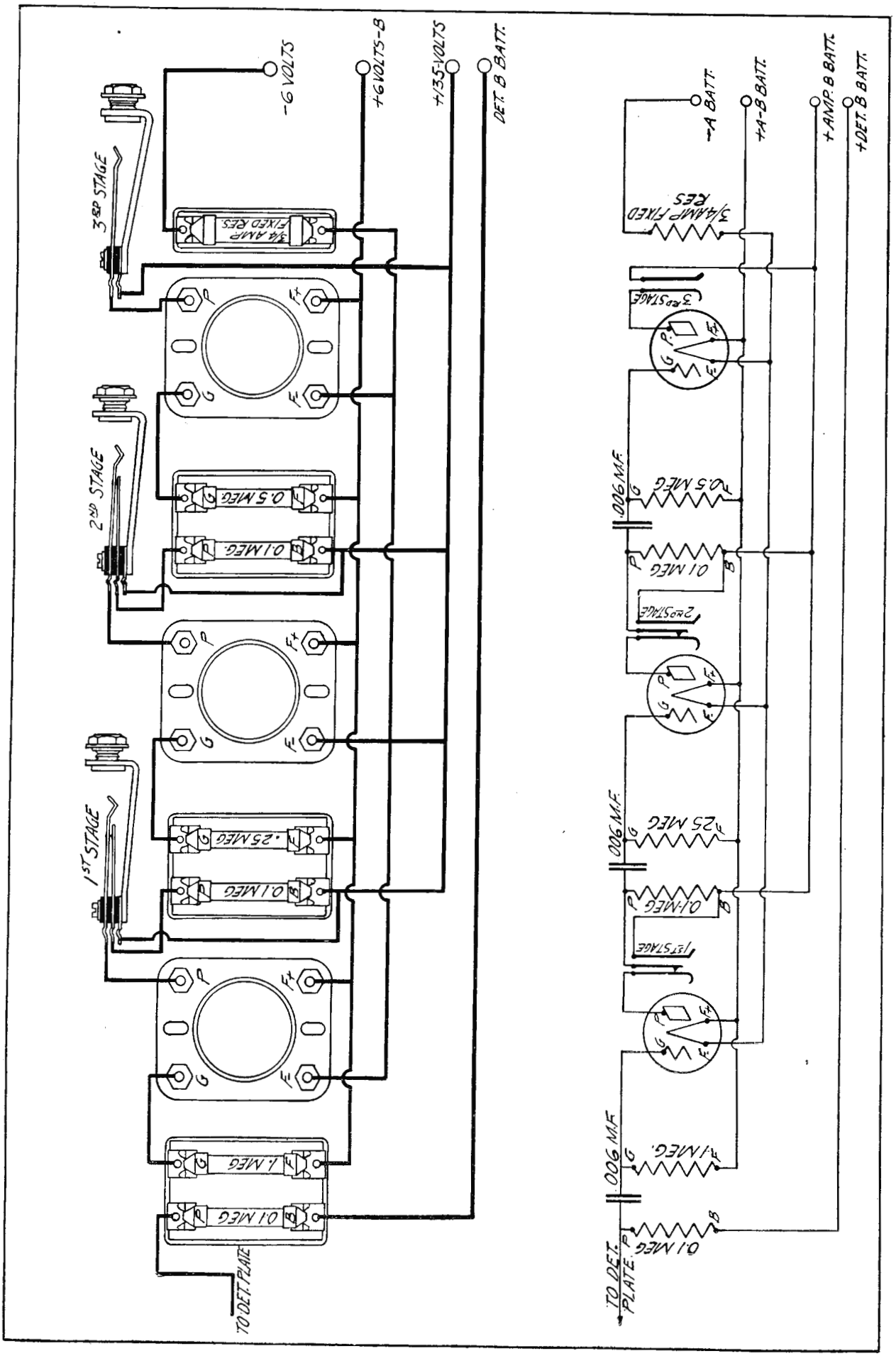
High Class Dealers Everywhere Sell Duplex Condensers. Write for Literature to

DUPLEX CONDENSER & RADIO CORP.,

28 Flatbush Ave. Extension, Brooklyn, N. Y.

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

Resistance Coupled Amplifier



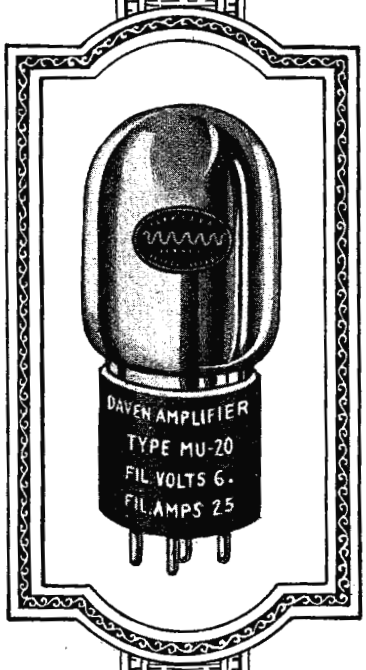
The Tide Has Turned!

Today, wherever you go—to set manufacturers, radio engineers, dealers, experimenters, or amateur set builders — you hear the praises sung of Daven Resistance Coupled Amplifiers. Why?

Because years of research, experimentation, and investigation have conclusively proven that Resistance Coupled Amplification is the best known method of procuring *amplification without distortion.*

Recognizing the *shortcomings* of the average present day vacuum tube, Daven has created a special tube for specific use in Daven Resistance Coupled Amplifiers—the *Daven High Mu Vacuum Tube.* This tube is recommended solely for use with Daven amplifiers. It is not a "Jack of all trades" tube.

Folder descriptive of Daven High Mu and Daven Power Tubes may be obtained from your dealer or we will mail one direct.



Daven Super Amplifier $15.00	High Mu Tubes Mu-20 $4.00 Mu- 6 5.00	Daven 3-Stage Amplifier Kit $9.00

Daven Products are sold only by good dealers.

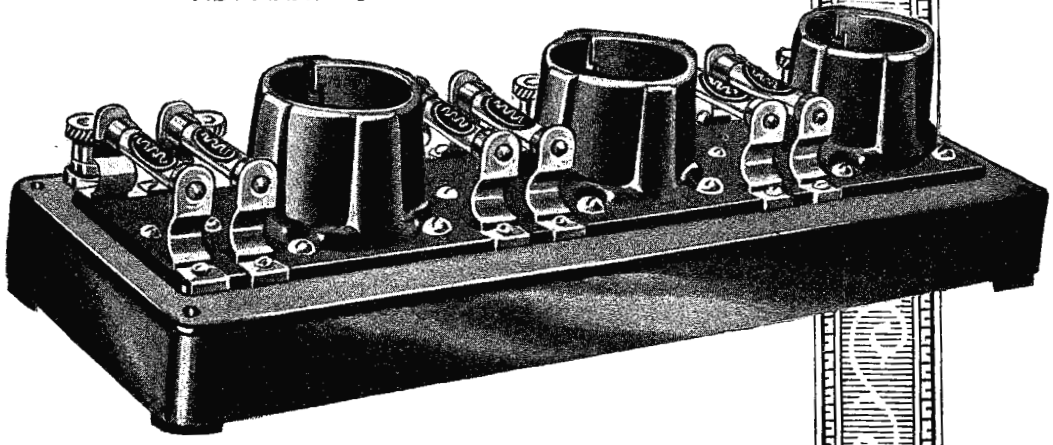
For valuable information on Resistance Coupled Amplification, read the RESISTOR MANUAL. From Your Dealer 25c or postpaid 35c.

The Sine of Merit

DAVEN RADIO CORPORATION

TRADE MARK *"Resistor Specialists"* REG. U.S. PAT. OFF.

NEWARK, N. J.



Review of Circuits

The Diagrams Covering the Circuits Mentioned Below Will Be Found on Preceding Pages

FOUR STAGE IMPEDANCE COUPLED AMPLIFIER

For the experimenter who desires a real audio frequency amplifier that will handle plenty of volume without distortion this circuit offers wonderful possibilities.

A complete description will be found on page 52.

List of Parts

4 Thordarson autoformers.
1 Dubilier .002 MF condenser.
3 Kellogg .5 MF cendensers.
1 Kellogg 1 MF condenser.
4 Frost No. 618 sockets.
1 Frost No. 658 10-ohm rheostat.
1 Frost No. 234 jack.
1 Frost No. 224 jack.
4 Daven No. 50 grid leak mountings.
1 Daven ½ megohm grid leak.
2 Daven .01 megohm grid leaks.
1 Daven ¼ ampere ballast resistance.
1 4½ volt "C" battery.
1 CRL 500,000 ohm potentiometer.
1 Formica 7x21x3/16 panel.
1 8½x20x¾ baseboard.
6 binding posts.

TWO TUBE REFLEX CIRCUIT

Reflex circuits give excellent results if properly handled, as no distortion will result from the crystal detector.

In the circuits shown the General Radio variocoupler should be tapped every eight turns.

List of Parts

1 Phenix .0005 MF variable condenser.
1 American transformer.
1 Acme R3 reflex transformer.
1 Star crystal detector.
1 Howard 400 ohm potentiometer.
1 Howard 6½ ohm rheostat.
2 Howard sockets.
1 General Radio No. 268 vario coupler.
1 Yaxley inductance switch.
1 Yaxley battery switch.
1 Yaxley No. 1 jack.
1 Muter .0025 MF condenser.
1 Muter .00025 MF condenser.
1 Muter .005 MF condenser.

ONE TUBE REFLEX

This circuit uses only one tube and a crystal detector. If properly constructed distant stations can be brought in on the loud speaker.

List of Parts

1 Phenix .0005 MF variable condenser.
1 Amertran transformer.
1 Acme R2 reflex transformer.
1 Star crystal detector.
1 Howard 400 ohm potentiometer.
1 Howard 25 ohm rheostat.
1 Howard socket.
1 General Radio No. 268 vario coupler.
1 Yaxley inductance switch.
1 Yaxley battery switch.
1 Yaxley No. 1 jack.
1 Muter .002 MF condenser.
1 Muter .00025 MF condenser.
1 Muter .005 MF condenser.

TWO STAGE AUDIO FREQUENCY AMPLIFIER

There are a great many radio fans using one tube or crystal sets who are anxious to increase their range.

With this in mind we have drawn a good two stage audio frequency amplifier that is easy to construct.

List of Parts

2 Amertran audio frequency transformers.
2 King No. 374 jacks.
1 King No. 371 jack.
2 Howard 25 ohm rheostats.
2 Howard sockets.
6 binding posts.
1 4½ volt "C" battery.

ONE TUBE ULTRAUDION CIRCUIT

For beginners this is a very simple receiver to build. Care should be taken to keep the receiver from oscillating, as it will disturb your neighbors.

List of Parts

1 Bakelite tube 3x4½-inch wound with 70 turns of No. 22 DCC wire.
1 General Radio 199 socket.
1 Muter .00025 MF condenser with grid leak mounting.
1 Muter 2 megohm grid leak.
1 Duplex .005 MF variable condenser.
1 Bradleystat.
8 Binding posts.
1 Pair head telephones.
1 22½ volt "B" battery.
3 Dry cells.
1 UV 199 tube.
1 Formica panel 6x14x1/8 inch.
1 Baseboard 6x13½x½ inch.
1 Kurz Kash 3-inch dial.

FOUR CIRCUIT TUNER

This is a well-known circuit, does not reradiate and is very selective. We have shown in the diagram how it can be constructed, using only one variable rheostat.

List of Parts

1 Set of 4 circuit tuner coils.
2 Phenix .0005 variable condensers.
1 Muter .00025 MF condenser.
1 Muter .001 MF condenser.
1 Daven 2 megohm grid leak with mounting.
1 Bradleystat.
2 Six volt amperites.
3 Heath sockets.
1 King No. 374 jack.
1 King No. 371 jack.
2 Modern audio transformers.
1 Howard switch lever.
5 Contact points.
7 binding posts.

FOUR TUBE NON-RERADIATING REGENERATIVE RECEIVER

This is a very efficient low loss three circuit tuner, having but two controls, one for regeneration and one for wave-length.

One stage of radio frequency amplification is used ahead of the detector, making the circuit very selective.

List of Parts

2 Duplex .00025 variable condensers.
1 AC3 Bremer Tully antenna coupler.
1 Type B Bremer Tully low loss tuner.
2 Carter No. 102A jacks.
1 Carter No. 101 jack.
1 Carter filament switch.
2 King 40 ohm rheostats.
2 Four volt 199 amperites.
1 Muter .00025 MF grid condenser.

1 Muter 2 megohm grid leak.
1 Muter .005 MF condenser.
1 Muter .001 MF condenser.
2 Acme audio transformers.
4 Howard sockets.
1 4½ volt "C" battery.
6 Binding posts.

THREE STAGE RESISTANCE COUPLED AMPLIFIER

Resistance coupled amplification, having no distorting windings, is free from the defects of transformer coupled amplifiers. The clarity of speech is a revelation even to those who have enjoyed the output from the best of transformer amplifiers. However, as there is no step-up ratio, there is less amplification per stage. Three stages of resistance coupled audio frequency amplification is about equivalent in volume, and superior in quality, to the best transformer coupled two-step intensifier. Two stages of resistance coupled A. F. will satisfactorily actuate a good loud-speaker.

It is unnecessary to emphasize that this system of amplification entails considerably less of an original financial outlay than the conventional amplifier. The cost of a three stage, with the extra tube and socket, approximates three-quarters that of a two-step transformer coupled amplifier.

The plate current consumption of the resistance coupled amplifier is also lower than that of the usual unbiased transfer coupled type. This is contrary to the prevalent and fallacious idea that the resistance coupled system imposes an excessive drain on the "B" battery. Applying a plate potential of 120 volts, through coupling resistances of 100,000 ohms, each tube will draw approximately one milli-ampere.

List of Parts

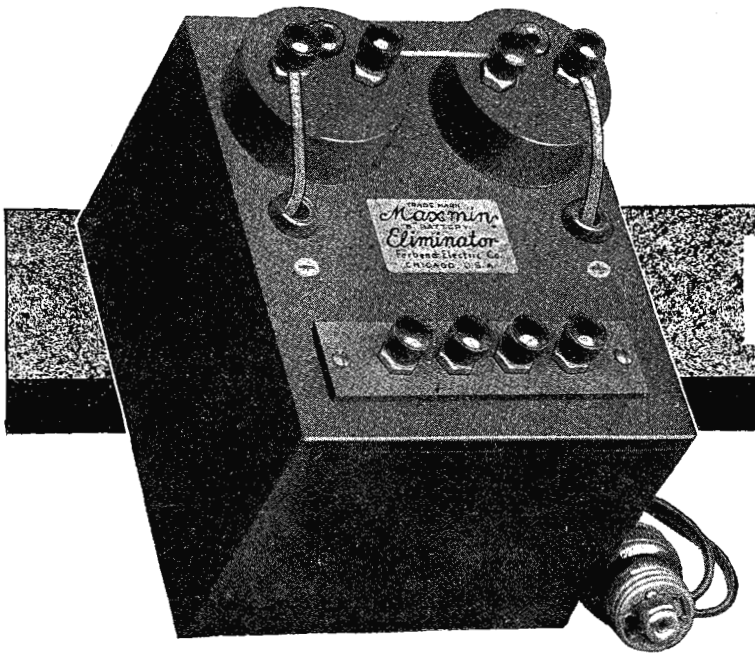
3 Daven resisto-couplers with condensers.
1 Daven ¾ ampere ballast resistance.
1 Daven .25 megohm resistance.
3 Daven .1 megohm resistance.
1 Daven .05 megohm resistance.
1 Daven 1 megohm resistance.
3 Heath sockets.
1 King No. 371 jack.
2 King No. 372 A jacks.
4 Binding posts.

THIRTY KILOCYCLE SUPERHETERODYNE

This circuit differs from the ordinary "super" in that it uses only two stages of intermediate frequency amplification. It is more important for volume to have two stages of audio frequency amplification performing satisfactorily without the usual squeals and howls so easily contracted.

List of Parts

1 Signal loop.
2 Signal .0005 MF variable condensers.
7 Naald sockets.
2 General Radio No. 271 intermediate frequency transformers.
1 General Radio No. 331 filter coil.
1 General Radio oscillator coil.
1 Bakelite tube, 3 inches in diameter and 2½ inches long.
1 Yaxley 25 ohm rheostat.
2 Yaxley 10 ohm rheostats.
1 Yaxley No. 2A jack.
1 Yaxley No. 3 jack.
1 Yaxley filament switch.
1 Yaxley 400 ohm potentiometer.
1 Hammarlund .000045 variable condenser.
2 Acme audio frequency transformers.
2 Muter .00025 MF condensers with grid leak mounting.
1 Muter .002 MF condenser.
1 Muter .006 MF condenser.
1 Muter 0.5 condenser.
2 Muter 2 megohm grid leaks.
2 Daven No. 50 resistance mountings.
2 Daven ¼ ampere resistances.



Superior Results Guaranteed

$9.75

Complete, nothing else to buy.

Operates at maximum efficiency at all times on either direct or alternating current, any frequency.

Delivers unlimited current to any receiving set regardless of number of tubes.

Delivers 100 volts to ANY set.

Cost of operation less than 50c a year.

It lasts indefinitely.

All parts are specially designed and manufactured by us for this purpose only.

Unconditionally Guaranteed

to be equal or superior to any eliminator on the market, regardless of price.

Now-Plate Voltage for any Set—and You can afford it!

First Cost Economy now makes it possible for EVERYONE to obtain efficient "B" current supply right from their electric light socket. Now one of the biggest improvements in modern-day radio reception is placed within the reach of all. Think of it! A perfect, always efficient source of plate voltage for *any* set for $9.75! It marks a revolutionary step forward and will be welcomed by millions of radio enthusiasts.

The price of this remarkable new unit is spectacular in more than one way. Besides saving you from $15 to $50 it is amazingly low considering the quality and superiority. You may ask "how could it be possible to build such a unit for the ridiculously low prices of $9.75?" True mechanical genius and resourcefulness alone are responsible. But the logical way to answer this question is to equip your set at once with this marvelous unit and be convinced.

FERBEND
Wave Trap
PATENT APPLIED FOR

This company also manufactures the famous Ferbend WAVE TRAP — the instrument which has been widely imitated but never equaled. It is the only **original** and **genuine.**

Ask Your Dealer—or Send Direct

Until nation-wide distribution is completed it is possible that your dealer hasn't stocked the MAXMIN "B" Battery Eliminator as yet. So you will not have to wait, we will make prepaid shipment direct to you upon receipt of $9.75, or C. O. D., plus postage. Remember, *superior results are guaranteed* or your money back. Be one of the first to own and use the Ferbend MAXMIM "B" Battery Eliminator.

Use the COUPON NOW!

FERBEND ELECTRIC COMPANY
26 East South Water Street **Chicago, Ill.**

FERBEND ELECTRIC CO.
26 E. South Water St., Chicago

☐ Send Postpaid. I am enclosing $9.75.
☐ Send C.O.D., plus few cents postage.
☐ Send Literature.

Name.....

Address.....

City.....

State.....

Ferbend *Maxmin* "B" *Eliminator*

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

Balkite Radio Power Units

the ideal power supply for any radio set

Balkite Radio Power Units are the ideal power supply for any radio set. They simplify and improve radio reception. They reduce the amount of attention you must give your set. With their use your current supply is always exactly what is required for each circuit.

For the "A" circuit there are the Balkite Chargers. Because of its obvious advantages the Balkite Battery Charger is the most popular charger on the market. Entirely noiseless—it is the only charger commonly used while the set is in operation.

For sets of smaller "A" current requirements—any dry cell set or sets of few storage battery tubes—there is the Balkite Trickle Charger. With a low capacity storage battery it enables owners of sets now using dry cells to make a most economical installation.

For the "B" circuit there is Balkite "B"—the outstanding development in radio. It eliminates "B" batteries entirely and supplies plate current from the light socket. It fits any set of 5 tubes or less. For sets of six tubes or more there is Balkite "B" II, the same popular model offered last year.

Noiseless—No bulbs—Permanent

All Balkite Radio Power Units are based on the same principle. All are entirely noiseless in operation. They have no moving parts, no bulbs, and nothing to adjust, break or get out of order. They cannot deteriorate through use or disuse—each is a permanent piece of equipment with nothing to wear out or replace. They require no other attention than the infrequent addition of water. They do not interfere with your set or your neighbor's. Their current consumption is remarkably low. They require no changes or additions to your set.

An "A" battery, a Balkite Charger and a Balkite "B" constitute the most advanced power equipment on the market, one that is economical, unfailing in operation, and eliminates the possibility of run-down batteries.

Manufactured by FANSTEEL PRODUCTS COMPANY, Inc.
North Chicago, Illinois

FANSTEEL
Balkite
Radio Power Units

FOR THE "A" CIRCUIT

U. S. Patent May 27, 1924

Balkite *Battery Charger*

The most popular battery charger on the market. It can be used while the radio set is in operation. If your battery should be low you merely turn on the charger and operate the set. Charging rate 2.5 amperes. Operates from 110-120 AC 60 cycle current. Special model for 50 cycles.

Price $19.50
West of Rockies, $20
In Canada, $27.50

U. S. Patent May 27, 1924

Balkite *Trickle Charger*

Charges both 4 and 6 volt radio "A" batteries at about .5 amperes. Usable in 3 ways: (1) As a regular charger with a low capacity storage battery for sets now using dry cells. (2) With storage battery sets of few tubes. Furnishes more current than used by 6 dry cell or 2 storage battery tubes, so that if used during operation it need be used at no other time. (3) As a "trickle" or continuous charger for storage battery sets of as many as 8 tubes. Size 5½ in. long, 2¾ in. wide, 5 in. high. Operates from 110-120 AC 60 cycle current.

Low capacity batteries especially adapted for use with this charger with sets now using dry cells are being offered by practically all leading battery manufacturers this fall.

Reputable manufacturers are also offering this fall for use with this charger special switches which turn on Balkite "B" and turn off the charger when you turn on your set. This makes the current supply for both "A" and "B" circuits automatic in operation.

Price $10
West of Rockies, $10.50
In Canada, $15

FOR THE "B" CIRCUIT

U. S. Patent May 27, 1924

Balkite "B"

Eliminates "B" batteries. Supplies plate current from the light socket. Operates with either storage battery or dry cell tubes. Keeps "B" circuit always operating at maximum efficiency, for with its use the plate current supply is never low. Requires no changes or additions to your set. No bulbs—nothing to replace. Requires no attention other than adding water about once a year.

A new model, designed to serve any set of 5 tubes or less. Size 8¼ in. long, 8 in. high, 3¾ in. wide. Occupies about same space as 45 volt dry "B" battery. Operates from 110-120 AC 60 cycle current.

Price $35
In Canada, $49.50

U. S. Patent May 27, 1924

Balkite "B" II

The most outstanding development in radio last season. Same as the new Balkite "B" but will fit any set including those of 10 tubes or more. Current capacity 40 milliamperes at 90 volts. Size 9 in. high, 6¼ in. wide, 7½ in. deep. Operates from 110-120 AC 60 cycle current. Special model for 50 cycles.

Price $55
In Canada, $75

The Unipower, manufactured by the Gould Storage Battery Company, is equipped with a special Balkite Radio Power Unit.

BALKITE BATTERY CHARGER · BALKITE TRICKLE CHARGER · BALKITE "B" · BALKITE "B" II

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

The Nation's Music at the Turn of a Switch!

WITH this beautiful five tube Tuned Radio Frequency Receiver in your home, distant reception is easy. A slight adjustment of the dials tunes out a high power local station and brings in the strains of music from your favorite orchestra or entertainer from any station you may desire.

This set offers you the best in radio reception results and is a decorative piece which will harmonize with the furniture in your home. The console is constructed of highly polished five-ply walnut. Has beautiful toned loud speaker and compartment below with ample room for storage of all batteries.

Complete, no extras to buy, $135.00.

The other Atec model shown below is the same set without the console cabinet. It sells complete for $85.00.

Have your dealer demonstrate the ATEC five tube to you. If he does not handle them, write us direct and we will arrange for a demonstration.

