

Citizen's

# RADIO CALL BOOK

REG. U.S. PAT. OFFICE

50¢

FOREIGN  
65 CENTS

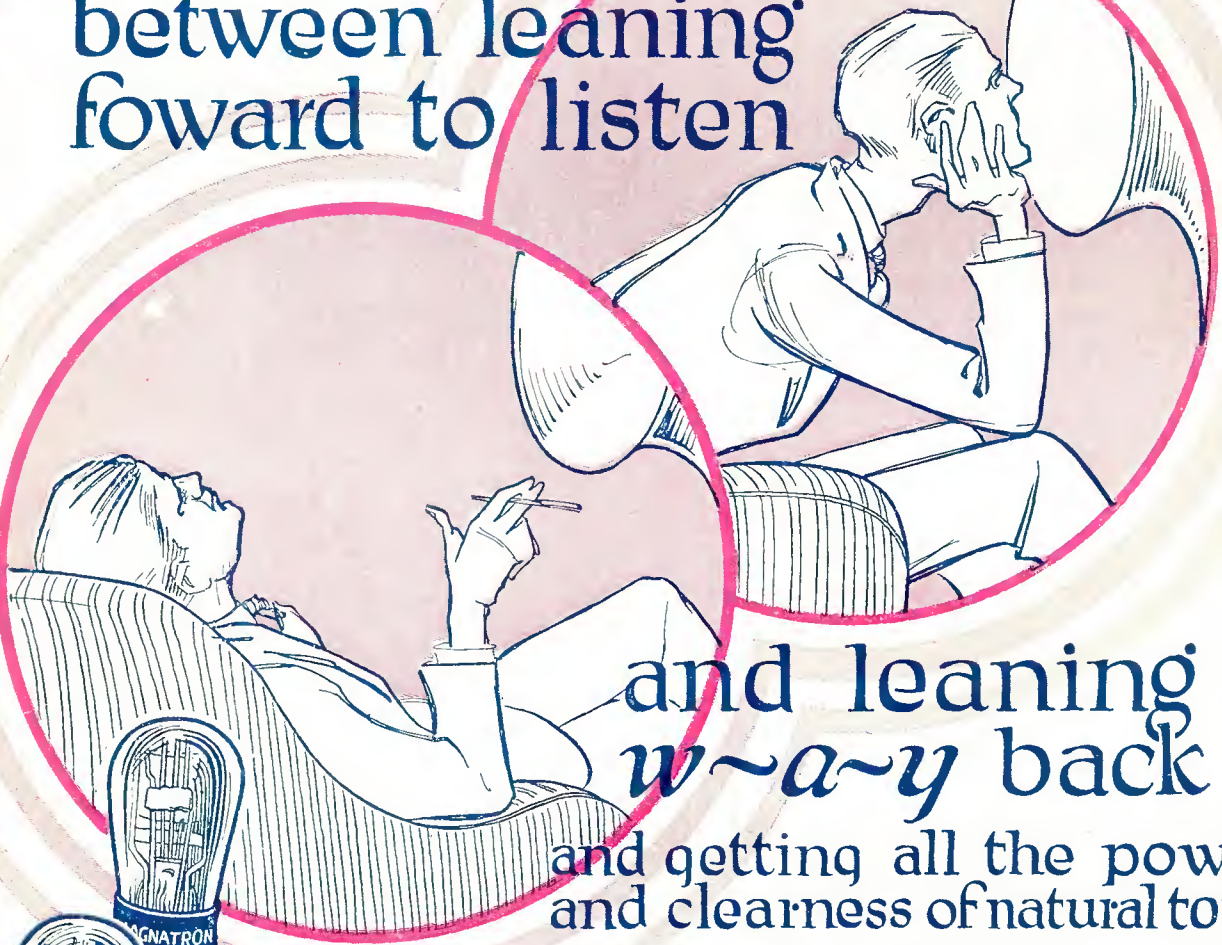
A  
COMPLETE  
RADIO CYCLOPEDIA



“Used the World Over”

# the difference

between leaning  
forward to listen



and leaning  
*w-a-y* back  
and getting all the power  
and clearness of natural tone



#### To Bring Your Radio Up to Date

Use the new bigly sensitive detector DC-200A, and either the DC-112 power tube with platinum filament or the DC-171 power tube with low impedance, here illustrated. Either power tube may be had with the patented handy adapted base at no extra cost.

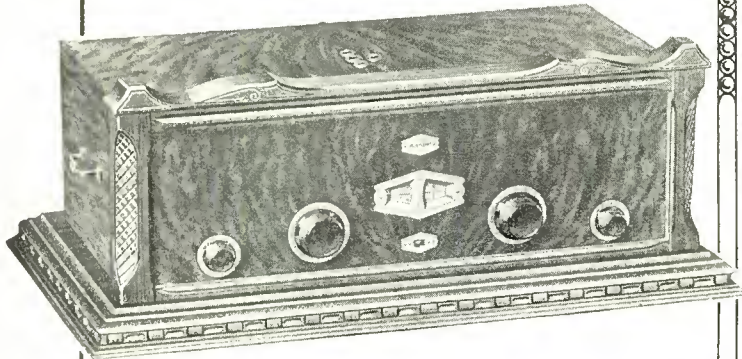
RADIO tubes are NOT all the same! One set of tubes will give you the kind of reception that just about trickles through—all right if you have good ears! Another set will give you a hurricane of sound, but very little music—satisfactory if you HAVEN'T good ears.

But Magnatrons are made for normal people who want normal volume and a smooth even flow of natural, undistorted tone. Quantity of quality—clear, natural—delightful.

These wonderful radio tubes are made by an organization of experts who have specialized in nothing but the production of tubes since the beginning of broadcasting. Just one Magnatron will give you a new conception of radio reception. A complete set will practically give you a new receiver!

CONNEWAY ELECTRIC LABORATORIES  
Magnatron Bldg. Hoboken, N. J.

# MAGNATRONS

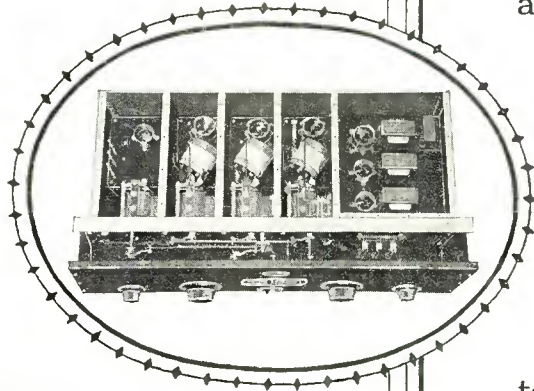


**Model Seven**

COMPLETELY SHIELDED RECEIVER

SEVEN TUBES

ELECTRIC LIGHT SOCKET OPERATION

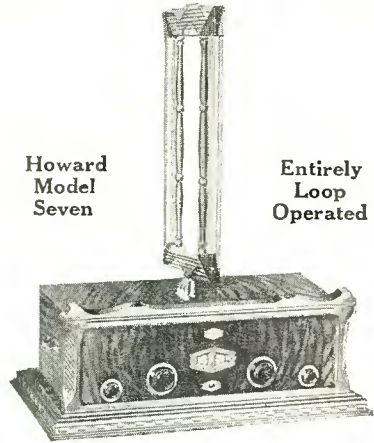


**Model Eight**

Howard Super Power Console Receiver with reproducer built in and controllable concealed loop. An efficient instrument of indescribable beauty.

**Howard Model Seven**

Entirely Loop Operated



Inspired reception—living, faithful, real—are yours with this new and unusual development.

Music of the finest orchestras in the land, is brought to you so vividly — with such fidelity of tone that it is just like having them in your own living room.

Complete shielding, a perfected feature of this superb instrument is responsible for its exceptional attainments.

*There are other Models from \$125.00 up.*

Write for our free booklet, entitled, "Radio for the Years Ahead."

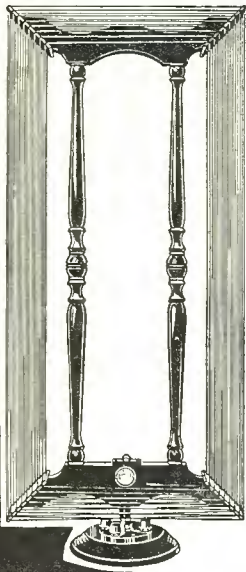
**Howard Radio Company**  
Chicago, U. S. A.



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

# 3 Bodine Radio Items that make Radio Better!

## Bodine DeLuxe Radio Loop



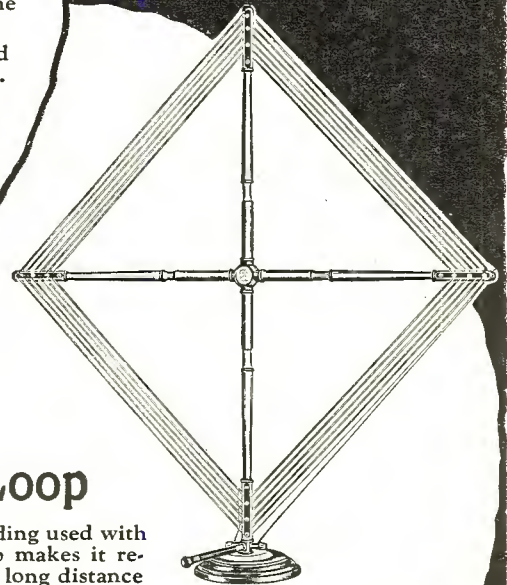
This beautiful loop fulfills perfectly the long-felt need for a compact and artistic loop—outstandingly efficient. The symmetrical frame of superb hand-rubbed solid walnut, black bakelite mountings, and attractive silk covered windings combine in producing a loop of outstanding beauty.

Fine copper wires, stranded with phosphor bronze wires, which have been hardened to prevent stretching, are used for the winding. A three-contact jack mounted on bakelite in the base permits the loop to be rotated continuously without disturbing the connecting wires.

The DeLuxe Loop is remarkably efficient, and brings in distant stations with amazing power. Sharper selectivity, due to directional tuning, improves tone quality and makes reception better. The DeLuxe Loop is designed for standard loop sets, but it can be used effectively with many aerial sets.

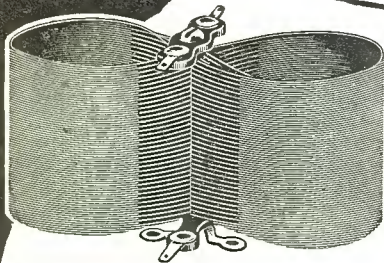
Write for FREE illustrated booklet that tells how to use this beautiful loop with ordinary aerial receivers. Price, all models, \$12.00. If your dealer can't supply you, order direct.

*Write for Complete  
Data about Bodine  
Items that Improve  
Radio Reception*



## Bodine Folding Loop

The basket-weave principle of winding used with this powerful and convenient loop makes it remarkably efficient. It brings in the long distance programs sharp and clear. When in use sliding sleeves conceal the hinges of the English Mahogany frame. Folded it fits a box only 3½ x 6 x 18 inches. Ideal for camping. It is a special favorite for use with portable sets. Special non-stretch wire holds shape under long service. Satin-Silver dial makes logging easy. When directional setting is once located for a certain station, it is easy to refind. Price of the Bodine Folding Loop, \$8.50 to \$10.00. If your dealer can't supply you, order direct.



## Bodine Twin-Eight R. F. Transformer

The new principles of design used in Bodine Twin-Eight Radio Frequency Transformer make it outstandingly efficient. This unique method of winding combines a very limited magnetic field with tremendously high amplification. The result is unexcelled amplifying capacity with an unusually high degree of selectivity combined with clearness of reception. Bodine Twin-Eight Coils greatly improve the performance of tuned radio frequency circuits. No type of toroidal or doughnut coils can compare with Twin-Eights.

Compact and small, they are easy to install. A boon to amateur set builders. Don't miss these coils. Price \$2.00 per coil, set of three matched coils \$6.00. If your dealer can't supply them, order direct.

BODINE ELECTRIC COMPANY,  
2256 West Ohio Street,  
Chicago, Illinois.

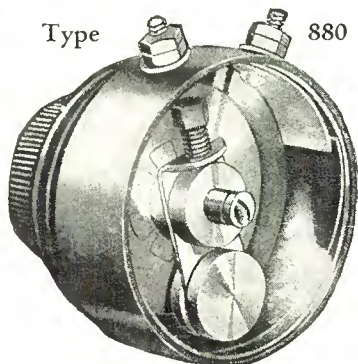
Of course we want to know about Bodine items that make radio better. Kindly mail circulars describing:  
Bodine Radio Loops.  
How to use a loop with aerial receiver.  
How to build the Bodine Twin-Eight receiver.

Name .....

Address .....

# FROST-RADIO

*Ask Your Neighbor*



Type 880

**FROST-RADIO**

**Super-Variable Resistance**

These new high resistance units are absolutely non-inductive, smooth and noiseless in operation. They give a continuous graduation of resistance from zero to maximum without steps or jumps. Cannot overheat and positively will not vary even after long continued use. See both types at your dealer's.

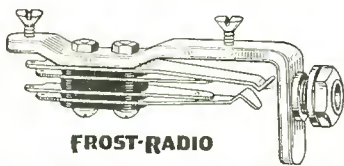
**Type 880 Series**  
(2 Terminals)

No. 880.....	50,000 ohms
No. 881.....	100,000 ohms
No. 882.....	200,000 ohms
No. 885.....	500,000 ohms

**Type 890 Series**  
(3 Terminals)

No. 890.....	50,000 ohms
No. 891.....	100,000 ohms
No. 892.....	200,000 ohms
No. 894.....	400 ohms
No. 895.....	500,000 ohms
No. 896.....	2,000 ohms

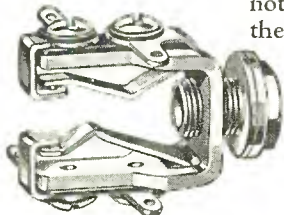
Both types, \$1.25 each



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

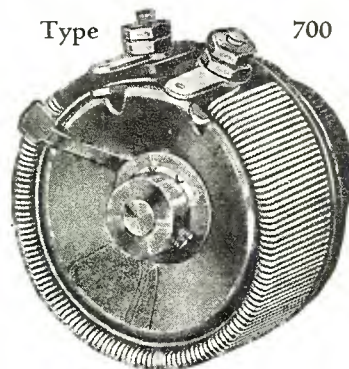
Pan-Tabs are DeLuxe radio jacks built to precision standards. Spring action is absolutely accurate and permanent in adjustment. Arranged for either panel or table mounting.

The NEW  
**FROST-RADIO**  
GEM-JAC  
No. 951  
Prices  
40c to 50c



**FROST FONES**

\$ 3.00  
\$ 3.50  
\$ 6.00



Type 700

**FROST-RADIO Type 700**  
Metal Frame Rheostat

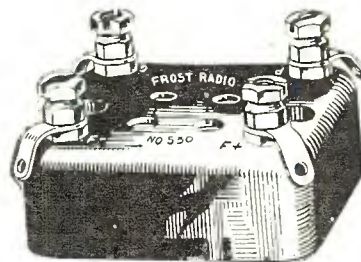
	Ohms		Ohms
No. 702 1/2.....	2 1/2	No. 707.....	7
No. 703.....	3	No. 710.....	10
No. 703 1/2.....	3 1/2	No. 720.....	20
No. 704.....	4	No. 730.....	30
No. 705.....	5	No. 750.....	50
No. 706.....	6	No. 775.....	75

Type 700..... 50c

**FROST-RADIO Type 800**  
Bakelite Frame Rheostat

	Ohms		Ohms
No. 802 1/2.....	2 1/2	No. 807.....	7
No. 803.....	3	No. 810.....	10
No. 803 1/2.....	3 1/2	No. 820.....	20
No. 804.....	4	No. 830.....	30
No. 805.....	5	No. 850.....	50
No. 806.....	6	No. 875.....	75

Type 800..... 75c



**No. 530 FROST-RADIO**  
Socket

A genuine Bakelite socket that takes ALL tubes with new type bases. Has double-grip self-cleaning springs that hold the tube prongs for almost their entire length. Is equipped with soldering lugs and hexagon slotted binding posts. Terminals are clearly marked. Your dealer has them.  
Price, 40c



No. 143—Double Fone Automatic Plug .. 50c



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

**HERBERT H. FROST, Inc.**  
160 NORTH LA SALLE STREET · CHICAGO, ILLINOIS  
NEW YORK CITY  
LOS ANGELES

# CITIZENS RADIO CALL BOOK

C. O. STIMPSON, President  
 J. R. MAC FARLAND, Vice-President  
 D. H. BELL, Secretary-Treasurer  
 E. M. GIBSON, Advertising Manager

Established 1921  
 Executive Offices:  
 508 So. Dearborn St., Chicago, Ill.  
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 Chief of Engineering Staff

M. H. HARRIS, Circulation Manager  
 F. C. BURLINGTON, Managing Editor  
 RICHARD K. PEW, Associate Editor  
 ARTHUR ELKINS, Technical Editor

Member Audit Bureau of Circulations

DECEMBER, 1926

Vol. 7, No. 3

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## With the Editor

WE wish to announce that Mr. W. W. Harper, Consulting Engineer, has joined the engineering staff in the capacity of Chief Engineer of this Department.

We consider Mr. Harper amply able and well qualified to give our readers many valuable articles of a high class nature, and original in design—watch for them in succeeding issues.

HAVING made application for second class postoffice mailing privileges, we are now able to mail your copy direct from the printing plant. This will reach you several days in advance of those placed on sale through newsstands. Subscription coupon on page 199 for your convenience.

WE are especially anxious to have you mail us back the Questionnaire on page 221, this issue.

It will enable us to more intelligently carry out the wishes of our readers. Even though you do not enter the \$100 Letter Contest—won't you be so kind as to mail this page back to us. We thank you in advance for so doing.

OWING to popular demand we are publishing the CITIZENS RADIO CALL BOOK four times yearly—instead of three times. They will be on sale at all newsstands, book, news and department stores and most all good radio stores. September 1, November 1, January 1, and March 1.—EDITOR.

Copyrighted, 1926, by Citizens Radio Service Bureau, Incorporated, Publishers. Requests for permission to reprint any articles or other matter contained herein must be made in writing to the executive offices.

Citizens Radio Call Book is published four times a year and is on sale approximately the first of December, March, September and November. Subscription price \$1.75 per year in U. S. A. Canada and Foreign \$2.00 per year, payable in advance. Single copies 50 cents. Remit by check, draft or P. O. order. No foreign stamps or coins accepted. Mail subscriptions to 508 So. Dearborn Street, Chicago. We will not be responsible for cash sent for subscriptions unless registered.

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

Entry as second class matter applied for at the Postoffice at Chicago, Illinois, under the Act of March 3, 1879.

We also publish Citizens Radio Amateur Call Book, semi-annual, 75c per copy, listing all amateur transmitting stations in the world. Subscription price, \$2.00 yearly. Starting Sept., 1927, will be published 3 times a year—September, January and March.

## Advertising Representatives:

Chicago—A. B. Mills, 508 So. Dearborn St. Wabash 1901.

New York—(Branch Office) 1674 Broadway. Circle 4887. Cor. 52nd St.

Baltimore—H. Boyd, 1202 Maryland Ave. Vernon 0771.

Philadelphia—C. S. Palmer, 731 Victory Bldg. Walnut 6568.

Boston—E. H. Jaudon, 99 Chauncey St. Hancock 6974.

PERMANENCE

*The Pharaohs  
Built for the Future*



### Kellogg Builds Radio Sets That Way

The purchase of a Kellogg receiver is a permanent investment in Radio. The buyer of a Kellogg set gets the radio satisfaction that other people may not know for years, as Kellogg receivers have gone far ahead of others in the use of new and important improvements.

When you purchase a Kellogg set, you are providing for the future as well as the present.

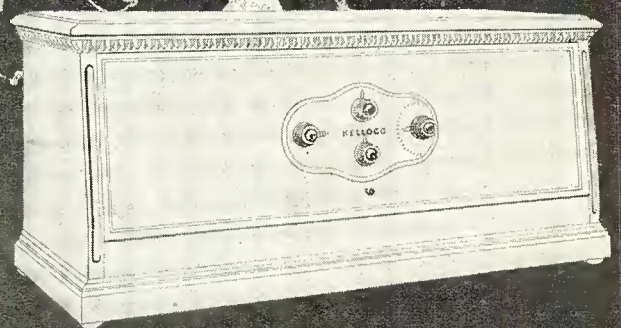
Inductive Tuning is one of the Kellogg innovations. It brings, for the first time, even range and volume at all wave lengths—permits accurate tuning of four circuits with one hand.

When you buy a set made by a solid, substantial institution like Kellogg, you buy with confidence that promises made *will be fulfilled*. Kellogg has been building telephones and switchboards for 29 years—and will be here for years to come, standing back of the radio sets now sold.

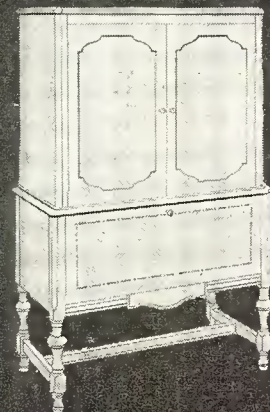
Write for folder describing fully Models 507 and 508

**Kellogg Switchboard & Supply Co.**  
Dept. 24-L, 1066 West Adams Street, Chicago, Ill.

Kellogg receivers are licensed under application for letters patent of Radio Frequency Laboratories, Inc. (R. F. L.)  
Dealers and Jobbers inquiries invited



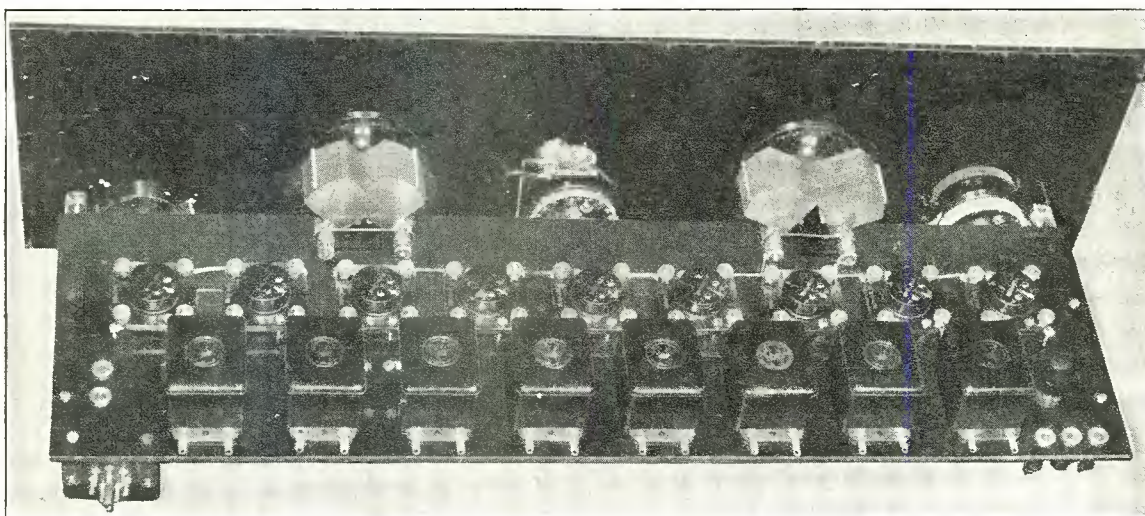
Model 507, 6-tube receiver, Kellogg's development of the sensational new RFL circuit. The same of Selectivity and Musical Reproduction.



Model 508, the 6-tube Kellogg RFL in a beautiful walnut console, equipped with the Kellogg new long air column speaker.

# KELLOGG Radio

FLAWLESS REPRODUCTION



## Nine In Line the Wonder Circuit—

⌘
⌘
 The Nine in Line circuit has more than made good the claims made for it earlier in the season. For selectivity, volume and tone quality, we believe it unequalled. We recommend and offer the list as shown in the Call Book. The complete kit includes drilled and engraved panel and sub-base, also miscellaneous screws, wire, lugs, etc. Write for complete catalog CBR and prices.

### We Handle the Following Lines:

Allen Bradley	Jewell
Amsco	Jones
Belden	Kurz-Kasch
Benjamin	Majestic
Burgess	NaAld
Carter	Radiodyne
Centralab	Raytheon
Crosley	Remler
Cunningham	Sangamo
Cutler-	Sterling
Hammer	Thordarson
Daven	Thorola
Dubilier	Timmons
Eby	Trimm
Electrad	Tungar
Formica	Utah
Frost	Weston
General Radio	Yaxley

### — Dealers —

find greater profit and protection by securing nationally advertised lines at our liberal discounts, backed by the TELMACO guarantee. Our broad guarantee protects you and our low net prices produce extra profits. Our late net catalog No. CBW sent gratis to dealers. Write TODAY.

*Distributors of Quality Radio  
Exclusively*

## TELEPHONE MAINTENANCE COMPANY

20 South Wells St., Chicago, Illinois

Established

# TELMACO

in 1918

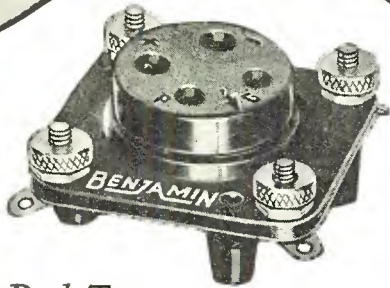
*Tell 'Em You Saw It in the Citizens Radio Call Book*



# Buy by the Name

## Success in Set Building Begins at the Dealer's Counter

ALL BENJAMIN RADIO PRODUCTS ARE OF THE SAME HIGH STANDARD AS THE FAR-FAMED CLE-RA-TONE SOCKETS



**Push Type Cle-Ra-Tone Spring-Supported Shock-Absorbing Sockets**

Stop tube noises. Greatest aid to non-noisy operation. Contacts always clean.

75 cents each

When you buy your radio parts, buy them right. Everything else being equal, when a name has stood for a quarter of a century's striving toward technical perfection it is practically as safe as a formula as a guide to right buying. When your dealer sells you Benjamin radio products for your set you have already leaped a big hurdle on the way to success.

### Improved Tuned Radio Frequency Transformers

Proved through exhaustive and comparative tests to be the most efficient coil for modern radio sets. Better in all important features and characteristics. Space wound. Basket weave. Cylindrical. Highest practical air dielectric. Gives wonderful sharpness in tuning, better volume and purer tone quality.

#### 2 1/4" Diameter Transformer

Compact. Especially desirable for crowded assembly. Eliminates interfering "pickup."

Set of three, \$5.75

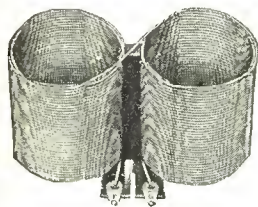
Single Transformer, \$2.10

#### 3" Diameter Transformer

Capacity coupling reduced to lowest degree. For use with .00035 Mfd. Condensers.

Set of three, \$6.00

Single Transformer, \$2.25



### "Lekeless"

#### Transformers

Uniform high inductance, low distributed capacity and low resistance. The external field is so slight that it permits placing coils close together without appreciable interaction.

Single Transformers \$2.50

#### Brackets

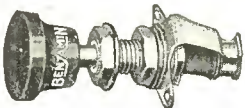
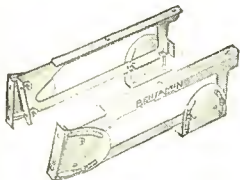
An aid to simplification in set construction. Supports sub-panel, with room underneath for accessories and wiring. Plain and adjustable.

Plain, 70c per pair  
Adjustable, \$1.25 per pair

#### Battery Switch

Quick, positive, clean-cut make and break. When it's "in" it's "off," eliminating danger of wasteful use of battery.

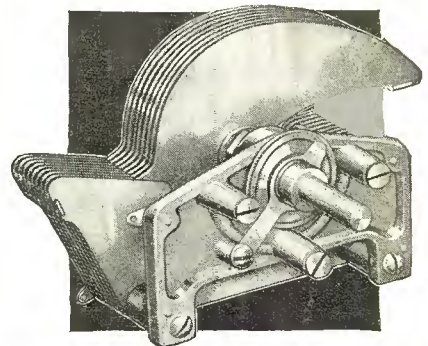
30 cents each



### Straight Line Frequency Condensers

No crowding of stations. The broadcast range is spread evenly over the dial. Stations come in without interference, and tuning is much easier. Adjustable turning tension. Low loss characteristics give a definite and distinct radio reception. Beautiful in appearance—a credit to the looks and efficiency of any set. Finished in dull silver. Made in 3 sizes.

.00025 Mfd., \$5.00; .00035 Mfd., \$5.25; .0005 Mfd., \$5.50



If your dealer cannot furnish you with Benjamin Radio Products, send amount direct to our nearest sales office with his name and we will see that you are promptly supplied.

# Benjamin Electric Mfg. Co.

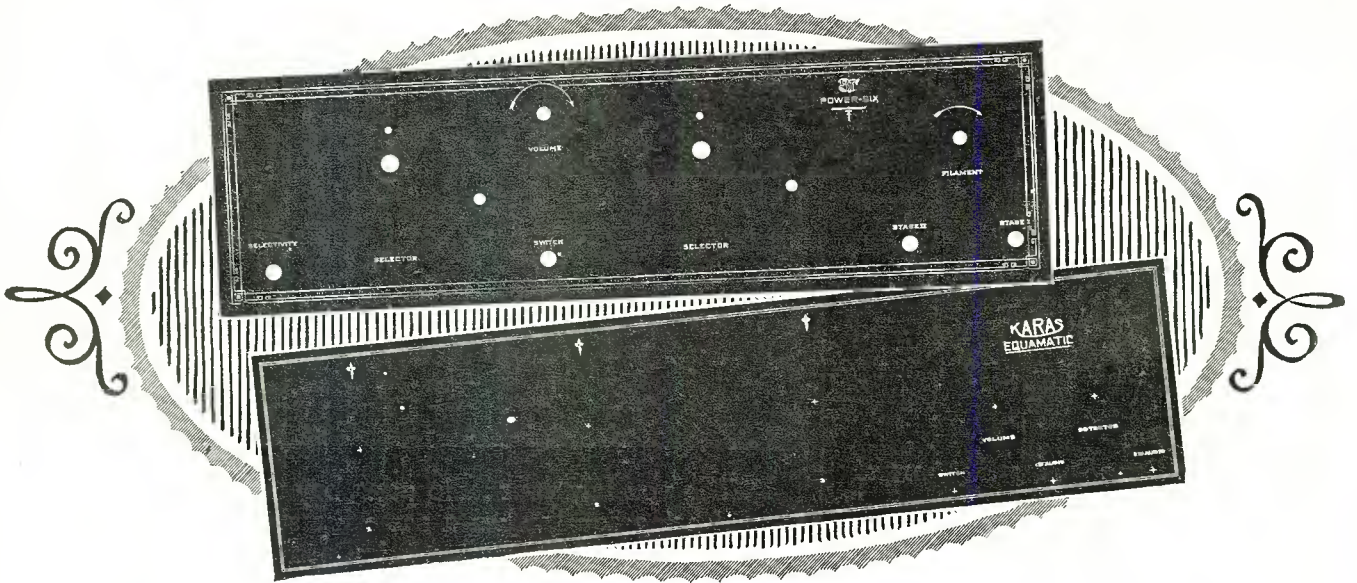
120-128 South Sangamon Street

New York: 247 W. 17th St.

Chicago

San Francisco: 448 Bryant St.

Manufactured in Canada by the Benjamin Electric Mfg. Co. of Canada, Ltd., Toronto, Ontario



## Karas, Power Six, Infradyne.

Formica offers a beautifully finished panel Veri Chromed in gold for the kit-set you plan to build.

There is a handsome Karas Equamatic front panel and sub-panel, both fully drilled and ready to assemble, a Bremer Tully Power Six and Counterphase, both drilled; two Infradynes, one 7" x 28" and 7" x 30"; a new H. F. L. Nine-in-Line Superheterodyne and fully drilled sub-panel; Browning Drake National; Madison Moore Superheterodyne; Victoreen two dial or one dial Universal; Aerodyne; St. James; Camfield Duo-former and others.

Formica has a complete service on tubing, plain or threaded; punched or drilled or fully assembled sub-panels, and on punched and machined parts for radio manufacturers.

### The Formica Insulation Co.

4666 Spring Grove Avenue

Cincinnati, Ohio

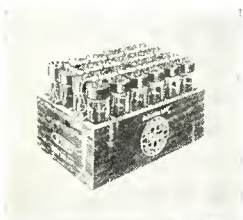
**FORMICA**  
 Made from Anhydrous Bakelite Resins  
 SHEETS TUBES RODS

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

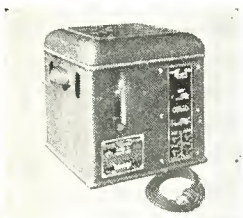
*Anything  
you need for  
radio power*



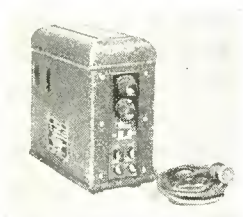
**Willard "A" Battery.** Thread-Rubber Insulation. CHARGED Bone-dry. Correctly rated, like all Willard Batteries. Made in 75, 100, and 120-ampere hour capacities.



**Willard "B" Battery.** Thread-Rubber Insulation. CHARGED Bone-dry. Same battery the broadcasting stations use for voice amplification. Made in 48 and 80-volt sizes.



**Willard "A" Power Unit.** Selective charging, a distinctive Willard feature, insures a constant supply of "A" power at all times. This unit also charges "B" batteries.



**Willard "B" Power Unit.** Also operates from house-lighting circuit. Can be depended upon to supply steady power in all types of radio sets—including those with power tubes.

# WILLARD RADIO BATTERIES

*and*

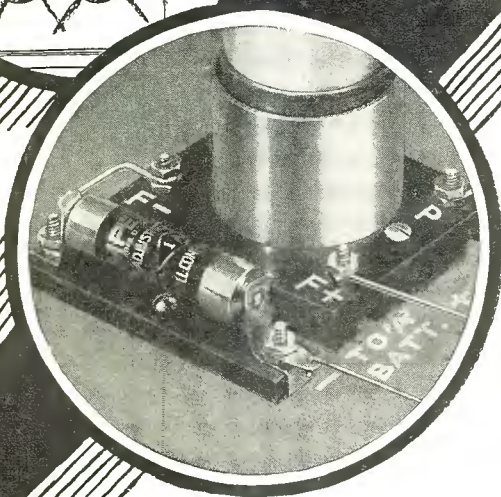
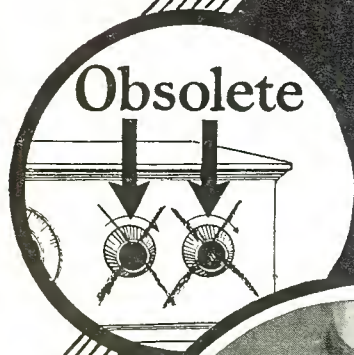
# POWER UNITS

There are genuine Willards for every radio need—full-powered, rechargeable radio batteries which give the utmost in fine reception, and last for years; Willard Power Units, also, for the listener-in who prefers the convenience of operating his radio set direct from the lighting circuit in his home.

*For sale by*

# The Willard Battery men

*and authorized radio dealers*



# Why your set needs **AMPERITE**

Because quality of reception without distortion, also long tube life necessitate that delicate and self-adjustable filament control which only AMPERITE can give you.

AMPERITE eliminates hand rheostats, simplifies set-wiring and abolishes all tube troubles.

Uniformly successful performance for more than 5 years in every type of circuit has proven AMPERITE to be *the only perfect filament control.*

Universally accepted as the best filament control by leading radio engineers, AMPERITE is recommended by them as standard equipment in every popular construction set. For instance:—

- |                           |                       |
|---------------------------|-----------------------|
| HAMMARLUND-ROBERTS "HI-Q" | L-C 27                |
| Popular Science Monthly's | HENRY-LYFORD RECEIVER |
| POWERFUL 5 TUBE SET       | VICTOREEN SUPER       |
| KING EQUAMATIC            | BROWNING-DRAKE        |
| INFRA DYNE                | BEST'S SUPER          |
| DIAMOND OF THE AIR        | INTERFLEX             |
| and many others           |                       |

\$1.10 complete with mounting  
[In U. S. A.]

**FREE** Write for "The Radiall Book", containing 24 pages of the latest popular hook-ups and valuable information for the set-builder. Sent free on request to Dept. R.C.B.-5

*Radiall Company*

50 Franklin Street

New York City

# AMPERITE

REG. U.S. PAT. OFF.

*The "SELF-ADJUSTING" Rheostat*



**Radio Plug**  
The smooth and instantaneous action of this Radio Plug, the positive grip, the beauty of design and finish mark it as a typical Weston product. More than a million in use.



**Model 301  
Filament  
Voltmeter**

A filament voltmeter is recognized as an essential of every good radio set, because close regulation of filament voltage improves reception and materially lengthens the life of the tubes.



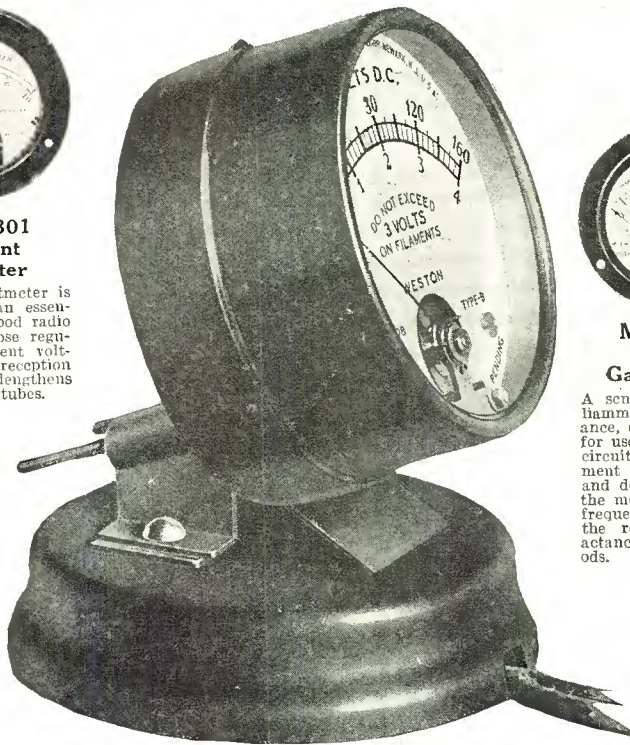
**Model 489  
Radio Table  
Voltmeter**

A high resistance instrument, beautifully made with a strong Bakelite case. Its portable form, accuracy, dependability and range combination (150/7.5 volts) make it an ideal all-purpose voltmeter around the radio set, for checking filament and grid voltages, locating troubles such as loose or broken connections, testing new hook-ups, for improving reception and for materially increasing the useful life of the tubes.



**2-Inch Model 506 Voltmeter and  
Weston Universal Bi-Polar Switch**

A new and remarkable combination having universal application to all types of radio sets. It consists of a Weston 2-inch Voltmeter with double scale (140/7 volts) and a nine-point bi-polar switch. The resistance for the high range of the instrument is contained in the housing of the switch. This Weston combination makes a complete electrical check of your set—by simply turning a switch. Can be readily installed by any radio enthusiast.



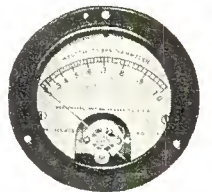
**Model 425  
Thermo-  
Galvanometer**

A sensitive thermo-milliammeter of low resistance, designed especially for use in a wave meter circuit for the measurement of wave length and decrement; and for the measurement of high frequency resistances by the resistance and reactance variation methods.



**Model 506  
Panel  
Instruments**

Two inch Radio Panel Voltmeters, Ammeters, and Milliammeters. Voltmeters have an exceptionally high internal resistance (125 ohms per volt)—an outstanding advantage for dry-cell battery operated sets. Small and compact in design, but retaining all of the famous Weston quality. These small instruments are made in a comprehensive list of ranges.



**Model 425  
Antennae  
Ammeter**

This Weston thermo-couple type ammeter solves perfectly the problem of measuring high frequency currents such as are imparted to the antennae. It also measures accurately and with equal facility, alternating currents of low frequency.

## Quality Radio Instruments

☐ The most recent addition to the Weston Radio line is Model 506 Convertible "Pin-jack" Voltmeter. It is perhaps the most versatile and practical electrical measuring device for radio use so far developed.

☐ The instrument itself is a "Pin-Jack" Voltmeter and mounts on the panel of Radiola, Victor and Brunswick-Balke Superheterodynes by plugging it into the pin-jacks provided by the manufacturer. Here you have an instrument that measures filament voltages. Remove it and plug it into the High Range Stand and you have another instrument that will measure battery voltages. This unique combination is unusually pleasing in appearance and places the average operator of a radio set in a position where he may operate at the exact proper filament voltages, save tubes, save batteries and get vastly improved reception over results without its use. ☐ For other makes of sets a pair of pin-jacks is supplied with each instrument for mounting on and permanently connecting the filament circuit to the panel. The group of Weston Quality instruments, some of which are here pictured, meets every need of the expert and enthusiast. ☐ For full, clear-cut information write us today for free booklet entitled "Weston Radio Instruments."



**WESTON ELECTRICAL INSTRUMENT  
CORPORATION**

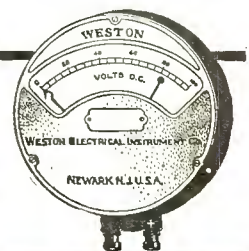
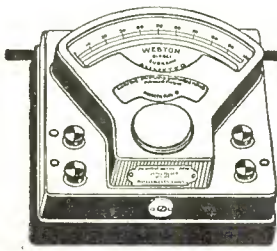
1 Weston Avenue,

Newark, N. J.

**STANDARD THE WORLD OVER**

# WESTON

*Pioneers since 1888*



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

# American Broadcasting Stations

Five dollars reward is offered to the person sending the greatest number of corrections to the following list before March first. The correction will be verified by the broadcasting station and placed to your credit. Employees of broadcasting stations are not eligible.



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

**KDKA** Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa. 309 meters, 970 kilocycles, 10,000 watts. Monday, 6:15-9:45 pm. Time calls, 11 am, 12 n, 2:30 pm; baseball scores, 3:20 pm; stock weather reports, 5:30; dinner program, 6:15; baseball scores, 7:40 pm; stock report, 8-9:55 pm; evening program, 9:55 pm. Time signals, late program, Tues & Thurs, 10:35 am; Sun, 10 am-12 n, church; 6:15 pm, baseball scores; 7:45-9 pm, church

**KDLR** Radio Elec. Co., Devils Lake, N. Dak. 231 meters, 1300 kilocycles, 5 watts. Daily ex Sun, 12:10 pm, weather; 6:15 pm, markets. Mon, 9:30 pm, studio program; Sun, 11 am, church; 4:30 pm, studio program. Central standard time. Slogan: "North Dakota's Own Station."

**KDYL** Intermountain Broadcasting Corp., 1009-10-11 Ezra Thompson, Salt Lake City, Utah. 246 meters, 1220 kilocycles, 250 watts. Daily, including Sun, 3-5 pm, matinee program. Mon, 8-10 pm, dance orchestra. Tues, 8-9 pm, classical. Wed, 7-8 pm, Courtesy Program. Daily ex Sun, 9-10 pm, 10-11 pm, 11-12 pm, dance orchestra. Mountain time. Slogan: "The Little Station with the Big Voice."

**KFAB** Nebraska Buick Auto Co., 13th and Ives sts., Lincoln, Nebr. 340.7 meters, 880 kilocycles, 1000 watts. Sun, 9-10 pm. Mon, Tues, Wed, 9:30-9:55 am, 10:30-11 am, 2:15-4:30 pm, 3-3:30 pm, 5:30-6:30 pm, 8:10-10:30 pm. Thurs, 3-4 pm. Fri same as Mon, Tues & Wed. Sat, 9:30-9:55 am, 3-3:30 pm, 5:30-6:30 pm, 8:30-10:30 pm. Slogan: "Home Service—Home Station."