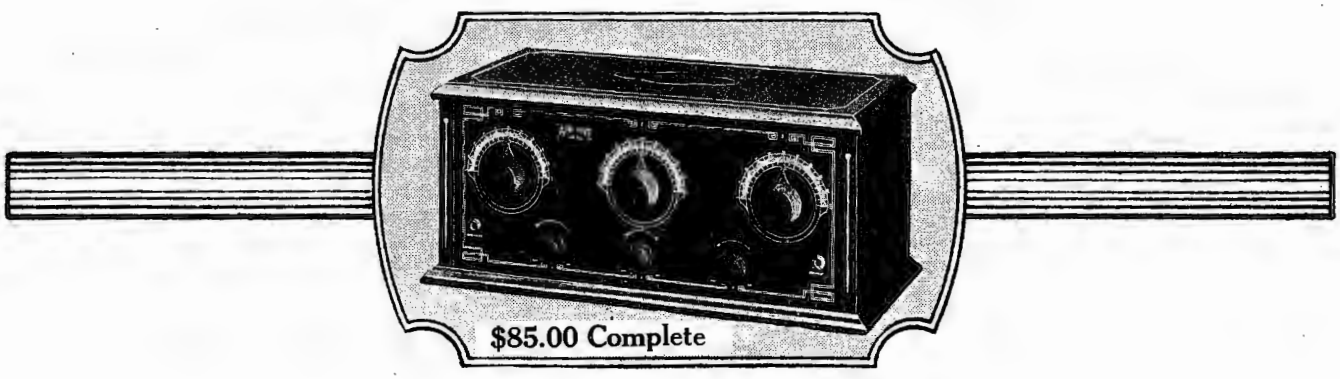
Dealers—Write for exclusive proposition

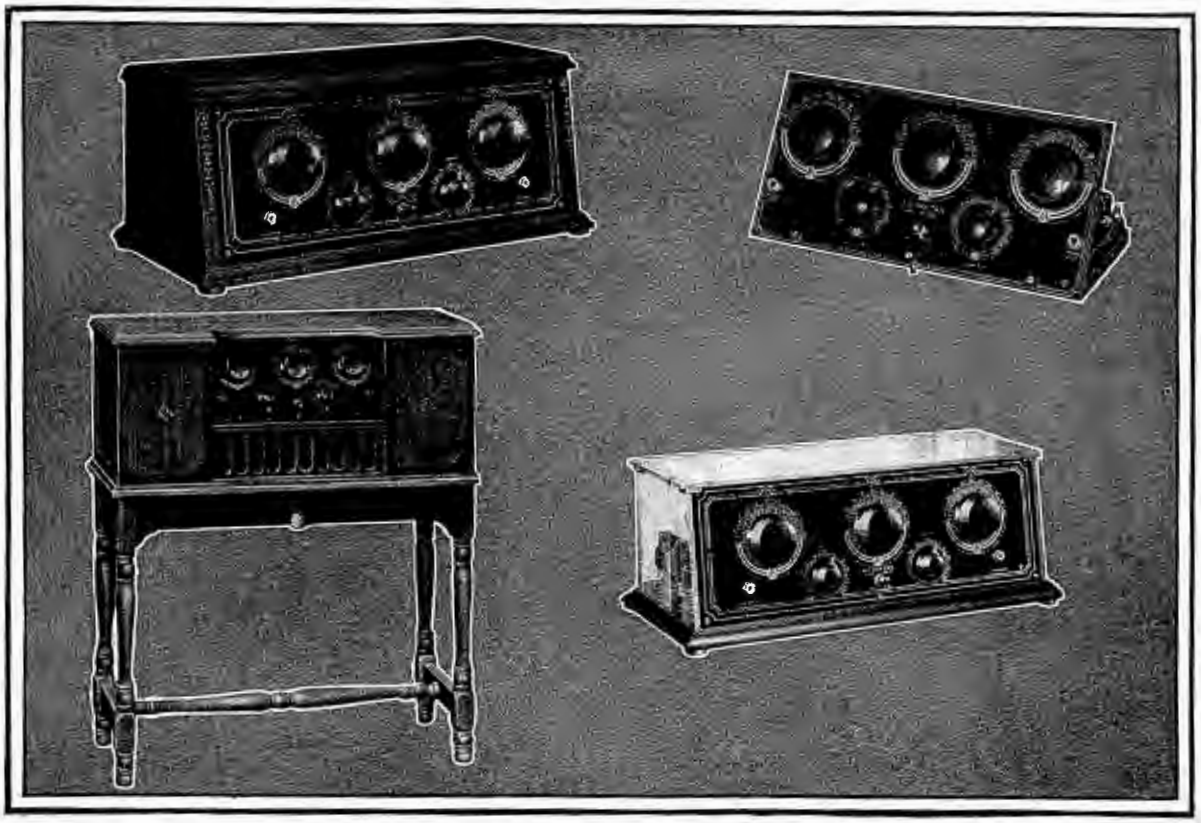
ATEC PRODUCTS

Manufactured by

ABLE TOOL & ENGINEERING CO.

536 West Elm Street **Chicago, Ill.**





Let Your Own Ears Guide You

AFTER all is said and done, the only sound basis upon which to buy a radio receiver is by what your own ears tell you. The strongest claims mean nothing, the most glowing descriptions are empty unless your set performs consistently in a way to please you and your guests.

This is the basis upon which A-C DAYTON has been built. This is the reason why A-C DAYTON has confined its efforts to the production of one circuit. Our engineers devote their whole time to the perfection of the admittedly finest circuit, with the result that you get a finer receiver for the money you have to invest.

The four models in the A-C DAYTON line shown above range in price from $85 to $185 ($90 to $190, west of Denver). Each is a five-tube tuned radio frequency set capable of equaling or bettering the performance of any other set you can buy, regardless of price. Each has a handsome black panel, silver etched with the necessary dials and each has the three controls essential to precise tuning.

Cabinet and Console models are finished in two tone mahogany, while the glass set is of rich, heavy French plate glass. The Phono-set is the same circuit as other models, built for installation in phonographs, new or old, console or cabinet model.

Let your own ears guide you when you select a radio receiver. See your local A-C DAYTON dealer and ask him to arrange a demonstration in your home. If you know of no such dealer now, simply write and we will put you in touch with the nearest radio merchant selling the A-C DAYTON line.

THE A-C ELECTRICAL MANUFACTURING CO.

Dayton, Ohio **U. S. A.**

Makers of Electrical Devices for More Than Twenty Years

A-C DAYTON RADIO

"For the Man Who Believes His Own Ears"

THE A-C ELECTRICAL MFG. CO.
Dayton, Ohio.

Please send me full information about the A-C DAYTON line and put me in touch with the nearest dealer.

Name.....

St. Address.....

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

TRUE BLUE RADIO TUBES

BRIGHTSON True Blue Radio Tubes differ from all others. They are designed by radio engineers who are authorities. They are made of materials heretofore considered too costly for commercial radio tube use by selected skilled workers, then rigidly inspected before being allowed to leave the laboratory. No other tubes are comparable to Brightson True Blue Radio Tubes.

The lowest loss tubes because of their solid silver contacts and non-conductive color bakelite bases, Brightson Tubes are also the clearest toned, because of their rigid, non-microphonic construction and high degree of vacuum. They give crystal clear reproduction. Their special filament material lasts two to three times longer than the standard.

Storage Battery Operation with Large or Small Sockets

Whether your set has 3-volt sockets or 6-volt sockets, Brightson Tubes enable you to enjoy all the economy, volume, distance and trouble freedom only 6-volt storage battery operation gives. The Standard Type fit 6-volt sockets; the Power Plus Type fit 3-volt sockets, giving 6-volt results with less drain on B batteries than with ordinary dry cell tubes. They greatly improve the range volume and smooth operation of all sets equipped for 3-volt dry cell tubes and can be used in 6-volt sockets with adapters. Both types safety cased singly or in sets.

Interchangeable Noiseless Long Lived Radio Tubes

60 Day Guarantee 10 Day Return Privilege

Unless Brightson True Blue Tubes do all that you expect of them you need not keep them. You can return them for refund within 10 days. If they develop any defects of manufacture in 60 days you may return them for replacement.

If your dealer does not stock Brightson True Blue Tubes mail your check or money order to the nearest representative listed below.

Price $3.50, Formerly $6.00

Write Our Nearest Representative

Philadelphia Representative:
R. G. Newland, 50 N. Eleventh St., Philadelphia, Pa.

New England Representative:
Wm. C. Oakes, 832 Park Sq. Bldg., Boston, Mass.

New Jersey Representative:
Triad Sales Co., Tr. Co. of N. J. Bldg., Jersey City, N. J.

Milwaukee Representative:
Yahr & Lange, 207 E. Water St., Milwaukee, Wisconsin.

Detroit Representative:
A. G. Schultz, 2831 Gratiot Ave., Detroit, Mich.

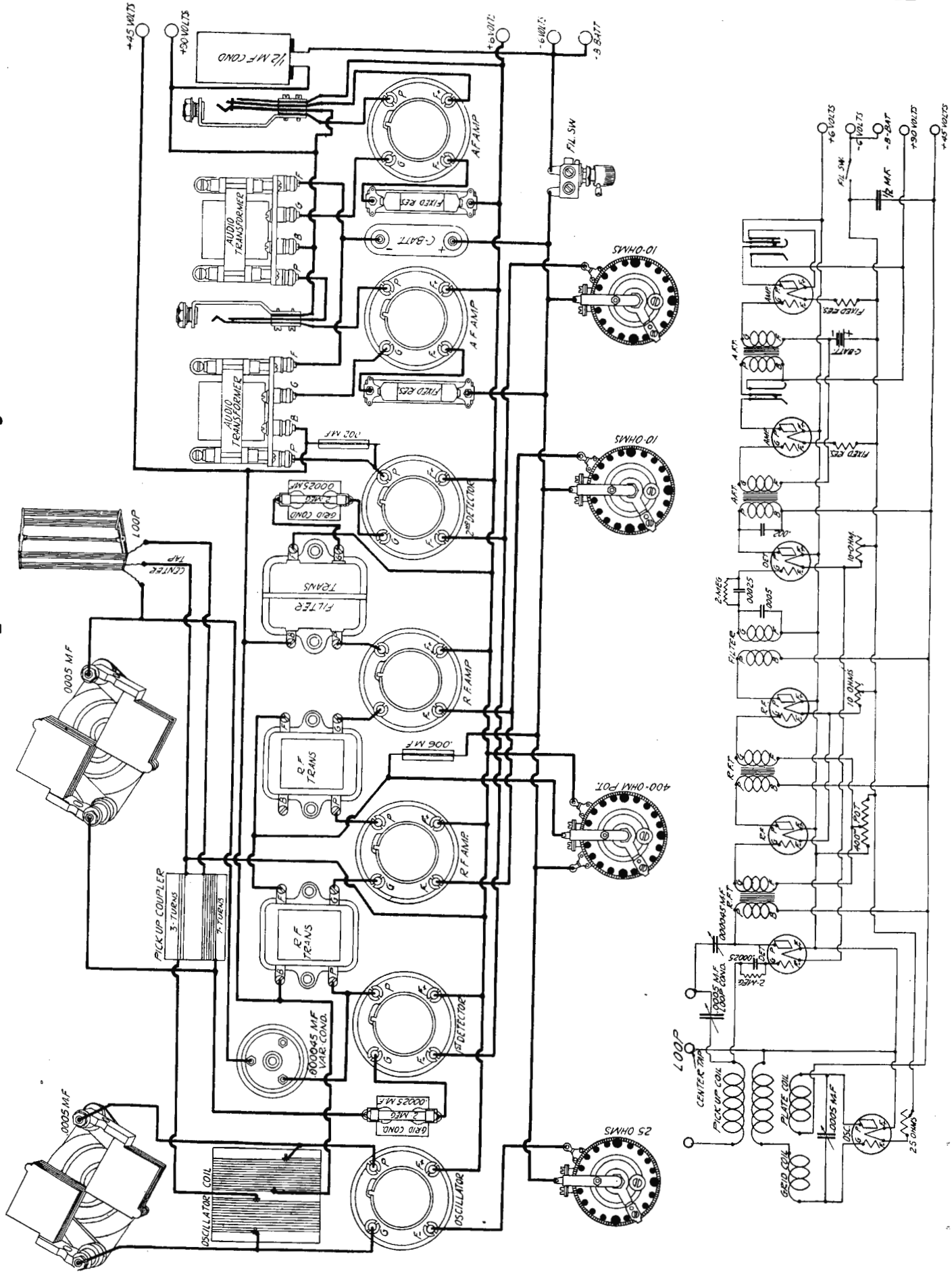
Chicago Representative:
Young, Lorish & Randall, 808 S. Michigan Ave., Chicago.

Brooklyn Representative:
G. J. Seedman Automotive & Radio Co., Bedford Ave. at Madison St., Brooklyn, N. Y.

Australia and New Zealand:
Parsons & Whittemore, Limited.
299 Broadway, New York City.

BRIGHTSON LABORATORIES, Inc., Waldorf-Astoria Hotel
16 West 34th Street, New York

30 Kilocycle Super Heterodyne



New "Signal" Products For Up-to-the-Minute Results

Signal Bracket Type Loop Aerial

This high grade aerial solves the problem of using a loop in close quarters. It is designed with a special bracket to be mounted on the end of the radio cabinet. This does away with "that extra piece of apparatus." At the same time, the aerial may be easily disconnected for moving about without unmounting the bracket. It can be turned a full 360° in a space no greater than the width of the average cabinet.

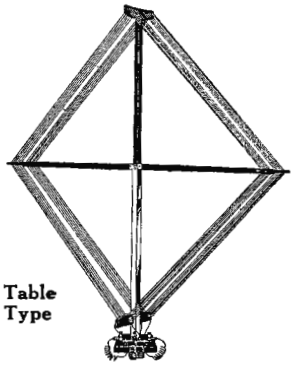
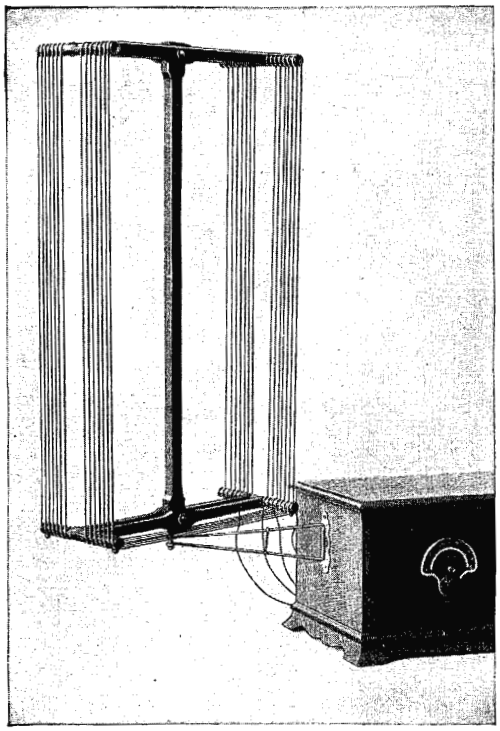


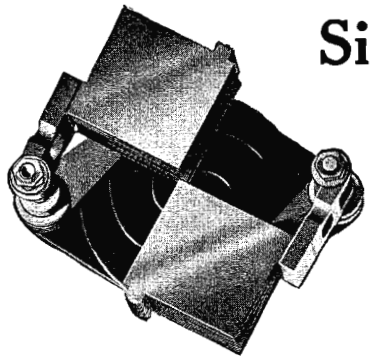
Table Type

The Signal Bracket Type Loop Aerial has all the advantages of the famous Signal Table Type Loop Aerial illustrated at the left. Built of solid walnut with extra tap for super-heterodynes and other circuits requiring a shorter aerial. See both types at your dealers. They are built for results.

Circular on Request



Signal Spiral Cam Condenser



No more "bunched-up" stations—that's the big advantage of this new and efficient condenser. Wave lengths as low as the contemplated 150 meters and up to 600 meters are evenly distributed over the 360° of the dial. Unique cam construction accomplishes this. Resistant losses are very low and the dielectric is entirely out of the condenser field. Entire unit is sturdily built in three capacities (.00025 M.F., .00035 M.F., .0005 M.F.), and is compactly designed for use in tight places. We have some interesting charts proving the efficiency of this condenser, which are yours for the asking. Write us for them. For condensers, see your dealer.

Write Us for Efficiency Charts

You will find a complete line of Signal Radio Products, including condensers, aerials, sockets and cabinets at all good radio stores. Ask your dealer to show you the new numbers.

SIGNAL ELECTRIC MANUFACTURING CO.

1919 Broadway, Menominee, Michigan

BRANCH OFFICES
Boston, Philadelphia, New York, Atlanta, St. Louis, Chicago, Pittsburgh

BRANCH OFFICES
Minneapolis, Toronto, San Francisco, Winnipeg, Havana, Los Angeles, Montreal

"WHERE MILLIONS OF GOOD RADIO PARTS COME FROM"

You Can Use "UX" Tubes in Standard Na-Ald Sockets!

With this Na-Ald Adapter you can take advantage of the UX 120 tube for the last stages of audio amplification. (Also UX-199 and UX11)

Na-Ald Adapter No. 419-X
Price 35c

This is the Na-Ald socket which takes all the UX tubes without an adapter

YOU may keep your set available for ***both*** the old UV and the new UX tubes merely by using the simple and satisfactory Na-Ald adapter No. 419-X. It is thus unnecessary to forego either one style or the other. Use both as you see fit, without expensive changes in your set.

The Radio Corporation of America has made the terminals on all UX tubes identical in order that storage battery or dry cell tubes may be used without an adapter and without any changes in sockets.

These tubes with the new bases are to be known as the UX-199 (taking the place of the UV-199), UX-11 and UX-12 (taking the place of the WD-11 and WD-12), the UX 201-A (taking the place of the UV 201-A), and the UX-120 (for use in the last stages of audio amplification).

Na-Ald Socket No. 481-X
Price 35c
Cushion mount 50c

The Na-Ald socket taking all five of these new tubes is known as the 481-X. This is made either with spring cushion, plain binding post, or rivet mounting for both the home builder and set manufacturer. The new UX 201-A and UK-12 tubes will also fit UV 201-A sockets. Na-Ald adapter 419-X make the new UX-199 and UX-11 and UX120 tubes fit Na-Ald UV 201-A sockets.

SOCKETS **NA-ALD** DIALS

Na-Ald No. 400 DeLuxe Socket

Actual contacts of these sockets scrape a clean connection with the side of each tube terminal, simply by turning the tube three or four times without removing the tube from the socket. Made of genuine bakelite, Alden Processed, highest insulating qualities, low loss. Price de Luxe 75c.

No. 401-S

The new Na-Ald cushion mountings permit direct connection either above or below the panel without using binding posts. This means positive, permanent connection and permits hidden wiring. The period of vibration of these cushion sockets is adjusted so as to always minimize microphonic noises. Price deLuxe cushion socket No. 400-S, 75c; price small space cushion socket No. 401-S, 50c; price UV-199 cushion socket No. 499-S, 50c.

New! Na-Ald Cushion Sockets

No. 400-S

Na-Ald 5-Inch Dial

The biggest dial on the market. Has 200 graduations arranged for quicker, easier reading. Its double knob is big enough to get hold of comfortably so you can tune in easily and smoothly, getting such accurate adjustment that it is often preferred to a vernier on sets that do not need critical tuning. Distinctive in appearance, made of genuine bakelite, price $1.50; $2.00 in any of the colors mentioned below.

New! Na-Ald Vernier Dial

Now! a vernier that looks like any other Na-Ald dial, yet so smooth and positive in its operation that to try it is to want it. No gears. Nothing to get out of order. No "live" metal. It can be used on metal panels. Fits all condenser constructions, including condensers with one hole mounting. Retail price $1.50; also obtainable in colors.

Color Dials

Now! for the first time you can obtain dials in colors! Garnet, Malachite-green (a mottled green and white), brilliant tortoise, and mahogany. You have no idea how they will brighten your panel! If your dealer cannot supply, write us direct.

ALDEN MANUFACTURING COMPANY
Dept. F2 **Springfield, Mass.**

Mail Today

ALDEN MFG. CO.,
Dept. F2, Springfield, Mass.

Please send complete information about the Na-Ald line of sockets and dials.

Name.....

Address.....

RADIO LOG BOOKS

This book together with 100 log sheets only

$2.00

No Station Is Complete Without One

By special arrangement, the Citizens Radio Call Book is now prepared to furnish at cost to all radio fans, a Genuine Art Leather 6x9½ in. LOG BOOK together with specially designed log sheets.

The illustration below shows the exceptional design of the log sheets which makes possible the proper recording of all adjustments on your receiver.

You should have one of these books. You will find it a wonderful help in the operation of your set.

RADIO STATION LOG

Date	Station	Time	Q S S	Q R N	Char	Tone	Remarks

Sample of Log Sheet

CITIZENS RADIO SERVICE BUREAU

508 So. Dearborn St. ~ Chicago.

SUPERADIO

VACUUM TUBE

DYNOMETER

TELLS EXACTLY WHAT YOUR TUBES CAN DO

At last you can tell exactly what your Tubes can do. No more "cut and try" methods to get the best detector, audio or radio frequency amplifier. No more meaningless calculations. No more "Maybes." The Superadio Dynometer is a revolutionary Meter device. It ushers in a new era in Radio.

Already the public is demanding TESTED tubes. For some time they have been obtaining tested "B" Batteries. Now they want only Tubes they know will work. To meet this new situation, the progressive Dealer and Jobber is selling only TESTED Tubes. The Superadio Dynometer makes TESTED Tubes possible.

The Superadio Dynometer is equipped with Phones, Plug, and necessary instructions.

Every Manufacturer, Jobber and Dealer will want this necessary product. Write for details.

FEATURES

1. The Superadio Dynometer is entirely different from conventional Meters.
2. Accurate—tells if tube is underaged, gassy, etc.
3. Enables tubes to be matched.
4. Rapid—tests 3 tubes per minute.
5. Easy to operate — no more complicated calculations necessary. No more drawing curves.
6. Absolutely measures the power of any vacuum tube on the market.
7. Tells whether tubes are good R. F. amplifiers, A. F. amplifiers or detectors and how well they will work in the sets.

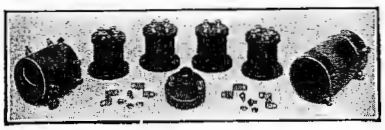
We are interested in obtaining high class representatives.

Superadio Reactodyne

(Licensed Under Reactodyne Agreement)

This set operates on a radically new principle—Inductive Reaction. Oscillations automatically controlled. Use of low loss, straight line frequency condensers and highly developed solenoid r. f. transformers assures the added punch to get the distant station. Wonderful tone, terrific power. Only two hands needed to operate.

The Reactodyne is not a copy of any conventional Receiver but the result of extensive research and mathematical calculations. It works where others won't. Price $56.00.



Superadio Superhetrodyne Kit only $17.50

Everyone wants to build the Super-Heterodyne. This is the Kit for best results—a sure-fire proposition. Contains 1 Antenna Coupler, 1 Oscillator Coupler, 1 Special Variable Condenser, 1 Tuned Filter Transformer, 3 Matched Intermediate Transformers and all necessary hardware with diagrams, layouts and complete Super-Heterodyne Treatise by Louis C. Billotte. Write today for information.

DeWITT-LaFRANCE Co. Inc.

54 Washburn Avenue, Cambridge, Mass.

Chicago Representative
William A. Welty & Co., 36 So. State St.

Boston Representative
Martin, Hartley & DeWitt Sales Co., 99 Bedford St.

KING IN RADIO

A complete line—that's "King in Radio"

King-Hinners Neutrodyne Model 25

King-Hinners Neutrodyne Model 25S

King-Hinners Neutrodyne Model 25C

KING-HINNERS neutrodyne is neutrodyne *PLUS*. Offered in table type, table type with loud speaker built in and the elaborate console model, each one a masterpiece of the cabinet maker's art. These receivers embody features which stand out above all competition—special tube arrangement, tapped antenna coil, voltmeter, push-pull volume control and dozens of others, all unique.

Then there is the King Five Broadcast Receiver which embodies tone, selectivity, distance, volume and beauty at prices which anyone can afford.

These receivers represent the two circuits which have been proven best by popular demand.

Knock-down kits and a full assortment of parts complete the line.

"KING IN RADIO" products are backed by the King reputation—twenty years in the making of precision parts plus fifteen years of radio research, an eight acre plant, a world-wide sales organization.

A national advertising campaign just getting under way will bring "KING IN RADIO" to the attention of more than twenty million possible radio buyers—Saturday Evening Post, Country Gentleman, leading radio publications and newspapers backed by direct mail.

Now is the time for jobbers and dealers to take on the sale of "KING IN RADIO" products. Let us send you the full story.

KING QUALITY PRODUCTS, Inc.
BUFFALO, N. Y.

Branches: Chicago — Kansas City — Bridgeburg, Ont.

King Five Broadcast Receiver Model 30

King Five Broadcast Receiver Model 30S

King Five Broadcast Receiver Model 30C

BE A RADIO EXPERT!

The Opportunity of a Lifetime

Amazing money-making possibilities—Big Salaries—yes, even fortunes and independence await wide-awake ambitious men entering the Radio field.

Earn $3,000 to $10,000 a year

Everyone knows that the men who got in on the ground floor opportunities of the locomotive, the telephone, electricity, the automobile, moving pictures, etc., have been handsomely rewarded—many of them made millions. Now science contributes the greatest opportunity of the age—a discovery so marvelous and so easily within the means of all that even the humblest home seeks its possession and benefits.

From a business and money-making standpoint Radio fairly staggers the mind of anyone who gives it a moment's thought. Even men with little or no knowledge of its principles are making $3,000 to $10,000 a year. Radio is the fastest growing industry in the world. Everywhere people are crying for radios. Manufacturers are swamped with orders that cannot be filled. And yet anyone of average intelligence can learn at home in spare time how to construct, install, repair and sell dependable sets.

Train at Home in Three Months

If you are in a routine job with poor pay and no future, here is truly *the chance of a lifetime.* Don't miss it. In a few short months at home by mail we can make you an expert representative of our Association. Become the radio expert of your town or neighborhood. Find out how the Radio Association of America throws the doors of opportunity wide open for you. We will show you the way to swing big salary jobs or to get into business for yourself and be your own boss.

No Previous Experience Necessary

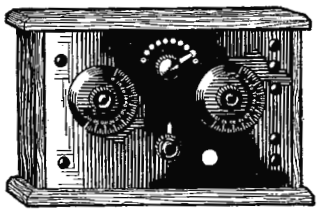
Get your share of the big money to be made in the most rapidly growing business of all time. Mail the coupon below for our big free book, which tells how in your spare time at home, without giving up your present position or losing a dollar of pay, you can become a thoroughly trained radio expert in a few short months.

No previous experience is necessary. For the man who prefers a salary, big pay jobs are waiting with the U. S. Government, Steamships, Railroads, and thousands of corporations and business houses. For the man who wants to start in business on a full or spare time basis, with little or no capital, grow and become independent, Radio offers an easy way to unlimited money-making opportunities. In no other line can ambitious men find an easier road to success.

You can train under one of America's leading Radio authorities. Read Mr. A. G. Mohaupt's offer to train you personally in everything about constructing, installing, repairing and selling Radio Sets and Accessories. By enrolling with us now, you get the benefit of the direct personal guidance of this well-known Radio expert.

A. G. MOHAUPT, B.A., M.S.
Head of the Radio Association of America, Graduate Electrical Engineer, University of Wisconsin. Former Radio Instructor for U. S. Government. Author of "Practice and Theory of Modern Radio."

"I give my personal attention to every student taking my course. Your individual problems and questions are answered by myself. I work with you at every stage of the course, guiding you, directing you to your goal to be a Radio Engineer in the big-pay class. My course prepares you to successfully pass Gov't examination for Operator's License."



FREE—1000 Mile Radio Outfit

This set when completed has a range of over 1000 miles. Right now we give it free to each member taking our course of training. Mr. Mohaupt's clear, simple instructions will show you how to build similar sets to sell at a big profit. When you have finished the course, you can sell this free set at a price that will practically pay the cost of your training.

Get the Facts—Mail Coupon

Our training is not only easy and interesting, and supplies knowledge you can always use in operating your own set, but is the most cashable knowledge a man can possess. Let us prove to you that there is nothing difficult about Radio—that any intelligent person can easily learn it right at home by mail under our simplified and approved methods. Mail the coupon now for our big, free Radio Book, which gives all the facts. Let us prove that Radio is easier to learn and offers bigger money than any other business or profession you can get into. Don't wait—act while our Free Offer of a 1000 mile radio outfit is still in effect.

A. G. MOHAUPT, Radio Engineer
RADIO ASSOCIATION OF AMERICA
4513 Ravenswood Avenue **Chicago, Ill.**

Radio Association of America,
4513 Ravenswood Avenue
Dept. RCB
Chicago, Ill.

Please send me your free book telling all about Radio opportunities and your Expert Home Training Plan and offer to representatives, also your offer of a 1000 mile Radio Set FREE.

Name.....

Address.....

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

"Just like having new batteries every evening"

You know what a difference it makes every time you connect new batteries to your radio.

You wish you might have reception like this all of the time—and so you can if you'll take our advice and get Willard Radio Batteries.

Willards are built for Radio. They last for years, and with an occasional recharge they can be depended upon to give you uninterrupted service.

WILLARD RADIO BATTERIES

Willards are easy to install, too. Just snap the standard Fahnestock clips on your present wiring and you are ready to operate your set.

If you are already using storage batteries for Radio let us remind you that our conveniently located service stations are equipped to give you prompt service on all makes.

Sales and Service thru The Willard Battery men and their Associate Radio Dealers

WTAM

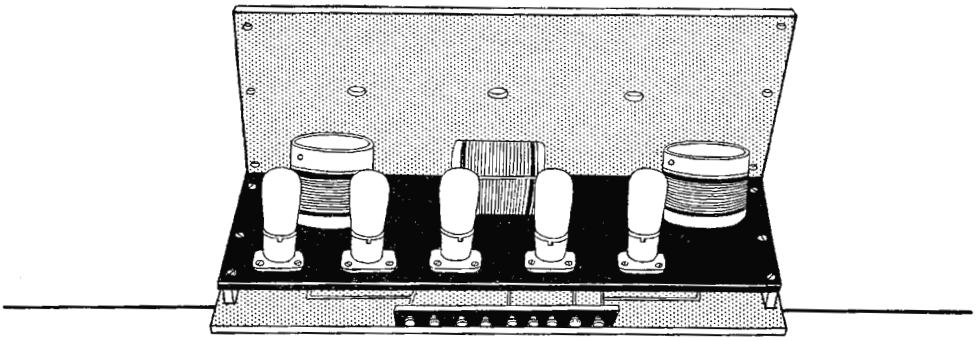
[The Voice of the Storage Battery]

Much of the research work which has resulted in the high quality of Willard Radio Batteries, and which is constantly improving this quality, is carried on at WTAM.

This station is owned and operated by the Willard Storage Battery Company, manufacturer of these batteries.

Its management has just published a very interesting booklet entitled "New Batteries That Stay New", which we are distributing in our stores and service stations. Ask for your copy or write WTAM—Cleveland, Ohio.

WTAM is on the air for your entertainment every Monday, Wednesday and Saturday evening—wave length 360.3 meters.



FORMICA *Base Panels*

THE use of Formica base panels in a radio set is becoming almost universal practice with set makers, and with amateurs who do the better work.

It makes the leads shorter and the wiring more efficient. If it is desired to avoid soldering, the base panel may be used to greatly reduce the number of soldered joints.

The appearance of the set is much neater and finer. And the structure is so much stronger that such a set can be dropped from a counter or store shelf and nothing will happen to it.

It is essential that a base panel be made of mechanically strong material that will not warp and distort—so that coils will not be thrown out of alignment—and the operation of the set made less efficient.

Formica is used by 125 leading manufacturers of radio sets.

Write for booklet, "What Formica Is."

Veri-Chrome Panels

By the purchase of a controlling interest in the Veri-Chrome laboratories, the financial and production resources of the Formica Insulation Company have been placed behind this remarkable new process for decorating radio panels. Elaborate decorations can be produced much more rapidly and more economically than by engraving. Decorations designed by the leading American artists are offered. Tuning scales may be marked directly on the panel eliminating the standard dial and substituting pointers instead. The reduction in cost is large. Write for prices on complete panels finished in this way in quantity.

THE FORMICA INSULATION COMPANY
4666 Spring Grove Ave., Cincinnati, Ohio

Sales Offices

50 Church Street	New York, N. Y.
9 South Clinton St.	Chicago, Ill.
516 Caxton Bldg.	Cleveland, Ohio
327 Cutler Bldg.	Rochester, N. Y.
422 First Avenue	Pittsburgh, Pa.
6 Beacon Street	Boston, Mass.
55 Calle Obispo	Habana, Cuba
1026 Second Avenue	Minneapolis, Minn.
725 Bulletin Bldg.	Philadelphia, Pa.
708 Title Bldg.	Baltimore, Md.
585 Mission Street	San Francisco, Cal.
419 Ohio Bldg.	Toledo, Ohio
309 Plymouth Bldg.	New Haven, Conn.
Whitney Central Bldg.	New Orleans, La.

FORMICA
Made from Anhydrous Bakelite Resins
SHEETS TUBES RODS

Hear the Formica Orchestra over WLW every Tuesday evening from 9 to 10 Central Standard Time.

PROFIT: TURNOVER—

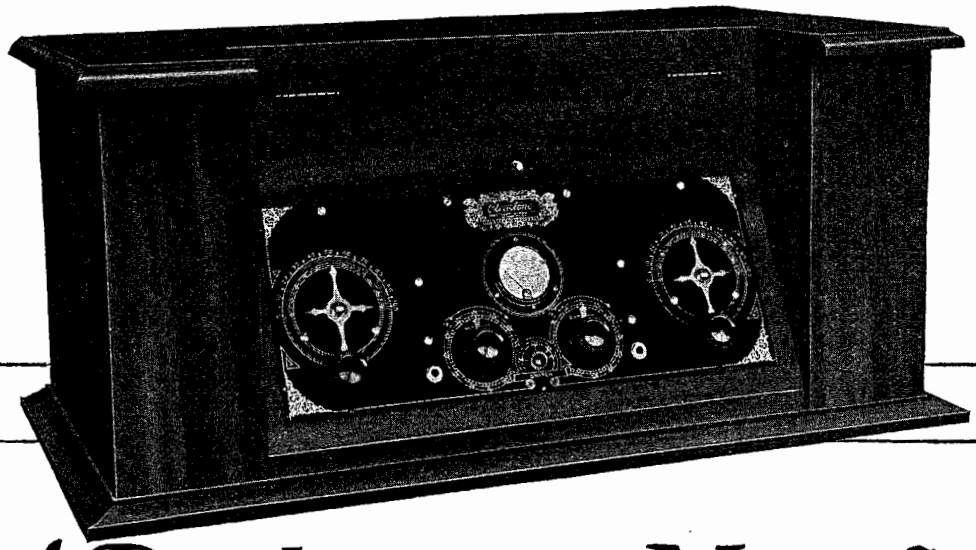
HERE is a partial list of manufacturers we serve—leaders in their respective lines, we are justly proud of our association. Our protection plus their quality product means success to you thru satisfaction to your customers.

BREMER-TULLY	DAVEN	PHILCO
ACME	DUBILIER	PYREX
ALL-AMERICAN	EBY	REMLER
ALLEN-BRADLEY	RATHBUN	SIGNAL
AMPERITE	ERLA	THORDARSON
FRANCE	EVEREADY	THOROLA
BALKITE	FROST	TUNGAR
BELDEN	HOWARD	ULTRADYNE
BENJAMIN	JEWELL	UNIVERNIER
CARTER	MUSIC MASTER	WESTERN ELECTRIC
CELERON	NA-ALD	WESTON
CUNNINGHAM	APCO	WILLARD
MUTER	SANGAMO	KARAS

With these nationally advertised lines we solicit the business of the recognized radio merchant on Price, Service, and Quality.

HUDSON-ROSS
INCORPORATED
119 South Wells Street
CHICAGO

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



A Revolutionary NEW Set!

The first set produced by a reliable manufacturer complete with tested tubes, batteries, loop and loud speaker. There is nothing extra to buy!

Price $185.00

Here is the set of the future—distinct from and above competition. You have waited for a set of beautiful finish and workmanship, at a moderate price, that will operate anywhere without aerial or ground—and equal or excel the best performance of sets using an outdoor antenna.

The Cleartone "90" gives you exceptionally strong loud speaker volume over big distances. Remarkably low "A" and "B" battery consumption. This is a seven tube, completely self contained set using dry cell equipment.

Beautiful cabinet work, the finest material—mellow, clear, and beautiful tone. Every detail of workmanship and construction stamps it as high grade.

This set solves the problem of the apartment dweller who can't erect an antenna. It is the ideal outfit for the farmer who has no charging equipment. And this year the farmer will be radio's biggest customer.

You can demonstrate this set anywhere—in ten minutes—and it sells itself!

Dealers and Distributors:

Get away from the fierce competition on ordinary five tube sets. This outfit at this price is a wonderful value. Easy to demonstrate. Easy to sell. The perfect proposition for the great apartment building and farm markets. Our new sales plan eliminates most of the troubles you have encountered in selling the ordinary set. Write for it.

The Cleartone Radio Company

2431 Gilbert Ave., Cincinnati, Ohio

CLEARTONE WAS FIRST—**To use pointers instead of dials. To use a metal panel. And now it is first to provide the loop set that *really performs* and that is *sold complete*.**

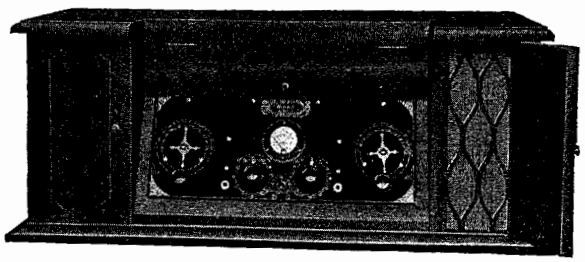
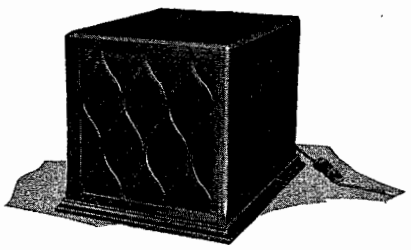


Table Model 91, Loud Speaker Built in, $200.00
Console Type, Loud Speaker Built in, $275.00



The clear tone detached loud speaker is a handsome cabinet type of the finest appearance and workmanship and wonderful distortionless tone for only $25.00

CLEARTONE *Complete* RADIO SETS

IMPORTANT NOTICE

EVERY reader of the Citizens Radio Call Book will be interested in the big new free radio apparatus campaign now being conducted by the publishers of "RADIO"—the great Western authority on radio. You get radio premiums without any cost whatsoever, merely in return for sending us your subscription to "RADIO" for one year. The subscription price is $2.50 per year. In addition to receiving the magazine for twelve months, you have your choice of one of the following premiums:

Pair of 2000 ohm headphones, made by Big Three Radio Co.
Two four inch dials with brass bushing for 1-4 in. shaft.
Three type 199 sockets for 199 type tubes. Six ohm or thirty ohm rheostats.
Induction filter for elimination A. C. noises. Radio Log Book for keeping records of stations heard.
"THE RADIOBUSTER," a 112 page book of radio fiction stories.
"Elements of RADIO Communication," by Lieut. Stone.

Imagine it—your choice of one of these premiums **FREE** with only one subscription to "RADIO" for one year. $2.50 covers the entire cost of the offer. There are no other payments to make. Premiums are sent to you postpaid on the same day your order reaches us. If you subscribe for two years ($5.00) you have your choice of one of the following premiums:

The New Ensign square plate variable condenser.
Phograph unit for attaching to phonograph.
The Regal or Peerless Audio Frequency transformer.
Standard Regal low loss 21 plate variable condenser.
Cunningham C301A or C299 vacuum tube.

$5.00 brings you "RADIO" for two years and one of the above premiums without any cost. Don't let this big offer pass by without taking advantage of it. Subscribe either for one or two years—get the best radio magazine in print as well as a very useful, **guaranteed** radio premium.

If you don't know "RADIO," get a copy from your newsdealer today and see how good it really is. The magazine contains only first-run articles by the leading radio authorities. Many helpful, constructional articles by Gerald M. Best, technical Editor of "RADIO" — questions and answers — "Radiotorials"—wiring diagrams of the latest types of radio receivers, transmitters, etc.

Don't delay sending your subscription. Use the coupon, attach your remittance to it and get it in the mails today. This great offer gives you double value for your money.

Use the Coupon—Mail It Now!

"RADIO", Pacific Building, San Francisco, Calif.

Herewith is $.....for which you will send "RADIO" to my address for.....

years and the following free premium.....

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

Vital Parts of Leading Radio Sets

Nowhere is the axiom *"an article is no better than the parts it contains"* more true than in the radio world. So it is not surprising that leading manufacturers of radio sets choose the accessories for their hookups only after gaining a full technical knowledge of their make-up and the results they give.

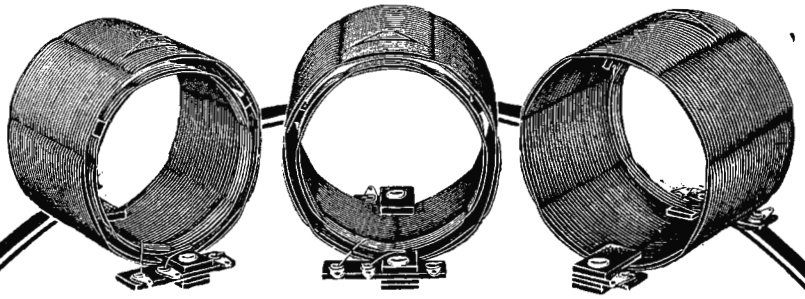
In full consideration of this, the choice of Benjamin Radio Products, above all others, by the manufacturers of many of the finest modern radio sets, bespeaks eloquently of their worth as practical radio parts made by one of the oldest manufacturers of electrical goods.

Each has been made a *super* radio part—to secure for the owner of the set the purest, loudest and clearest radio signals possible. Used together, their total efficiency spells the acme of selectivity, tuning range, the elimination of disturbance and distortion, and the reduction of radio losses. And, the logical total of these many worthy features is *"Better Radio."*

Benjamin Electric Mfg. Co.

120-128 S. Sangamon St., Chicago
241 W. 17th Street New York
448 Bryant Street San Francisco

Manufactured in Canada by the Benjamin Electric Mfg. Co. of Canada, Ltd., Toronto, Ontario



BENJAMIN
Tuned Radio Frequency Transformers

Low Resistance—Low Distributed Capacity

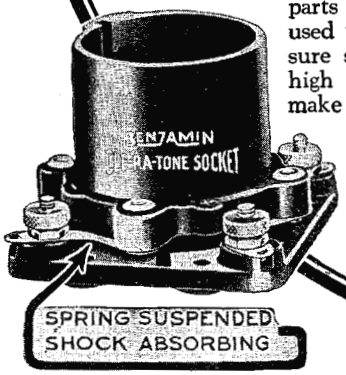
Wires are space wound, adjacent coils are parallel, air insulated and so separated that while capacity is reduced to a minimum, inductance is maintained at a high point of efficiency.

Greater Tuning Range—Greater Selectivity

These coils are very uniform, both in inductance and distributed capacity, so that if desired they may be geared for single control of the three tuned stages. A minimum amount of material is used in the field of the coil, and an anti-capacity cement is used only where the wires cross. Coils are coupled so as to reduce capacity coupling to a minimum. Green double silk covering provides high insulation and gives a fine appearance to the coil.

Benjamin Cle-Ra-Tone Sockets

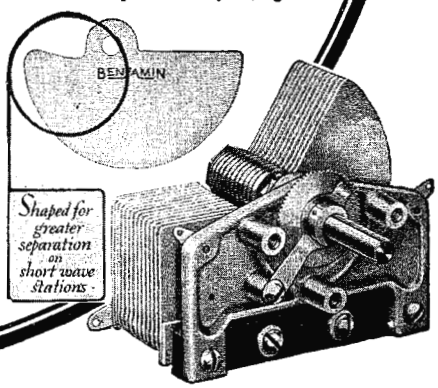
Benjamin Cle-Ra-Tone Sockets prevent the transmission of outside vibrations into microphonic disturbances. Four delicately adjusted double springs support the socket—"float" it above the base—and absorb all jars and shocks. An absolute necessity in portable sets. Used by leading manufacturers and recommeded by radio engineers in their most popular hookups. There are no rubber parts to deteriorate. Bakelite is used wherever possible to insure sturdiness, long life and high insulation. Handy lugs make soldering easy. Stiff bus wiring does not affect the flexibility of the Cle-Ra-Tone springs. Furnished also in gangs on Bakelite sub-panels for compact set building, as when mounted on Benjamin brackets there is plenty of space underneath for mounting accessory equipment.

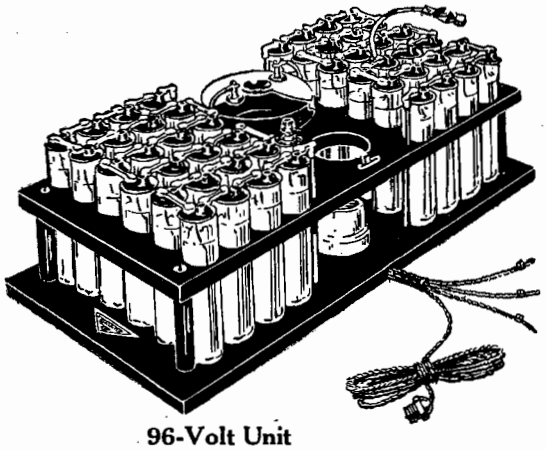


Benjamin Low-Loss, Long-Range Condensers

Straight line type. Definite and positive control of minute changes in condenser capacity. Spreads the broadcast range on the higher frequencies, and eliminates bunching of stations on the lower side of the dial. Aids sharp tuning and increases selectivity. Minimum insulation is used and leakage must go through long paths outside of strongest field. Unpolished silver plate finish. Small size of condenser makes it adaptable to any set, regardless of crowding of apparatus on sub-panel. Friction disc on rotor shaft adjusts tuning tension without throwing rotor plates out of alignment. Drilling template furnished with each condenser. Made in three sizes:

13 plate for .00025 Mfd.
17 plate for .00035 Mfd.
25 plate for .0005 Mfd.





96-Volt Unit

GRAYNIE

"B" BATTERY AND CHARGER

THE "B" Battery is the heart of your receiver. Without a constant plate current supply, the finest set is a disappointment. A good battery is necessary for the best reception.

Supplies constant voltage

The built-in charger is so convenient that you never need to let the battery drop below maximum voltage. Connections to the set need not be disturbed. Just switch the current on and off again, when the gravity balls indicate a full charge. A hydrometer is not necessary.

The cell tops are brown, glazed porcelain and are designed to prevent the accumulation of moisture. There can be no electrical leakage, and consequently there are no noises in the receiver from this cause. Internal noises, which are common in dry cells and which many fans mistake for static, are entirely eliminated. Range and volume are greatly increased. A selector for the detector tube enables you to use the proper voltage for best results.

Guaranteed for two years

The GRAYNIE is handsomely finished to harmonize with the finest set. A beautiful cabinet equipped with a handle is furnished when desired, making this battery especially attractive and easily portable. It is convenient and dependable and over a period of months is the most satisfactory and least expensive source of plate current.

Your dealer probably has this unit in stock. If not we shall be pleased to send you full particulars. Remember, there is no substitute for a GRAYNIE.

THE GRAYNIE CORPORATION
323 West Jackson Blvd. Chicago, Ill.

GRAYNIE USA

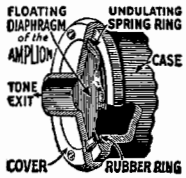
Hear your set with an Amplion

No matter how good your set may be, you will never do it full justice until you hear it over the world's finest loud speaker.

This is to urge you to hear your set over The Amplion—that masterpiece of the actual originators and oldest makers of loud speakers, thirty years experienced in sound reproduction. The loud speaker selected by the King and Queen of Italy, the Royal family of Belgium, and innumerable others of the royalty and nobility.

The loud speaker chosen for installation throughout St. Peters Cathedral, Rome, to reproduce important papal ceremonies. The loud speaker which is standard on the finest sets made in England, France, Belgium, Switzerland and many other countries—and now is being adopted by American manufacturers of the higher grade instruments. The loud speaker which outsells any other make throughout the world—and which has so rapidly paralleled in America its success on other continents.

Not until you hear *your* set over The Amplion will you know how fine a set you actually possess.



Diaphragm, (Special Metal), insulated from contact with other metal by rubber, rests on narrow ledge—lightly held there by a spring ring with enough pressure to prevent "chatter" when extreme volume is desired. Diaphragm thus "floats," free from strain, stress or undue tension and free to vibrate in exact accord with the variations of current flowing through electro-magnetic system.

AMPLION

The World's Standard Loud Speaker

ALFRED GRAHAM & CO., LONDON, ENG.—Patentees

Phonograph Units in Two Sizes

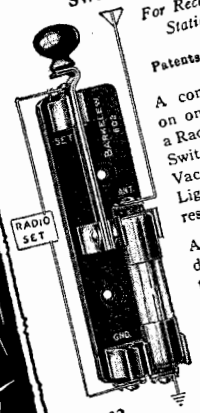
A dealer near you will gladly arrange to have you test an Amplion on your set. Do this and prove to your entire satisfaction that The Amplion fully deserves its world-wide leadership in popularity and sales. Write us for interesting literature and dealer's address. Amplion Loud Speakers are priced at $12.00 upwards.

THE AMPLION CORPORATION of AMERICA
Executive Offices: Suite N, 280 Madison Ave., New York City
Canadian Distributors: Burndept of Canada, Ltd., Toronto

BARKELEW
RADIO ACCESSORIES

LIGHTNING ARRESTER SWITCH
For Receiving Stations

Patents Pending



A combination on one base of a Radio Ground Switch and a Vacuum Tube Lightning Arrester.

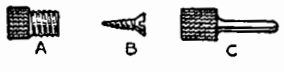
A distinctive device for those who know and demand the best lightning protection.

Price $2.50

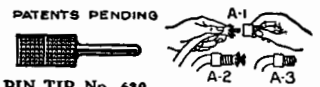
No. 602

Approved by the Underwriters Laboratories.

Screw Grip DONT SOLDER Cord Tips!



PATENTS PENDING

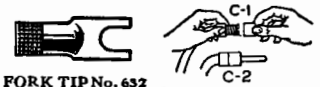


PIN TIP No. 630
Price 5c each

The Universal Sleeve "A" has an internal thread. Screw it on end of wire.

EYE TIP No. 631
Price 7½c each

Expose ¼" of bare wire. Insert wood screw "B" locking wire to sleeve.

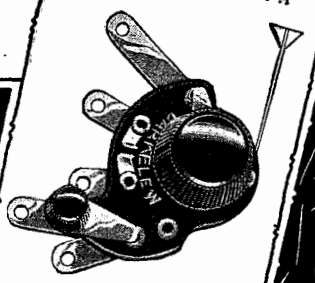


FORK TIP No. 632
Price 7½c each

Screw on any of our standard Screw Grip Tips shown at left.

A cord tip that requires no solder, no wrapping of the insulation and no tools other than a pen knife and a small screw driver.

ANTENNA SELECTOR SWITCH
For Radiola III and III-A



No. 605 **Price $1.00**

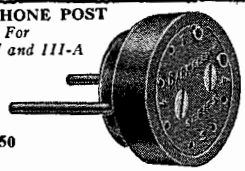
The entire range of antenna adjustments may be obtained by simply turning the two knobs, without loosening a nut. The antenna wire attaches to the one binding post on the rear.

VACUUM TUBE LIGHTNING ARRESTER

No. 606 **Price $1.50**

Required on the antenna of every Receiving Station. Approved by the Underwriters Laboratories.

FOUR PHONE POST
For Radiola III and III-A



No. 624
Price $0.50

The prongs on this post fit through phone holes in the face of panel. It takes one to four head-sets in series.

GROUND SWITCH

No. 600 **Price $2.50**

Required on all Transmitting Stations—Built of 60 Ampere Copper.

CONFIDENCE

THE annual increase in the number of dealers selling Barkelew Accessories expresses the confidence of the Radio Public in our product.

Special attention is called to the No. 605 Antenna Selector Switch and the Screw Grip Cord Tips. Both items were introduced late last year but will have their best run during the present season.

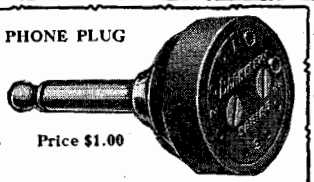
All radio material is packed in paper cartons and well labeled, making excellent shelf stock.

The design is good, materials are carefully selected and workmanship by skilled mechanics.

Prices and discounts are right for a fast moving line. This means a profitable stock.

For full description of each item, see our new Radio Catalog at your dealer. If he hasn't his copy, we have one for him.

FOUR PHONE PLUG



No. 616 **Price $1.00**

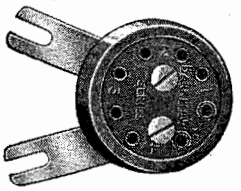
Connects one to four head-sets in Series to any Radio set using telephone jacks.

"LEAD-IN" INSULATOR
For Receiving Stations

No. 612 **Price $0.60**

Spaces the "Lead-In" Wire 5 inches out from the wall.