**KFAD** McArthur Bros. Co., 134 So. Central st., Phoenix, Ariz. 273 meters, 1100 kilocycles, 100 watts. Daily ex Sun. Mon, 6-7 pm. 8-9 pm daily ex Sun. Wed, 6-7 pm; 9-11 pm, concerts, news, stock. Mountain standard time. Slogan: "The Voice of the Atwater-Kent Radio."

**KFAF** Alfred E. Fowler, 31st & San Antonio sts., San Jose, Calif. 217-3 meters, 1380 kilocycles, 50 watts. Pacific standard time.

**KFAU** High School, Boise, Idaho. 280.2 meters, 1070 kilocycles, 750 watts, Sun, 7:30 to 8:30 or 9 pm, church services. Mon, Wed & Fri, 12:30 pm to 1 pm, market, weather, news; Tuesday, 12:30 to 1 pm, market, weather, news; 7:30-8 pm, 8 pm-10 pm Thursday; 12:30 pm to 1 pm, 8 pm, 10 pm entertainment; children's hour Saturday. No market or weather; 7:30 pm-8:30 pm, farm news by State Dept. of Agriculture.

**KFBC** Radio Station KFBC, on Roof of Balboa Theater Bldg., San Diego, Calif. 380 meters, 780 kilocycles, 100 watts. Sun, 7-7:30 pm, religious lecture. Daily ex Sat & Sun, 7-10 pm, studio program. Sat, 7-12 pm, irolic. Pacific standard time.

**KFBB** F. A. Buttrey Co., Havre, Mont. 275 meters, 1090 kilocycles, 50 watts. Daily ex Sun, 12:45 am-1:30 pm. Mountain standard time.

**KFBK** Kimball Upson Co., 610 Calif st., Sacramento, Calif. 535 meters, 560.4 kilocycles, 100 watts. Mon, Thurs & Sat, 6-10 pm. Standard time.

**KFBL** Leese Bros., 2814 Rucker av., Everett, Wash. 224 meters, 1340 kilocycles, 100 watts. Daily, 7:30-8:30 pm. Pacific time.

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

**KFBU** Broadcasting Station KFBU, Laramie, Wyoming. 374.8 meters, 800 kilocycles, 1000 watts. Sun, 7:30-9 pm, church services. Mon, Wed, Fri, Sat, 12:30-8:30 pm, weather & news. Tues, Thurs, 7:30-9:00 pm, studio program. Mountain standard time. Slogan: "The Top of the World."

**KFCB** Nielsen Radio Supply Co., 311 N. Central Ave., Phoenix, Ariz. 238 meters, 1260 kilocycles, 100 watts. Sun, 9:30 to 10:30 am, Radio Community Bible Class. Mon, 7:30 to 8:30 pm, children's hour. Wed, 8 to 9 pm, musical. Sat, 7-8 pm, educational program 12 to 2 am. Mountain standard time. Slogan: "Kind Friends Come Back."

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

**KFDM** Magnolia Petroleum Co., Box 798, Beaumont, Tex. 315.6 meters, 950 kilocycles, 500 watts. Sun, 11-12 n, 8-9 pm, church services. Tues & Fri, 12:30 n, band concert; 8 pm, band concert. Central standard time. Slogan: "Call for Dependable Magnolene."

**KFDX** First Baptist Church, Shreveport, La. 236.1 meters, 1270 kilocycles, 500 watts. Sun, 10:50 am, 7:45 pm. Wed, 9-10 pm. Central standard time.

**KFDY** South Dakota State College, Brookings, So. Dak. 306 meters, 980 kilocycles, 500 watts. Daily ex Sun, 12:15-12:45 pm, markets & agriculture. Thurs, 7:30-8:30 pm, entertainment. Central standard time.

**KFDZ** Harry O. Iverson, 2510 Thomas av., South Minneapolis, Minn. 231 meters, 1300 kilocycles, 10 watts. Central standard time.

**KFEC** Meyer & Frank Co., Portland, Ore. 248 meters, 1210 kilocycles, 50 watts. Daily ex Sun, 12 n, weather reports; 4-5 pm, music; 6:30 pm, weather, crop, markets, reports. Sat, 11 am-12 n, children's hour. Pacific time.

**Windsor Wall or Table  
Type Cone Speaker  
Amazes Radio World**



Model 210  
(Pat. Applied For)

The latest model Windsor Cone Loudspeaker has astonished the world of radio. In convenience, quality of reception, and extremely low price, it far surpasses anything yet offered. The cone is 22 inches in diameter and is mounted on a sounding board which, in turn, is supported by an easel back. It can be hung up on the wall, as in the picture above, or stood upon any flat surface as shown in the picture below. It contains the famous Windsor loudspeaker unit noted for the extreme clarity and fidelity of reproduction.



Model 210  
22-inch Cone Loudspeaker with sounding board and easel back.

**\$15<sup>00</sup>**

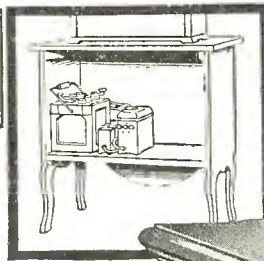
(West of Rockies \$18)  
(Pat. Applied For)

Model 302 (Shown below)  
With Moulded Composition Horn Loudspeaker and 18-inch Cone Loudspeaker.



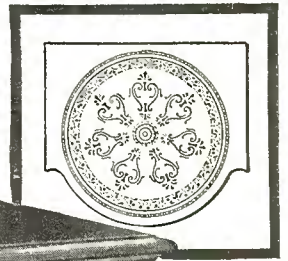
(Pat. Applied For)

In this Windsor Console is combined both the Windsor Moulded Composition Horn Loudspeaker and the 18-in. Windsor Cone Loudspeaker. The top is 30 in. x 17 in. and stands 29 in. high. Plenty of battery and equipment space is provided by large shelf in rear. Price, finished in Mahogany or Walnut **\$48<sup>00</sup>**  
(West of Rockies, \$55)



Rear view at left shows large compartment with ample space for batteries, battery charger, or battery eliminator, which are entirely concealed from view. Back is open for ventilation of batteries.

At right is shown the Cone Loudspeaker, with its sounding board, which is quickly and easily removable, allowing instant access to all batteries, battery charger, battery eliminator or other equipment and wiring.



(Pat. Applied For)

Model 200—with 22-inch Cone Loudspeaker

This Windsor Cone Loudspeaker Console is equipped with a 22-inch Windsor Cone Loudspeaker. Its top is 30" x 17" and is 29" high. The battery shelf provides ample space for batteries, charger, battery eliminator and other equipment. Beautifully finished in either Mahogany or Walnut.

Model 200

**\$29**

Console with Cone Loudspeaker Ready for Set and Batteries  
(West of Rockies, \$35)

**This is the Fastest Selling Line of Loudspeakers and Loudspeaker Consoles in the Radio World Today**

The quality of radio reception made possible by Windsor Cone and Horn Loudspeakers and Loudspeaker Consoles so far surpasses anything heard heretofore that it amazes and delights every radio enthusiast. The Windsor Line is so complete that everyone can find in it a loudspeaker, loudspeaker table, or loudspeaker console exactly to fit their particular needs.



Model 100  
with Moulded Composition Horn Loudspeaker or 16-inch Cone Loudspeaker  
(Pat. Nov. 18, 1924)

Above is shown a beautiful Windsor Loudspeaker Console, finished in either Walnut or Mahogany, which provides ample space on top for any radio set. The battery shelf beneath will accommodate all necessary equipment. Equipped with either Moulded Composition Horn or 16-inch Cone Loudspeaker. Size: 38 in. x 18 in., and 29 in. high. Price **\$40<sup>00</sup>**  
(West of Rockies, \$42.50)

To the right is shown the newest Windsor Loudspeaker Console. It is equipped with a 22-inch Cone Loudspeaker and cabinet suitable for 7-inch radio panels up to 26 inches in length. Battery shelf provides ample space for all equipment. Beautifully finished in either Walnut or Mahogany. Price (without receiving set) **\$44<sup>00</sup>**  
(West of Rockies, \$52.00)



(Pat. Applied For)

Model 1000  
with 22-inch Cone Loudspeaker

Note to Dealers: Write or wire today for details of the highly profitable Windsor line.

Electrical Department

**WINDSOR FURNITURE COMPANY**

1498 Carroll Avenue • CHICAGO, ILLINOIS

Los Angeles Branch—917 Maple Avenue

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

**KFEL** Eugene P. O'Fallon, Inc., Argonaut Hotel, Denver, Colo. 254 meters; 1180 kilocycles, 250 watts. Sun, 9-10 am, church services. Mon, Tues, Wed, Thurs, Fri, Sat, 11-12 am, 2-3 pm, 4-5 pm, 5-6 pm, station programs. Tues, 9-10 pm, special programs. Thurs, 10-12 pm, Sleepwreckers' Program. Mountain standard time. Slogan: "The Argonaut Station."

**KFIF** Benson Polytechnic Institute, Portland, Ore. 248 meters, 1210 kilocycles, 100 watts. Pacific standard time.

**KFJM** University of North Dakota, Grand Forks, N. Dak. 278 meters, 1080 kilocycles, 100 watts. Limited coml. Sun, 6-7 pm, orchestra. Daily ex Sun, 12 n-1 pm, music records; 6-7 pm, orchestra. Central standard time. Slogan: "The Educational Center of the State."

**KFEQ** J. L. Scroggin, Oak, Nebr. 267.7 meters, 1120 kilocycles, 500 watts. Sun, 4:30-6 pm, 8:30-10 pm. Mon, Tues, Wed, Thurs, Fri, Sat, 2-3 pm, 8:30-10 pm. Central standard time.

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

**KFJR** Ashley Dixon & Son, care Ralph Schmeeloch Co., 95 Fifth st., Portland, Ore. 263 meters, 1140 kilocycles, 120 watts, Mon, 7:30-8:15 pm, story; 8:15-8:45, Listeners Service. Tues, 7:30-8:15, junior program; 9:15-10:45, "Music of the Masters." Wed, 7:30-8:30 (1st & 3rd) Y. M. C. A. program (2nd & 4th). Thurs, 7:30-8:15 pm; 8:15-8:30 B. C. L. service; 9:10 pm, music. Fri, 12:30 (midnight), test program. Sat, 1:30-3 pm, music. Pacific standard time.

**KFEY** Bunker Hill & Sullivan Industrial Y. M. C. A. & Union High School, Kellogg, Idaho. 233 meters, 1290 kilocycles, 10 watts. Sun, 11 am-7:30 pm, church services. Wed, 7:30-8:30 pm, musical. Thurs, 7:30, health talks. Sat, 9-10 pm, dance, music. Pacific standard time. Slogan: "The Voice of the Coeur D. Alenes."

**KFIQ** First Methodist Church, 332 Miller Bldg., Yakima, Wash. 256 meters, 1170 kilocycles, 100 watts. Wed, Sat, 7:30 pm, musical programs. Sun, 11 am, 7:30 pm, church services. Pacific standard time.

**KFJY** Tunwall Radio, 1004 Central Ave., Ft. Dodge, Iowa. 245.8 meters, 1220 kilocycles, 50 watts. Sun, 11 am, church services. Daily ex Sun, 5:30 pm, market & weather reports. Thurs, 7:30 pm, musical program. Central standard time.

**KFFP** First Baptist Church, 6th & Rollins, Moberly, Mo. 241.8 meters, 1240 kilocycles, 50 watts. Sun, 9:45-10:45 am, 7:30 pm, church services. Thurs, 8 pm, musical program. Central standard time. Slogan: "The Gospel Messenger of the Air."

**KFIU** Alaska Elec. Light & Power Co., Juneau, Alaska. 226 meters, 1330 kilocycles, 10 watts. Mon, Wed & Fri, 6-7 pm, daily news items, steamer sailings, music, vocal and instrumental. Alaska time. (Note: 6 am, Seattle time, is 5 am Alaska time.) Slogan: "A Voice from the Far North."

**KFJZ** W. E. Branch, 400 W. 7th St., Fort Worth, Tex. 254.1 meters, 1180 kilocycles, 50 watts. Sun, 7-10 pm, 11-12:30 mornings. Daily ex Sun & Wed, 8:30-9:30 pm, 9 am to 6 pm. Central standard time.

**KFGQ** The Cray Hardware Co., Boone, Iowa. 226 meters, 1330 kilocycles, 10 watts. Sun, 3-4 pm. Wed, 8-9. Slogan: "The Daniel Boone Station." Central standard time.

**KFIZ** Fond du Lac Commonwealth Reporter, Fond du Lac, Wis. 273 meters, 1100 kilocycles, 100 watts. Daily, 5 to 5:30 pm, markets, weather & news. Occasional evening programs of music. Sun, 6-7 pm, dinner hour concert. Central standard time.

**KFKA** Colorado State Teachers' College, Greeley, Colo. 273 meters, 1100 kilocycles, 50 watts. Wed, 10 am, chapel exercises. (Schedules to be announced.) Mountain time.

**KFH** Hotel Lassen (Rigby-Gray Hotel Co.), Wichita, Kan. 268 meters, 1120 kilocycles, 500 watts. Sun, 7-10 pm, church services, studio program. Daily ex Sun, 7-2 pm, every hour, markets; 7 pm, studio program. Central standard time. Slogan: "Kansas' Finest Hotel—In the Very Heart of God's Country."

**KFJB** Marshall Elec. Co., 1603 W. Main st., Marshalltown, Iowa. 248 meters, 1210 kilocycles, 10 watts. Daily ex Sun, 10 am, market reports. Tues. & Fri, 7:30-11 pm, musical programs. Sun, 10 am-12 pm; vespers, 3-6 pm. Central standard time. Slogan: "Marshalltown, the Heart of Iowa."

**KFKU** University of Kansas, Lawrence, Kan. 275 meters, 1090 kilocycles, 500 watts. Mon & Thurs, 6:55-8 pm. (Also special broadcasting.) Central standard time. Slogan: "Up at Lawrence on the Kaw."

**KFHA** Western States College of Colorado, Gunnison, Colo. 252 meters, 1190 kilocycles, 50 watts. Sun, 3 pm, organ program. Tues, Fri, 7 pm, kiddies' hour; 7:30 pm, musical. Mountain time. Slogan: "Where the Sun Shines Every Day."

**KFJC** R. B. Fegan (auspices of the Episcopal Church), 410 N. Jefferson st., Junction City, Kans. 218.8 meters, 1370 kilocycles, 10 watts. Central standard time.

**KFKX** Westinghouse Elec. & Mfg. Co., Hastings, Nebr. 288.3 meters, 1040 kilocycles, 5000 watts. Daily ex Sun & Sat, 9:30 & 10:30 am, 12:15-2 & 7 pm; musical program at 12:40 & 9 pm. Sat, 9:30 & 10:30 am, markets, also 12:15 pm. Slogans: "Empress of the Air" and "Pioneer Radio Repeating Station of the World."

**KFHL** Penn College, Oskaloosa, Iowa. 240 meters, 1250 kilocycles, 10 watts. Central standard time.

**KFJF** Oklahoma City, City of Opportunity, 406 N. Hudson St., Oklahoma City, Okla. 261.7 meters, 1150 kilocycles, 500 watts. Daily ex Sun, 9 am, market service; 9:15 am, musical program; 10 am, market service; 12:30 pm, market service; 6:15 pm, market service; 6:30 pm, dinner musical; 7 pm, news bulletins; 9 pm, musical program. Sun, 10 am, 11 am; 7:30 pm, 9:30 pm, church services. Central standard time. Slogan: "City of Opportunity."

**KFKZ** F. M. Henry, 107 E. Harrison St., Kirksville, Mo. 226 meters, 1330 kilocycles, 100 watts. Sun, 3:30 to 4:30 pm. Mon, 8-9 pm, dance music; 9 pm, radio plays. Slogan: "Kirksville, the Home of Osteopathy."

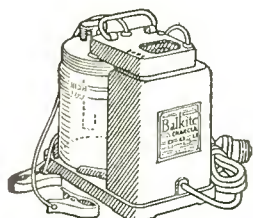
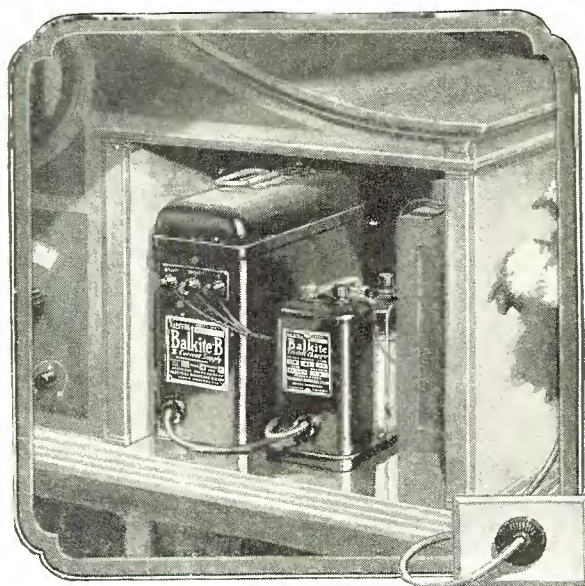
**KFI** Earle C. Anthony, Inc., 1000 S. Hope St., Los Angeles, Calif. 467 meters, 642 kilocycles, 5000 watts. Sun, 10 am, church; 4 pm, vespers; 6:30 pm, nightly doings; 6:45 pm, music chat; 7-11 pm, musical program. Mon, Wed, Fri, 10:20-11 am, household talk. Daily ex Sat, Sun, 5:30-11 pm, musical program. Sat, 2:30 pm, football games; 5:30 pm-2 am, musical program. Pacific standard time. Slogan: "National Institution, Where Great Programs Come From."

**KFJI** Liberty Theatre and E. E. Marsh, Astoria, Ore. 246 meters, 1220 kilocycles, 10 watts. Wed, 9-10 pm, organ music. Sun, 12:30-1:30 pm. Sat, 10:30-11 pm. Pacific standard time.

**KFLR** Korber Wireless Station, the State University of New Mexico, Albuquerque, N. Mex. 254 meters, 1180 kilocycles, 100 watts. Fri, 8:10 pm. Mountain standard time. Slogan: "Sunshine Center of America."

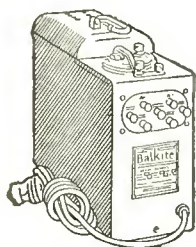


# The new Balkite "B" at \$27<sup>50</sup> and the Balkite Trickle Charger furnish all radio power from the light socket



The New Balkite Charger

MODEL J. Has a low trickle charge rate and a high rate for rapid charging and heavy duty use. Can thus be used either as a trickle or as a high rate charger and combines their advantages. Noiseless. Large water capacity. Visible electrolyte level. Rates: with 6-volt battery, 2.5 and .5 amperes; with 4-volt battery, .8 and .2 amperes. Special model for 25-40 cycles with 1.5 amperes high rate. Price \$19.50. West of Rockies \$20. (In Canada \$27.50.)



Balkite Combination

When connected to the "A" battery this new Balkite Combination Radio Power Unit supplies automatic power to both "A" and "B" circuits. Controlled by the filament switch already on your set. Entirely automatic in operation. Can be put either near the set or in a remote location. Will serve any set now using either 4 or 6-volt "A" batteries and requiring not more than 30 milliamperes at 135 volts of "B" current—practically all sets of up to 8 tubes. Price \$59.50. (In Canada \$83.)

All Balkite Radio Power Units operate from 110-120 volts AC current with models for both 60 and 50 cycles. The new Balkite Charger is also made in a special model for 25-40 cycles.

The light socket is your most convenient source of radio power. Use it by adding the new Balkite "B" and the Balkite Trickle Charger to your radio set.

Balkite "B"—the unique "B" power supply—eliminates "B" batteries entirely and supplies "B" current from the light socket. The new Balkite "B"-W at \$27.50 serves sets of 5 tubes or less requiring 67 to 90 volts, Balkite "B"-X sets of up to 135 volts and 8 tubes and Balkite "B"-Y any standard set.

The Balkite Trickle Charger at \$10 is probably the most popular of all chargers. Over 200,000 were purchased during one season and are now in service. Instead of operating intermittently at a high rate, it operates continuously at a low rate, thus automatically keeping the battery at full charge. In effect it converts your "A" battery

into a light socket "A" power supply. With 4-volt batteries it can be used as an intermittent charger, or as a trickle charger if a resistance is added.

Both Balkite "B" and the Balkite Trickle Charger are noiseless in operation. Both are permanent pieces of equipment, with nothing to renew or replace. Other than a slight consumption of household current, their first cost is the last. Both are built to conform with the standards of the Underwriters' Laboratories.

Over 700,000 radio sets are already Balkite equipped. Make yours a light

socket receiver too by adding these Balkite Units. Enjoy the pleasure of owning a radio set always ready to operate at its best.

[Balkite "B"-W \$27.50; "B"-X \$42; "B"-Y \$69; Trickle Charger \$10; West of Rockies \$10.50. In Canada, "B"-W \$39; "B"-X \$59.50; "B"-Y \$96; Trickle Charger \$15.]

Fansteel Products Co., Inc., North Chicago, Ill.

### The Balkite Radio Symphony Concerts with WALTER DAMROSCH and the New York Symphony

These concerts are broadcast every other Saturday Evening. On intervening Saturdays, Mr. Damrosch gives one of his famous piano recitals on Wagner's great Music Dramas. At 9 P.M. Eastern Standard Time, over a group of 13 stations: WEAf, WEEL, WGR, WFI, WCAE, WSAI, WTAM, WWJ, WGN, WCCO, KSD, WDAF, WOC.

# FAN STEEL Balkite Radio Power Units



**KFLU** San Benito Radio Club, San Benito, Tex. 236 meters, 1270 kilocycles, 10 watts. Wed & Sat, 8-9 pm. Central standard time.

**KFLV** Swedish Evang. Miss. Church, Rockford, Ill. 229 meters, 1310 kilocycles, 100 watts. Fri, 8:30 pm. Sun, 12:30 pm (Swedish), 9:30 pm (English). Central standard time.