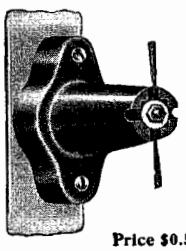
FOUR PHONE POST



No. 628
Price $0.50

For binding post mounting. Connects one to four head-sets in series to the more common types of brass phone posts.

PORCELAIN PEDESTAL
Brown Glaze



No. 611 **Price $0.50**

An insulator with a rigid clamp for the lead-in wire. A pedestal for spacing Ground Switches or other apparatus, 5 inches clear of the mounting surface.

CORD TIPS
With Solder Inserted

No. 623 **Price $0.05 ea.**

The wire hole is tinned and half full of solder. Heat and insert the wire.

PLAIN CORD TIPS

No. 627 **Price $0.01 ea.**

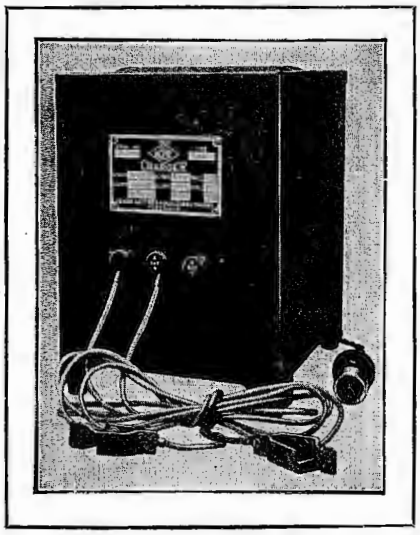
A nickel plated tip for those who can do their own soldering.

The Barkelew Electric Mfg. Co.

Middletown, Ohio, U. S. A.

NEW YORK, 157 Chambers St.
BOSTON, 31 Bedford St.
WASHINGTON, D. C., Mills Bldg.
CHICAGO, 15 S. Clinton St.
DENVER, Denham Bldg.
MINNEAPOLIS, 1017 Lumber Ex.
SEATTLE, 1041 Sixth Ave. S.
SAN FRANCISCO, 75 Fremont St.
LOS ANGELES, 443 S. San Pedro St.
TORONTO, No. 7 Crang Ave.
MONTREAL, 296 St. Paul St. W.

You Need An Acme Double Duty Charger

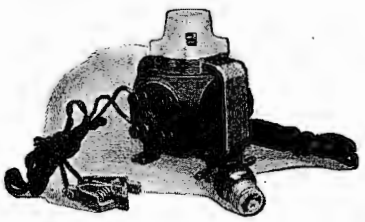


Acme Universal Charger

ACME Double Duty Chargers are designed to properly recharge both "A" and "B" Batteries. Wonderfully durable and efficient. With the type illustrated above 1, 2, 4, or 6 volt battery may be charged and also 48 cells of Radio "B" battery. Type AU-120 (without bulb) **$13.50**

Type A. B. M.-5-120. A five ampere charger with battery clips, extension cord, meter and plug attachment to charge "A" and "B" batteries. Will charge 120 volt "B" battery in series without grouping. Price..... **$20.00**
Without meter..... **$18.50**

Acme Directo Type DM-110. For charging batteries where direct current is used; 5 ampere, with meter, clips and extension cord attachment. Price..... **$12.00**
Chargers to operate on 32 volts D. C. can be supplied. Price **$12.00**



Two Ampere Acme Jr.

Operates from your light circuit by simply connecting plug. Charges "A" battery at 2½ ampere rate, "B" battery rate ¼ to ½ ampere, 120 volt "B" battery in series without grouping or paralleling..... $10.50
Type A-2 for "A" batteries only..... 8.50

See Your Dealer Today

THE ACME ELECTRIC MFG. CO.
1501 Hamilton Ave. Cleveland, Ohio

DONGAN Quality Radio Parts

35 Types of Audio Transformers

Here is one of Dongan's most popular Audio Transformers. Sturdy, perfectly balanced and assuring the greatest possible amplification with practically no distortion, this handsome Type S Audio will get the best performance from your set. Suited to all hook-ups and designed particularly for low wave reception.

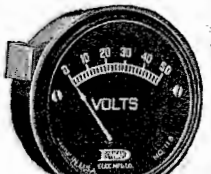
We build 35 Types of Audio Transformers. Thousands are in use today as we supply 38 set manufacturers with transformers.

Type S — Handsome Mountings. Ratios 2-1, 3½-1, and 6-1. List **$4.00, $3.00, $3.75.**

Voltmeters

That Are Accurate

Leading Set Manufacturers are equipping their sets with panel-mounted voltmeters for they know that efficient reception depends on correct tube and B-Battery voltage. By all means equip your set with a Dongan Voltmeter and keep performance up to par all the time. Dongan builds 5 types of Voltmeters—each one is accurate over the entire range of scale. You get definite readings from these precision instruments.



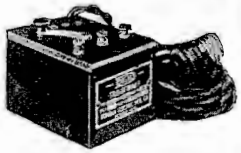
Type N—Panel Mountings. Nickel Finish. Black Bezel Clamp Mounting. Range 0-7, 0-50, and 0-100 volts. List **$1.75, $1.75, $2.00.**

Type F—Portable. Handsome Black Finish. Range 0-7, 0-50, and 0-100 volts. List **$1.50, $1.50, $1.75.**

A C Tube Step Down Transformer

Designed for Cockaday's Popular Radio A. C. Receiver and now the standard step-down A. C. Transformer used everywhere. (Distinctly not a toy transformer.) Simply plug into your light socket—does away with A Batteries.

Type B-A. C. Tube Transformer is satisfaction-guaranteed like all Dongan products.



Type B—A. C. Tube Transformer, for A. C. Tube Receivers. List **$6.00.**

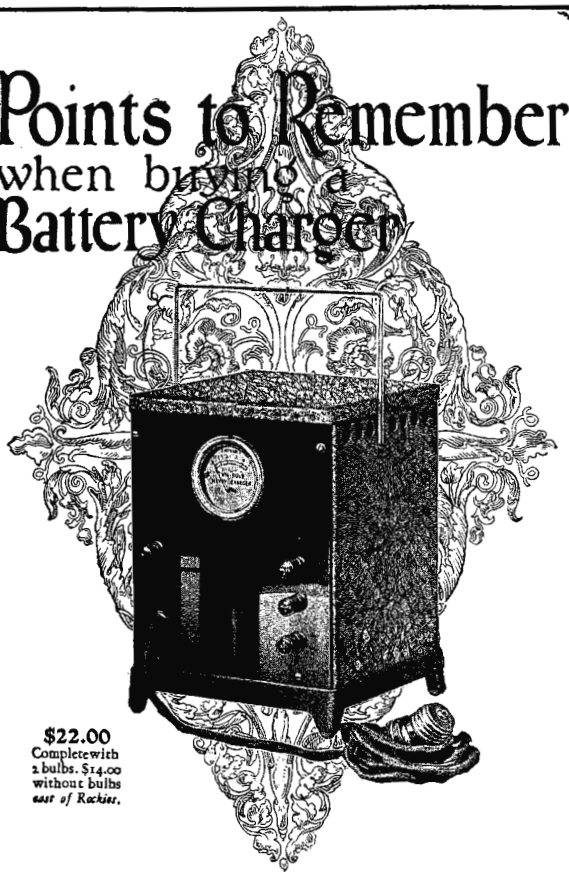
Ask your dealer or write to us direct for details. Money orders filled same day as received.

Dealers—If you aren't acquainted with the Dongan sales plan ask your jobber or write us.

Dongan Electric Manufacturing Co.
2997 Franklin Street Detroit, Mich.

"Transformers of Merit for 15 Years."

Points to Remember when buying a Battery Charger



$22.00
Complete with 2 bulbs. $14.00 without bulbs *east of Rockies.*

THE economy and convenience of owning a good battery charger is recognized by radio owners. However when setting out to purchase a charger there are several vital factors to consider.

(1) Select an up-to-date charger that is guaranteed by a reliable company. (2) That will charge quietly (3) at a fast rate (4) with no danger of overcharging or discharging your battery. (5) That is safe (6) dependable (7) easy to use (8) economical (9) and attractive in appearance.

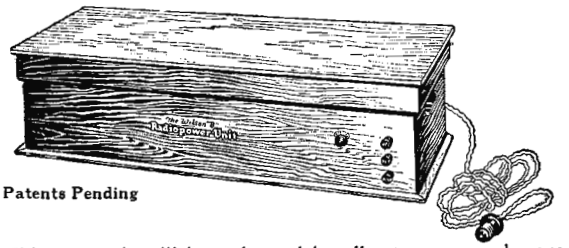
The new Twin Bulb HANDY CHARGER is the latest improvement in battery chargers, made and guaranteed by the largest exclusive manufacturer of battery chargers—the Interstate Electric Company. It charges without the slightest noise and cannot overcharge or discharge your battery. A very economical and fast rate of charging is assured by the advanced "push-pull" principle that uses *both* halves of the AC wave at a speed of from 4 to 5 amperes. Adapted to "A" batteries of from 2 to 12 volts; "B" batteries from 24 to 120 volts in series. No extra attachments necessary. It charges them all. It is easy to use and practically trouble proof.

Ask your nearest radio dealer about the new Twin Bulb HANDY CHARGER or write direct for additional information

The New TWIN-BULB HANDY CHARGER

INTERSTATE ELECTRIC CO.
4343 DUNCAN AVE. - - ST. LOUIS

The Wilson "B" Radiopower-Unit



Patents Pending

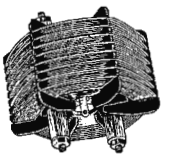
This new unit will be welcomed by all set owners, who are looking for a device which will eliminate all "B" battery troubles. *It is guaranteed not to set up the slightest hum in the receiver.*

It supplies uniform voltage at all times thus insuring better reception. Nothing to adjust. No moving parts to break or get out of order. No acid to spill. No voltmeter or hydrometer necessary. Will not affect your neighbor's set. Requires no attention whatever, except to switch it on or off as you want to use your receiver. Convenient and economical.

In Handsome, Solid Walnut Case, Price $35

The Andrews Paddlewheel-Coil

Pats. Pend.



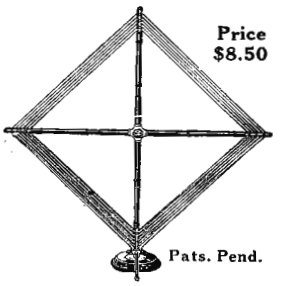
The coil of ideal characteristics. *Has exceptionally high ratio of inductance to resistance.* Losses are negligible. Gives maximum range and volume with entire freedom from distortion. Increases selectivity and greatly improves tone quality. This coil is employed in such well-known receivers as the Andrews DE-RESNADYNE and BUCKINGHAM, and it can be used in all standard hook-ups where a high grade transformer-inductance is required. It has a range from 200 to 600 meters when tuned by a condenser of .00025 Mfd. capacity. Provided with nickeled bracket for mounting. Price $3.00.

Our Technical Dept. will answer questions relative to the Paddlewheel Coil and its use in any hook-up. Get blueprints of well-known receivers and circuits using this coil from your dealer, or write direct.

Duo-Spiral Folding Loop

Handsomely finished in silver and mahogany. Neat and compact. An ornament to your set—not an eyesore. Folds readily and can be used anywhere. Ideal for portable sets. Has silvered dial graduated in degrees. Many who have an outside aerial use a DUO-SPIRAL also, to reduce static and cut out undesired stations. A special model for every circuit.

Price $8.50



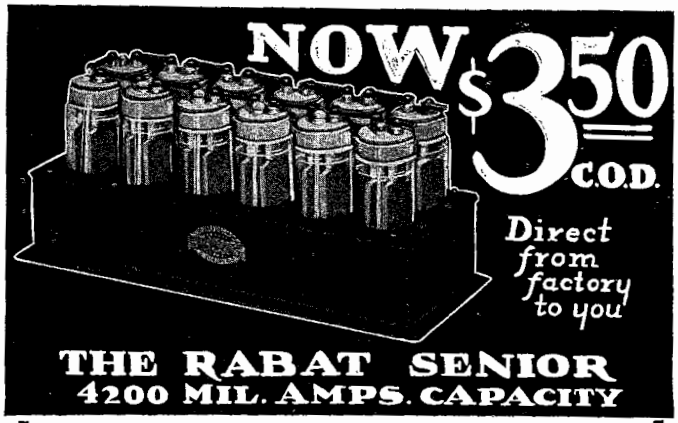
Pats. Pend.

Write direct if your dealer is unable to supply these standard products.

Radio Units Inc.

1302 First Ave. **Maywood, Ill.**

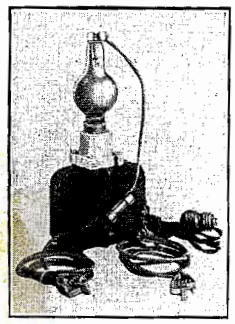
Perkins Electric, Ltd., Montreal, Toronto, Winnipeg



HERE is a wet "B" battery built for use on any type Radio set, producing stronger and clearer tones. Longer life by means of patented rubber cork with insulating sleeves completely preventing internal current leakage Plates are of 100% pure lead—no clay filler. 12 cell, 24 volt, fully charged ready to use, only $3.50. 24 cell, 48 volt size, only $7.00. This factory priced battery going direct to you is positively the most amazing battery value ever offered.

RABAT SUPER "B" CHARGER, $3.00 C.O.D.

Satisfactorily recharges any storage "B" battery. Shipped complete and ready to use, including lamp socket, attachment plug and cord.



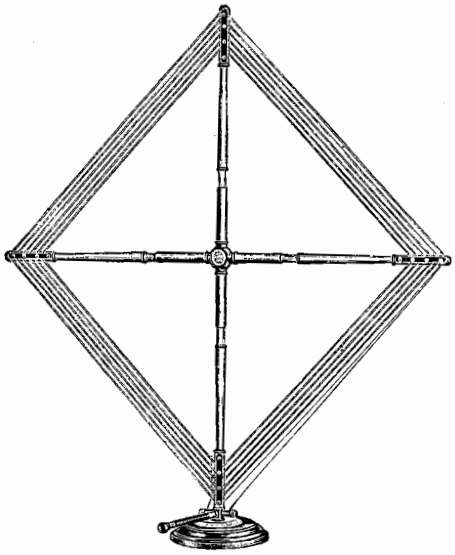
RABAT DOUBLE DUTY "A" and "B" Battery Charger, $11.00 Including 2 Amp. Bulb

Charges "A" batteries at 2 to 2½ amp. rate or two 48 volt "B" batteries in series at ¼ amp. charging rate.

SEND NO MONEY but mail your order today. After examination and approval pay expressman small c. o. d. charges. All prices are f. o. b. factory. These amazing batteries are sold on an ABSOLUTE MONEY BACK GUARANTEE.

The Radio Rabat Co.

1763 St. Clair Ave. Cleveland, Ohio



Now Try LOOP Reception

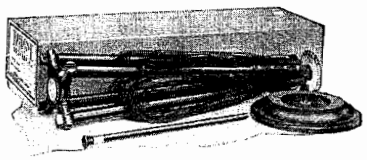
Thousands of owners of the better types of radio sets have found a new pleasure in radio through receiving with a high grade loop. Sharper tuning that eliminates interference—the reduction of static annoyance—abolishing of unsightly wires—complete portability, allowing use of set in any part of any room—perfect tuning control—all these advantages are found at their best in the

BODINE BASKET WEAVE FOLDING LOOP

The basket weave method of wiring used exclusively by the Bodine Loop insures superior results. A calibrated dial allows directional logging of stations, and an insulated handle for turning loop prevents the effects of body capacity.

There is a Bodine Loop designed to give perfect service with every set suited to loop reception. Excellent for Remler Super Het; special models for Grebe Synchrophase and Radiola Super Het. Prices $8.50-$10.00.

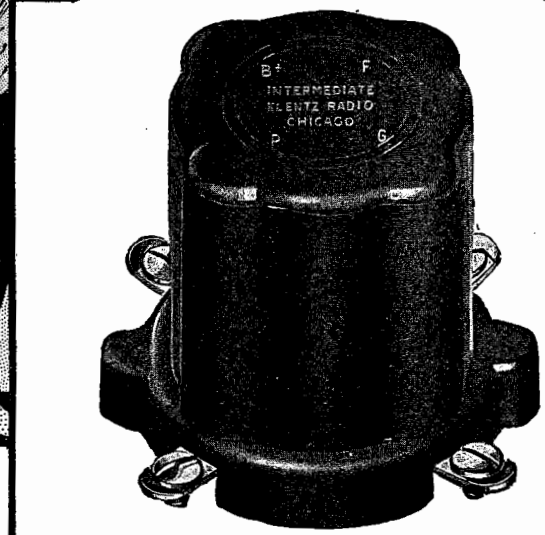
The Bodine is a really artistic bit of furniture—graceful and beautiful, with green silk wire and slender frame of brown mahogany finish. Two feet square when set up. Folds into a box 3½x6x18 inches in size.



BODINE ELECTRIC COMPANY

2250 W. Ohio Street Chicago, Ill.

KLENTZ TRANSFORMERS



Cut Shows Transformer Full Size. Notice Short Connection to Socket

A Super-Heterodyne for Quality, Amplification, Distance

The efficiency of your "Super" depends on the quality of the intermediate frequency transformers. Klentz air core transformers are designed to give maximum efficiency.

Salient Features

Quality of tone—Selectivity—Perfect matching—Stagger windings—Non-Impregnated — Bakelite construction throughout — Easily assembled on account of Bottom Connection—Moderately priced.

One Filter, Three Intermediate Frequency Matched Transformers, One Oscillator, Four Matched Condensers, One Set Blue Prints. Price **$25.00.**

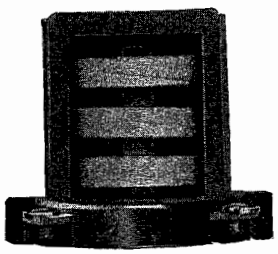
BLUE PRINTS

No. 1. This sheet shows full size panel layout giving dimensions and can be used as a template. Very handy when laying out apparatus that is mounted on front panel.

No. 2. Shows full baseboard layout so that you can lay out evenly apparatus to be mounted on baseboard. Gives exact dimensions of distance between each instrument.

No. 3. This shows a complete schematic diagram with all electrical connections plainly marked so that receiver will work when it is hooked up.

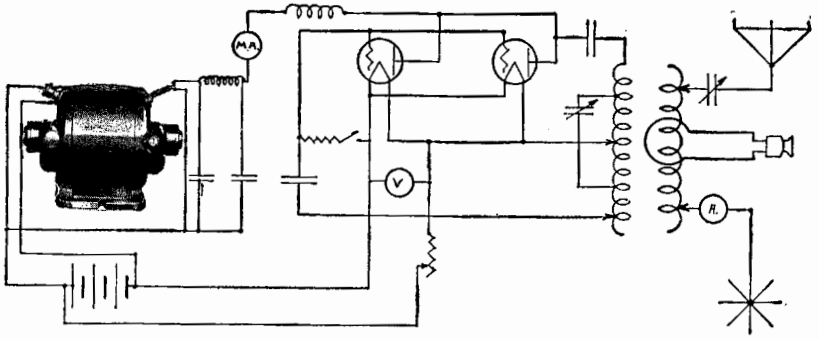
Complete set of three prints 50c postpaid



This "cut-away" view of the Klentz Transformer shows the Stagger windings which assure its perfect performance at all times.

Klentz Radio Co., Not Inc.

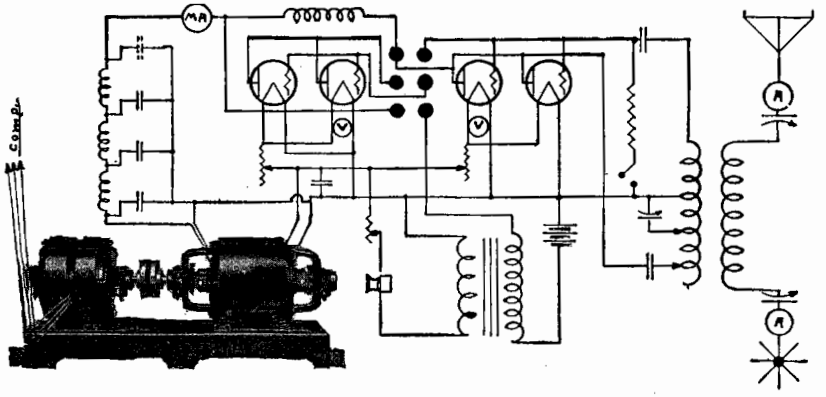
2324 No. Sawyer Ave., Chicago



A SMALL PORTABLE SET FOR THE AUTO, BOAT OR HUNTING LODGE. KEEP IN TOUCH WITH BUSINESS AND THE FOLKS AT HOME.

Item No. 68 6-12 volt primary, 500 volts, 40 watt secondary.

This little ten watt set can easily be constructed for less than $100. Requires a minimum of technical knowledge to effectively operate.



Item No. 37—Supplying 4-50 watt tubes in a telegraph and telephone circuit makes a good reliable "DX" set. Generator is 1000 volts, 600 watts —12 volts, 300 watts. Motor single phase, polyphase or direct current supplied to suit customers requirements.

This is but two of the many combinations built by "ESCO" and designed to give a **"pure wave,"** and the **maximum miles per watt.**

Don't forget—the maximum miles per watt equals the maximum miles per dollar.

TRADE **"ESCO"** MARK

MOTORS - DYNAMOTORS - GENERATORS - MOTOR-GENERATORS

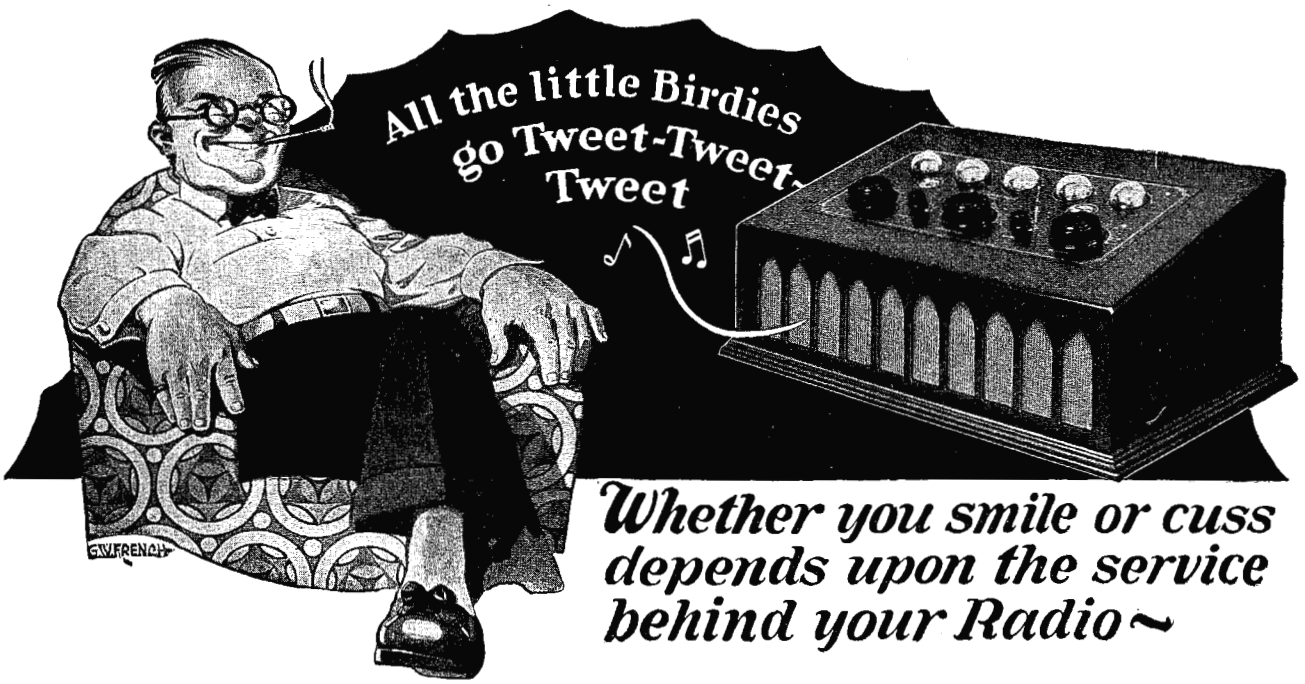
Used by more than 150 Universities—Colleges—Research Labs., etc. Many Federal—State—County and Municipal Depts.
Write for Bulletins 237B and 242A Listing over 200 combinations

Send us your problems—we'll help you solve them

ELECTRIC SPECIALTY COMPANY

267 South Street, Stamford, Conn., U. S. A.

Pioneers in Developing and Perfecting High Voltage Wireless Apparatus



Whether you smile or cuss depends upon the service behind your Radio~

WHAT is this radio service which we claim is so necessary?

Do you drive a car?

Do you ever have little things go wrong with it?

You have become so used to minor troubles that you don't condemn the car on which they occasionally occur.

No—

You go right to a service man—a man who knows your make of car. You don't go to a handy man who claims he can fix any car.

That's automobile service, and is one of the main reasons for the auto being the success it is today.

The same service condition exists in radio—the only difference being that people don't yet understand it.

The radio instrument which never requires service has never been built—it never will be.

Like automobile manufacturers, the better radio manufacturers do all within their power to make their instruments mechanically perfect. Nevertheless, like the auto, little things will sometimes go wrong—they are serious to the radio owner but very simple to a factory trained service man.

The handy man who can fix any radio simply experiments until he locates the trouble—such a method was disastrous to the auto in former days—it is disastrous and expensive in radio today. It is not sound.

Ozarka instruments are sold only by Ozarka factory representatives, men who are factory trained in sales and service, men who sell no other radios but Ozarka.

These men don't pretend to know all about radio but they do know all there is to know about Ozarka—isn't that the kind of radio service you want?

Ozarka instruments are sold under a very definite plan. An Ozarka representative will gladly set up an Ozarka in your home—he won't tune it—he won't tell you what it will do—you must operate yourself. If the results you receive by your own operating won't convince you that the Ozarka gives you the distance, volume, selectivity, tone and ease of tuning that you demand then don't buy it.

Ozarka instruments are built to sell themselves but no Ozarka is sold without factory-trained service behind it.

Openings for a Few More OZARKA Factory Representatives

OZARKA Incorporated, is now entering its 4th year. From a beginning with one engineer, one stenographer, one salesman—our present president, the Ozarka organization has grown to over 3,100 people. There must be some good reason for this growth.

Ozarka instruments have made good—they have more than met competition. Ozarka representatives have made good not only because Ozarka instruments were right, but because they have been willing to learn what Ozarka engineers were willing and capable to teach them—Ozarka unusual salesmanship and Ozarka service.

There are still openings for the right men in this organization—men who believe in the future of radio—men who are tired of working for some one else—men who want a business of their own. Prove yourself by sales and willingness to learn and exclusive territory will be given you. The man we want has lived in his community for some time. He has the respect of his fellow men because he has never "put anything over" just to make money. He may not have much money, but he is not broke and is, at least, able to purchase one demonstrating instrument.

Send for FREE Book

Radio offers a wonderful opportunity to men who are willing to start at the bottom and build. You need not know salesmanship, but will you learn what we will gladly teach you? You may not know radio, but we can and will teach you if you will do your part. With such knowledge and willingness to work, it doesn't seem possible that you cannot make good. Sign the coupon below, don't fail to give the name of your county. Better still write a letter, tell us about yourself and attach the coupon. If interested in our salesman's plan ask for "Ozarka Plan No. 100."

OZARKA
128 Austin Avenue A
Chicago, Illinois

Gentlemen: Without obligation send book "Ozarka Instruments No. 200" and name of Ozarka representative.
10-25-128A

Name.....

Address.....City.....

County.....State.....

You'll Know the Man Behind This Button!

INCORPORATED
128 Austin Avenue A
Chicago, Illinois

Gentlemen: I am greatly interested in the FREE book "The Ozarka Plan" whereby I can sell your radio instruments.
10-25-128A

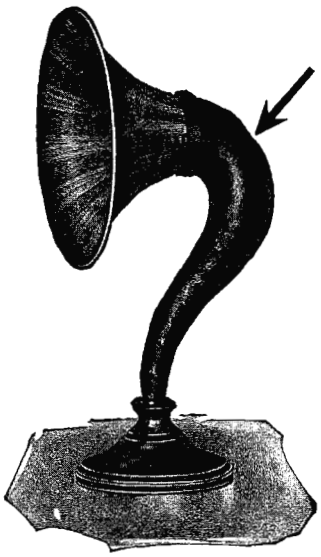
Name.....

Address.....City.....

County.....State.....

The Tone Arm is Built of Bent Wood

Radio News Certificate of Merit No. 870



$37.50

F. O. B. Indianapolis
OR AT YOUR DEALER'S

ORCHESTRION De Luxe

The All-Wood Loud-Speaker

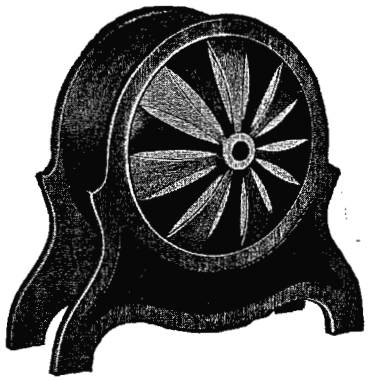
brings your first realization of complete radio satisfaction. The all-wood tone arm totally eliminates the harsh metallic sounds so often found in metal or moulded plastic loud-speakers. This tone arm of ORCHESTRION De Luxe is built entirely of bent wood, from the best tone-reproducing spruce-pine and maple, just as all fine musical instruments are made.

The amplifying bell, 15 inches in diameter, contains ***twenty-four separate ribs,*** alternating in walnut and mahogany. The natural grain of these woods in ***soft velvet finish*** makes the appearance of the All-Wood Orchestrion De Luxe a joy to all lovers of fine craftsmanship. The tone arm has a stippled mahogany finish. The outer edge of the bell is bound in ***black and white pyralin inlay.*** The base containing the electrical unit is 8 inches in diameter, made of solid mahogany and highly finished. The complete instrument stands 27 inches high, is perfectly balanced and will harmonize completely with any furniture.

Try ORCHESTRION De Luxe at Our Risk!

Every dealer handling ORCHESTRION De Luxe ***is authorized to sell to you on ten days' trial.*** If this splendid instrument does not please you completely and fulfill every claim we make, ***you may take it back and your money will be refunded.*** We also ***absolutely guarantee this speaker against any structural or material defects for one year from date of purchase.***

Get ORCHESTRION De Luxe in your home on trial. If your dealer does not handle it, *order direct from our factory,* on same money-back guarantee.



Orchestrion Sunburst

Cabinet Type Speaker

Those who prefer the cabinet type loud-speaker will find the ORCHESTRION SUNBURST a wonderful instrument. It is built of two-tone mahogany and walnut, with solid mahogany cabinet in dull wax finish. The 12 ribs of the sunburst are alternate mahogany and walnut bound with black and white pyralin. Swell of sunburst amplifier, 1½ inches; width of cabinet over all, 15 inches; height, 14 inches; front-to-back thickness, 4½ inches.

The ORCHESTRION SUNBURST, like ORCHESTRION De Luxe, is an ***all-wood instrument,*** of beautiful design and craftsmanship. ***It has our special all-wood tone arm that insures clear, beautiful reception.*** It is sold on the ***same trial plan*** and under the same year's guarantee of service, as the higher-priced ORCHESTRION De Luxe, and will give complete satisfaction.

$25

At your dealer's or direct from factory.

RADIO CABINET COMPANY

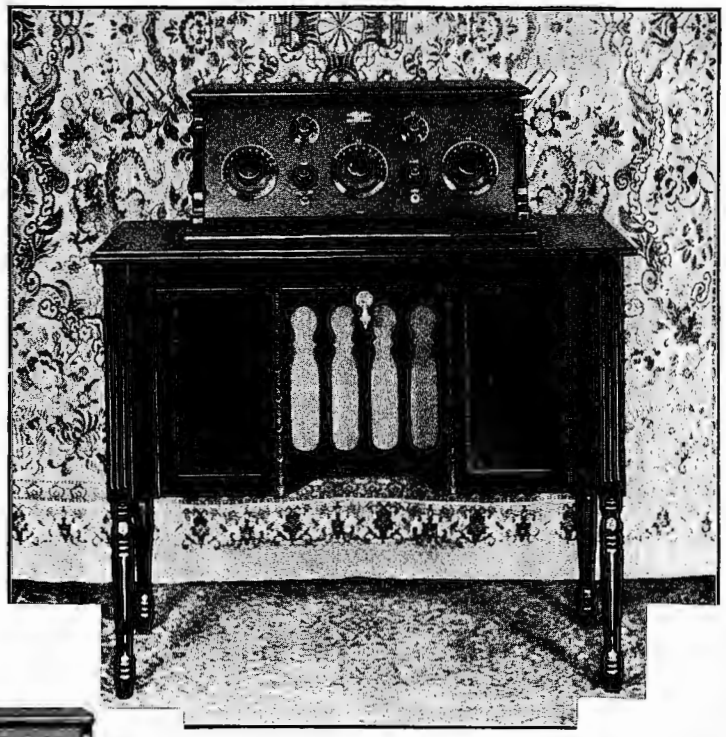
2128 North Olney Street **Indianapolis, Indiana**

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

Better *Because It's* Practical

The Greatest Loud Speaker Value Today

Considered only as a piece of furniture or only as a loudspeaker, the Console Master Speaker is worth the money. But as a combined cabinet and speaker it is the greatest loudspeaker value today. The loudspeaker is concealed behind the silk covered grill and has a beautiful, natural tone, of great volume.



An Unusual and Exclusive Feature

The Console Master Speaker, with a front that may be opened to give convenient and quick access to batteries and speaker. This is our own exclusive origination, and strong patent claims protect it.

In Walnut or Mahogany. Either way a fine piece of furniture.

Retail Price $49.50
Complete with Loudspeaker (Adjustable Unit)

31½-in. high
38-in. long
18-in. wide

The* Console *Master Speaker
with the opening front, showing the exceptionally spacious battery compartment, which will hold an "A" battery, a charger, and 2 dry or wet "B" batteries, besides the built-in loudspeaker.

The Console *Master Speaker*

for any Radio Set

The* Console *Master Speaker
showing the front let down, allowing convenient and quick access to batteries and speaker, using the front as a shelf or tray.

THE MOST PRACTICAL CONSOLE SPEAKER

Just a pull of the handle and ALL the batteries, charger, and loud speaker unit are within immediate reach

ORDER FROM YOUR JOBBER **FULL TRADE DISCOUNTS**

CONSOLE MASTER SPEAKER CO.

15 East 40th Street, NEW YORK

Service Rechargeable "B" Batteries

Indestructible, Rubber Cases

50 Volts, $5.50;
100 Volts, $10.00; 125 Volts, $12.50

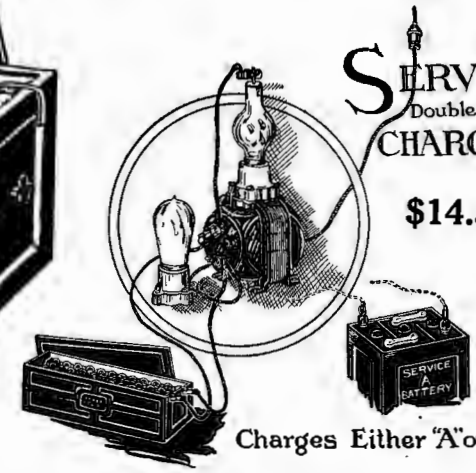
Quiet Operation

Negative and positive plates are cast in one piece, eliminating burned-on connectors, the potential noise-makers of radio batteries. Cells are spaced far apart, preventing inter-cell leakage and the hard-rubber case prevents shorting between terminals.

Service "A" Batteries
Indestructible rubber case.
Two year guarantee.
6 volt, 100 amp. hr..... $14.00
6 volt, 120 amp. hr..... $16.00

Service Battery Co.
704 East 102nd Street Cleveland, O.

For three years SERVICE BATTERIES have maintained an enviable position in the minds of radio buyers who demand *quality* in addition to price.



SERVICE Double-Duty CHARGER

$14.50

Charges Either "A" or "B"

No more changing of connections and paralleling of batteries. This charger charges anything from 22½ to 125 volts in series. Charging rate is controlled by ordinary lamp.

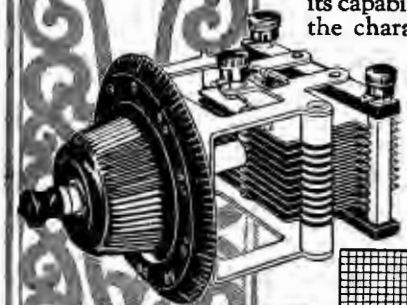
COMPLETE with battery leads, resistance lamp socket and leads, extension cord, and 2-amp. rectifying bulb..... **$14.50**

Make Your Set Do the Impossible!

BARRETT & PADEN
Micrometer Condenser

(for Any Type of Set)

The Only True *Micrometer Type* Condenser

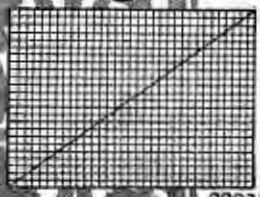


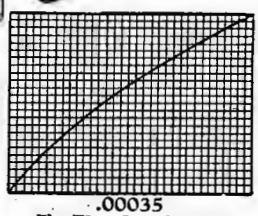
THERE is real enjoyment in having a set which will do things that other sets can't even attempt to do.

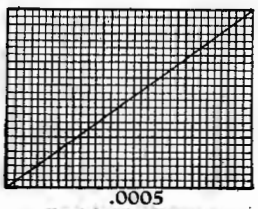
When you install Barrett & Paden condensers in any set you immediately increase its capabilities manyfold. These condensers bring in stations which, because of the characteristics of your other condensers, could not be found. Separating stations which are closely upon one another is easy and positive because of the wider range of minute capacity variations which this and only this condenser has.

The Barrett & Paden Condenser works like a mechanic's micrometer. Just as this latter mentioned device makes possible the laying-off and determination of minute distances, so the Barrett & Paden Micrometer Condenser makes it possible to obtain the minute capacity variations so necessary for precision tuning.

Build your next set with Barrett & Paden Micrometer Type Condensers. The tremendous difference in performance will amaze you. You will have a set which will do things almost beyond the belief of anyone who has not seen the set in actual operation. At your dealers or direct.


.00025
Straight Line Wave Length


.00035
Flat Wave Length Curve


.0005
Straight Line Capacity

.00025—straight line wave length
.00035—flat wave length curve
.0005 —straight line capacity

$6.00 *including dial*

BARRETT & PADEN
1314 Sedgwick St., Chicago, Ill.

Prepared by Kirtland-Engel Adv. Co., Chicago

Buy or Build an ELKAY Super-Selector

Genuine Satisfaction in This Remarkable 5 Tube Set

Compares favorably with any set on the Market at any Price

$80

Selectivity Volume Distance and Tone Quality Assured in this new ELKAY Triumph

The Biggest Value of Them All

The new improved ELKAY five tube Super-Selector, which is based on the same fundamental circuit as the Lloyd C. Greene Concert Selector, presents new ideas and new inventions, as the direct result of a high efficiency in engineering. It pioneers in radio advancement. It is a product fully representative of the well known L + K Standards of workmanship and material. Compare an ELKAY in appearance and in performance with any set selling at twice the price and you will be convinced that it is the biggest value of them all.

A Free Descriptive Booklet

There are so many new progressive features in the ELKAY Super-Selector that you will be intensely interested to know all about them, particularly if you would enjoy constructing your own set at a reduced cost with parts, blue prints and complete advice which you should be able to obtain at your dealers. If not, write direct to us.

ELKAY Engineering and Construction methods and ELKAY apparatus make it an easy matter for you to build the Super-Selector.

Send for the free booklet today.

The Langbein-Kaufman Radio Co.
511 Chapel St., Dept. M
New Haven, Conn.

Some Reasons Why the ELKAY is Far Ahead

It operates on either dry cells or storage batteries.

It uses either UV 201-A type or UV 199 type tubes without change of construction details of wiring. Any kind or arrangement of tubes can be employed. To change the set from one type of tube to any other requires less than 30 seconds.

It has a selectivity control. You can make the set as selective as you wish. This is a distinct departure—an ELKAY invention.

Its patented CLARIFIER, not alone filters out extraneous noises, but clears up muffled signals to full brilliancy. A remarkable new development.

It uses less B Battery current than other standard sets.

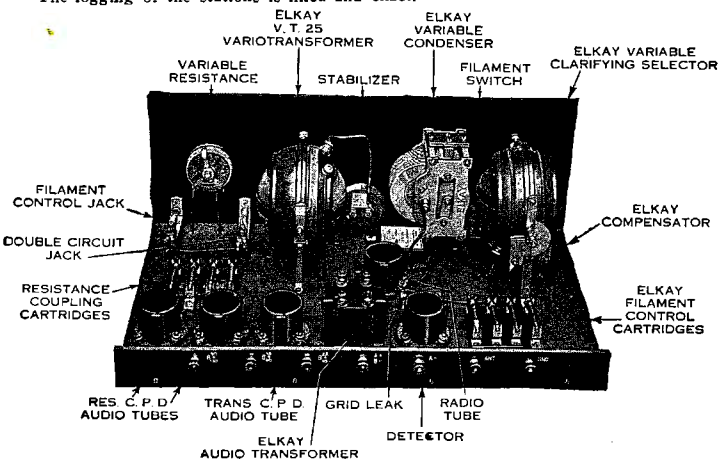
Its volume is full, equal to any set; controllable at will.

A good distance getter.

Tonal fidelity is its strongest characteristic.

There is absolute control over oscillation. Low wave length stations can be brought in just as easily as the high.

The logging of the stations is fixed and exact.



Prices of Sets and Kits

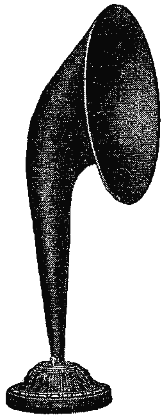
Type 4-S Four tube set	$70.00	Type 4-K Four tube kit	$60.00
Type 5-S Five tube set	80.00	Type 5-K Five tube kit	65.00

Construction Blue Prints—$1 Each

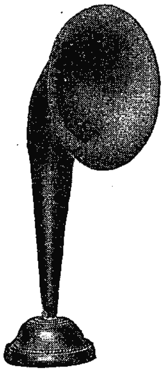
An L+K Product

TUNERS ELKAY SETS, KITS

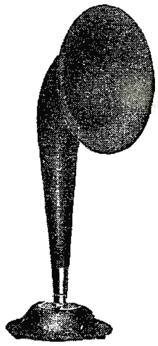
TRADE MARK REG



Model S Horn stands 29¼ inches high. The bell is 14½ inches across. The finish is a black velvet mat surface that is a delight to the eye. Has tone regulator in base. Requires no additional batteries. Price, including 4 ft. of cord with phone tips, $25.00.



Model J This horn is 26½ inches in height and has a 12 inch bell. The finish is rich bronze. An excellent horn but slightly smaller than Model "S." No extra batteries needed. Price, with 4 ft. of phone tipped cord, $20.00.



Baby Grand This Baby Grand with its 10 inch horn is a glad surprise to all. It has a full round resonance due to its non-metallic body. Furnished in black velvet mat. No extra batteries needed. Stands 24 inches high. Price, with 4 ft. phone tipped cord, $15.00.

It Tells The Tonal Truth

THE Bristol Audiophone Loud Speaker has all the volume you will ever wish, but its chief claim to popularity is that true quality of tone reproduction which critical people now demand.

Volume of sound is no longer a distinguishing feature in radio reception.

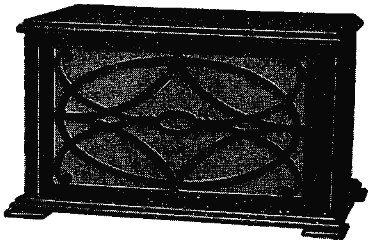
The accuracy of the Bristol Audiophone, in bringing to the listener's ear the full rich resonance of the singer's voice or the artist's instrument, has made for it a high place in public regard. It reproduces with natural quality the most powerful tones and yet has unsurpassed sensitiveness due to its "Voice," which is not a mere phone unit but a highly developed electromagnetic device.

Models "S" and "C" are equipped with the new Bristol "Super Unit" which contains a specially designed diaphragm of broad pitch range, reproducing perfectly the high as well as the low notes.

Send For Free New Booklet

"How To Select Your Loud Speaker"

an impartially written treatise, which although prepared by engineering experts, is most easily understood. It explains in detail the "how" and "why" of the many mechanisms and materials which enter into various constructions, and is highly interesting to anyone interested in radio. This booklet will be sent on request. If not at your dealer's, send for Booklet 3025-CR.



Model C—The Cabinet

A handsome addition to any furnishing. Made of genuine mahogany. Size 17x10x10¼ and just right for top of radio set or phonograph. Price with phone tipped cord, $30.00.

BRISTOL AUDIOPHONE Loud Speaker

Trade Mark Reg. U.S. Pat. Office

The Bristol Company, Waterbury, Connecticut

FOR 36 YEARS MAKERS OF BRISTOL'S RECORDING INSTRUMENTS

Ask Any Technical Engineer

Music Master Receiving Sets

A Logical Development

Music Master
Resonant Wood Insures Natural Tone Quality

(Canadian Prices Slightly Higher)

Ten Models, $50 to $460
Guaranteed Unconditionally

Authorized dealers everywhere are ready to demonstrate radio as you have always wanted to hear it. See Music Master—hear—compare—before you buy ANY radio set.

Type 300

Five Tubes. New circuit. Connect with standard bell or cabinet type Music Master Reproducer, or with specially designed art model reproducer, illustrated. Great selectivity, extraordinary volume, wonderful tone quality. Solid mahogany cabinet, beautifully ornamented, brown mahogany art satin finish.

Price, $300

Music Master Reproducer, Model XIII, Drum Type, Specially designed art model, illustrated.

Price, $40

NOW you will enjoy hearing over the radio songs as sung, words as spoken, and music as played.

For Music Master Receivers insure efficiency of reception equal to the quality of reproduction which has achieved a world-standard in Music Master Reproducer.

You will really enjoy the wonderful entertainment of New Era Radio if you hear its varied offerings, through the proved powers of Music Master reception and the demonstrated supremacy of Music Master reproduction available in one splendid radio ensemble—Music Master Receiver.

Combining the functions of radio in one complete unit of supreme efficiency, Music Master reasserts its pre-eminent title as the Musical Instrument of Radio—there IS no substitute.

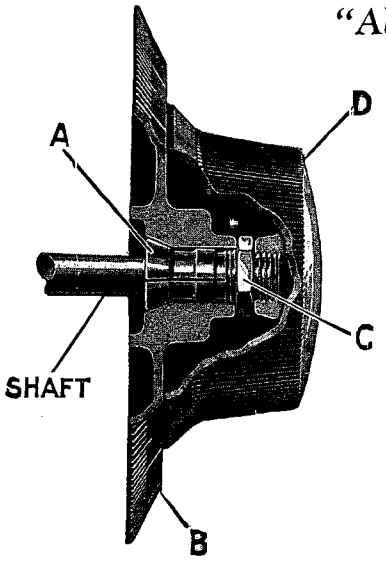
Music Master Corporation
Makers and Distributors of High Grade Radio Apparatus
128-130 North Tenth Street
CHICAGO NEW YORK PHILADELPHIA PITTSBURGH MONTREAL
Canadian Factory: Kitchener, Ontario

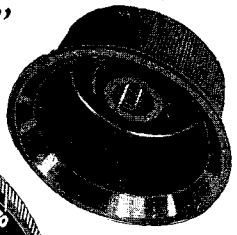
Music Master
RADIO PRODUCTS

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

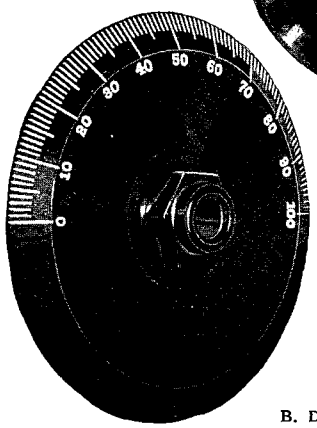
The Kurz-Kasch Aristocrat Line

"Aligns rite—Holds tite"

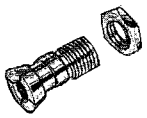




D. Knob



B. Dial



C. Fastening nut for tightening bushing on shaft

A. Split Bushing

The simple method of attaching the Kurz-Kasch dials makes an instant appeal to radio set owners. No set screws to tighten.

The patented split bushing is placed over the shaft. The dial is then slipped over the bushing. No scraping or rubbing of the panel is possible—the lock-nut is next adjusted and the entire assembly is then enclosed by screwing on the large tapered knob.

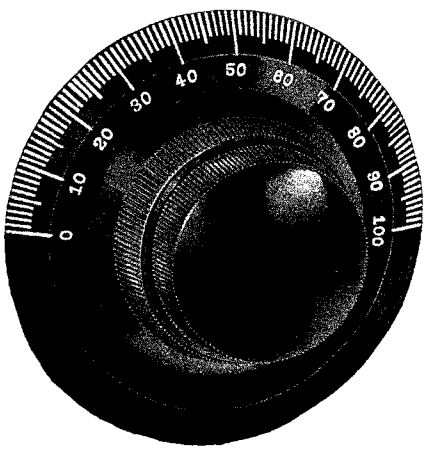
Simple—Easy—Quick.

The dial ***"Aligns rite—Holds tite."***

The split bushing eliminates entirely the unsightly set screw holes in the dial and gives a more beautiful and comfortable dial to handle.

Over two hundred leading set manufacturers have been quick to appreciate the high quality and beauty of Kurz-Kasch products and have adopted them as standard equipment.

Beautify your set with Kurz-Kasch Aristocrat Dials and Knobs. Made in all sizes and markings—standard black finish—mahogany can be supplied if desired. Ask your dealer to show you. Write us for illustrated catalog.



Aristocrat E-Z-TOON (EASY TUNE)

"The Key To Simplified Tuning"

The E-Z-Toon Dial will increase the "capacity" and range of your set, by permitting you to separate those close together and hard to tune stations. Like the other members of the Aristocrat family, the patented split bushing makes it simple and easy to install. A 50-1 Vernier gives that close tuning so desirable. Over a quarter of a million in daily use. Thousands of set owners have written us telling of the wonderful improvement in their set after installing Aristocrat E-Z-Toon dials. Replace your present dials with Aristocrat E-Z-Toons. Your dealer will be glad to give you a demonstration. Write for illustrated folder.

All genuine Kurz-Kasch Bakelite Dials and Knobs bear our trade-mark. Dials or Knobs sold without this identification are not Kurz-Kasch. Insist on the dials and knobs with the trademark moulded into the back of each part.

Kurz-Kasch Aristocrat Dials and Knobs (patented—patents pending)

Manufactured by

THE KURZ—KASCH COMPANY

Largest Exclusive Moulders of Bakelite

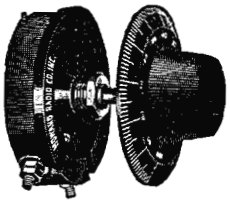
Factory & Main Office Dayton, Ohio.

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

HOWARD RADIO COMPANY—CHICAGO

451-469 E. Ohio St.

HOWARD STANDARD RHEOSTAT WITH DIAL CONTROL. Note the simplicity of this rheostat and the convenience of drilling only one hole in the panel for mounting.