**KFLX** Geo. R. Clough, 1214 40th St., Galveston, Tex. 240 meters, 1250 kilocycles, 10 watts. Central standard time.

**KFMR** Morningside College, Sioux City, Iowa. 260.7 meters, 1150 kilocycles, 100 watts. Commercial. Mon, Wed, Fri, 11:40 am, chapel exercises (20 minutes). Central standard time.

**KFMX** Carleton College, Northfield, Minn. 336.9 meters, 890 kilocycles, 50 watts. Sun, 7 pm, college vesper service. Tues, 9:30 pm, lecture. Wed, 9 pm, concert. Fri, 10 pm, organ recital. Central standard time.

**KFNF** Henry Field Seed Co., Shenandoah, Iowa. 461 meters, 650 kilocycles, 1000 watts. Sun, 10:45 am-12:15 pm, services; 2:30-4:30 pm, 6:30-9:00 pm, services. Mon, 7-8 am. Tues, 10-11 am. Wed, 12-2 pm. Thurs, 3-5 pm. Fri, 7-9 pm. Sat, 11-12 pm. Slogan: "Known for Neighborly Folks." Central standard time.

**KFOA** Rhodes Dept. Store, 1321 2nd Ave., Seattle, Wash. 454.3 meters, 660 kilocycles, 1000 watts. Mon & Tues, 9:30-10:30 am, 12:30-1:30 pm, 2:30-5 pm, 6:25-10 pm. Wed, 9:30-10:30 am, 2:30-5 pm, 6:25-10 pm. Thurs, 9:30-10:30 am, 2:30-5 pm, 6:25-6:45 pm. Fri, 9:30-10:30 am, 12:30-1:30 pm, 2:30-5 pm, 6:25-12:10 pm. Sat, 2:30-5 pm, 6:25-10 pm.

**KFOB** KFOB, Inc., Burlingame, Calif. 226 meters, 1330 kilocycles, 50 watts. Tues & Thurs, 10-11:30 am, 1-2:30 pm, 5:30-7 pm, 8-11 pm. Sat, 1-3 pm, 5:30-7 pm, 9 pm-1 am. Pacific standard time.

**KFON** Nichols & Warinner, Inc., 212 Jerkins Trust Bldg., Long Beach, Calif. 233 meters, 1280 kilocycles, 500 watts. Sun, 2:30-11 pm, bands, concerts, studio orchestra, etc. Daily ex Sun, 11:30-12 n, news bulletins; 4-7 pm, concerts, organ recitals, news bulletins, etc.; 8-11 pm, studio programs. Pacific standard time. Slogan: "Where Your Ship Comes In."

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

**KFOR** David City Tire & Elec. Co., David City, Nebr. 226 meters, 1330 kilocycles, 100 watts. Mon & Tues, 8-9 pm. Central standard time. Slogan: "The Voice of David City."

**KFOT** College Hill Radio Club, 1st and Erie Sts., Wichita, Kan. 231 meters, 1300 kilocycles, 50 watts. Sun, 11-12:30 pm, 7:30-9 pm, church services. Mon, 9-10 pm, music. Central standard time. Slogan: "Radio-casting Church."

**KFOX** Technical High School, Omaha, Nebr. 248 meters, 1210 kilocycles, 100 watts. No regular schedule. Central standard time.

**KFOY** Beacon Radio Service, 373 Robert St., St. Paul, Minn. 252 meters, 1190 kilocycles, 50 watts. Sun, 2:30 pm, musical. Central standard time.

**KFPL** C. C. Baxter, Dublin, Tex. 252 meters, 1190 kilocycles, 15 watts. Central standard time. Sun, 7 am, Mon, Thurs, 7-8 pm. Slogan: "Baxter's Place."

**KFPG** Oliver S. Garretson, 5118 Maywood Ave., Los Angeles, Calif. 238 meters, 1260 kilocycles, 10 watts. Pacific time.

**KFPM** The New Furniture Co., Box 628, Greenville, Tex. 242 meters, 1240 kilocycles, 10 watts. Sun, 11 am, services. Mon, Tues, Fri & Sat, 9 pm, music; 7:15 pm, sports in season; 1 pm, musical program. Wed & Thurs, 8 pm, music; 7:15 pm, sports in season; 1 pm, musical program. Central standard time. Slogan: "Biggest Little Ten Watts on the Air."

**KFPR** Los Angeles Co. Forestry, Los Angeles, Calif. 231 meters, 1300 kilocycles, 500 watts. Irregular schedule. Pacific standard time.

**KFPW** St. John's M. E. Church, Box 424, Cartersville, Mo. 258 meters, 1160 kilocycles, 20 watts. Sun, 1-2 pm, chapel service. Fri, 8-10 pm, popular and classical. Central standard time. Slogan: "Keeping Pace with Christ Means Progress."

**KFPY** Symons Investment Co., Symons Block, Spokane, Wash. 273 meters, 250 watts, 1098 kilocycles. Sun, 9 am-10 pm. Daily ex Sun, Tues, 7-8 pm. Mon, 9-10 pm. Wed, 9 pm-12 midnight. Thurs, 10-11 pm. Sat, 11 pm-midnight. Pacific standard time.

**KFQA** The Principia, 5539 Page Ave., St. Louis, Mo. 261 meters, 1150 kilocycles, 100 watts. Sun & Thurs, 8-9 pm, church services and lectures. Central standard time.

**KFQB** Lone Star Broadcasting Co., Ft. Worth, Tex. 508.2 meters, 590 kilocycles, 1000 watts. Daily ex Sun & Wed, 8-12 midnight, musical. Sun, 10 am-12 pm, 3-10 pm, church services. Central standard time. Slogan: "Keep Folks Quoting the Bible—KFQB."

**KFQO** Meier Radio Shop, Russell, Kan. 261 meters, 1150 kilocycles, 10 watts. Central standard time.

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

**KFQU** Holy City Broadcasting Station, Holy City (Alma P.O.), Calif. 230.6 meters, 1300 kilocycles, 100 watts. Daily ex Sun & Mon, 9-10 pm. Sun, 11 am-12 noon, 9-10 pm. Pacific standard time.

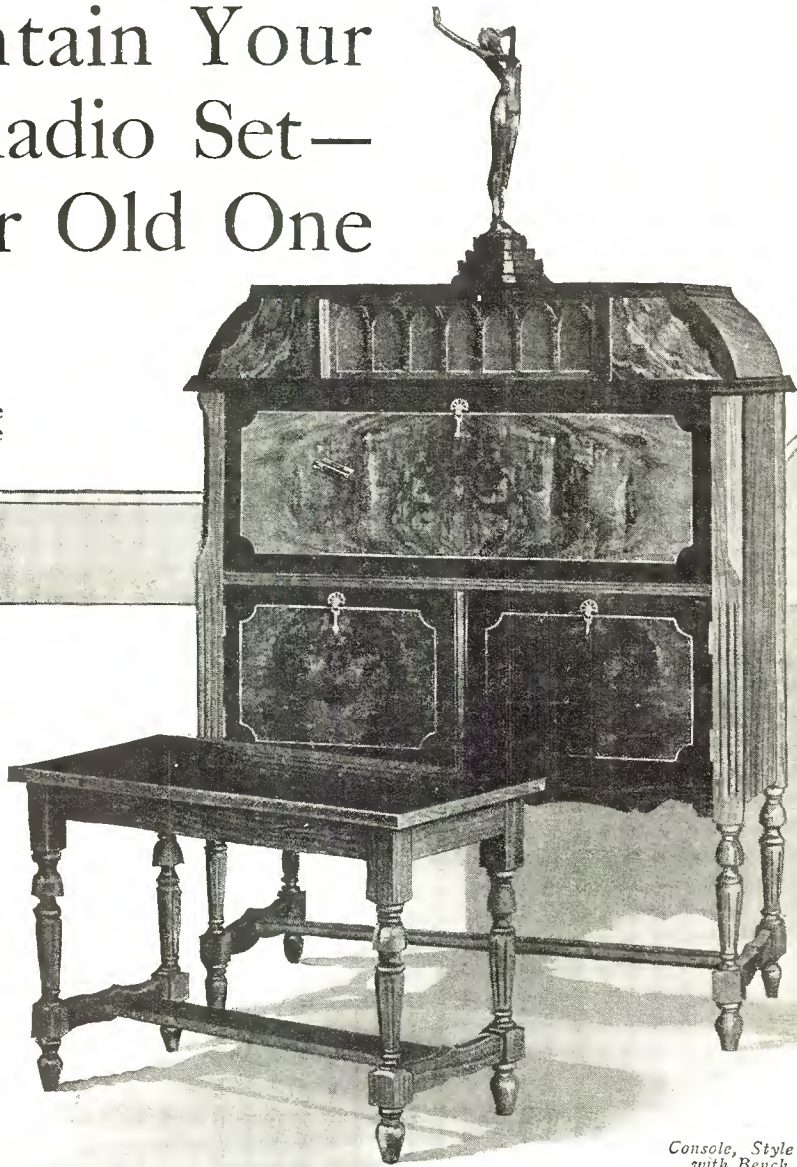
**KFQW** KFQW, Inc., Continental Hotel, Seattle, Wash. 215.7 meters, 1390 kilocycles, 50 watts. Daily ex Sun, 4:30-7:30 pm, music, 8-12 pm, dance music. Pacific time. Slogan: "At the Western Entrance of Snoqualmie Pass."

**KFQZ** Taft Products Co., 5653 De Longpre Ave., Hollywood, Calif. 226 meters, 1330 kilocycles, 50 watts. Tues, Fri, 9-11 pm, musical program. Pacific standard time.

**KFRB** Hall Bros. (Rialto Theatre), Beeville, Tex. 248 meters, 1210 kilocycles, 250 watts. Central standard time.

# A Fine Piece of Furniture to Contain Your New Radio Set— or Your Old One

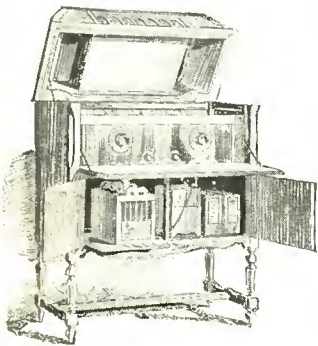
The Excello Radio Console  
embodies years of experience  
in fine cabinet making.



Console, Style No. R-23,  
with Bench to match

**T**HIS Console is designed in three compartments, the tone chamber, the receiver compartment and the battery space. The tone chamber is of wood with metal throat for perfect tone production. The receiving set compartment has adjustable filler pieces to accommodate any panel not exceeding 10½" x 32". The battery space measures 14" x 32" and the A battery sets on a leaf which pulls forward for easier filling or testing. Matched wood door panels of Butt Walnut, two-tone effect. Ask to see the Exeello at your dealers or write for catalog showing full line of consoles and tables.

Sketch showing  
accessibility of  
all parts of set  
and equipment



Distributors and dealers  
—attractive territory  
still open. Write for  
interesting proposition.

## EXCELLO

Radio  
Consoles & Cabinets

# EXCELLO PRODUCTS CORPORATION

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

**KFRC** Don Lee-Caddillac Station, San Francisco, Calif. 268 meters, 1120 kilocycles, 50 watts. Daily ex Sun & Mon, 6:30-8 am, exercises. Daily ex Sun, 5:30-6:30 pm, children's hour, 6:30-10 pm, Mon & Thurs. Tues & Fri, 6:30-11 pm, concert. Wed, 6:30-12 pm. Sat, 6:30 pm-1 am, dance music. Sun, 6:30-10 pm, 10-12 pm. Pacific standard time.

**KFRO** Curtis Sales Co., 1109 8th Ave., Fort Worth, Tex. 246 meters, 1220 kilocycles, 50 watts. Central standard time.

**KFRU** Stephen's College, a Junior College for Women, Columbia, Mo., "The Athens of the West." 499.5 meters, 600 kilocycles, 500 watts. Sun, 7:30 am, sunrise service; 9:20 am. Burrall class; 7:30 pm, church services. Daily ex Sun & Sat, 8:30 am, public school convocation; 4:30 pm, popular program; 6 pm, dinner hour. Wed, 9 pm, musical program. Thurs, 10 pm, musical program. Sat, 4:30 pm, popular program; 6:15 pm, weather, news. Central standard time. Slogan: "Where Friendliness is Broadcast Daily."

**KFRW** United Church, Olympia, Wash. 218.8 meters, 1370 kilocycles, 50 watts. Sun, 11 am-12:15 pm, 7:30-9 pm. Pacific time. Slogan: "Make the World a Brotherhood."

**KFRX** J. G. Klemgard, R. R. 2, Pullman, Wash. 217 meters, 1380 kilocycles, 10 watts. Pacific time.

**KFSD** Airfan Radio Corporation, U. S. Grant Hotel, San Diego, Calif. 245.8 meters, 1220 kilocycles, 1000 watts. Sun, 3-4 pm, musical program; 6:15-10 pm, musical program. Daily ex Sun, 6:15-11 pm, musical program. Pacific time.

**KFSG** Angelus Temple, 1100 Glendale Blvd., Los Angeles, Calif. 275 meters, 1091 kilocycles, 500 watts. Sun, 10:30 am-12:30 pm, 2:30 pm-4:30 pm, 6:40-11 pm, church services. Tues, Wed, 10:30 am-12:30 pm, 2:30-4:30 pm, 6:30-9 pm, church services. Thurs & Fri, 10:30 am-12:30 pm, 2:30-4:30 pm, 6:30-11 pm, church services. Sat, 10:30 am-12:30 pm, 3:30-4:30 pm, 6:30-9:30 pm. Slogan: "The Church of the Air."

**KFUL** Thos. Goggan & Bro. Music Co., Galveston, Tex. 258 meters, 1160 kilocycles, 50 watts. Daily, 10:30 am. Fri, 8 pm. Central standard time. Slogan: "Kan't Fool Us Loughorns."

**KFUM** Corley Mountain Highway, Colorado Springs, Colorado. 239.9 meters, 1250 kilocycles, 100 watts. Sun, 8:15-8:35 am. Mon, Fri, 7:30-9 pm. Thurs, 8-9:30 pm. Sat, 7:15 pm, sport news. Mountain standard time.

**KFUO** Concordia Seminary (Lutheran), St. Louis, Mo. 545.1 meters, 550 kilocycles, 500 watts. Daily ex Sun, 3:30-4 pm, 9:15 pm. Mon, 8 pm. Tues, 6:30 pm. Wed, 9:30 pm. Fri, Sat, 7:15 pm. Central standard time. Slogan: "The Gospel Voice."

**KFUP** Fitzsimmons General Hospital, Denver, Colo. 234 meters, 1280 kilocycles, 50 watts. Mountain time.

**KFUR** Peery's Egyptian Theatre (H. W. Peery, Mgr.), Ogden, Utah. 224 meters, 1340 kilocycles, 50 watts. Tues, Thurs, Sat, 9:50-11:50 pm, dance music. Mountain time.

**KFUS** Gospel Radio, 529 28th St., Oakland, Calif. 259 meters, 1170 kilocycles, 50 watts. Tues, 2:30-3:30 pm, Educational; 8-9 pm, 6:30-7:30 pm, sacred studio program. Wed & Fri, 8-9 pm, sacred program. Thurs, 4:30-5 pm, educational; 5-5:30 pm, children's program. Sun, 9-9:30 am, S.S. lesson; 3:30-4:30 pm, sacred program. Pacific standard time.

**KFUT** University of Utah, Salt Lake City, Utah. 261 meters, 1150 kilocycles, 100 watts. Off air until October or later.

**KFUU** Mathewson Motor Co., Inc., and Oakland Times, Oakland, Calif. 220 meters, 1363 kilocycles, 150 watts. Mon, Wed, Fri, 6:30-7:30 pm, 8-10 pm. Tues & Thurs, 8-10 pm. Sat, 6:30-7:30, 8-11 pm.

**KFVD** Venice Ball Room, Venice, Calif. 205 meters, 1460 kilocycles, 250 watts. Sun, 10-12 pm, Ball Room orchestra. Daily ex Sun, 8-10 pm, musical; 10-12 pm, Ballroom Orchestra. Sat, 12 pm, Midnight Frolic from Ship Cafe. Pacific time.

**KFVE** Romaine Fielding, Film Corp. of America, 6800 Delmar Blvd., University City, Mo. 240 meters, 1250 kilocycles, 5000 watts. Daily ex Sun & Thurs, 9:15 pm, National amusement review, studio entertainers, & orchestra music. Central standard time.

**KFVG** First Methodist Episcopal Church, 204 S. Penn. Ave., Independence, Kan. 236 meters, 1270 kilocycles, 15 watts. Sun, 10:55 am-12:30 pm & 7:30-9:15 pm, church services. Central standard time. Slogan: "Kansas Folks Very Good."

**KFVI** Headquarters Troop, 56th Cavalry Brigade, 305 Sabine St., Houston, Tex. 240 meters, 1210 kilocycles, 10 watts. Central standard time.

**KFVN** Carl E. Bagley, Welcome, Minn. 227 meters, 1320 kilocycles, 50 watts. Mon, Tues, Wed, 9-10:30 pm, musical programs. Fri, 8:30-8:50 pm, children's religious hour; 9-10:30 pm, musical program. Sun, 2:30-3:30 pm, Sunday School. Central standard time.

**KFVR** Moonlight Ranch Broadcasting Station (Eugene Rossi), Route No. 6, Denver, Colo. 244 meters, 1230 kilocycles, 50 watts. Mon, Fri, 10 pm-12 midnight. Tues, Sat, 8-9 pm. Wed, Thurs, 12-1 am. Mountain time.

**KFVS** Hirsch Battery & Radio Co., 312 S. Frederick St., Cape Girardeau, Mo. 224 meters, 1340 kilocycles, 50 watts. Daily ex Sun, 12:15 noon, news & markets. Mon, 6:30-10:30 pm, musical. Wed, 7:30-10:30 pm, musical. Thurs, Fri, 7:30-9:30 pm, musical. Central standard time. Slogan: "The City of Opportunity."

**KFVY** Radio Supply Co., 407 W. Central Ave., Albuquerque, N. Mex. 259.9 meters, 1200 kilocycles, 10 watts. Daily ex Sun, 5:30-6:30 pm, news items & music. Tues & Fri, 8-9:30 pm, dance music. Mountain standard time.

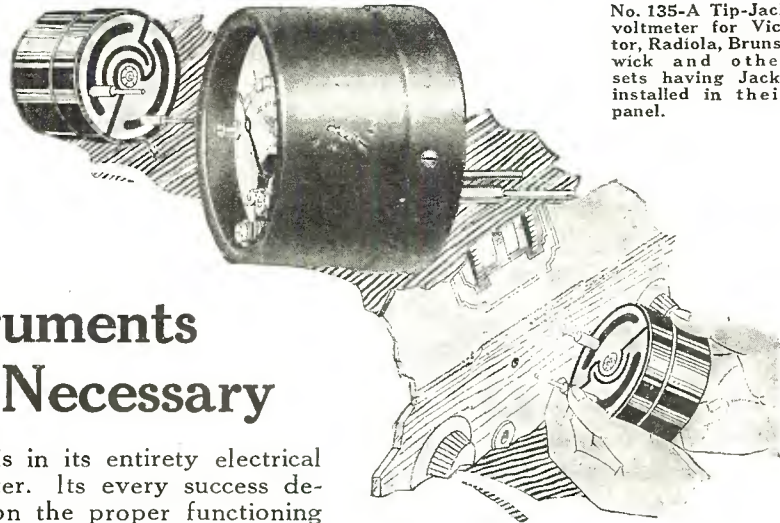
**KFVZ** Glad Tidings Tabernacle, Inc., 1536 Ellis St., San Francisco, Calif. 234 meters, 1280 kilocycles, 50 watts. Pacific time.

**KFWB** Warner Bros. Motion Picture Studios, Inc., 5806 Sunset Blvd., Hollywood, Calif. 252 meters, 1190 kilocycles, 500 watts. Mon, Tues & Wed, 5-6 pm, Big Brother hour; 6-11 pm, musical. Thurs, Fri & Sat, 6-11 pm, musical. Sun, 9-11 pm, musical. Pacific standard time. Slogan: "Movieland."

**KFWC** L. E. Wall, Upland, Calif. 291.1 meters, 1030 kilocycles, 5 watts. Sun, 9-12 am, church services; 9-12 pm, musical. Mon, 9 am-1 pm, 4-12 pm. Tues, 11:30 am-12:30 pm, 3-5 pm, 9-12 pm. Wed, 11:30 am-12:30 pm, 4-6 pm, 9-12 pm. Thurs, 12-1 pm, 4-6 pm, 9-12 pm. Fri, 11:30 am-12:30 pm, 3-5 pm, 9-3 pm. Pacific standard time. Slogan: "The Voice of the Orange Empire."



# JEWELL



No. 135-A Tip-Jack voltmeter for Victor, Radiola, Brunswick and other sets having Jacks installed in their panel.

## Instruments Are Necessary

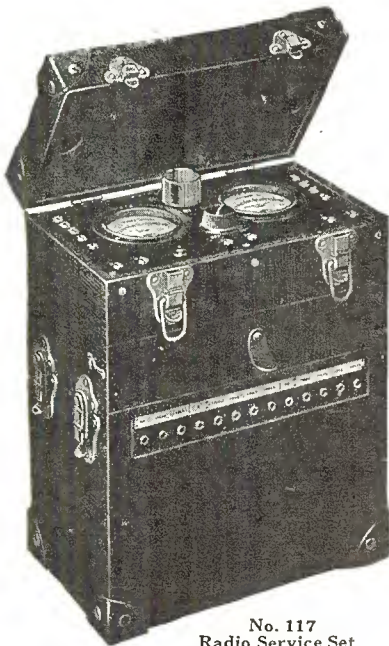
Radio is in its entirety electrical in character. Its every success depends upon the proper functioning of delicate electrical circuits. Voltage and amperage cannot be guessed accurately. Instruments must be used if precision and satisfaction in radio operation is to be secured.