HOWARD Rheostats are guaranteed to give uniform service, perfect filament control and maintain constant resistance under continuous duty. HOWARD Rheostats meet every radio requirement. Workmanship and materials are of the highest quality. The bases are of special heat resisting materials, preserving shape and finish under all operating conditions. Slide contacts are phosphor bronze, insuring perfect electrical connections and resistance elements constructed of special non-corrosive resistance wire, accurately spaced by precision machines and wound under tension on a seasoned fibre strip so that the turns cannot come loose. Carrying capacity 1.5 amperes. Its operation is controlled by a beautiful 2⅛-inch dial with 100 point marking covering full sweep of contact arm. Diameter of base 2 5/32 inches. Made in resistance of 6½, 25, 40 and 60 Ohms.

Each $1.10

HOWARD MICROMETER RHEOSTAT WITH DIAL. ONE CONTROL. The HOWARD Micrometer Rheostat gives instantly that extremely fine and hair line adjustment so necessary for the successful operation of all gas content tubes, known as soft tubes. The micrometer adjustment does not have a separate control but is automatically carried along with the main contact arm and brought into play instantly when desired. Made in resistances of 6½, 25 and 40 Ohms. The micrometer attachment can be purchased separately and will fit any standard HOWARD Rheostat.

Dial Rheostat with Micrometer Attachment. Each..... $1.50
Micrometer Attachment separate. Each..... .50

POTENTIOMETERS WITH DIAL. HOWARD Potentiometers are noted for that extremely close control of the potential in the plate and grid circuits so necessary to increase selectivity and obtain satisfactory results. The potential is kept under positive control at all times.

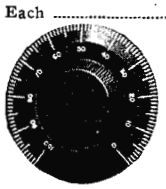
The HOWARD Potentiometer is the same size and matches the HOWARD Standard Rheostats. Furnished in resistance of 200 and 400 Ohms.

200 Ohms. Each..... $1.50
400 Ohms. Each..... 2.00

MIDGET RHEOSTATS. The HOWARD MIDGET RHEOSTAT was designed to meet the long-felt want for a high grade rheostat small enough to be used in portable sets where space is limited and a smaller instrument is desired. The same materials and workmanship will be found in this Rheostat as in the standard HOWARD Rheostats, the only difference being in the size, the base being 1⅝ inches as compared with 2 5/32 inches on the standard Rheostat. This Rheostat is not furnished with micrometer attachment. Made in resistances of 6½, 25, 40 and 60 Ohms.

Each $1.10

(Cut is ⅔ actual size)

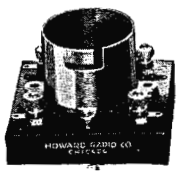


Front view of HOWARD Dial. These dials are sold separately and may be placed on any HOWARD Rheostat or Potentiometer. Size, 2⅛ inches in diameter.

Each $0.25

Rear view of HOWARD Dial showing 3/16-inch shaft permanently anchored in dial. The length of this shaft is 1⅜ inches.

Each $0.25

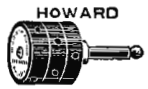


The superiority of the HOWARD Socket lies in the "Sure Contact" which is made to the side of the tube pins and not to the ends. The contact arms have more than twice the spring value found in the average socket, as well as a full ¼-inch contact surface applied to the side of the pins. These contact arms cannot lose their spring tension and can be relied upon to make a permanent, perfect contact. The base of the Howard Socket is moulded from the highest grade bakelite.

Each $1.25

Upper Cut shows the Howard Socket and Lower Cut shows the construction of the "Sure Contact" springs.

THE HOWARD MULTI-TERMINAL PHONE PLUG is the most simple and efficient on the market. The patented feature provides instantly a positive connection for phones or loud speaker and will accommodate from one to six pairs of phones, all connected in at the same time, with maximum electrical efficiency. Slip in another pair of phones instantly without interfering with connections previously made. Merely insert the tips in the holes provided in the plug for that purpose.



Each $2.00

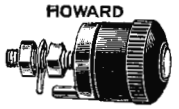
FIXED CONDENSERS. Nearly every radio set in existence makes use of small fixed condensers. They perform a very important part in the successful operation of the set. Defective or inaccurate condensers cause no end of trouble. When a circuit calls for a condenser of a "fixed" rated capacity, install a "HOWARD" for accuracy and permanency. Only the best grade of Indian Ruby Mica is used to separate the copper and brass conductors. No paraffin or similar substances form any part of the dielectric. They are all hand made, each tested on a capacity bridge and guaranteed to be noiseless and accurate. Made in capacities of .00025, .0005, .001 and .002.

Each $0.60

HOWARD INDUCTANCE SWITCH LEVER. This switch lever is made in two sizes, with small and large knob and having a blade radius of 1 inch and 1 9/32 inches respectively. The highly nickel plated phosphor bronze contact blade is securely keyed to the knob and will not turn or come loose under any condition.

Each $0.50

HOWARD BINDING POST. The special feature of this binding post is the holding device which positively prevents the binding post from turning after it has been mounted. The top is made of the same high-grade insulating material as used in the manufacture of other Howard products.



Each $0.20

21-22 — Large and small indicating pointers. .020 inch thick, 8-32 thread, 1 1/16 inch radius and 13/16 inch radius respectively. Highly nickel plated.

Each $0.08

23-24-25—Soldering Lugs with standard 6-32 hole, nickel plated.

Per dozen $0.10

26-27—Switch points and switch stops, highly nickel plated, 6-32 thread and equipped with nut.

Each $0.03

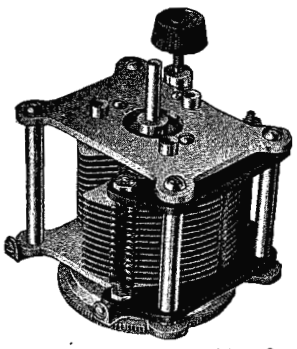
All Howard Products are sold with a Guarantee of "Satisfactory Performance or Money Back"

Ask your dealer to show you the Howard line of parts. If he cannot supply your wants, send his name to us with your order.

CHI-RAD

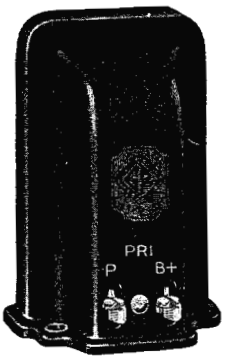
OLDEST EXCLUSIVE RADIO JOBBER IN THE MIDDLE WEST

Complete Stock of **New General Radio Co. Apparatus**



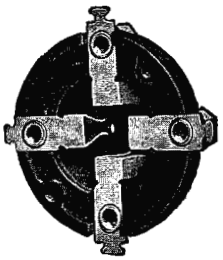
Type No. 334 Metal End Plate Condensers. Capacities .00025, .00035, and .0005. Write for prices.

Type No. 248 Tandem Condensers. For single control receivers.



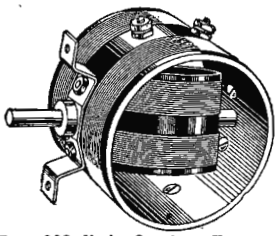
Type 285-L. 2-1 Audio Frequency Transformer. Write for prices, etc.

Special Descriptive Bulletins Sent on Request

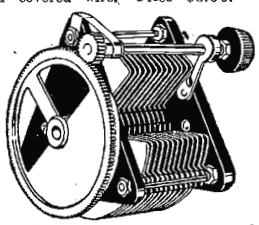


Type 346 Socket. For new UX tubes. List $0.50 (also Type 349 Adapter for UX tubes listing at $0.30).

No. 6025A. Western Electric new power amplifier. Supplies own A and B current direct from AC lines. No batteries required. Price $115.00.



Type 268 Vario Coupler. Very compact and rugged—ideal for the portable set. Stator coil has but a single tap which simplifies installation, operation, and reduces losses. Bearings very smooth running. Forms of genuine moulded bakelite wound with green silk covered wire. Price $3.50.



Type 247 Condensers. The type 247 General Radio Condenser is a universal favorite because of its high electrical efficiency. Plates of Rotor and Stator Groups soldered together, thus insuring perfect electrical contact. Vernier adjustment is by balanced metal gear operated by fibroil pinion. End plates of hard rubber. Prices, $3.25 to $7.25.

If you want quality radio merchandise—
If you want radio apparatus that will make friends out of customers—
If you want prompt, intelligent attention to all your orders—big or small—
If you want courteous, friendly co-operation—
Make Chi-Rad your jobbing headquarters for Radio in 1925 and every year thereafter!

Jobbers for the following:

General Radio Co. **Complete Line**
Benjamin Electric Mfg. Co. **Sockets**
Burgess Battery Co. **"B" Batteries**
Allen D. Cardwell Mfg. Co. **Condensers**
Corning Glass Works **Pyrex Insulators**
E. T. Cunningham, Inc. **Cunningham Tubes**
Dubilier Condenser & Radio Corp. **Dubilier Condensers**
H. H. Eby Mfg. Co. **Eby Binding Posts**
Fiat Loops
Fleron Insulators
Formica Insulation Co. **Sheets, Tubing**
Jewell Instrument Co. **Jewell Meters**
Jones Multiplug
Kellogg Switchboard & Supply Co. **Sockets, Fixed Condensers**
Kurz-Kasch Co. **Dials**
Mica Insulate Co. **Tubing**
Mu-Rad Laboratories **Receivers**
National Co. **Condensers, Coils, Dials, Regenaformer Kits**
Fansteel Products Co. **Balkite Chargers and "B" Current Supply**
Rel Low-Loss Tuners
Remler Mfg. Co. **Condensers, Transformers**
Reichmann Co. **Do-Nut Coils Thorola Talkers**
Thordarson Transformers
Vesta Storage Batteries
Western Electric Co. **Loud Talkers, Tubes**
Weston Electric Inst. Corp. **Meters, Plugs**

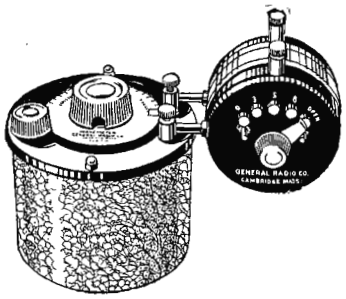
DEALERS—Write for New Catalog

Every radio dealer should have a copy of our handy loose-leaf catalog—a perpetually up-to-date Radio Catalog. Free to dealers only.

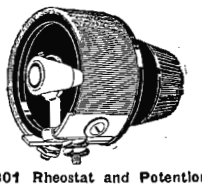
CHICAGO RADIO APPARATUS CO.

Radio Jobbers Exclusively

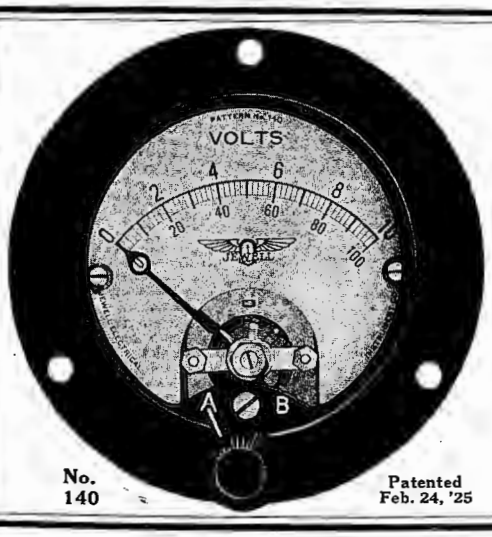
415 South Dearborn Street, Chicago, U. S. A.



Type 247-W Wavemeter and Filter. The type 247-W wavemeter and filter increases the selectivity of a receiver by tuning out interference from various sources. Composed of a special type condenser with filter coil attached. Filter coil with range of **150** to **500** meters is of moulded bakelite wound with silk covered wire. Price $10.00. Extra interchangeable filter coils for shorter or longer wavelengths, furnished for $3.00.



Type 301 Rheostat and Potentiometer. The type 301 rheostat maintains positive contact at all times. There is no momentary opening of the circuit to cause a bothersome click in the earphones.
The resistance units are tightly wound on specially treated fibre strips.
The base and tapered knob are of genuine moulded bakelite. Pointer on knob indicates the position of the contact arm. Furnished with resistance units of 10 or 30 ohms. Price $1.25. Potentiometer similar in construction but with 200 ohm resistance unit. Price $1.25.



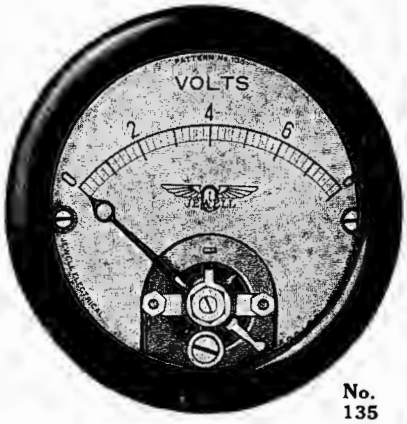
No. 140

Patented Feb. 24, '25

TWO NEW JEWELL INSTRUMENTS

(CUTS ACTUAL SIZE)

Send for Special Circular No. 776, describing these two-inch high resistance voltmeters for radio set panels.



No. 135

JEWELL

THIS

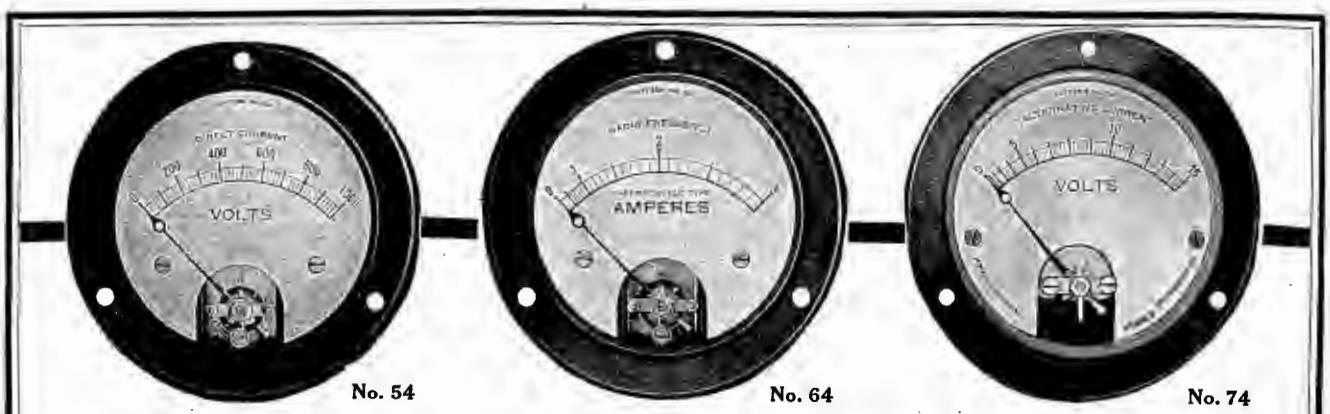
instrument is recognized as standard among engineers, manufacturers, jobbers and dealers for checking tubes and making radio tests.

Jewell leads in radio because our engineers have studied radio problems and we have developed new instruments to meet every need.

SEND FOR 15-B CATALOG

Jewell Electrical Instrument Company
1650 Walnut St. Chicago, U. S. A.

No. 95—Jewell Radio Test Set



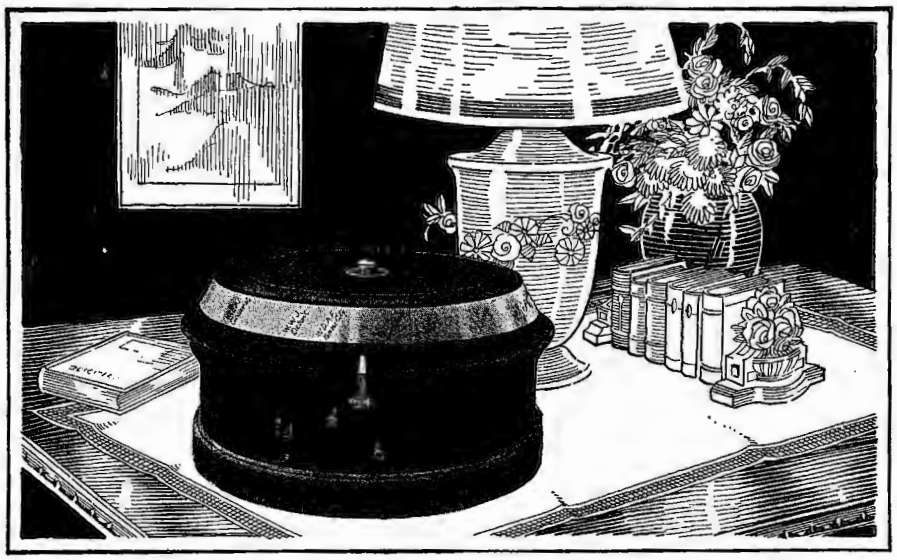
No. 54 No. 64 No. 74

THE JEWELL TRIO—"FAMOUS AMONG AMATEURS"

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

NO-DIAL (Patented)

The Newest Thing in Radio



Licensed under Blackmore Patents and Patents Pending, Hogan Patent No. 1014002

Radio's Greatest Sensation!

Revolutionizing Radio Operation

The "NO-DIAL" so simple in operation, so positive in performance, is just what you want

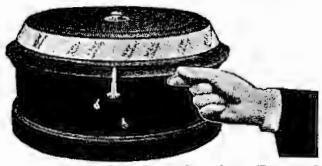
Dials are gone forever! Old-fashioned—obsolete! They served their purpose in the "radio pioneer days." Now up-to-date fans refer to them as primitive—pre-historic—"old-as-the-hills!"

Away with trouble, complicated tuning and puzzling operations! Scrap your log book! Forget your past disappointments.

For radio is SIMPLICITY itself now! Just what you predicted and everybody expected. You, who have waited for the "grief-less," and "worry-less" radio receiver, can buy NO-DIAL safely.

VISIBLE STATION RECORD

The NO-DIAL brings in stations far and near by merely rotating the cover. Each station comes in at a certain point. As stations are received they are recorded right on the cover (Fig. 1) and thereafter they will always come in at the same point. Thus you have a *permanent* and *visible* station record which is positive and unfailing.



Permanent Visible Station Record. A touch of the finger brings 'em in.

IT'S BEAUTIFUL

The NO-DIAL represents a complete departure in radio set design. It is housed in a compact, circular case finished in popular brown crystalline, a perfect match for most high grade loud speakers. Nothing to spot, scratch or mar. Easily cleaned with a damp cloth. Finally, it's trouble-proof and GUARANTEED.

NO-DIAL sets are built for storage or dry batteries.

THE HOME OF NO-DIAL

LOUD AND CLEAR AS A BELL

The tonal qualities of the NO-DIAL will please everyone, due to the fact that they are directly caused by our latest combination in resistance coupled amplification. The tonal qualities are so sweet, so clear, so mellow! Harshness and interfering noises are absorbed and never reach the ear. Volume is regulated with a control lever. Far distant stations come in almost as distinctly as local. Results are positive and instantaneous.

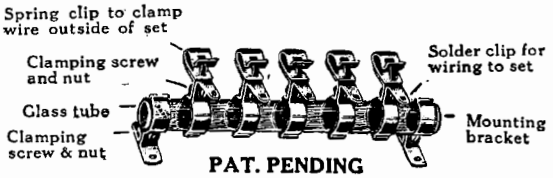
Tube for tube, the NO-DIAL recognizes no superior, and on test it has out-performed many higher priced receivers. The NO-DIAL will do everything any other single control set will do, and more, as regards fine volume, long range and clarity of tone.

See your dealer TODAY and ask for a demonstration. You'll be amazed. Descriptive literature sent on request.

DEALERS: Write for details regarding a NO-DIAL Franchise.

The Ohio Stamping and Engineering Company - Dayton, Ohio, U. S. A.

SOMETHING NEW!
NO LOSS TERMINAL STRIP



PAT. PENDING
Cut Half Size

Hornig Glass Insulated Radio Terminal Strips

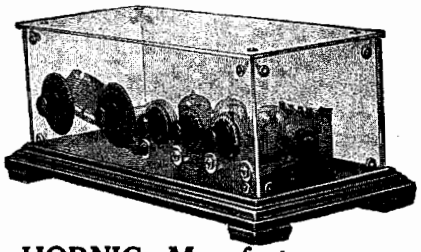
Samples Sent Postpaid on Receipt of Following Prices:

Two Connections	$0.50	Each includes a glass insulating tube, two mounting brackets, and all necessary machine screws and nuts. Shipped knocked down.
Three Connections	.65	
Four Connections	.80	
Five Connections	.95	
Six Connections	1.10	
Seven Connections	1.25	
Eight Connections	1.40	

Above Made Up in Retail Store Display Kits. Ask for Discounts.

Glass Panels and Cabinets

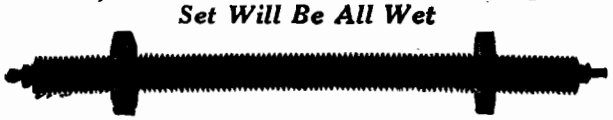
Equipped with Hornig Safety Bushings (pat. applied for), allowing a pressure far in excess of what is needed to mount the radio instruments without breakage. Ask for discounts.



AUG. W. HORNIG, Manufacturer
3927 Dickens Ave. Chicago, Ill.
Tel. Spaulding 3156

Use M & M Low Loss Antenna
INSULATORS

Storm, Weather and Water Proof—or Your Set Will Be All Wet

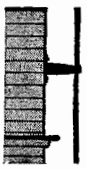


M. & M. Low Loss Lead-In Insulators make your set absolutely immune to rain or storm.

M. & M. Low Loss Lead-In Insulators are made of hard rubber with brass rod in the center.

Perfect the installation of your radio set by the use of these reliable insulators.

4-in. Lead-In Insulators, **50c**; 10-in. Lead-In Insulators, **80c**; 20-in. Lead-In Insulators, for heavy walls, **$1.50.**

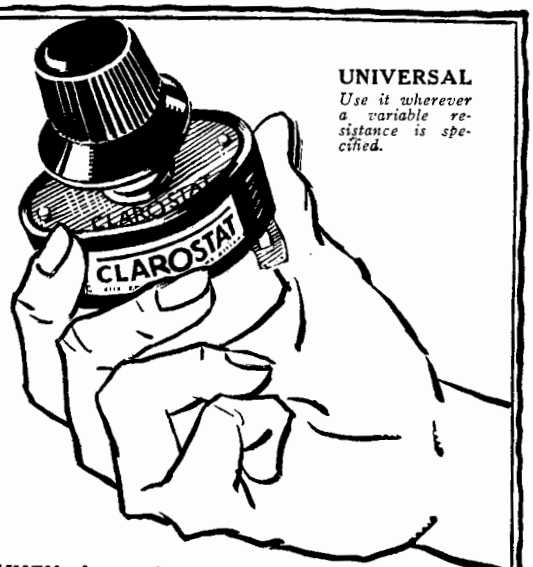


Antenna Wall Insulator

Made especially for radio work. Has steel base moulded into hard rubber column. Holds any sized wire from No. 14 to 4. Keeps wire 5 inches from wall, thus meeting underwriters' requirements. List price, **60c.**

DEALERS! If your jobber doesn't carry M. & M. Insulators write us direct and ask about our attractive display board, free to dealers.

THE M. & M. CO.
500 Prospect Avenue Cleveland, Ohio



UNIVERSAL
Use it wherever a variable resistance is specified.

WHEN that radio speaker sounds as though he were juggling beans and vowels at the same time, that's the time to install CLAROSTAT.

$2.25 LIST

CLAROSTAT across the transformer of your amplifier will clear up distortion. Installed in a minute and lasts a lifetime. Ask your dealer!

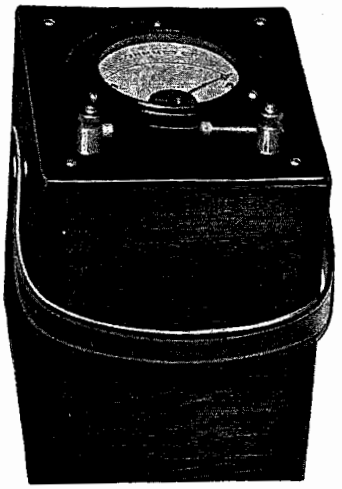
American Mechanical Laboratories, Inc.
285 North 6th St. Brooklyn, N. Y.

Ask about the New CLAROTUNER!

CLAROSTAT

Grid Leak Tester

With our model 239 meg-ohm meter instant readings may be obtained directly on the instrument scale.



This meter has a range from 0 to 5 meg-ohms (higher reading may be interpolated on the scale).

It is complete with internal batteries and a pair of self adjusting terminals to support all types of grid-leak units—a pair of binding posts are also provided which allows connecting wires for external tests.

This meter is provided with a carrying strap and as it weighs only a few pounds may be carried about with ease.

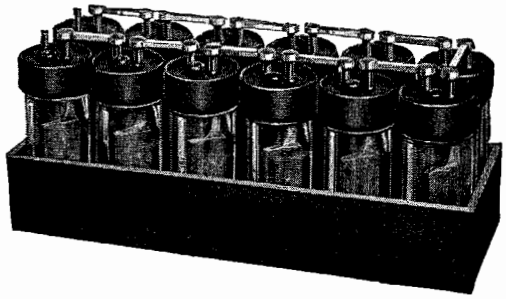
Manufacturers and dealers are finding this instrument an ideal device for determining the resistances of grid-leak units.

Our Bulletin No. 239 describes this instrument more in detail.

ILLINOIS TESTING LABORATORIES, INC.
Testing Engineers and Manufacturers
143 West Austin Avenue Chicago, U. S. A.

World Batteries

"To Purchase a World is to Purchase Economy"



RADIO Storage "B" Battery

$3.25 C.O.D.

4 Batteries in Series (96 Volts) $12.75

World Storage "B" Battery

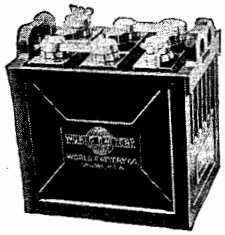
12 Cells—24 Volts—*Solid Rubber Case*

To ten million homes with Radio Sets—and to countless millions of prospective buyers—this WORLD Storage "B" Battery brings a new conception of battery economy and performance. Here is a battery that pays for itself in a few weeks—will last for years, and can be recharged at a negligible cost.