## Amateurs— Set Owners— Service Men—

Jewell instruments are regularly preferred by the amateurs. Radio set builders and manufacturers specify Jewell Instruments because of their reliability and beauty. Radio dealers who require dependable and serviceable instruments for testing the accessories and servicing the sets they sell, turn to Jewell.


There is a Jewell quality instrument for every radio need and they are the universal choice of the radio industry.

Send for New Radio Instrument  
Catalog No. 15-C




No. 117  
Radio Service Set


**JEWELL**




No. 135




No. 107



No. 110




No. 84



No. 87

**JEWELL**


**JEWELL**




No. 135-B




No. 83



No. 135-C



Lightning Arrester



No. 116

**JEWELL**

# Jewell Electrical Instrument Co.

1650 Walnut Street, Chicago

*"26 Years Making Good Instruments"*

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

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

**KFWH** F. Wellington Morse, Jr., Chico, Calif. 254 meters, 1180 kilocycles, 100 watts. Daily ex Sun, 6:15-6:30 pm, news & music. Daily, 6:30-7:15 pm, dinner concert. Mon, Wed, Fri, 8-10 pm. Pacific time. Slogan: "Kind Friends, We're Here."

**KFWI** Radio Entertainments, Inc., Chevrolet Bldg., San Francisco, Calif. 250 meters, 1200 kilocycles, 500 watts. Sun, 1-2 pm, 8-9 pm, 9-10 pm, 10-12 pm. Mon, 1-2 pm, 6:30-7 pm, 7-7:30 pm, 8-9 pm, 9-10 pm, 10-12 pm. Tues, 8-8:30 pm, 8:30-9 pm, 9-10 pm, 10-11 pm. Wed, 1-2 pm, 6:30-7:30 pm, 8-9 pm, 9:30-11 pm, 11 pm-1 am. Thurs, 10-12 pm. Fri, 1-2 pm, 6:30-7:30 pm, 8-10 pm, 10-12 pm. Sat, 10-12 pm, 12:30-3 am.

**KFWM** Oakland Educational Society, 1520 8th Ave., Oakland, Calif. 315.6 meters, 920 kilocycles, 250 watts. Sun, 9:30-11 am, 1-2 pm, 8:30-9:30 pm. Mon, Thurs & Sat, 8-10 pm. Tues, Wed & Fri, 2-3 pm. Pacific standard time. Slogan: "Voice of Oakland."

**KFWO** Major Lawrence Mott, 346 Claressa Ave., Avalon, Catalina Island, Calif. 211.1 meters, 1420 kilocycles, 250 watts. Daily including Sun, 12:30-1:30 pm, 5-6 pm, 6-7:30 pm; 7:30-9 pm, band. Pacific standard time. Slogan: "Catalina for Wonderful Outings."

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

**KFWV** Wilbur Jerman, 385 58th St., South Portland, Ore. 212.5 meters, 1410 kilocycles, 100 watts. Sun, 12:1-30 pm, organ; 6-7 pm, Benson Hotel dinner music. Mon, Fri & Sat, 10-11 am, housewife hour; 6-7 pm, Benson; 7-8 pm, organ; 8-9 pm, dinner music. Tues, 10-11 am, housewife hour; 6-7 pm, Benson; 7-9 pm, organ. Wed, 10-11 am, housewife hour; 6-7 pm, 7-8 pm, organ; 8-9 pm, 11-11:30 pm, music. Thurs, 10-11 am, housewife music hour; 6-7 pm, Benson; 7-8 pm, organ; 8-9, 11-12.

**KFXB** Rim of the World Station, Big Bear Lake, Pine Knot, Calif. 202.6 meters, 1480 kilocycles, 500 watts. Daily ex Sun, 5-5:30 pm, news, road bulletins, lectures, music. Pacific standard time. Slogan: "The Rim of the World Station."

**KFXD** L. H. Strong, East Center St., Logan, Utah. 205.4 meters, 1460 kilocycles, 10 watts. Mountain time.

**KFXF** Pikes Peak Broadcasting Co., Inc., Colorado Springs Nat'l Bank Bldg., Colorado Springs, Colo. 250 meters, 1200 kilocycles, 500 watts. Mon, Tues, Sat, 8:30-10:30 pm, musical program. Thurs, 9:15-10:45 pm, dance program. Sun, 11 am-12:30 pm, 7:30-9 pm, church services. Mountain time. Slogan: "The Pike's Peak Station."

**KFXH** Bledsoe Radio Co., 2857 Montana St., El Paso, Tex. 242 meters, 1240 kilocycles, 50 watts. Mon, Wed, Fri, 8-10 pm, musical. Sat, 11-12 pm, frolic. Central standard time. Slogan: "The Voice of the Rio Grande."

**KFXJ** Mountain States Radio Distributors, Inc., 917 14th St., Denver, Colo. (Portable.) 215.7 meters, 1390 kilocycles, 15 watts. Mountain time.

**KFXR** Classen Film Finishing Co., Oklahoma City, Okla. 214.2 meters, 1400 kilocycles, 15 watts.

**KFXY** Mary M. Costigan, Flagstaff, Ariz. 205.4 meters, 1460 kilocycles, 50 watts. Mountain time.

**KFYD** N. Baker, 2nd St., Muscatine, Iowa. 256 meters, 1170 kilocycles, 250 watts. Central standard time.

**KFYF** Carl's Radio Den (Carl Newcomb), Oxnard, Calif. 214.2 meters, 1400 kilocycles, 10 watts. Mon, Tues, Wed, 5-6 pm, crop reports, news, music; 8-11 pm, music. Fri & Sat, 5-6 pm, crop reports, news, music. Slogan: "The Baby Super Station."

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

**KFYO** Buchanan-Vaughan Co., Texarkana, Tex. 351 meters, 1430 kilocycles, 10 watts. Sun, 11 am, church services. Daily ex Sun & Sat, 12 n-1 pm, musical program; 6-7 pm, dinner hour musical program. Sat, noon day program. Central standard time. Slogan: "Where Arkansas Ends and Texas Begins."

**KFYR** Hoskins-Meyer, Inc., 200 4th St., Bismarck, N. Dak. 247.9 meters, 1210 kilocycles, 10 watts. Sun, 10:30 am-12 noon, church; 3-5 pm, music. Daily ex Sun, 6:30-7:30 pm, music, baseball scores, weather forecast, etc. Central standard time.

**KGH** Marion A. Mulhony, King St., Honolulu, Hawaii. 270 meters, 1110 kilocycles, 500 watts. Sun, 11 am, 6-9 pm, church services. Mon, Tues, Thurs, Sat, 7:30-9 pm, musical, dance music. Slogan: "The Future Playground of America."

**KGAR** The Tucson Citizen, Tucson, Ariz. 243.8 meters, 1230 kilocycles, 100 watts. Sun, 9-11 am, church services. Mon, Tues, 7-8 pm. Wed, 8-9 pm. Thurs, 7-10 pm. Fri, 7-9 pm. Mountain standard time.

**KGBS** Arthur C. Daily, 844 East 58th St., Seattle, Wash. 227 meters, 1321 kilocycles, 100 watts. Sun, 1:30-2:45 pm, 5-6 pm. Mon, 8:30-9:30 pm. Wed, Fri, 7-8 pm. Wed, 9-10 pm. Sat, 9-10 pm. Pacific time.

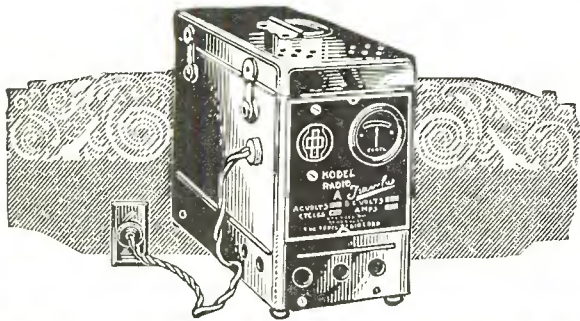
**KGBY** A. C. Dunning, Shelby, Nebr. 202.6 meters, 1480 kilocycles, 50 watts. Sun, 3-5 pm, religious program. Tues, 8-10:30 pm, popular program. Fri, 6-7 pm, dinner program. 8-10:30 pm, popular program. Central standard time. Slogan: "The Voice of Shelby, in the Heart of the Corn Belt."

**KGBZ** Federal Live Stock Remedy Co., Swine & Poultry Station, York, Nebr. 333.1 meters, 900 kilocycles, 100 watts. Sun, 9 am, church services; 3:30 pm, orchestra. Daily ex Sun, Tues, 12:30 pm, market, livestock; 3 pm, musical. Thurs, Sat, 9 pm, dance music. Central standard time. Slogan: "The Swine and Poultry Station."

**KGCA** Chas. W. Greenley, Decorah, Iowa. 280.2 meters, 1070 kilocycles, 15 watts. Sun, 9:30-10:30 am, 2:30-3:30 pm. Daily, 12:15-12:45 pm, 5:30-6:30 pm. Varied musical from Luther College and Educational. Central standard time.

**KGCG** Moore Motor Company, Newark, Ark. 234.2 meters, 1280 kilocycles, 100 watts. Sun, 2:30-3:30 pm, concert. Wed, 9-10 pm, popular concert. Sat, 10-11 pm, frolic. Central standard time.

# A·B & C Radio Power from your light socket



## Kodol Transifiers

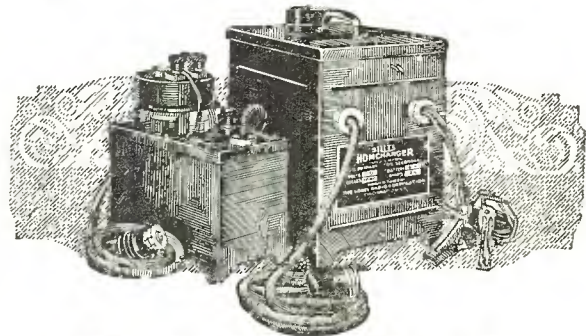
Operate any radio receiver direct from the light socket. Eliminate all A, B and C batteries. Absolutely no hum or noise—gives increased volume, a purer, richer tone—will improve the reception from any receiver. No moving parts to wear out. Will last indefinitely. Can be used on any make or type of set, any kind of tubes. See Kodol Transifiers at your nearest radio dealer or write direct for full information.

### Five Efficient Models to Serve Any Set!

*You may purchase exactly the Transifier to fit your needs. Models for all sets and all currents*

- Model 15 "A & B"—4 or 6 volts "A" current, 22½ to 150 volts "B" current.....\$65.00
- Model 10 "A"—4 or 6 volts "A" current for sets up to 8 tubes..... 42.50
- Model 61 "B"—Radio's most popular eliminator for 5 and 6 tube sets..... 28.50
- Model 10 "B"—22½ to 180 volts "B" current; 4 to 12 volts "C" current—for any size set..... 42.50
- Model 63 "B"—for use on 110 or 220 volt direct current circuits—for any size set..... 25.00

*Prices Do Not Include Tubes*



## SILITE TRICKLE CHARGERS

You can make an efficient light socket "A" power unit of your present radio battery. Merely connect either of the Silite Trickle Chargers to your battery and plug it into the light socket. That's all there is to it. Left permanently on charge, your battery remains always at peak power, ready to deliver a full charge of live powerful current to the set. Silite is being used in more than 40 makes of power units now on the market. You may obtain either of the two models from your nearest radio dealer, or write direct for full information.

- Silite Trickle Charger, gives .6 ampere charging rate. For any average size set. Absolutely noiseless. Complete .....\$10.00
- Silite Homcharger. In addition to .6 ampere rate, gives booster charge of 2½-3 amperes. For very large sets. Absolutely noiseless. Price complete..... 19.50

[ "Behind the Scenes in a Broadcasting Station," an interesting 24-page booklet, together with literature describing Kodol Transifiers, Silite Chargers, and all Kodol radio devices, will be mailed free on request. ]

THE KODEL RADIO CORP., 510 E. Pearl St., CINCINNATI, O.

*The World's Largest  
Manufacturers*

**KODEL**  
POWER SPECIALISTS SINCE 1912

*of Radio Power  
Devices*

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

**KGCH** Wayne Hospital, Wayne, Nebr. 434 meters, 690 kilocycles, 500 watts. Sun, 6 pm, sacred service. Daily ex Sun, 10:10 am, weather, stock reports. Daily ex Sat, Sun, Mon, 6:30 pm, musical recitals, orchestra, story hour, etc. Central standard time. Slogan: "Remember Us When U R Ill, & We Come to U in Health, You Come to Us in Sickness."

**KGCM** Robert B. Bridge, Radio Service Shop, 2412 Main Ave., San Antonio, Tex. 263 meters, 1140 kilocycles, 10 watts. Sun, 4-6 pm, varied musical program. Daily ex Sun, 10:15-11:30 am, weather bulletins, music; 12:30-2 pm, road bulletins, music; 6:30-7:30 pm, music. Central standard time.

**KGCN** A. E. Smith, Concordia, Kan. 210 meters, 1428 kilocycles, 50 watts. Daily ex Sat, 7:30-8:30 pm. Central standard time.

**KGL** North Pacific Sea Products Co., Port Hobron, Alaska.

**KGO** General Electric Co., Oakland, Calif. 361.2 meters, 830 kilocycles, 5000 watts. Sun, 11 am, 7:30 pm, church services. Daily ex Sun, 11:30 am, luncheon program; 1:30 pm, stock reports; 6 pm, dinner concert; 6:55 pm, evening reports. Mon, 5:30 pm, Kiddies' Club. Wed, 5:30 pm, Columnist. Thurs, 5 pm, Boys' hour. Fri, 5:30 pm, Girls' half hour. Mon, Thurs, 8 pm, studio program. Wed, 8 pm, farm program. Sat, 8:45 pm, sport review. 9 pm, dance program. Pacific standard time. Slogan: "Pacific Coast Station."

**KGU** Marion A. Mulrony, 236 King St., Honolulu, Hawaii. 270 meters, 1110 kilocycles, 500 watts. 2 1/2 hours later than Pacific time. Daily ex Sun, 12-1 pm, weather, stocks, musical. Mon, Tues, Thurs, Fri, 7:30-9 pm, musical. Tues, 9-10 pm. Sun, 11 am-12 pm; 7:30-9 pm, church services.

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

**KGTT** Glad Tidings Temple, 1471 Ellis St., San Francisco, Calif. 207 meters, 1450 kilocycles, 50 watts. Sun, 2:30-5 pm, 8-10 pm. Mon, Tues, Thurs & Sat, 12:10-12:30, sacred. Wed, 12:10-12:30 pm, 2:30-3:33 pm, sacred. Fri, 12:10-12:30 pm, 3-4 pm, 8-10 pm, sacred. Pacific standard time. Slogan: "Knights of Glad Tidings."

**KGY** St. Martins College, Lacey, Wash. 277.6 meters, 1080 kilocycles, 50 watts. Tues, Thurs, Sun, 8:30-9:30, PST concert. Pacific standard time. Slogan: "Out Where the Cedars Meet the Sea."

**KHJ** Los Angeles Times, Los Angeles, Calif. 405.2 meters, 740 kilocycles, 500 watts. Daily ex Sun, Mon, 12:30-1:30 pm, 6:30-11. Mon, 12:30-1:30 pm. Sun, 10-12:30 pm, 6-7:30, 8-11 pm. Pacific time. Slogan: "Kindness, Happiness, Joy."

**KHQ** Louis Wasmer, Inc., care of Davenport Hotel, Spokane, Wash. 394.5 meters, 760 kilocycles, 1000 watts. Sun, 11-12:30, 6-7:30, 7:30-10 pm, church services. Mon, Tues, Thurs, Fri, Sat, 2:30-4:30 pm, matinee; 5-6 pm, service hour. Thurs, Fri, Sat, 6-7 pm, concert. Mon, Tues, 7:30-12 pm, varied. Wed, 7-8 pm, rebroadcast from KFOA; 8-9 concert; 9-10 pm, dance music. Thurs, Fri, 8-10 pm, popular; 10:30-12 pm, KGW. Pacific time. Slogan: "Tells the World."

**KJBS** Julius Brunton & Sons Co., 1380 Bush St., San Francisco, Calif. 229 meters, 1360 kilocycles, 5 watts. Sun, (summer schedule—silent). Mon & Wed, 9-11:30 am, 2-4 pm. Tues, Thurs & Sat, 9-11:30 am, 2-4 pm. Slogan: "San Francisco's Baby Station."

**KJR** Northwest Radio Service Co., 641 Terminal Sales Bldg., Seattle, Wash. 384.4 meters, 780 kilocycles, 1000 watts. Sun, 11 am, church services; 7:30 pm, church services; 9-10 pm, concert. Mon, 11:30 am-12 noon, markets; 5:40-6 pm, 8:30-10 pm, studio. Daily ex Sun & Mon, 11:30 am-12 noon, markets. Pacific standard time.

**KLDS** Reorganized Church of Jesus Christ of Latter Day Saints, Independence, Mo. 440.9 meters, 680 kilocycles, 1000 watts. Sun, 11 am, 3 pm, 6 pm, 9:15 pm. Mon, silent. Thurs, 8 pm, studio program. Fri, 6:30 am, morning devotional program. Sat, 8 pm, studio program. Slogan: "The Station Dedicated to Knowledge, Liberty, Divinity and Service."

**KLS** Warner Bros. Radio Supplies Co., 2201 Telegraph Ave., Oakland, Calif. 250 meters, 1200 kilocycles, 250 watts. Sun, 10-11 am, church services. Pacific standard time. Slogan: "The City of Golden Opportunity."

**KLX** The Oakland Tribune, Oakland, Calif. 508.2 meters, 590 kilocycles, 500 watts. Mon, 7-7:30 pm, news; 8:10 pm, studio program. Tues & Thurs, 3-5 pm, 7-7:30 pm, baseball, news broadcast. Wed, 3-5 pm, baseball; 6:30-7, orchestra; 7-7:30 pm, news; 8-10 pm, studio. Fri, 3-5 baseball; 7-7:30 pm, news; 8-10:30, studio. Sat, 2:5-3 pm, football broadcasting during season. Pacific standard time. Slogan: "Where Rail and Water Meet."

**KLZ** Reynolds Radio Company, Inc., Shirley Savoy Hotel, Denver, Colo. 266 meters, 1130 kilocycles, 500 watts. Sun, 7:45-10 pm, services from Sunshine Rescue Mission. Mon, 7:50-8 pm, weather reports and announcements; 8-11 pm, studio program. Tues, 7:50-8 pm, weather reports and announcements; 8-11 pm, studio program. Thurs, 7:50-8 pm, weather reports and announcements; silent night. Fri, 6:30-7 pm, Movie Club; 7-8 pm, announcements and weather reports. Sat, 7:50-8 pm, weather reports and announcements; 8-12 pm, studio program.

**KMA** Earl E. May Seed & Nursery Co., Shenandoah, Iowa. 461 meters, 660 kilocycles, 500 watts. Sun, 8:30-9:30 am, sacred; 12:15-1:30 pm, talk and music; 4:30-6:30, talk and music. Mon, 3:30-7 am, 9-10 am, 11:30-12:30 pm, 6-7 pm, 9-11 pm. Wed, 5:30-7 am, 11:30-12:30, 6-7 pm. 9-11 pm. Thurs, 9-10 am, 11:30-12:30, 6-7 pm. Fri, 5:30-7 am, 9 am, 11:30-12:30, 6-7, 9-11 pm. Sat, 5:30-7 am, 9 am, 11:30-12:30, 2-3 pm, 6-7 pm, 9-11 pm. Central standard time. Slogan: "Keeps Millions Advised."

**KMJ** Fresno Bee, Fresno, Calif. 234 meters, 1280 kilocycles, 50 watts. Mon, Wed, Fri, 7:15-9 pm. Pacific time.

**KMMJ** The Old Trusty Station, Clay Center, Neb. 229 meters, 1310 kilocycles, 1000 watts. Sun, 9:15 pm. Mon, Tues, 10 am, 1:30 pm, 8 pm. Thurs, Fri, Sat, 10 am, 1:30 pm, 8 pm. Slogan: "The Old Trusty Station."

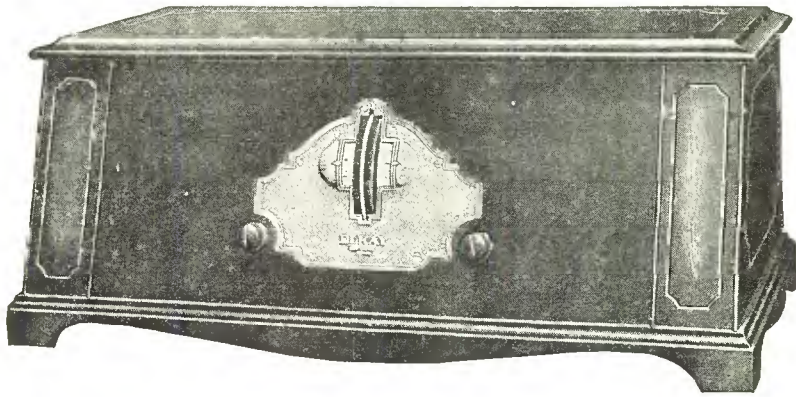
**KMO** Association Station (Love Electric Co.), Tacoma, Wash. 250 meters, 1199 kilocycles, 100 watts. Pacific time.

**KMOX** KMOC, St. Louis, Mo. 280.2 meters, 1070 kilocycles, 1500 watts. 9 pm, Skouras Brothers Sunday night club; 6:30 pm, Jacquinet Jules, organist; 7 pm, Knox Radio orchestra; 8 pm, Knox Radio orchestra; 9 pm, "By the Banks of Bonny Doon," Knox Radio orchestra; 10 pm, Knox Radio orchestra.

**KMTR** Echophone Mfg. Co., Los Angeles, Calif. 238 meters, 1260 kilocycles, 500 watts. Sun, 6:30-7 pm, 7-9:30 pm, church services. Daily ex Sun, 9:30 am, 12 midnight, programs vary. Pacific time. Slogan: "Echoes of Hollywood."

**KNRC** Kierulff & Ravenscroft Co., Radio Equipment, 17th & Los Angeles St., Los Angeles, Cal. 208 meters, 1440 kilocycles, 500 watts. Sun, silent. Mon, 1-3 pm, music; 8-10 pm, varied program. Tues, 7-10 pm, novelty program; Wed, 7-10 pm, popular program. Thurs, 2-3 pm, music; 8-10 pm, minstrel program. Fri, 8-10 pm, novelty program. Sat, 8-11 pm, concert and weekly meeting of the K.R.B.'s. Pacific standard time. Slogan: "Keep Novelties Radiating Constantly."





(Licensed Under Patents Granted and Pending)  
Six Tubes—\$125 List

THE NEW



RECEIVER

## A "Truphonic" [TRUE TONE] Reproducer

The new Elkay embodies the Donle Truphonic System of audio amplification, and the Elkay Synauto Radio Frequency principle . . . two momentous improvements in radio.

Truphonic means true tone amplification. The Donle System unit comprises three balanced stages of audio, entirely free from inter-stage coupling or distortion within the stages. A pure note entering this amplifier comes out a pure note—from the first point of audibility evenly up to the greatest volume it is possible for the tubes to supply. If good music is on the air, the Elkay will get it!

The Synauto principle, an Elkay patent, pours oil on the troubled waters of tuning! You may have noticed in your experience that if you set your dial for good volume on the low waves, you had to readjust the rheostats when switching to the higher waves to get volume. And if later you turned back into the lower waves without tuning down the filaments you were greeted with squeals.

The Elkay Synauto principle smooths out the entire dial from 200 to 580 meters. Switch where you will, the clarity and volume will be even.

Besides these outstanding advantages, the new Elkay has the following:

- neat, centralized Uni-Control . . . the flexibility of three dials, all under your thumb.
- the Elkay Tube Equalizer System of interchangeable, automatic rheostats; any combi-

nation of tubes can be used. In addition to the splendid new tubes now to be had, before this radio season is over there will be special R. F., Detector, Audio and Output tubes on the market. Elkay owners will be able to use these tubes without alteration of hook-up.

—both the R. F. stages and the Detector are entirely shielded against "strays."

—"floating" sockets mounted on Bakelite sub-panel; all important insulated and wearing parts genuine Bakelite.

—all connections from a common cable, plainly tabbed.

—in a beautiful sloping-front cabinet of brown, antique Duco finished natural grain mahogany, \$125. If your dealer can't supply you, send us his name and we will take care of you. Also, write for descriptive folder.

### Elkay Equalizers and Suppressors

Elkay Tube Equalizers are sold independently of Elkay Receivers. They are in handy cartridge form, just the thing for experimenters' and fans' use in trying out new circuits. There is a value for every tube made. List price, 50c; mounted, 75c.

Elkay Suppressors, also of cartridge design, for the grid circuit, suppress regeneration and facilitate tuning. 100 to 1800 ohm values. List price, 75c; mounted, \$1.00. Quantity prices to manufacturers on Suppressors and Equalizers.

**THE LANGBEIN-KAUFMAN RADIO CO., Dept. C, 62 Franklin St., New Haven, Connecticut**

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

**KNX** The Los Angeles Evening Express Broadcasting Station, 6116 Hollywood Blvd., Los Angeles, Calif. 337 meters, 890 kilocycles, 1000 watts. Sun, 10 am-10:30 pm, classical program. Mon, 7:30 am-12 midnight, semi and classical. Tues, 7:30 am-1 am, semi and classical. Wed, 7:30 am-12 midnight, semi and classical. Thurs, 7:30 am-12 midnight, semi and classical. Fri, 7:30 am-12 midnight, semi and popular. Sat, 7:30 am-2 am, semi, popular and classical. Slogan: "The Voice of Hollywood."

**KOA** Rocky Mountain Broadcasting Station, General Electric Co., 1370 Krameria St., Denver, Colo. 322.4 meters, 930 kilocycles, 5000 watts. Sun, 10:30 am, 4:30 pm, 7:30 pm, church services. Daily ex Sun, 11:45 am, weather, news; 12 noon, time signals; 12:45 pm, organ recital. Tues, Thurs, Fri, 3:30 pm, matinee; 4 pm, culinary hints; 4:15 pm, fashion review. Daily ex Sat & Sun, 6 pm, stocks, markets, news bulletins, etc.; 6:30 pm, dinner concert. Mon, Wed, Fri, 8 pm, instrumental program; 8:15 pm, studio program. Tues, 8:30 pm, wit & humor. Mountain standard time.

**KOAC** Oregon Agricultural College, Corvallis, Ore. 280.2 meters, 1070 kilocycles, 500 watts. Mon, agriculture night service talks and information lecture. Wed, information lectures & music. Fri, information lectures & music. Pacific standard time. Slogan: "Science for Service."

**KOB** New Mexico College of Agriculture & Merchants Arts, State College, N. M. 348.6 meters, 860 kilocycles, 1500 watts. Mon, 11:55 am-12 pm, time signals; 9:55-10 pm, time signals; 12-12:02 n, weather reports; 12:02-12:10 pm, New Mexico road reports; 12:10-12:30 pm, news briefs. Wed, 9:55-10 pm, standard mountain time signals; 10-10:02 pm, U. S. W. B. reports; 10:02-10:10 pm, New Mexico road reports. Mountain standard time. Slogan: "The Sunshine State of America."

**KOCH** Central High School, Omaha, Neb. 258 meters, 1160 kilocycles, 250 watts. Sun, 3-5 pm, classical. Mon, Tues, Thurs, & Sat, 8:30-10 pm, musical. Central standard time. Slogan: "The Voice of 2000 Students."

**KOCW** Oklahoma College for Women, Chickasaw, Okla. 252 meters, 1190 kilocycles, 200 watts. Mon, Tues, Thurs & Fri, 12-1 pm, educational talk and music. Tues, Fri & Sat, 8-9 pm, musical program. Wed, 10-10:40 am, chapel services; 12-1 pm, musical. Sun, 11 am-12 n, church services; 2:30-3:30 pm, musical. Central standard time.

**KOIL** Mona Motor Oil Radio Station, 1124 6th St., Council Bluffs, Iowa. 305.9 meters, 930 kilocycles, 500 watts. Sun, 11 am-12 noon, church services; 7-9 pm; 11-midnight. Daily ex Sun, Mon, & Wed, 12 n-1:15 pm; 6-9 pm; 11-12 midnight. Mon, 12 n-1:15 pm; 6-midnight. Slogan: "Station of Service."

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

**KOMO** Seattle, Wash. 305.9 meters, 980 kilocycles, 1000 watts. Tues, 7-8 pm, 8-9. Wed, 8-9:30, 9-10. Fri, 7-8 pm, 9-10, 10:15-12. Sun, 1-2 pm, 9:10-10:10, church service. Pacific time.

**KOWW** Blue Mountain Radio Association, 711 Baker Bldg., Walla Walla, Wash. 285 meters, 1052 kilocycles, 500 watts. Daily ex Tues & Sun, 7-7:30 pm, news, markets & weather; 8-12 pm, studio & orchestra. Tues, 7-7:30 pm, news, markets & weather.

**KPJM** Journal Miner Radiofone, Prescott, Ariz. 215 meters, kilocycles, 15 watts. Indefinite schedule, broadcasting only sports & feature news. Mountain time.

**KPPC** Pasadena Presbyterian Church, Colorado & Madison Sts., Pasadena, Calif. 228.9 meters, 1310 kilocycles, 50 watts. Wed, 7:15-9 pm, mid-week service. Sun, 10:30 am-12:30 pm, 6:45-9 pm, religious services. Pacific standard time.

**KPO** Hale Brothers & The Chronicle, San Francisco, Calif. 428.3 meters, 700 kilocycles, 1000 watts. Daily ex Sun, 7-8:15 am, health drill; 8-11 pm, music. Daily ex Fri & Sun, 2:30-3:30 pm, matinee. Daily ex Sat & Sun, 5:15-6:15 pm, "Big Brother." Daily, 10:30 am & 6:30 pm, weather forecast & "Ye Towne Crier," etc. Sun, 9:45-10:45 am, church service; 5-10 pm, musical. Pacific standard time. Slogan: "The City by the Golden Gate."

**KPRC** Houston Post-Dispatch, Houston, Texas. 296.9 meters, 1010 kilocycles, 500 watts. Sun am & pm, church services. Mon, Tues, Wed, Thurs, Fri, Sat, 11 am-12 noon; 5:30 pm, 7:30-10 pm. Wed, Sat, 11-12 midnight. Central standard time. Slogan: "Kotton Port Rail Center."

**KPSN** The Pasadena Star-News, 525 E. Colorado St., Pasadena, Calif. 315.6 meters, 950 kilocycles, 1000 watts. Tues, Thurs, Sat, 8-9:30 pm, studio concert. Sat, 9:30-10:30 pm, dance orchestra. Sun, 9:30-10:30 am & 6-7 pm, church services; 8:45-9:45 pm, hotel concert. Pacific standard time. Slogan: "Pasadena, California, Station KPSN."

**KQW** California Farm Bureau Station, First Baptist Church, San Jose, Calif. 333.1 meters, 900 kilocycles, 500 watts. Sun, 9:40-12:30 am, 7:30-9:30 pm, church services. Daily ex Sun, 9:30-10:30 am, shopping guide. Daily ex Sat, Sun, 6:15-8 pm, farm program. Sat, 6:30-7:30 pm, farm program with Humpty Dumpty. Wed, 8-9:30 pm, mid-week prayer service. Pacific standard time. Slogan: "The Voice of the California Farmer."

**KQV** Doubleday Hill Elec. Co., 719 Liberty Ave., Pittsburgh, Pa. 275 meters, 1090 kilocycles, 500 watts. Daily ex Sat & Sun, 10:30-11 am, music; 3-5 pm, music and baseball scores. Eastern standard time. Slogan: "The Smoky City Station."

**KRE** Berkeley Daily Gazette, Berkeley, Calif. 256 meters, 1170 kilocycles, 100 watts. Daily ex Sun, 7:30 am, Good Thought service; 11:15 am, physical exercise for women; 7 pm, current news. Mon, 8-10 pm. Tues, 9-11 pm, musical. Wed, 5-6 pm, children's hour; 9-12 pm, musical. Thurs, 8-11 pm. Fri, 9-12 pm. Sat, 8 pm-1 am, dance programs. Sun, 10-11 am, church; 6:30-7:30 pm, concert; 8:15-10 pm, sacred music concert. Pacific standard time. Slogan: "Looking Thru the Golden Gate."

**KSAC** Kansas State Agricultural College, Manhattan, Kan. 340.7 meters, 880 kilocycles, 500 watts. Daily ex Sat & Sun, 9-9:25 am, 9:55-10:25 am, 12:35-1:05 pm, 4:30-5 pm, 6:30-7:30 pm. Sat, 12:35-1:05 pm. Central standard time.

**KSBA** Shreveport Broadcasting Association, Shreveport, La. 316.6 meters, 959 kilocycles, 1000 watts. Sun, 11-12 am, church services; 5-6 pm, musical; 7:30-9 pm, church services. Mon, 8-9 pm, musical. Tues, 9-11, hotel dance. Thurs, Fri, 8-9 pm, musical. Sat, 9-11, hotel dance. Central standard time. Slogan: "Shreveport on the Air—Shreveport Everywhere."

**KSD** St. Louis Post-Dispatch, 12th & Olive Sts., St. Louis, Mo. 545.1 meters, 550 kilocycles, 500 watts. Sun, 6:20 pm. Mon, 9 pm, opera. Tues, 7 pm. Wed, Thurs, Fri, Sat, 8 pm, entertainment. Central standard time.

**KSEI** KSEI Broadcasting Association, Pocatello, Idaho. 260.7 meters, 1150 kilocycles, 500 watts. Sun, 8-10 pm. Mon, Fri, 9-11 pm. Western time. Slogan: "The Only Community-Owned Broadcasting Station in the United States."

**KSL** Utah Radio Service Corp., Salt Lake City, Utah. 300 meters, 1000 kilocycles, 1000 watts. Daily ex Sun, 7:30-11 am, 4-11:30 pm. Sun, 10:50 am-12 noon, 4-11:30 pm, classical & religious program. Fri, 6-11:30 pm. Mountain standard time. Slogan: "The Inter-Mountain Empire."

# Is actual reproduction possible?

**A**LTHOUGH it is common to hear such claims as "Perfect Reproduction," "Absolute Perfection," "The Living Artist Brought Right into Your Home"—in spite of these claims scientists have never boasted absolute perfection in radio reproduction.

Let us look at the facts.

At the broadcasting station the music of the violin, for instance, is changed into a radio wave, and is broadcast. It is then detected in your radio set and changed once more into an electric wave carrying the impulses of the music. This electric wave emerges from the detector tube not altogether perfect. However, it is so nearly perfect that radio science has turned its attention from the *broadcasting and detecting* phases of reproduction to the *audio amplifying* of the detector tube output.

Reproduction by good amplification has become the most important consideration in the art of radio. The amplifying transformers that were used in radio sets last year are definitely a thing of the past. Almost every set manufacturer has improved upon them. Some have adopted resistance coupling, others large size transformers, and some electric light socket power amplification.

Although these methods of amplification are an improvement, they do not and cannot give perfect reproduction, nor do they come as close to perfection as has now been made possible by the recently announced new principle of audio amplification.

## The New Amplification

An entirely new system of amplification known as *Truphonic* has been developed. This system more nearly approaches actuality than any other yet devised. Scientific laboratory tests and tests before both the musically trained and the musically untrained ear establish this fact beyond question.

Unfortunately the Truphonic system was not developed in time to be generally used in this fall's production of radio sets—with the exception of a number of the makers of the more expensive sets, who have a smaller production and who were able to

incorporate Truphonic amplification into their instruments.

But for radio listeners and lovers of fine music who want this most nearly actual of all reproduction *now* and immediately, the Truphonic Power Amplifier is provided in the simple, compact form shown below—for instant attachment, without tools, and with no change whatever in your present radio set.

Whether you bought or made your set this year, last year or five years ago, the Truphonic will give you finer reproduction than you can get in any other way—regardless of how much you can afford to spend.

The Truphonic Power Amplifier operates directly from the detector output. No transformers now in the set are utilized. This pure detector music in every note, tone, and shade, and in considerably greater volume, is so beautifully and faithfully reproduced that you will find it as difficult to describe as it is for us to attempt to describe it to you.

## The Truphonic with Power Tubes

Besides the fundamentally great improvement in reproduction that the Truphonic brings to radio in such a conveniently applied form, there is the added advantage that for those who want extreme volume without overloading the last stage tube, the necessary extra B and C battery connections for the use of power tubes are provided for in the attachment cord.

We have tried in this space to give you some idea of what you may expect from this new principle of audio reproduction that has come to radio. We realize that we have made some strong claims for Truphonic amplification, but we have made no claim that you will not find more than backed up when you have tried the Truphonic yourself.

We urge you to get the Truphonic *now*—so that you may begin immediately to have an altogether different kind of enjoyment of the splendid programmes that are coming to you over the air.

Your dealer has the Truphonic, or will get it for you.



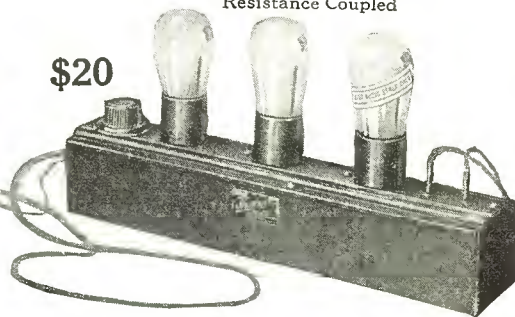
ALDEN MANUFACTURING COMPANY  
Dept. F-5, Springfield, Mass.

# TRUPHONIC Power Amplifier



Not Resistance Coupled

\$20



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

**KSMR** Santa Maria Valley R. R., Santa Maria, Calif. 209.8 meters, 1430 kilocycles, 100 watts. Daily ex Sun, 6:30-10 pm, music, children's hour, home & farm, music. Sat, 7:30-8:15 pm, markets, reports, etc. Pacific time. Slogan: "Santa Maria, Calif., The Valley of Gardens."

**KSO** Berry Seed Co., Clarinda, Iowa. 242 meters, 1240 kilocycles, 500 watts. Sun, 11 am, church services. Mon, Tues, Wed, Thurs, Fri, 12 noon, 7 pm, musical. Sat, 12 noon, Sunday school. Sat, silent night. Central standard time. Slogan: "Keep Serving Others."

**KTAB** The Associated Broadcasters, Inc., 1410 10th Ave., Oakland, Calif. 302.8 meters, 990 kilocycles, 1000 watts. Sun, 9:45-12:30 pm, 7:45-9:30 pm, church services. Daily ex Sun, 8:45-10 am, 5-6 pm, 7-7:30 pm. Daily ex Sat, Sun, 8-10 pm. Pacific standard time. Slogan: "Knowledge, Truth and Beauty."

**KTBI** Bible Institute of Los Angeles, 536 S. Hope St., Los Angeles, Calif. 294 meters, 1020 kilocycles, 750 watts. Mon, Tues, Wed, Thurs, 8 pm, musical studio program. Fri, 7 pm, Sunday school lesson. Sun, 10:45 am, 7:15 pm, church services; 6 pm, vespers. Pacific standard time.

**KTBR** Brown's Radio Shop, 39 1/2 Yamhill St., Portland, Ore. 263 meters, 1140 kilocycles, 50 watts. Mon & Wed, 11 am-12 noon, 1:30-2:30 pm, 6-7:30 pm, 8:30-9:30 pm. Tues, 11 am-12 noon, 1:30-2:30 pm, 7-7:30 pm. Thurs, 11 am-12 noon, 1:30-2:30 pm, 6-7:30 pm. Fri, 11 am-12 noon, 1:30-2:30 pm, 6-9 pm. Sat, 11 am-12 noon, 3-4 pm, 7-9:30 pm.

**KTHS** New Arlington Hotel, Hot Springs, Ark. 374.8 meters, 800 kilocycles, 500 watts. Sun, 11 am-12:15 pm, 9-12 pm, music. Daily ex Sun, 12:30-1:30 pm, markets; 9 pm-12 midnight, music. Central standard time. Slogan: "Kum to Hot Springs."

**KTNT** Calliphone Co., Muscatine, Iowa. 333.1 meters, 900 kilocycles, 1000 watts. Daily ex Sat & Sun, 6:30-8 pm; home folk's program, 12-12:30 pm. Sun, 6:30-7:30 pm. Central standard time. Slogan: "Calliphone Studio KYNT First New Tone in 40 Years."

**KTUE** Uhalt Electric Co., 614 Fannin St., New Orleans, La. 263 meters, kilocycles, 5 watts. Daily, 5:30-6:30 pm. Central standard time.

**KTW** First Presbyterian Church, 7th Ave. and Spring St., Seattle, Wash. 454 meters, 660 kilocycles, 1000 watts. Sun, 11 am & 1 pm, 3-4 pm, 7:30-9:30 pm. Pacific time.

**KUO** San Francisco Examiner, San Francisco, Calif. 434.8 meters, 690 kilocycles, 100 watts. Daily ex Sun, 9 am, 10 am, 12:30 pm, 2 pm, 4 pm, 6:30 pm. Sun, 9 am, 4 pm. Pacific standard time.

**KUOA** University of Arkansas, Fayetteville, Ark. 299.8 meters, 1000 kilocycles, 750 watts. Sunday services occasionally. Mon, 7:30 pm, farmers' program; Tues, 8 pm, musical program; Thurs, 8 pm, University Extension lectures.

**KUOM** State University of Montana, Missoula, Mont. 244 meters, 1230 kilocycles, 500 watts. Mon & Thurs, 8 pm, music & popular educational talks. Sun, 9:15 pm, sacred concert & sermon. Mountain standard time.

**KUSD** University of South Dakota, Vermillion, S. Dak. 278 meters, 1080 kilocycles, 100 watts. Wed, 8-9 pm. Central standard time.

**KUT** University of Texas, Austin, Tex. 230.6 meters, 1300 kilocycles, 500 watts. Sun, 11 am, St. David's Episcopal Church. Mon & Wed, 8 pm, studio program. Slogan: "Come to University of Texas."

**KVOO** Voice of Oklahoma, Bristow, Okla. 374.8 meters, 800 kilocycles, 500 watts. 12:30-7 pm, continuous program, with pipe organ, Rev. Luper and his 20-piece string band, the Laughton family, etc.; 7:30-9 pm, worship hour; 6-9 pm, Jimmie Wilson & his catfish string hand. Central standard time.

**KWCR** H. F. Paar, 1444 Second Ave. E., Cedar Rapids, Iowa. 278 meters, 1080 kilocycles, 500 watts. Sun, 11 am, church service; 5:15 pm, special service. Mon, Wed, Fri, 4:15-9 pm. Wed, 4:15-9 pm. Sat, 12 midnight. Central standard time. Slogan: "Voice of Cedar Rapids."

**KWG** Portable Wireless Telephone Co., 530 E. Market St., Stockton, Calif. 247.8 meters, 1210 kilocycles, 50 watts. Daily ex Sun, Tues, Fri, 4-5 pm. Tues, Fri, 4-5 pm, 8-9 pm. Pacific time. Slogan: "The Voice of the San Joaquin Valley."

**KWKC** Wilson Duncan Studios, 39th and Main Sts., Kansas City, Mo. 236 meters, 1270 kilocycles, 100 watts. Tues, Wed, Thurs, Fri, 7-9:15 pm. Central standard time. Slogan: "Keep Watching Kansas City."

**KWSC** The State College of Washington, Pullman, Wash. 348.6 meters, 860 kilocycles, 500 watts. Mon, Wed, Fri, 7:15-9 pm. Pacific standard time. Slogan: "The Voice of the Cougars."

**KWUC** Western Union College, Le Mars, Iowa. 252 meters, 1190 kilocycles, 50 watts. Sun, 3 pm, vesper service. Fri, 7 pm, musical entertainment. Wed, 8 pm. Central standard time. Slogan: "The Best 50-Watt Station on Air."