Approved and listed as Standard by leading Radio Authorities, including Pop. Radio Laboratories, Pop. Sci. Inst. Standards, Radio News Lab., Lefax, Inc., and other important institutions.

A ***Superior*** Battery Equipped with Solid Rubber Case.

Has heavy, rugged plates and plenty of acid circulation. Extra heavy glass jars allow ready observation of charge. You will find this battery a boon to long distance reception. It does away with a great many noises so often blamed on "static."



WORLD STORAGE "A" BATTERIES

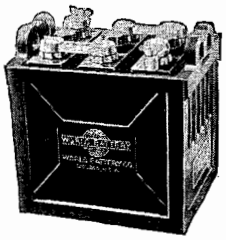
Equipped with *Solid Rubber Case*, an insurance against acid and leakage

TWO-YEAR WRITTEN GUARANTEE

Famous for Guaranteed Quality and Service. Backed by Years of Successful Manufacture and Thousands of Satisfied Users.

6 Volt, 100 Amps, Solid Rubber Case	$11.25
6 Volt, 120 Amps, Solid Rubber Case	13.25
6 Volt, 140 Amps, Solid Rubber Case	14.00

Approved and listed as Standard by leading Radio Authorities, including Pop. Radio Laboratories, Pop. Sci. Inst. Standards, Radio News Lab., Lefax, Inc., and other important institutions.



Send No Money

Just state number and kind of batteries wanted, and we will ship order the day it is received. When shipment arrives, examine the battery or batteries before you pay one penny. Then pay C.O.D. charges. 5% discount for cash in full with order. Remember, ***"to purchase a World is to purchase economy."*** Send your order TODAY.

WORLD BATTERY COMPANY

1219 So. Wabash Ave. **Dept. 26** **Chicago, Ill.**

Set your Radio Dials at 210 meters for the new 1000 watt World Storage Battery Station, WSBC, Chicago. Watch for announcements

Save You 50%

Quality Merchandise at REAL PRICES

Our FREE Big New Catalog is just off the press. Send for it and see the enormous savings we offer on all your radio needs.

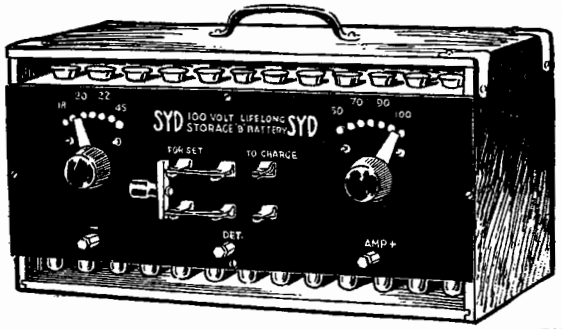
Hundreds of standard quality parts, sets and kits are shown in this big new catalog at the lowest prices in America. Write today.

We are an old reliable house and specialize in Radio only. The name of Western Radio Mfg. Co. stands for satisfaction from Coast to Coast.

Western Radio Bargain Catalog Mfg. Co.

134-136 W. Lake St.
CHICAGO ILL.

Only the finest advertised merchandise is shown and is backed by an absolute guarantee of satisfaction or money back. Write for FREE Catalog NOW.



The Syd Battery pictured above is a storage "B" Battery made of Edison Elements, which have nickel and iron in their construction.

The solution used is a preserver of nickel and iron, thereby giving the battery practically unlimited life.

Radio Fans' unqualified approval of the SYD "B" Battery, product of the SYD Battery Co., is founded solely on merit. Experience is a wise teacher and has taught the need of exact voltage at all times to insure greater volume, clearer reception and better selectivity from any radio set. The unvarying adequate power derived from the SYD "B" Battery explains its great and ever-growing popularity.

Operating on an average of 4 or 5 hours daily the SYD Batteries will last six weeks or more on a single charge. The cost of recharging is less than 5 cents. SYD Batteries do not discharge through idleness. The SYD Battery is assembled in a beautiful polished, chemically treated quarter oak cabinet. The Bakelite front panel has a voltage selector switch and various binding posts, which make it easy to obtain voltage from 16 to 100 volts. The battery unit is 14 inches long, 7½ inches high and 6½ inches wide and weighs less than eighteen pounds.

There Are Many Satisfied Users
—Ask Your Friend Who Owns One

MANUFACTURED AND SOLD EXCLUSIVELY BY

SYD Storage "B" Battery Co.
1452½ South Wabash Avenue Chicago
Mail Orders Filled Promptly

SYD 100 VOLT LIFE LONG STORAGE "B" BATTERY SYD

THE BATTERY OF MANY ADVANTAGES

Tested and approved by The Chicago Daily News Radio Laboratory.

It is only through our policy of selling direct to the consumer that we are enabled to sell this battery at the remarkable prices of—

Laboratory News Notes
Syd "B" Battery

The Syd storage "B" battery submitted to The Daily News radio laboratory for a test was found satisfactory. This battery is different from the usual lead sulphuric acid cell type of battery. The cells used are commonly known as the Edison cell; the electrodes, or "plates," are of nickel and iron instead of lead, and the electrolite is an alkaline instead of sulphuric acid.

In the hands of the novice the Edison type of cell has the distinct advantage of durability, and ability to withstand neglect and abuse without injury. The battery can be left in a discharged state for any length of time without injuring the plates. Overcharging or heavy loads, even short circuits, have no effect on the life of the battery.

100 Volts.....$15.50
145 Volts.....21.50

A SYD Charger Given Away **FREE** ***With Each Battery Purchased***

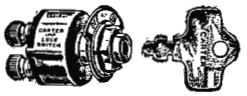
Tell 'Em You Saw It in the Citizens Radio Call Book

CARTER
Radio Products

Year after year th demand for Carter Radio products increases. Because of the originality and foresight in design each product is as good and in as great demand today as it was when first offered for sale. New products are being continually added—each to fit a specific demand—you will find it is not necessary to replace Carter Products. They last—and are always the "last word."

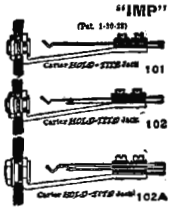
Any dealer can show you why

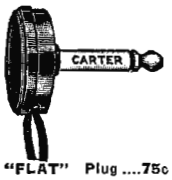
"IMP" Plug.....15c



"IMP" Lock Switch.....75c

Jack Switches, 4 Combinations of Springs, $1.00 to.....$1.60

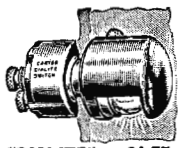




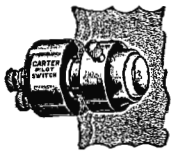
"FLAT" Plug 75c

"IMP" Rheostat....$1.00

"IMP" Potentiometer $1.25
200 or 400 ohms



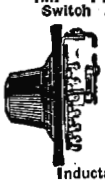
"DIALITE" $1.75

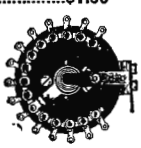


"IMP" Pilot Switch $1.50

"HOLD-TITE" Jacks, 70c to $1.30. 10 different spring combinations completely covering all circuit requirements.

Vernier Control Rheostats, 3, 6, 10, 20, 25 and 30 ohms $1.75

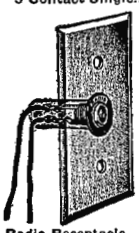




Inductance Switches
15 Contact Single Arm $1.50
15 Contact Double Arm 1.60
9 Contact Single..... 1.35

Potentiometer 200 or 400 ohms, $2.00

"IMP" Battery Switch 65c



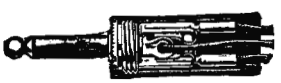
Radio Receptacle Jack $1.00

"TU-WAY" Plug 60c

New Loop Self-Supporting Aerial, $15.00

Portable Jack.....75c

Jack Name Plates 5c
Eight Styles



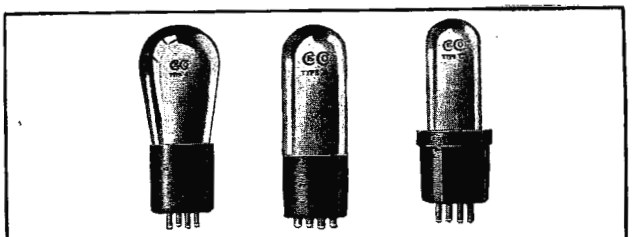
"ONE-WAY" Plug 50c

"IMP" Jack, 30c

In Canada—Carter Radio Co., Limited—Toronto

Carter Radio Co.
300 S. RACINE AVENUE
CHICAGO, ILL. U.S.A.

Offices in Principal Cities of the World



	"A"	"B"	"C"
Filament Volts	5.0	3.0	3.0
Filament Current	0.25	.06	.06
Plate Voltage.....20 to 120		20 to 80	20 to 80

Made with Brass and Bakelite Bases

TRADE MARK REG. **CeCo** U.S. PAT OFF.

TUBES
Make a Good Receiver
Better

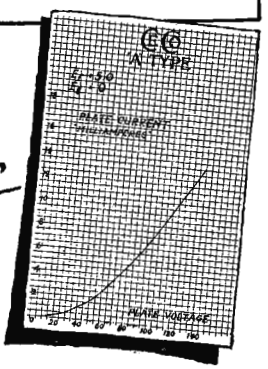


Chart shows plate current "CeCo" A-201A Type Tube in Milliamps at a filament terminal potential of 5 Volts and at plate potential between 0-140 Volts. Write for complete set of graphs.

CeCo Tubes are "Best by Test." Not just because we *say* so, but because they PROVE so in actual use. Clearer tone, increased volume, maximum results, longer life! You'll SEE the difference in YOUR receiver whatever its type.

CeCo Tubes are surprisingly superior, whether used as radio frequency amplifiers, detectors, oscillators, or audio frequency amplifiers. They have established a new and higher standard of tube excellence.

Every CeCo Tube backed by a guarantee that's backed by a company of established reputation and responsibility.

A complete plant, modern in all respects, with an experienced technical staff is devoted exclusively to the manufacture of perfect tubes under the registered trade mark "CeCo."

Insist on "CeCo" Tubes for Results. Approved by Recognized Authorities

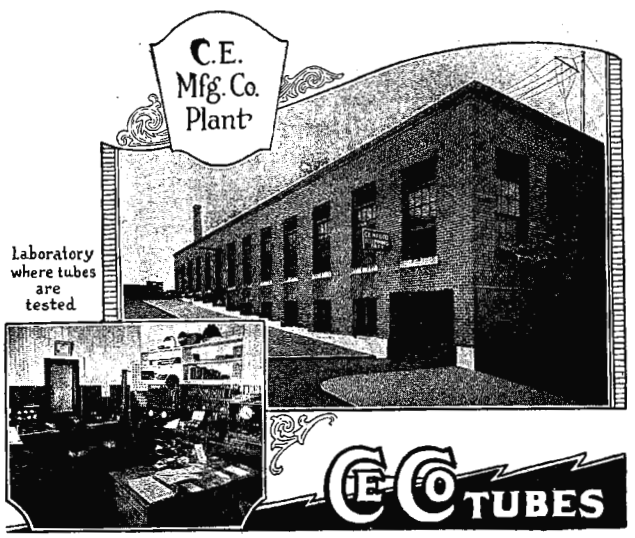
Your radio dealer has them or can get them for you. You can buy cheaper tubes. You CAN'T buy better ones. Three types—one quality—the BEST.

Set manufacturers: Ask about our SPECIAL MATCHED tubes. Trade supplied only through Jobbers.

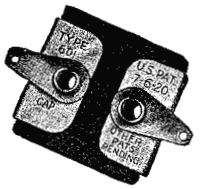
APPROVED RADIO NEWS LABORATORIES 1922

APPROVED POPULAR RADIO LABORATORY

C. E. MANUFACTURING CO.
702 Eddy Street **Providence, R. I.**

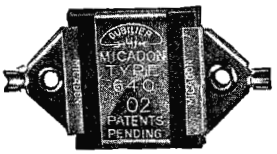


DUBILIER Devices



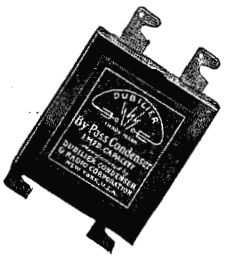
601 Micadon—

The standard fixed condenser of radio, made in accurate and permanent capacities. Extension tabs for simple assembly.



640—Micadon—

An efficient mica condenser of superior electrical and mechanical construction. It is available in a large range of capacities, .00025 to .02 mfd.



By Pass Condenser—

A device which smooths out the fluctuations of the "B" battery and provides an even flow of current. Intended for use with "B" batteries of not more than 150 volts.

Type 577 Condenser—

An extremely efficient condenser of the low loss type—normal voltage rating 1,000 volts, 60 cycles A. C.—especially adapted for use in low power vacuum tube transmitters.

Ducon—

A Ducon, plugged in on any light socket, takes the place of an unsightly, cumbersome antenna.

Metaleak—

The new resistance unit with the metalized filament.

Dubilier

CONDENSER AND RADIO CORPORATION

Earn $50 to $250 a week as a Radio Expert

If you are making less than $50 a week—if you want to jump quickly into the Big Pay Class—in the world's fastest growing industry—get into Radio NOW. Coupon below brings full information—it is your Ticket to Success.

Big jobs are open for trained men everywhere. We receive calls regularly for Radio Experts. Radio manufacturers, dealers, broadcasting and receiving stations, railroad and steamship companies, government departments need Radio Experts NOW. Pay is big. Thousands now make $50 to $250 a week in Radio.

EASY TO LEARN AT HOME

The National Radio Institute (America's largest and oldest Home Study Radio School) will train you at home, in your spare time to become a Certified Radio Expert. No red tape—no long drawn out delays. In a few short months by the famous National Radio Institute tested method you can become the Radio Expert of your own town or wherever you wish to locate.

N. R. I. MEN LAND BIG JOBS

Letters from our students prove that N. R. I. training, plus our Employment Service puts our graduates in the Big Pay Jobs where real money is made. See what these National Radio Instutute men say:

Makes $50 to $80 a Week More

Your course leads so much further ahead than practical electricity that there is nothing left to say. Since I took your course I have earned from $50 to $80 a week more. Preston Fowler, Gordon, Nebraska.

Increases Pay 160%

I was just receiving $3.00 per 8 hours when I enrolled with N. R. I., and now I am receiving $1.00 an hour more (160% increase). The course has been worth $2500 a year to me and in another year it will be worth $3500 a year. Andrew M. Shurie, Latrobe, Pa.

Up-to-date receiving sets given with course. National Radio Institute training is practical training—not merely text books but real work on real parts and receiving sets furnished Free to you. You learn to design—build—repair, and install and operate your own sets—it is like ABC.

SPECIAL OFFER—ACT QUICK

The coupon below brings you the most Amazing Book on Radio ever written. It tells you how to turn a pastime into a Gold Mine. Important: We have a Special Limited Offer for those who act Quickly. Mail the coupon NOW.

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NATIONAL RADIO INSTITUTE

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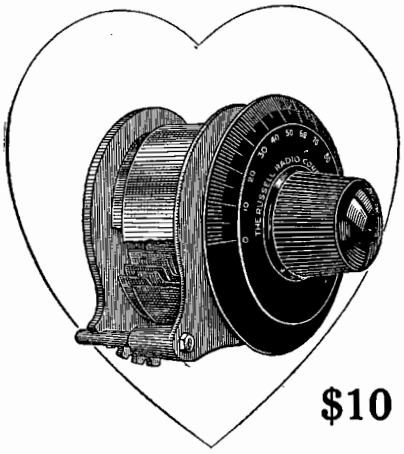
Please send me without the slightest obligation your Free Book, "Rich Rewards in Radio," and full details of your special Free Employment Service. Please write plainly.

Name..... Age.....

Address.....

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



The Heart of the Radio

Here's a condenser that is revolutionary in principle, design and construction and without an equal for efficiency. The rotor and stator plates are made of coiled, spiral brass which cannot vibrate and cause mushy reception.

$10

Russell ULTRA SELECTIVE Condenser

It is the only condenser made, having rigid and braced plates which maintain permanent and uniform spacing throughout.

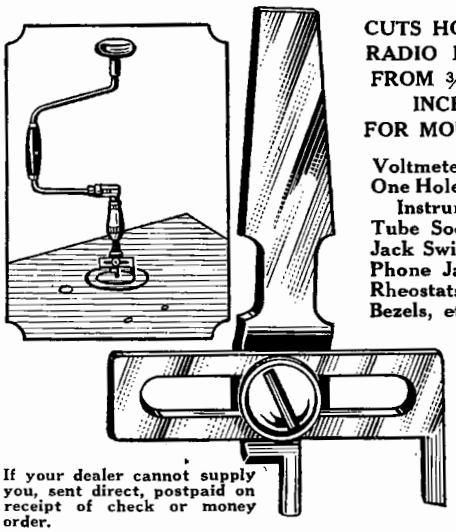
The air gap or spacing between the plates is variable. In fact it is a four capacity condenser in one. The entire condenser is a vernier and can be adjusted within one-thousandth of an inch, eliminating entirely the use of such devices as baby condensers, vernier dials and condensers and all the other devices that are used in an effort to obtain sharp tuning.

A one dial set equipped with the Russell Ultra-Selective Condenser has got Europe. Price complete with Genuine Baklite Knob and 4 inch dial $10.00. Order one today. Sent post paid upon receipt of price.

Distributors and Jobbers write for proposition.

RUSSELL RADIO CORP. 1023 Cathedral St. Baltimore, Maryland

THE G-R CIRCLE CUTTER



CUTS HOLES IN RADIO PANELS FROM 3/8 TO 3 INCHES FOR MOUNTING

Voltmeters
One Hole Mounting Instruments
Tube Sockets
Jack Switches
Phone Jacks
Rheostats
Bezels, etc.

Price 65c

If your dealer cannot supply you, sent direct, postpaid on receipt of check or money order.

A simple adjustable tool designed to cut mounting holes in either Bakelite or hard rubber panels.

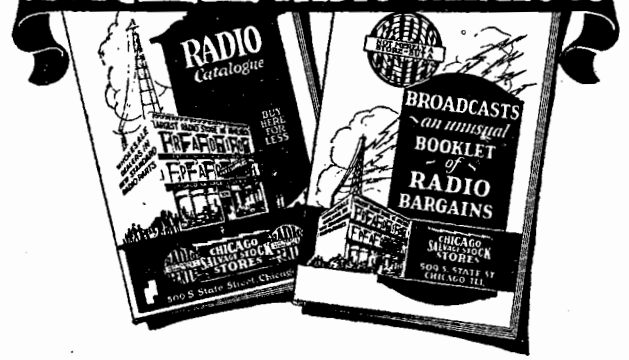
On holes 3/8 inch or larger—the sizes usually used for one hole mounting instruments—the cutter does better and neater work than does a twist drill.

Fits into an ordinary carpenter's brace.

Takes the place of a set of large twist drills, yet costs no more than one of them.

GARRISON-RUMELY
3020 SHERIDAN ROAD CHICAGO, ILL.

FREE two unusual RADIO CATALOGS



FOR "FANS"

OUR new 64-page Radio Catalog, including all the best and latest Kits, Parts and Accessories for broadcast receiving sets. Lowest prices in the country!

FOR "HAMS"

NEW 32-page booklet of army and navy transmitting apparatus and miscellaneous specials for "hams," such as W. E. Choke Coils, Generators, Resistance Boxes, etc.

More than 1,000,000 fans and hams make our store their headquarters—get these books and find out why.

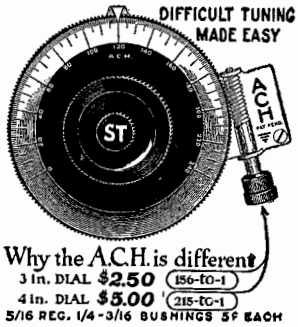
Write for either or both

509 South State Street

RADIO CENTER — NOT MERELY A STORE—BUT A — CHICAGO SALVAGE STOCK STORES — NOT MERELY A STORE—BUT A

Dept. CR6, Chicago, Ill.

A.C.H. Worm Drive Tuning Instrument



Why the A.C.H. is different

3 in. DIAL **$2.50** (156-TO-1)
4 in. DIAL **$5.00** (215-TO-1)
5/16 REG. 1/4-3/16 BUSHINGS 5¢ EACH

Can be fitted to any receiver.

No circuit too sharp for this Dial, due to the Worm Gear.

Many of these dials used in laboratories for scientific work.

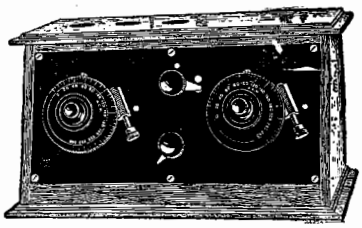
WHY?—1/10000 of an inch adjustment.

Sold Only From Factory To You

Foreign Countries—Foreign Representatives: Write for our easy payment plan, how to get parts free, or how you can make money by selling our instruments. All goods guaranteed as represented.

A.C.H. Dry Cell Three Tube Concert Receiver

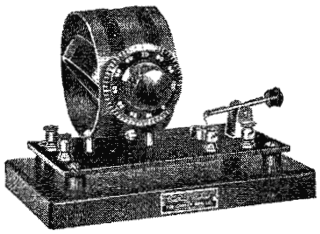
Sold Complete, Knocked Down or Parts Separate



A. C. Hayden Co. Radio Dept.
Brockton, Mass., U. S. A.

Carco

CRYSTAL RECEIVER



This reliable set will receive stations within a radius of 50 to 100 miles, and under ideal conditions, much further.

For local reception, the "Carco" cannot be beaten for tone, quality and clearness.

With an amplifying unit the "Carco" gives excellent results on a loud speaker.

The "Carco" is an exceptionally good set for a beginner on account of its extreme simplicity and low cost to operate.

Get Your "Carco" today.
Price $7.50

Send for a folder showing complete "Carco" line of variometers, coils, amplifiers, etc.

The Carter Manufacturing Company
1732 Coit Avenue **East Cleveland, Ohio**

Patented Mar. 31, 1925

The Doubletoroid Coil

"Doubletoroids" can be mounted at any angle or spaced at any distance.

"Doubletoroids" make more selective sets possible, since they do not form miniature loop aerials.

"Doubletoroids" hold static and other disturbances to a minimum since no current from an external source can influence them.

Outstanding Features of the Doubletoroids

Both primary and secondary are true toroids.

The magnetic path is shortest.

It is the most compact.

It's Variable

The Nonoise Gridleak improves reception because it can be adjusted for any station. Fits standard Brackets. Positively noiseless. At all dealers and in the better sets.

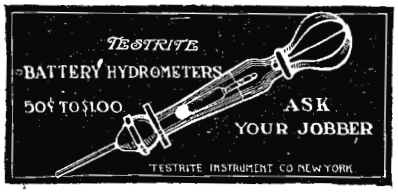
NONOISE GRIDLEAK

RADIO FOUNDATION, Inc.
25 West Broadway **New York**

EVERYTHING IN RADIO

Sets or Parts—Large or Small—Attractive Prices—Everything new—Mail orders only—Orders shipped same day.

RADIO SUPPLY HOUSE
500 Sixteenth Street **Moline, Ill.**



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Sets or Parts—Small or Large

Attractive Prices. Everything new. Mail order only. Orders shipped same day.

ALL RADIO
417 North Clark Street **Chicago, Ill.**

European Radio

EXECUTIVE in charge of sales—many years radio experience—is leaving for England and Continental Europe February 1. The removal of restrictions on most radio merchandise manufactured in the U. S. A. makes it possible to do a large volume of export business.

For a very moderate fee, to help defray traveling expense, I will show your merchandise, take orders and report the possibilities of their sale. Establish factory representatives or carry on any legitimate business for you. The charges will be very small.

Communicate with
Sales Manager, Box 50
Citizens Radio Call Book
508 South Dearborn Street
Chicago, Ill.

Don't Try to Receive With Old Tubes

Bring or send to us weak and paralyzed tubes. We reactivate them in accordance with well-known scientific principles. Keep your tubes up to their full efficiency. This is not a refill proposition, nor do we repair broken or short-circuited tubes. 24-Hour service: 75c per tube. C 299, C-301A, UV 199, UV 201A, and Deforest DVs only. Send tubes to

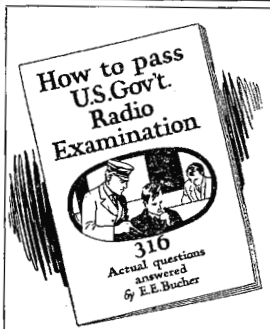
RADIO SUPPLY HOUSE
500 16th Street **Moline, Illinois**

Just Out, Beats Radio

TANZBAER

New Up-to-Date Automatic MUSICAL INSTRUMENT

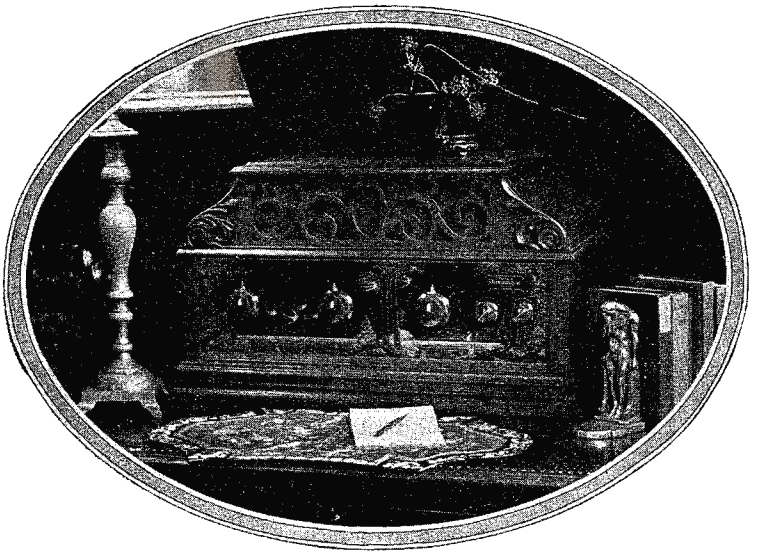
CENTRAL SUPPLY HOUSE
615 Seneca Ave. **Brooklyn, N. Y.**



PASS the U. S. Government Commercial or Amateur Radio License examination. This book will help you do it. Send sixty cents in stamps or coin for your copy —postage prepaid to any point in the U. S., Canada or Mexico.