**KWWG** Brownsville Chamber of Commerce, Brownsville, Texas. 278 meters, 1080 kilocycles, 500 watts. Sun, church services at 11 am. Mon, weather and river reports, music 12-12:30; music, 6-6:30, 8:30-9:45, 12 midnight-1 am. Tues, weather & river reports, 12-12:30 pm; music, 6-6:30. Wed, Thurs, Fri, Sat, same as Tues. Slogan: "Kum to the World's Winter Garden."

**KYW** Westinghouse Elec. & Mfg. Co., Congress Hotel, 500 S. Michigan Ave., Chicago, Ill. 535.4 meters, 560 kilocycles, 3500 watts. Sun, 11 am, church services; 4 pm, musical; 7 pm, Sun Evening club; 9 pm, symphony. Daily ex Sun, 11:35 am, table talks; 12 noon, concert; 6 pm, bed time stories; 7 pm-12 midnight, musical program. Central standard time. Slogan: "KYW, Pioneer Radio Station of West."

**KZM** Preston D. Allen, 13th and Harrison Sts., Hotel Oakland, Oakland, Calif. 240 meters, 1250 kilocycles, 100 watts. Daily ex Sun, 6:30-8 pm, Hotel Oakland dinner orchestra. Pacific standard time.

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

**WAAD** Ohio Mechanics Institute, Cincinnati, Ohio. 258 meters, 1160 kilocycles, 25 watts. Central standard time.

**WAAF** Chicago Daily Drovers Journal, 836 Exchange Ave., Chicago, Ill. 278 meters, 1080 kilocycles, 250 watts. Daily ex Sun & Holidays, 8:45 am, markets; 10:30 am, weather; 10:50 am, markets; 11 am, estimated receipts of following day; 12:30 pm, weather; 12:50 pm, markets; 3 pm, markets; 4:30 pm, eastern meat trade conditions. Sat, 12:30 pm, final weather and market reports. Central standard time.



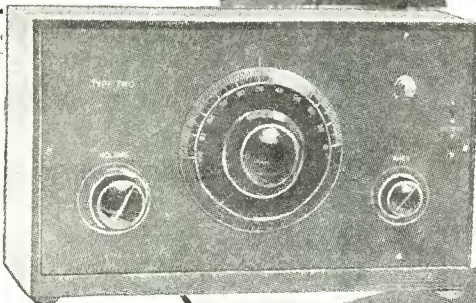
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Tell 'Em You Saw It in the Citizens Radio Call Book

**WAAM** I. R. Nelson Co., Bond St., Newark, N. J. 263 meters, 1140 kilocycles, 500 watts. Daily ex Sat, Sun, 11 am-12 pm, religious. Daily ex Thurs & Sun, 6-11 pm. Thurs, 6-7:30 pm. Eastern standard time. Slogan: "Sunshine Station."

**WAAW** Omaha Grain Exchange, 19th & Harney Sts., Omaha, Neb. 384.4 meters, 780 kilocycles, 500 watts. Daily ex Sun, Wed, 8 pm. classical, orchestra, etc. Central standard time. Slogan: "Pioneer Market Station of the West."

**WABB** Harrisburg Sporting Goods Co., Harrisburg, Pa. 204 meters, 1470 kilocycles, 10 watts.

**WABC** Asheville Battery Co., Inc., 19 Haywood St., Asheville, N. C. 254 meters, 1180 kilocycles, 20 watts. Sun, 11 am-12:30 pm, 7:30-9 pm. Central standard time.

**WABI** First Universalist Church, Park St., Bangor, Me. 240 meters, 1280 kilocycles, 100 watts. Sun, 10:30 am-12 pm, morning services; 7:30-9 pm, evening services. Eastern standard time. Slogan: "The Pinetree Wave."

**WABO** Lake Ave. Baptist Church, Rochester, N. Y. 278 meters, 1080 kilocycles, 100 watts. Sun, 10:25 am-12 noon, 7:15-9 pm, church services. Eastern standard time.

**WABQ** Haverford College, Dept. of Engineering, Haverford, Pa. 261 meters, 1150 kilocycles, 1000 watts. Mon, Fri, regularly 8 pm-12:30 am, organ recital. Alt. Mons. 8-8:30 pm, lectures. Fri, 8 pm, varied musical programs; 10:15-12 pm, every third Sun, musical programs. Eastern standard time. Slogan: "Designed, Built, and Operated by Engineering Students at Haverford College."

**WABR** Scott High School, Toledo, Ohio. 263 meters, 1140 kilocycles, 50 watts. No regular schedule. Eastern standard time.

**WABW** College of Wooster, Wooster, Ohio. 206.8 meters, 1450 kilocycles, 50 watts. No regular schedule. Eastern standard time.

**WABX** Henry B. Joy, Near Mt. Clemens, Mich. 246 meters, 1220 kilocycles, 500 watts. Central standard time.

**WABY** John Magaldi, Jr., 815 Kimball St., Philadelphia, Pa. 242 meters, 1240 kilocycles, 50 watts. Eastern standard time.

**WABZ** Coliseum Place Baptist Church, 1376 Camp St., New Orleans, La. 275 meters, 1090 kilocycles, 50 watts. Sun, 11 am-12 pm, 7:30-9 pm. Central standard time.

**WADC** Allen T. Simmons (Allen Theater), Portage Hotel, E. Market St., Akron, Ohio. 258 meters, 1160 kilocycles, 500 watts. Daily ex Sun, 11 am-12 noon, 11 am-11 pm. Tues & Fri, 7:50-11 pm. Thurs, 9-11 pm. Sun, 12:30-1:30 pm, 6:30-7:30 pm. Eastern standard time. Slogan: "Watch Akron Develop Commercially."

**WAFD** Albert B. Parier Co., 1432 Military St., Port Huron, Mich. 275 meters, 1090 kilocycles, 500 watts. Mon, 8-10 pm. Tues, 10 am-11 am. Wed, 8-11 pm. Sat, 12 pm-2 am. Sun, 10:30-11:30 am. Central standard time. Slogan: "Gateway to the Great Lakes."

**WAGM** Radio Dept. of the A. G. Miller Furniture Store, Royal Oak, Mich. 275 meters, 1330 kilocycles, 50 watts. Sun, 9-10 pm, Bible study. Mon, 8-12 midnight, popular program. Wed, 8-10:30 pm, semi-classical program. Fri, 8-10:30 pm, popular studio program. Central standard time. Slogan: "The Home of Prompt Radio Service."

**WAHG** A. H. Grebe & Co., Inc., 70 Van Wyck Blvd., Richmond Hill, N. Y. 315.6 meters, 950 kilocycles, 5000 watts. Daily ex Sun, 11:55 am-1:30 pm, time signals, weather reports, musical. Mon, 7:30 pm-midnight, musical. Tues & Sat, 12 midnight-2 am, musical novelty program. Eastern standard time. Slogan: "Wait & Hear Grebe."

**WAIT** A. H. Waite & Co., Inc., 32 Weir St., Taunton, Mass. 229 meters, 1326 kilocycles, 10 watts, class A. No regular schedule. Eastern standard time.

**WAIU** American Insurance Union, Columbus, Ohio. 293.9 meters, 1020 kilocycles, 500 watts. Sun, 2-4 pm, vesper; 6-7, dinner. Daily ex Sun, 10-11 am, 11:55-1 pm, 2-4 pm, 6-7 pm. Tues, Sat, 9:15-11:30 pm. Fri, 6-11:30 pm. Eastern standard time.

**WAMD** Hotel Radisson, Minneapolis, Minn. 243.8 meters, 1230 kilocycles, 500 watts. Daily ex Sun, 10:15 am, organ recital; 10:30 am, housewives' bargain broadcast; 11 am, housekeepers' chats, 6:58 pm, time signals; 7:01 pm, news bulletins; 7:05 pm, special agricultural features. Mon, Wed, 7:30 pm, musical program. Mon, 11 pm, theatrical frolic. Wed, Thurs, Fri, 10 pm, popular program. Sun, 10:30 am, 9:15 pm, church services. Central standard time.

**WAPI** Alabama Polytechnic Institute, Auburn, Ala. 461.3 meters, 650 kilocycles, 1000 watts. Daily ex Sun, 12:30-1 pm, 8-9 pm. All programs include musical numbers and educational lectures. Central standard time.

**WARC** American Radio & Research Corp., 1 Radio Ave., Medford Hillside, Mass. 261 meters, 1150 kilocycles, 100 watts, class A. Eastern standard time.

**WASH** The Baxter Laundry Co., 747 Fountain St., N. E., Grand Rapids, Mich. 256.4 meters, 1170 kilocycles, 500 watts. Central standard time. Sun, 11 am-12:15 pm. Daily ex Sun, 12:30-1:30, 5:30-6. 7-8 pm. Sat, 2:15 pm (football season only). Central standard time.

**WATT** Edison Elec. Illuminating Co., Boston, Mass. 243.8 meters, 1230 kilocycles, 100 watts.

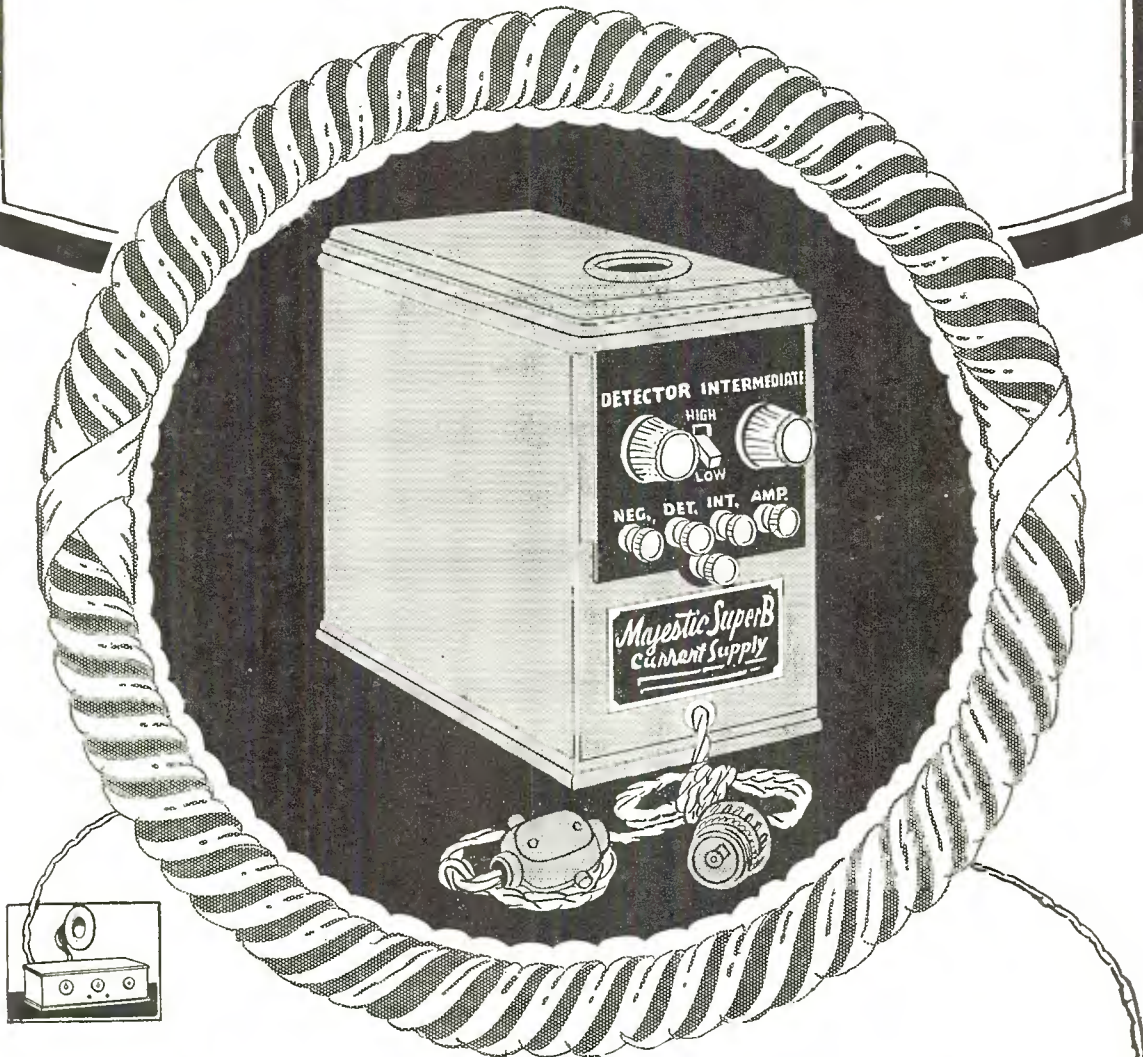
**WBAA** Purdue University, West Lafayette, Ind. 273 meters, 1100 kilocycles, 250 watts. Mon, Fri, 9:50 am, markets and WX; 7:15 pm, lecture, entertainment. Tues, Wed, Thurs, 9:50 am, markets & WX. Sat, 9:50 am, markets & WX; 11 pm, entertainment. Central standard time. Slogan: "Boilermaker Station."

**WBAK** Pennsylvania State Police, 18th & Herr Sts., Harrisburg, Pa. 275 meters, 1090 kilocycles, 500 watts. Daily ex Sun, 2 pm, weather, police information, etc.; 3 pm, agriculture bulletins. Eastern standard time.

**WBAL** Baltimore, Md. 246 meters, 1220 kilocycles, 5000 watts. Sun, 6:30-7:30 pm, concert orchestra. Daily ex Sun, Wed, Sat, 3:30-12 pm, all musical ex 3:45-4 pm, when talk is on air. Eastern standard time. Slogan: "The Station of Good Music."

**WBAO** James Milliken University, Decatur, Ill. 270 meters, 1100 kilocycles, 100 watts, class A. Irregular schedule. Central standard time.

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**Majestic Standard — B**  
Capacity seven tubes or six plus one power tube. 45 milliamperes at 135 volts.

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**WBAP** The Star-Telegram and Record-Telegram Station, Fort Worth, Tex. 475.9 meters, 630 kilocycles, 1500 watts. Sun, 11 am, church; 12:30 pm, kiddies' hour; 5 pm, sacred music; 9:30 pm, orchestra. Daily ex Sun, Wed, 7:30-8:30 pm, 9:30-11 pm, 11 pm-midnight, music. Central standard time. Slogan: "Daytime on the Hour, Nighttime on the Half."

**WBAW** Waldrum Drug Co. & Braid Electric Co., Nashville, Tenn. 236.1 meters, 1270 kilocycles, 100 watts, class A.

**WBAX** John H. Stenger, Jr., Box 104, Wilkes-Barre, Pa. 256 meters, 1170 kilocycles, 100 watts. Sun, 3-4 pm, symphony concert; 4-5 pm, religious; 5-6 pm, symphony concert. Tues, 10-11 pm, 9-10 pm, classical. Thurs, 8-9 pm, recital; 10-11 pm, dance. Sat, 10-12 pm, dance. Slogan: "In Wyoming Valley, Home of the Anthracite." Eastern standard time.

**WBBC** Brooklyn Broadcasting Co., 2123 Troy Ave., Brooklyn, N. Y. 249.9 meters, 1200 kilocycles, 500 watts. Tues, Thurs, Sat, 8-12 pm, musical. Eastern time.

**WBBL** Grace Covenant Presbyterian Church, Richmond, Va. 229 meters, 1310 kilocycles, 100 watts. Sun, 11 am-7:45 pm. Tues, 8 pm. Eastern standard time. Slogan: "Richmond, the Gateway North and South."

**WBBM** Atlas Investment Co., 1554 Howard Ave., Chicago, Ill. 225.4 meters, 1330 kilocycles, 1500 watts. Mon, 4-7 pm. Tues, Wed, Thurs, Fri, 4-6 pm, 7-12 pm. Sat, 4-6 pm, 8 pm-2 am. Sun, 12:30-2 pm. Central standard time. Slogan: "World's Best Broadcast Medium." The Stewart-Warner Air Theater, Chicago.

**WBBP** Petoskey High School, Petoskey, Mich. 238 meters, 1260 kilocycles, 200 watts. Program irregular. Central standard time. Slogan: "There's Only One Petoskey."

**WBBR** Station WBBR, "The Watchtower," 124 Columbia Heights, Brooklyn, N. Y. 416.4 meters, 720 kilocycles, 500 watts. Sun, 10-12 am, orchestra, lectures, lessons; 2-4:30 pm, concert; 7-9 pm, Bible questions, music. Tues, Thurs, Fri, 7:30-9:30 pm, organ recital, health items, vocal & violin, Bible lecture. Eastern standard time. Slogan: "Watchtower."

**WBBW** Ruffner Junior High School, Norfolk, Va. 222 meters, 1350 kilocycles, 50 watts. Programs vary. Eastern standard time.

**WBBY** Washington Light Infantry, 240 King St., Charleston, S. C. 268 meters, 1120 kilocycles, 10 watts, class A. Irregular through week. Sat, 7-12 pm, orchestra, vocal, instrumental and talks. Eastern time. Slogan: "The Seaport of the Southeast."

**WBBZ** C. L. Carrell, 36 So. State St., Chicago, Ill. (Portable.) 215.7 meters, 1390 kilocycles, 50 watts. Central standard time.

**WBCN** Southtown Economist Station, Foster & McDonnell, 730 W. 65th St., Chicago, Ill. 266 meters, 1130 kilocycles, 500 watts. Sun, 10:30 am, 9:15 pm, church services. Daily ex Sun, 9:45-11 am, home service program; 3-5:30 pm, Tea Time matinee; 5:30-6 pm, police bulletins; 7-8 pm, classical program; 10-12 pm, popular program. Central standard time. Slogan: "World's Best Community Newspaper."

**WBES** Bliss Electrical School, Takoma Park, Washington, D. C. 222.1 meters, 1350 kilocycles, 100 watts, class A. Eastern standard time.

**WBNY** Shirley Katz, 145 West 45 Tilmor Bldg., New York, N. Y. 322.4 meters, 930 kilocycles, 500 watts. Daily ex Sun, 7-11 pm. Sun, 2:30-6 pm. Eastern standard time. Slogan: "The Voice of the Heart of New York."

**WBOQ** A. H. Grebe & Co., Inc., 70 Van Wyck Blvd., Richmond Hill, L. I., N. Y., 236 meters, 1270 kilocycles, 100 watts. Tues, Thurs, Sat, 9:55 pm, time signals and weather reports. Eastern standard time.

**WBRC** Bell Radio Corp., 1913 5th Ave. N., Birmingham, Ala. 248 meters, 1210 kilocycles, 50 watts. Sun, 11 am-12:30 pm, 7:30-9 pm, church services. Mon, Wed, Thurs, Fri, 8-10 pm, musical. Tues, 7:30-8 pm, musical. Central standard time. Slogan: "The Biggest Little Station in the World."

**WBRE** Baltimore Radio Exchange, 17 W. Washington St., Wilkes-Barre, Pa. 231 meters, 1300 kilocycles, 100 watts. Sun, 9-12 pm. Wed, 6-7 pm, dinner music. Fri, 8:30-10:30 pm. Eastern standard time.

**WBRL** Booth Radio Laboratories, Tilton, N. H. 410 meters, 731.3 kilocycles, 500 watts. Sun, 10:30-11:30 am, 7-8 pm, church services. Tues, Fri, 10-11:30 pm, dance program. Mon, Wed, Thurs, Sat, program varied. Eastern time. Slogan: "The Voice of the Granite State."

**WBS** D. W. May, Inc., 325 Central Ave., Newark, N. J. 252 meters, 1190 kilocycles, 100 watts. Eastern standard time.

**WBT** C. C. Coddington, Realty Bldg., Charlotte, N. C. 275 meters, 1090 kilocycles, 250 watts. Sun, 11 am & 8 pm, church services. Tues & Thurs, 9 pm, organ recital. Daily, 7:30 pm, organ recital. Eastern standard time. Slogan: "The Queen City of the South."

**WBZ** Westinghouse Elec. & Mfg. Co., 625 Page Blvd., East Springfield, Mass. 333.1 meters, 900 kilocycles, 5000 watts. Daily ex Sun, 6:30-10:30 pm. Sun, 10:50 am, 7 pm, 8 pm. Eastern standard time. Slogan: "The Broadcasting Station of New England."

**WBZA** Westinghouse Electric & Mfg. Co., Hotel Brunswick, Boston, Mass. 333.1 meters, 900 kilocycles, 250 watts. Eastern standard time.

**WCAC** Connecticut Agricultural College, Storrs, Conn. 275 meters, 1090 kilocycles, 500 watts. Mon, Wed, Fri, 7:30-9 pm, farm lectures & music. Eastern standard time. Slogan: "Voice from the Nutmeg State."

**WCAD** St. Lawrence University, Canton, N. Y. 263 meters, 1140 kilocycles, 250 watts. Daily ex Sun, 11-11:15 am. Wed, 8-10 pm. Thurs, 11-11:15 am. Eastern standard time. Slogan: "The Voice of the North Country."

**WCAE** The Pittsburgh Press & the Kaufman & Baer Co., Pittsburgh, Pa. 461.3 meters, 650 kilocycles, 500 watts. Mon, Wed, Fri, 10:45 am, 3 pm, 4:30 pm, 6:30-10:30 pm. Mon, 12:45 pm, news. Tues, 8 to 11 pm. Thurs, Sat, 12:30 pm, 3 pm, 4:30 pm, 6:30-11 pm. Sun, 10:45 am, 3:45 pm, 7:20 pm & 9:15 pm. Eastern standard time. Slogan: "Where Prosperity Begins."

**WCAJ** Nebraska Wesleyan University, University Place, Nebr. 254 meters, 1180 kilocycles, 500 watts. Mon, Tues & Thurs, 5:30 pm, radio forecasts, weather & news. Wed, 5:30 pm, news, weather; 8 pm, music, lectures. Fri, 5:30 pm, news, weather; 7 pm, Bible study hour. Central standard time.