60c *For a short time only*

Radio Institute of America
326 Broadway **New York City**



And now the final radio set

—the Deresnadyne operating from the light socket

A complete receiver employing no batteries

FOR those who want a radio receiver second to none, both in convenience and performance, the Deresnadyne will settle the question of which set to buy. It is a complete set requiring no added equipment. A set installed by merely plugging in the light socket. A set requiring no attention and always ready to operate at full power. A set which does not choose between tone quality and volume, nor between selectivity and distance, but combines all four qualities of a superlative radio receiver.

The Deresnadyne employs no batteries. It is equipped with a power unit which furnishes all necessary current from the light socket. This unit is an adaptation of one of the most successful power devices in radio. It is entirely noiseless—a permanent piece of equipment, with no bulbs and nothing to adjust, wear out, replace, recharge or renew. It improves reception for it performs at all times exactly as do batteries when these are new and fully charged.

The Deresnadyne includes all accessories except tubes. Its compactness has made possible radical improvements in appearance. The power unit and speaker are included in the cabinet. There is nothing more to buy and no further expense other than household current (110-120 AC 60 cycle)—about 1/10¢ per hour of actual use. The only connection you need make is the ground wire. Price $365. See it at your dealer's. See also the Deresnadyne II at $125 and III at $165, receivers employing the Deresnadyne circuit but requiring the usual battery and aerial equipment.

Andrews
Deresnadyne
Radio Receiving Set

ANDREWS RADIO CORPORATION • 1414 S. WABASH AVENUE • CHICAGO

NOW! Guaranteed Radio Reception

—and with a Low Priced Speaker

$14

Utah Superflex has no competition at this price. Brings in distant stations with perfect tone and with volume, and our guarantee backs it up. Ask your dealer now.

MADE OF SEMI HARD RUBBER

UTAH
Trade Mark Registered
Made In Salt Lake City

SAME UNIT IN ALL TYPES

Deflection of sound in the Superflex gives wonderful tone and volume with small tone chamber.

STANDARD HORN

$25.00

SUPREME CABINET

$25.00

PHONO - SPEAKER

WITH STAND **$10.00**

WITHOUT STAND **$9.50**

This Is Your Protection

GUARANTEE

Buy a **Utah** and use it for two weeks. Compare its tone with the best the others are able to produce. **If the Utah does not give better reception** return it to your dealer and **he will refund your money.**

Any Dealer Will Give You a Demonstration

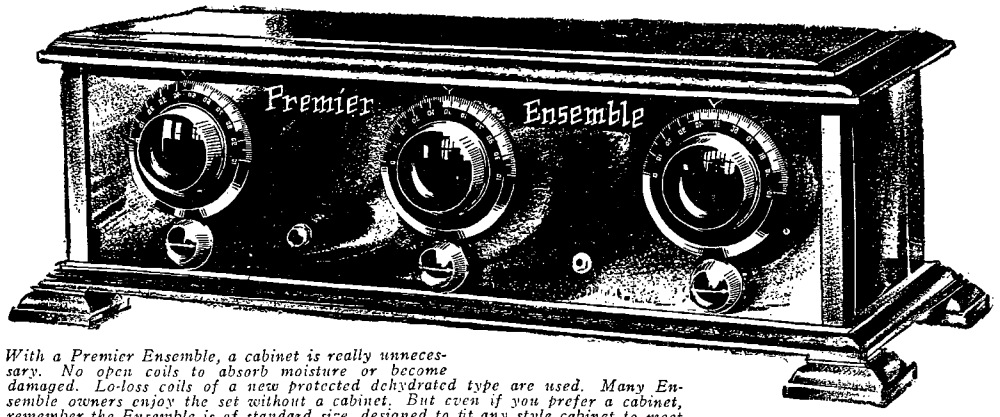
The Largest Makers of Speakers in America

BROADCASTING STATION K. S. L.

Watch for announcement of new station to be opened by Utah Radio Service Corporation. Daily organ concerts will be given from the Morman Tabernacle.

UTAH RADIO PRODUCTS COMPANY

Dept. 1902, 1427 S. Michigan Ave. Chicago, Illinois



With a Premier Ensemble, a cabinet is really unnecessary. No open coils to absorb moisture or become damaged. Lo-loss coils of a new protected dehydrated type are used. Many Ensemble owners enjoy the set without a cabinet. But even if you prefer a cabinet, remember the Ensemble is of standard size, designed to fit any style cabinet to meet your individual taste.

Tune in Everywhere!

with the new

Premier 5 TUBE Ensemble

TRADE MARK

$35

Licensed Under U. S. Navy Dept. Patents

Big Performance at Midget Price!

Before you spend a dollar on a radio set of any kind, at any price, see a Premier Ensemble. See this new development of the Premier Electric Company that gives to every radio enthusiast the very limit of radio quality and performance at the amazing price of $35.00.

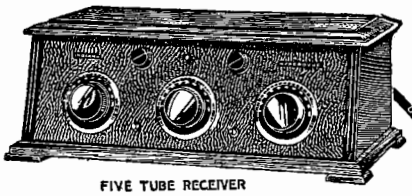
Not a kit—but a complete Ensemble of famous Premier parts already attached to the panels. The panels are genuine Bakelite beautiful dark walnut grained. Only thirty seconds and a screw driver put them together. No drilling, taping or machine work necessary. The new copyrighted Premier wiring plan with six color charts is so simple and sure that almost anybody can easily wire it in one hour. No tools required except a soldering copper and that comes with the Ensemble.

The Premier Ensemble is made up entirely of genuine Premier parts. That includes the well known Crofoot Vario Condenser, Premier Hegehog Transformers, Premier Lo-loss Tube Sockets and Premier full-floating Rheostats and other Premier parts. This insures quality unexcelled.

You may have felt that it is really necessary to pay $125 to $150 for a set that will bring you distance, reception and selectivity that every radio user most desires. The Premier Ensemble will astonish you with its performance—it will do anything any set at three or four times its price will do. Everything you could wish for in a radio set is yours if you select a Premier Ensemble. Don't decide on your radio until you see it.

See your radio dealer today. Tell him you want to see this new Premier Five Tube Ensemble. Find out why one hundred thousand radio buyers will purchase Ensembles in the next few days. There is a reason for it. Find out.

Grace Street and Ravenswood Ave. **Premier Electric Company** **CHICAGO, ILLINOIS**



FIVE TUBE RECEIVER
Model 500

LOOK HERE!

The Indiana Hyperdyne

is a De luxe Long Distance Receiver with two stages of tuned Radio frequency amplification, detector, and two stages of audio frequency amplification. Circuit is positively non-radiating, non-oscillating, and free of objectionable noises.

A striking Hand-rubbed Solid Mahogany Cabinet 24x8x12 with a 15° sloping panel makes this Radio the ultimate in Radio Receivers. See it and you will agree that anyways near the price nothing can equal it.

We positively build all our own parts from raw materials. These parts have been used for the past three years successfully. You can profit highly with this proven Radio Equipment.

Write your jobber or us direct for full information, descriptive literature, attractive window displays and Dealers Helps.

Investigate Today!

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Factory and General Offices
Marion, Indiana

$65.00 LIST

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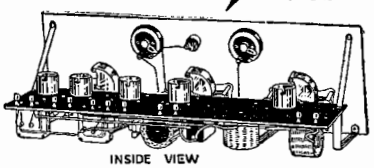
Eastern Sales Office
Geo. L. Holmes, 1819 Broadway, N. Y. City.
Western Sales Office
T. A. Mitchell Co., Balboa Bldg., San Francisco, Cal.



INSIDE VIEW

The New All-Frequency AUDIO TRANSFORMER

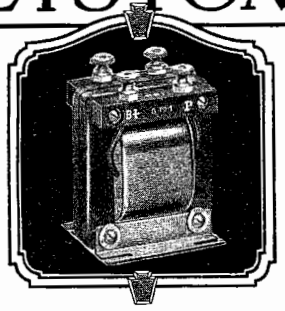
Specified by Citizens Radio Call Book

Whether the solo be high soprano, baritone or bass, you will understand every word of it—if you use the new KEYSTONE All-Frequency Audio Transformer. And whether the instrumental number be the heavy, low roll of the pipe organ or the high frequency note of the flute—your set's reproduction of it will be natural, and **correct!** This is the transformer which amplifies all frequencies **equally!** Perfect **clarity** and absolute **naturalness** at any audible frequency, at any volume degree.

Replace your present transformers with Keystones NOW! The immediate difference in the performance of your set will amaze you—and radio will hold a new, greater fascination for you. If your dealer has not yet been supplied with Keystone All-Frequency Transformers—order direct, enclosing price. Specify ratio wanted.

KEYSTONE RADIO LABORATORIES, Inc.
4245 LINCOLN AVENUE CHICAGO, ILL.

KEYSTONE



Ratios

6 to 1.....$4.50
3½ to 1..... 4.00
2 to 1..... 5.00

Beautifully Finished in Polished Enamel and Nickel Plate

Every One Thoroughly Guaranteed!

ONLY $2.95

A Laboratory Product

Our Guarantee Protects You

OLD TUBES MADE GOOD AS NEW

With this laboratory product any one can recondition old run down tubes and make them good as new in a few minutes' time. Operates on either A.C. or D.C. 110-120 volts. Simple, efficient, and practical. Full directions accompany each instrument.

Reconditioner costs only a few cents more than a new tube.

Absolutely guaranteed to do the work or your money cheerfully refunded.

With a Mack Reconditioner your tubes are all working at full capacity. No more ruining a good evening's program on account of one or two faulty tubes.

Tubes can be reconditioned time and time again.

Pays for itself in one evening and pays big dividends by reconditioning the tubes of others.

MACK LABORATORIES
CHICAGO

MACK LABORATORIES
720 Cass St., CHICAGO, ILLINOIS

Gentlemen: Inclose $2.95 check or money order (stamps not accepted); please send me the Mack Tube Reconditioner postpaid—on your guaranteed refund plan.

Name.....

Street.....

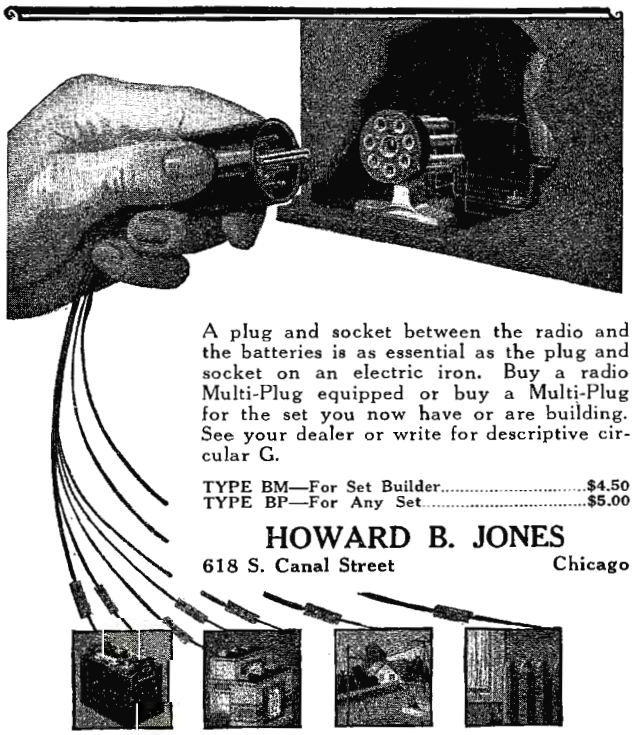
Town..... State.....

Check type of tube you desire Reconditioner for:

☐ **A Type**
☐ **199 Type**

Jones MULTI-PLUG

THE STANDARD SET CONNECTOR

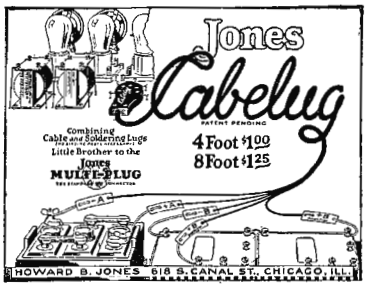


A plug and socket between the radio and the batteries is as essential as the plug and socket on an electric iron. Buy a radio Multi-Plug equipped or buy a Multi-Plug for the set you now have or are building. See your dealer or write for descriptive circular G.

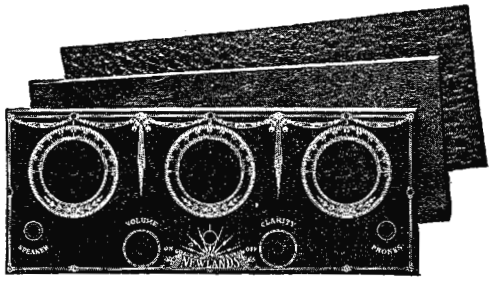
TYPE BM—For Set Builder.....$4.50
TYPE BP—For Any Set.....$5.00

HOWARD B. JONES
618 S. Canal Street Chicago

Jones MULTI-PLUG
THE STANDARD SET CONNECTOR



INSULINE
PANELS AND PARTS



THIS standard insulating material, universally known for its beautiful mirror-like finish and high dielectric properties, satisfies the demand for a quality product at a moderate price.

Insuline is made specially for radio use. It does not chip, crack nor get soft; withstands hard usage; and can be worked with ordinary tools.

In three finishes as shown above: top, Frieze finish; center, Mahogany; lower, Ebony, with Etch-O-Gravure design. In all standard sizes; also drilled and engraved for nine well known circuits.

Etch-O-Gravure Process

Beautiful etched effects in gold or white, not obtainable by any other process. Permits the expression of your own ideas in decoration. Costs less than ordinary engraving. Our Engraving Service is prepared to execute all styles of engraving at nominal prices.

WORLD'S LARGEST PANEL HOUSE

Our enormous facilities for panel work, consisting of the most approved machinery for cutting, engraving and drilling, enable us to turn out quality work at lowest cost of manufacture, at proportionate savings to you.

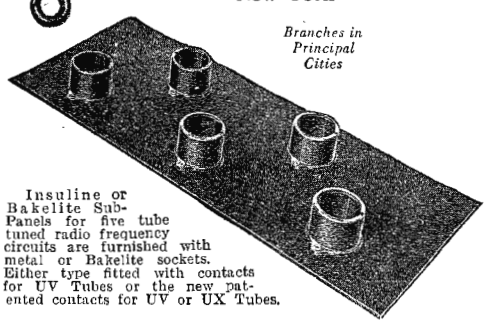
Estimates gladly submitted on receipt of specifications. Special rates to the trade.

Insuline Aerial Insulators. Heat resisting; strain resistance 1000 lbs.

Insuline Binding Post Panels. Drilled and engraved, black and mahogany, 1¼ x 7 in.

Radio Panel & Parts Corp.
(Insulating Co. of America)
Insuline Bldg. 59 Warren St.
New York

Branches in Principal Cities



Insuline or Bakelite Sub-Panels for five tube tuned radio frequency circuits are furnished with metal or Bakelite sockets. Either type fitted with contacts for UV Tubes or the new patented contacts for UV or UX Tubes.

Index to Advertisers

It's Here!

AT LAST Aero B is ready for the radio world. This perfected "B" Battery eliminator—which actually does the work of a fully charged "B" Battery on all tube sets—is now ready.

Aero B is not "just another "B" Battery eliminator" rushed on the market to meet a demand. It is a carefully developed tube rectifying "B" Battery eliminator that has been slowly and painstakingly perfected by skilled radio engineers. It has been thoroughly tested by both professional experts and amateurs on all types of radio sets. Skeptics have been convinced by its consistently faultless results on sets that have proved the stumbling blocks of other eliminators.

Price $42.00

The results achieved with Aero B have been remarkable. It is a "B" Battery eliminator that every radio user can absolutely depend upon.

Aero B is built and backed by The Glenn L. Martin Co. who have been building radio equipped aircraft for the U. S. Army, Navy and post office department for years. This precision work, necessitating the most careful fabrication to the high government standards, has developed an organization noted for its skilled craftsmanship—an organization with sixteen years reputation for square dealing and quality precision work.

THE GLENN L. MARTIN COMPANY, Cleveland, Ohio
Radio Division

AERO B

B BATTERY ELIMINATOR

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

How to Use the LIBERTY Comparometer

Test every radio set which comes into your store by comparing with others in your line by means of the LIBERTY COMPAROMETER. If a salesman offers a set, a tube, or a battery with the claim that it will do more than those you are now selling, the LIBERTY COMPAROMETER will quickly tell you whether his claims are true. Test all radio equipment this way before you buy it. This even applies to goods from your regular manufacturers, in which slight mechanical defects may cause a noticeable difference in performance. These tests can be made in an instant and they settle the efficiency of radio apparatus, beyond dispute.

Think how this device increases the sale of sets! With the flick of a finger you can instantly switch on or off any one of four different sets or four different speakers. If a prospective customer is listening he can hear an instant comparison between your set and your competitors'. He can also instantly compare the merits of the different priced models which you offer. The LIBERTY COMPAROMETER removes "loose talk" from radio selling. A most important feature is that sets can be compared for quality at the same time their cost of battery upkeep is measured,—thus picking out the set that not only *sounds* best, but is also most economical. Use it in a demonstration and your prospect cannot leave in a doubtful frame of mind.

If you want to know how four different sets compare, listen to them all during the singing of one verse of some song. You can make such a test only with the LIBERTY COMPAROMETER.

Instant comparison under constant conditions.

Aerial, ground, batteries and speaker remain the same. Only the sets are switched in and out of the circuit on the flick of a finger when you use the

LIBERTY COMPAROMETER

Fully guaranteed. Price $125

Jobbers, dealers, experimenters: Order at Once!

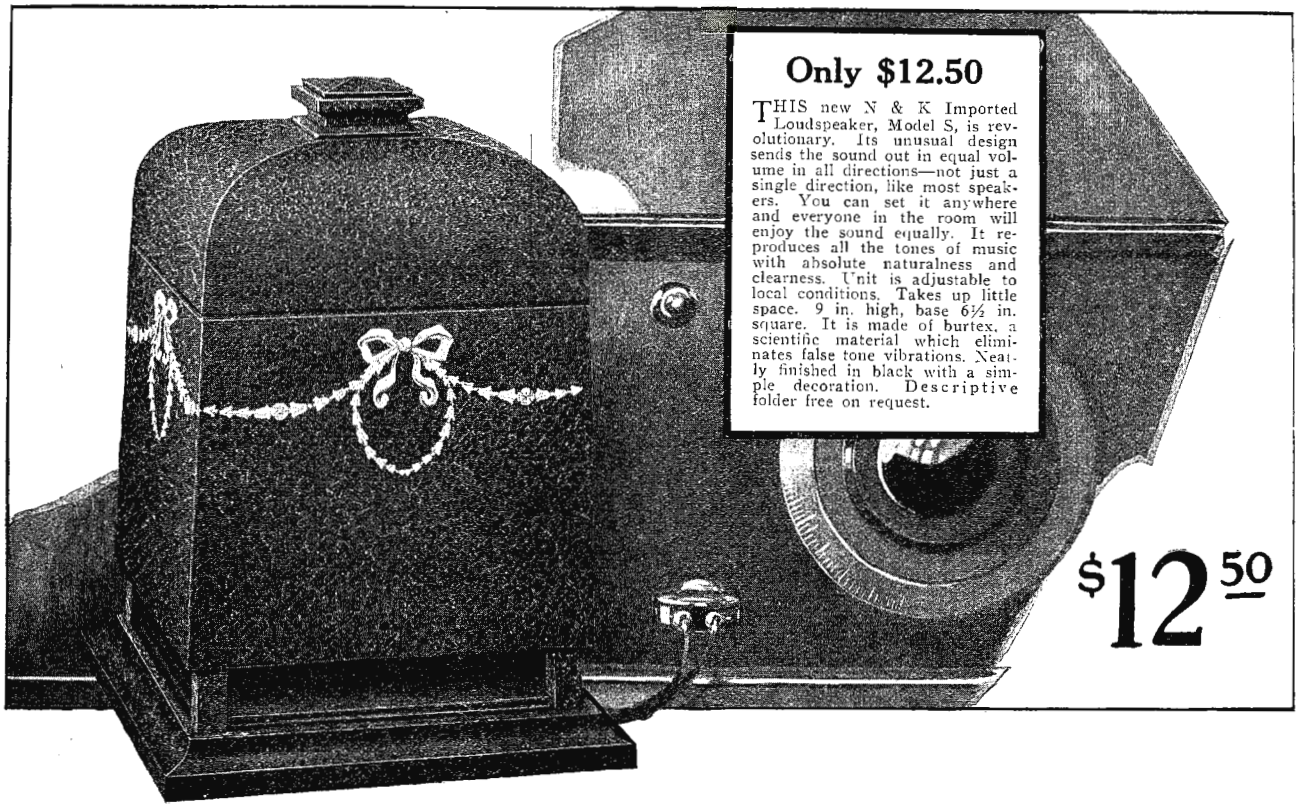
Patented and manufactured only by

Liberty Transformer Co.

123 N. Sangamon St.
Chicago

To Rejuvenate Tubes

Thoriated tubes, either standard or peanut type, can be tested for efficiency, and if found to be weak, can be rejuvenated. Meanwhile, during rejuvenation, you actually can *see* the output reading increase until the tube tests as good as new.



Increase Your List of Stations with this New Speaker

OFTEN you have tuned in on some distant station, heard the far-off music more or less clearly, then strained your ears in vain to catch the name of the station, because the *spoken words were too indistinct* to make out.

At such a time this new type N & K Loudspeaker comes to your rescue.

Because, first of all, it is built for CLEARNESS.

And then, in addition, for *Loudness.*

The musical instrument, the singing voice, the speaking voice—all come in so distinctly, and with such volume, that your radio set gains new life and new interest.

But perhaps the best thing of all about this new Model S, N & K Imported Speaker, besides its clearness and volume, is its *low price.*

Before putting your money into *any* speaker, be sure to hear the new N & K. Ask at your regular radio dealer's. If he is not supplied, we will be very glad to send you the name of a dealer who is. And it is more than worth the little bother of writing your name and address on a postcard to get acquainted with this new speaker.

The N & K Line

The New N & K Imported Loudspeaker Model S $12.50

N & K Imported Loudspeaker Type W $27.50

N & K Imported Phones Model D, 4000 Ohms, $8.50

N & K Imported Phonograph Unit Attaches Instantly to Any Phonograph $7.50

The New N&K *Imported*

TRADE MARK REG. U.S. PAT. OFF.

LOUDSPEAKER

MODEL S

N&K KING OF THE AIR TRADE MARK

THE GOLDSCHMIDT CORP., *NEUFELDT & KUHNKE DIV.*, Dept. F12, 15 William St., New York, N. Y.

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

Vital to every radio fan

In a radio set, it is the tube that detects the signal—that amplifies the signal—that determines in large part the quality and volume of the sound. Therefore the tube—intricate of mechanism and delicate to make—is the vital spot in every set. And it always pays to be sure you use genuine Radiotrons—made with experienced precision.

Build any circuit—simple or complex. Buy any set, plain or fancy, simply boxed or elaborately cabineted. But give it every chance to achieve its best—with genuine Radiotrons. Be just as careful when you replace tubes, too. *Always* see for yourself that each one bears the identifying marks of a Radiotron: The word Radiotron and the RCA mark.

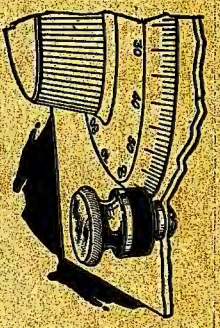
Radio Corporation of America

Chicago New York San Francisco

Radiotron

REG. U.S. PAT. OFF.

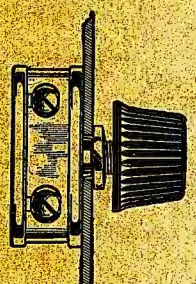
PRODUCED ONLY BY RCA



Bradleynier—Perfect Vernier Knob.

There's a Real Thrill in trying a New Hook-Up!

Bradleyswitch—Perfect Battery Switch.

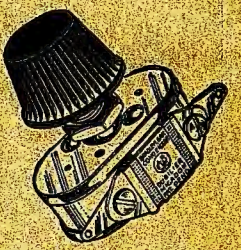


Bradleystat—Perfect Filament Control for All Tubes.

EVERYONE in the family is eagerly waiting to hear the new set! After hours and hours of drilling and soldering, the set is nearly ready for its first crucial test.

Will it meet with your expectations or will it be a disappointment? That depends upon two things—first your workmanship, and second, the quality of the parts used.

Good workmanship is the result of patience, but good parts are assured only by demanding well-known, guaranteed products, such as Allen-Bradley Perfect Radio Devices. Allen-Bradley Products are known the world over for exceptional performance and fine appearance. They eliminate the hazard and disappointment that follows the use of inferior radio products.



Bradleyleak—Perfect Grid Leak, ¼ to 10 Megohms.

Ask your dealer for Allen-Bradley Perfect Radio Devices if you value your time and labor. *They always work!*

Bradleyohm—Perfect Adjustable Resistor.

Allen-Bradley Co.

ELECTRIC CONTROLLING APPARATUS

Sales Offices:
Baltimore, Birmingham, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Denver, Detroit, Kansas City, Los Angeles, New York, Philadelphia, Pittsburgh, Saint Louis, Saint Paul, San Francisco, Seattle

General Offices and Factory: 286 Greenfield Avenue Milwaukee, Wisconsin

Bradleyunit—Perfect Fixed Resistor.

Bradleyometer—Perfect Potentiometer.