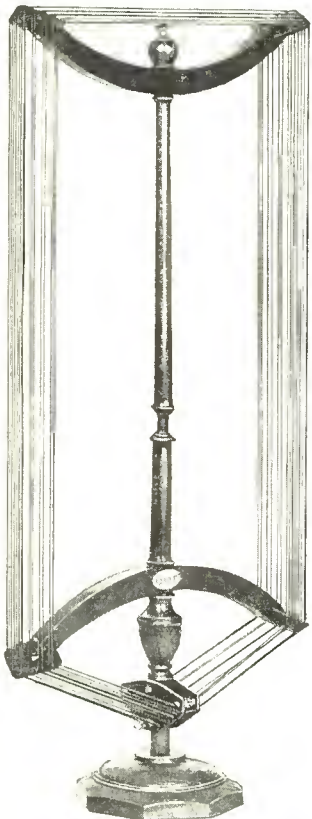
**WCAL** St. Olaf College, Northfield, Minn. 336.9 meters, 890 kilocycles, 500 watts. Daily ex Sun & Thurs, 9:45 am, chapel service. Mon, Fri, Sat, 8:30 pm, music, lecture, book talk. Thurs, 9 pm, music, lecture. Sun, 8:30 am, Norwegian Church service; 9 pm, sacred music, sermon. Central standard time. Slogan: "The College on the Hill."



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**R**EPORTS SHOW that fully 85% of the radio public regard the Loop as the ideal antenna. Ultimately there will be no other kind used.

The loop antenna has everything in its favor. It makes a radio set a complete unit in itself. It offers less interference from static and similar disturbances. It is more convenient. Can be directly and easily adjusted. Is portable. Lastly, the loop antenna can be made a thing of beauty, adding a real artistic touch to the entire radio set.



**Fiat Console Loop**  
30" high—14" wide. Tuned with .0005 M. F. Condenser

Its rectangular shape with less than 7 inch turning radius makes it convenient for standing close to adjoining walls or furniture.

It has great beauty of design and finish, the graceful lines of its simple Colonial design giving it a touch of refinement that is very pleasing.

The frame is solid American Walnut with hand-rubbed lacquer finish. The metal parts and name plate are rose gold. The end pieces, through which the high frequency cable is wound, are of polished Bakelite.

The Fiat Loop is adjusted by simply turning the center pole. It is easily

assembled and taken down. Can be packed conveniently in small compass.

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The Fiat Loop is recommended for use with Madison-Moore, St. James, Victoreen, Cotton, Nine-in-Line, Mello-Heald, and many other super-heterodynes. Also Brown-ing-Drake and all other circuits designed for loop antenna.

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**JOBBERs**—Good territory still open to recognized jobbers and distributors.



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**WCAM** Municipal Broadcasting Station, Camden, N. J. 336.9 meters, 890 kilocycles, 1 watt. Mon, Wed, Fri, 8-12 pm, mixed program. Eastern time.

**WCAO** Metropolitan Club, 842 N. Howard St., Baltimore, Md. 275 meters, 1090 kilocycles, 100 watts. Mon, Wed & Fri, 8-11, varied. Sun, 11-12 am, church. Eastern standard time. Slogan: "Swartwout."

**WCAR** Southern Radio Corp. of Texas, 101 West Pecan St., San Antonio, Texas. 263 meters, 1140 kilocycles, 500 watts. Daily ex Sun, 11 am, stock reports; 3 pm, late stock reports & news item; 8-10 pm, musical program. Central standard time. Slogan: "Down in Sunny Antonio."

**WCAT** South Dakota State School of Mines, Rapid City, S. Dak. 240 meters, 1250 kilocycles, 50 watts. Daily ex Sun, 9:30-9:45 am, weather; 12:30-1 pm, weather & agrigrams. Mountain time. Slogan: "WCAT, Station of the South Dakota State School of Mines at Rapid City."

**WCAU** Universal Broadcasting Co., Hotel Pennsylvania, 39th & Chestnut Sts., Philadelphia, Pa. 277.6 meters, 1080 kilocycles, 500 watts. Sun, 11 am-5 pm, 6:45-11 pm. Mon, 7:30-12 pm, musical. Tues, 7:30-12 pm, musical. Wed, 7:30-12 pm. Thurs, 6:30-12 pm. Fri, 7:30-12 pm. Eastern standard time. Slogan: "Where Cheer Awaits U."

**WCAX** University of Vermont, Burlington, Vt. 250 meters, 1200 kilocycles, 100 watts. Fri, 7:30-8:30 pm, educational & entertainment. Eastern standard time. Slogan: "The Voice of the Green Mountains."

**WCBA** Queen City Radiophone Station, WCBA, 1015 Allen St., Allentown, Penna. 254 meters, 1180 kilocycles, 15 watts. Wed & Fri, 8:15-11 pm, musical programs. Sat, 9:30-11 pm, dance program. Sun, 10 am, 5:30 pm, 7 pm, church services. Eastern standard time.

**WCBD** Wilbur Glenn Voliva, Shiloh Park, Zion, Ill. 344.6 meters, 870 kilocycles, 5000 watts. Tues, Thurs, 8-10:30 pm, concerts. Wed, 12:30-1 pm, organ concerts. Thurs, 2:30-3:45 pm, sacred music and address. Sun, 9-10:45 am, Bible school; 2:30-6 pm, service. Central standard time. Slogan: "Where God Rules Man Prospers."

**WCBE** Uhalt Bros. Radio Co., New Orleans, La. 263 meters, 1140 kilocycles, 5 watts. Daily ex Sun, 11:30-12:30 pm. Sun, 12:30-2:30 pm, 7:30-8:30 pm. Central standard time. Slogan: "Second Post, U. S. A."

**WCBH** University of Mississippi, University P. O., Miss. 242 meters, 1240 kilocycles, 50 watts. Tues, 7 pm. On air irregular times, broadcasting athletic events. Central standard time. Slogan: "The Voice of Ole Miss."

**WCBM** Hotel Chateau, Baltimore, Md. 229 meters, 1310 kilocycles, 50 watts. Sun, vocal & instrumental, 9:45-11 pm. Wed & Sat, 10-12 midnight, dance orchestra. Eastern standard time. Slogan: "The Chateau Roof, Where a Man Can Bring His Wife."

**WCBR** C. H. Messter (Portable), 42 Doyle Ave., Providence, R. I. 210 meters, 1430 kilocycles, 100 watts. Daily ex Sun, 6:30 pm, 7:30 pm, 9-10 pm. Eastern time.

**WCCO** Gold Medal Station, St. Paul & Minneapolis, Minn. 416.4 meters, 720 kilocycles, 5000 watts. Daily ex Fri & Sun, 9:30 am, 9:35 am, 9:45 am, 10:30 am, 11:30 am, 12 noon, 1:30 pm & 2 pm, news, markets, weather, noon concert & woman's hour. Mon, 2:30-10 pm. Tues, 3-10 pm. Wed, 2:30-11:30 pm. Thurs, 3-10:05 pm. Fri & Sat, 6:15-10:05 pm. Sat, 2:30 pm. Sun, 10:50 am, 1:45-9:15 pm. Central standard time.

**WCFL** Chicago Federation of Labor, 166 West Washington St., Chicago, Ill. 491.5 meters, 610 kilocycles, 1000 watts. Daily ex Sun & Mon, Fed. talks, Brevoort concert trio, and entertainment. Sun, 4-7:45 pm, church services. Slogan: "The Voice of Labor."

**WCLO** C. E. Whitmore, Camp Lake, Wis. 231 meters, 1300 kilocycles, 50 watts. Sun, 11 am, church services; 3 pm, musical. Mon, 9-12 pm, concerts. Other week days, irregular programs. Central standard time. Slogan: "The Playground of the Lake Region."

**WCLS** Boston Store, 301 Jefferson St., Joliet, Ill. 214 meters, 1400 kilocycles, 150 watts. Central standard time.

**WCMA** Culver Military Academy, Culver, Ind. 258.5 meters, 1160 kilocycles, 500 watts.

**WCOA** Municipal Broadcasting Station, City Hall, Pensacola, Fla. 222.1 meters, 1350 kilocycles, 500 watts. Sun, 12:30 pm, weather forecasts. Daily ex Sun, 10:30 am-12:30 pm, weather forecasts; 7-10 pm, studio concerts. Eastern standard time. Slogan: "Wonderful City of Advantages."

**WCSH** Henry P. Rines, Congress Square Hotel, Portland, Maine. 500 meters, 600 kilocycles, 500 watts. Sun, 10:30-12 noon, 1:30-2:30 pm, 7:30 to 10:15 pm. Mon, 10 to 11 am, 12-2 pm, 3-4 pm, 6-11 pm. Daily ex Sun same as Mon. Slogan: "The Voice from Sunrise Land."

**WCSO** Wittenberg College, Springfield, Ohio. 248 meters, 1210 kilocycles, 100 watts. Irregular schedule. Central standard time.

**WCWK** Keen Service System, Fort Wayne, Ind. 234.2 meters, 1280 kilocycles, 250 watts. Sun, 10:30 am, 6:30-7:30 pm, church services. Mon, Tues, Wed, Thurs, Fri, Sat, 11 am-12 noon, musical program. Mon, 4-5:30 pm, children's hour. Tues, Fri, 8-11 pm, musical program. Central standard time. Slogan: "The Hoosier Station."

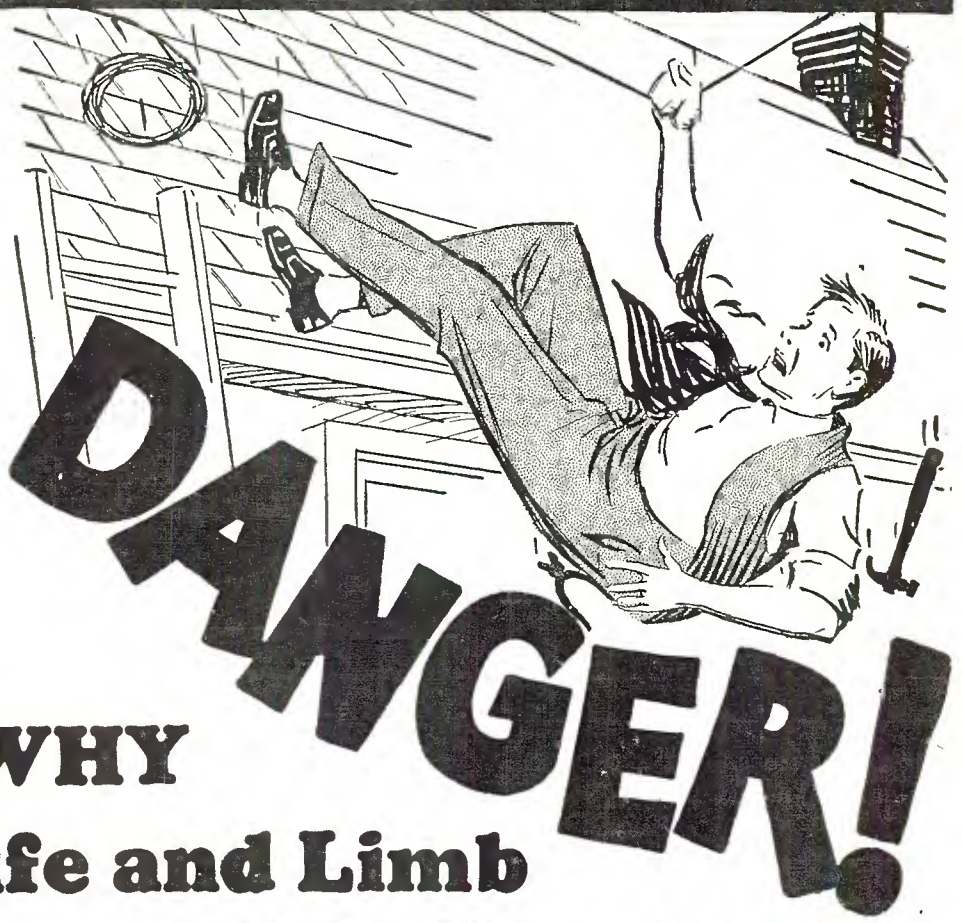
**WCX & WJR** Detroit Free Press & Jewett Radio & Phone Co. 516.9 meters, 530 kilocycles, 5000 watts. Sun, 7:15 pm, church services Central Methodist Episcopal. Mon, Wed, Thurs & Fri, 4 pm, news bulletin; 6 pm, dinner concert, 8 pm, studio program. Friday also, 10 pm, dance music. Tues, 4 pm, news bulletin; 6 pm, dinner concert; 10 pm, Red Apple Club. Sat, 4 pm, news bulletin; 6 pm, dinner concert.

**WDAD** Dad's Auto Accessories & Radio Store, 160-164 8th Ave. North, Nashville, Tenn. 226 meters, 1336 kilocycles, 150 watts. Daily ex Sat, 3:30-5 pm, musical (Sun, sacred program). Daily ex Sun, 8-10 pm, musical. Central standard time. Slogan: "Where Dollars Are Doubled."

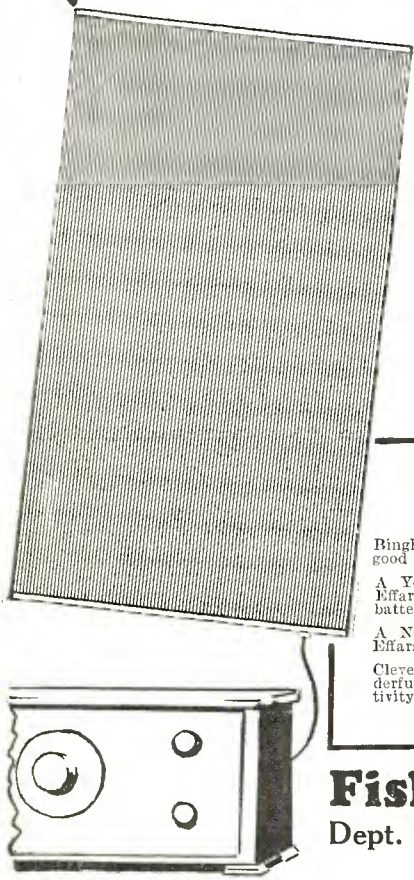
**WDAE** Central Florida Broadcasting Station, Inc., care of Tampa Times, Tampa, Fla. 273 meters, 1100 kilocycles, 250 watts. On air every afternoon and evening. Eastern standard time. Slogan: "The Land of Wonderful Days and Evenings."

**WDAF** The Kansas City Star, Kansas City, Mo. 365.6 meters, 820 kilocycles, 1000 watts. Sun, 3-4:45 pm, church concert and services. Mon, Tues, Wed, Thurs, Fri, Sat, 10:45 am-1:15 pm, housewife chats; 3:30-4:30 pm, musical matinee; 6-7 pm, school of the air; 8-10 pm, evening program; 11:45 pm-1 am, Nighthawk Frolic. Central standard time. Slogan: "Enemies of Sleep."

**The  
Safe  
Sane  
Effective  
INDOOR  
AERIAL!**  
*Easy to install!*



**WHY  
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**P**LAY safe by using Effarsee Antennae. Hang one indoors in 30 seconds, following simple directions we furnish, and get strong, clear reception. No danger of a fall. No lightning risks.

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In attic, spare-room or closet—under carpets, behind pictures, drapes or furniture. Effarsee Antennae work without interference from metal structural work, phone or light wires. Catch both sides of the radio wave and give you greater selectivity and a better tone, practically free of static. Special parchment covering

keeps wires properly spaced and insulated from moisture and electrical losses. Fixed condensers at each end provide the sharp tuning of a short aerial and the range and volume of a long one.

**Free Trial**

Effarsee Antennae save you trouble and danger and improve results from your set. Try one on your set for ten days. You will be surprised and delighted.

**SEND NO MONEY**

If your local dealer does not carry Effarsee Antennae write your name and address on coupon below, mail it to us at once, and we will send you your Antennae. C. O. D. for \$4.00. Nothing else to buy. If you are not delighted we will refund your money. You take no risk. Send order now.

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Binghamton, N. Y., user writes: "I never have heard as good reception as is given on your aerial."  
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(Complete names and addresses on request)

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Please send complete Effarsee Antennae at once. I will pay \$4.00 (plus a few cents postage) on delivery, with understanding that if not satisfied I may return Antennae in ten days and my money will be refunded.

Name.....  
Address.....  
Town..... State.....

**Fishwick Radio Co.**  
Dept. 54, 133 West Central Parkway  
**Cincinnati, Ohio**

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

**WDAG** J. L. Martis, 605 E. 4th St., Amarillo, Texas. 263 meters, 1140 kilocycles, 100 watts. Daily ex Sun, various programs. Sat, all musical and entertainment. Mon, Wed, Fri, Sat, 12:45 pm, markets, weather, etc. Tues, Thurs, 12:45 pm, markets; 9-10 pm, entertainment. Central standard time. Slogan: "Where Dollars Always Grow."

**WDAH** Trinity Methodist Church, El Paso, Tex. 267.7 meters, 1120 kilocycles, 50 watts. Sun, 10:45 am, 7:30 pm, church services. Wed, 7:30-9 pm, musical program. Central standard time.

**WDAY** Radio Equipment Corporation, 119 Broadway, Fargo, N. Dak. 261 meters, 1150 kilocycles, 50 watts. Sun, 10:30 am, church services; 3 pm, musical; 7:30 pm, church services. Daily ex Sun, 10 am, markets, news, weather; 10:15 am, chapel; 11 am, market; 12 n, farm school; 12:30 pm, musical; 2 pm, market report; 5 pm, musical program; 5:30 pm, children's hour; 5:50 pm, afternoon news. Mon, Thurs, 6 pm, musical. Tues, Thurs, Sat, 7:30 pm, musical program. Central standard time. Slogan: "The Biggest Little City in the World."

**WDBE** Silham Schoen Elec. Co., 35 Cone St., Atlanta, Ga. 270 meters, 1100 kilocycles, 100 watts. Tues, 7-8 pm, 9C. S. T. Central standard time.

**WDBJ** Richardson Wayland Elec. Corp., 106 Church St., S. W., Roanoke, Va. 229 meters, 1310 kilocycles, 50 watts. Sun, 7:30-8:30 pm, church services. Daily ex Sun, 12 noon-1 pm, 5:30-6 pm, 8-9 pm, musical. Wed, 9-11 pm. Fri, Sat, 9-10 pm, dance, sports, music. Eastern standard time. Slogan: "The Magic City."

**WDBK** M. F. Broz Furniture, Hardware & Radio Store, 13918 Union & Kinsman Sts., Cleveland, Ohio. 227 meters, 1320 kilocycles, 100 watts. Tues & Fri, 8:30-11:30 pm. Eastern standard time. Slogan: "Brozcasting from Cleveland."

**WDBO** Winter Park, Orlando, Florida, 239.9 meters, 1250 kilocycles, 500 watts. Sun, 11-12 am, 4-5 pm, 7:30-8:30 pm, church services. Daily ex Sun, 6:15 pm, announcements, markets; 6:30 pm, dinner music; 7:30 pm, talks; 8 pm-1:30 am, entertainment. Sat night silent. Eastern standard time. Slogan: "The Voice of Central Florida, Way Down By Orlando."

**WDBZ** Kingston Radio Club, Kingston, N. Y. 232.4 meters, 1290 kilocycles, 10 watts.

**WDEL** Wilmington Electric Specialty Co., 405 Delaware Ave., Wilmington, Del. 266 meters, 1130 kilocycles, 100 watts. No regular schedules at present. Slogan: "The Gateway to the Delmarvia Peninsula."

**WDGY** Twin City Broadcasting Station, Minneapolis, Minn. 263 meters, 1140 kilocycles, 500 watts. Mon, 6-8 pm, 9-11. Tues, 7-8 pm. Wed, 6-10 pm. Fri, 7-11 pm. Central standard time.

**WDDO** Chattanooga Radio Co., Inc., 615 Market St., Chattanooga, Tenn. 256 meters, 1170 kilocycles, 500 watts. Mon, Wed, Fri, 6:30-10 pm. Alternate. Sun, 11 am-7:30-9:15 pm, church services. Sat, 8:30-10:30 pm, popular program. Central standard time. Slogan: "Wonderful Dynamo Of Dixie."

**WDRC** Doolittle Radio Corp., 115 Crown St., New Haven, Conn. 268 meters, 1119 kilocycles, 500 watts. Sun, 11 am-12 pm. Thurs, 8-9 pm. Summer schedule. Eastern standard time.

**WDWF** Dutee Wilcox Flint, Inc., Cranston, R. I. 440.9 meters, 680 kilocycles, 500 watts. Eastern standard time.

**WDZ** Jas. L. Bush Grain Office and Tuscola Radio Supply Station, Tuscola, Ill. 277.6 meters, 1080 kilocycles, 100 watts. Daily ex Sat & Sun, grain markets, 9 am-2:15 pm, each half hour. Sat, 9 am-1:15 pm, each half hour. Slogan: "The Buckle of the Corn Belt."

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

**WEAI** School of Electric Engineering, Cornell University, Ithaca, N. Y. 254 meters, 1180 kilocycles, 500 watts. Eastern standard time.

**WEAM** Borough of North Plainfield, North Plainfield, N. J. 261 meters, 1150 kilocycles, 250 watts. Eastern standard time.

**WEAN** The Shepard Stores, Westminster St., Providence, R. I. 367 meters, 817 kilocycles, 500 watts. Daily ex Sun, 12-1 am, 4-5 pm, musical program; 6:30 pm, dinner dance; 8 pm, concert. Tues & Thurs, 10 am, home service talk. Wed, 9:30, dance program. Sun, 10:30 am or 11 am, church service; 1:30 pm & 4 pm, concert program. Eastern standard time. Slogan: "We Entertain a Nation."

**WEAO** Ohio State University, Columbus, Ohio. 293.9 meters, 1020 kilocycles, 750 watts. Daily ex Sun & holidays, 9:45 am, weather, market reports, agricultural bulletin; 11 am, market reports and music; 1 pm, market, music; 4 pm, markets. Tues, 7 to 9 pm, lectures, music. Wed, 8 to 10 pm, lectures, music. Thurs, 8 to 10 pm, lectures, music. Eastern standard time.

**WEAR** The Goodyear Tire & Rubber Co., 2026 Union Trust Bldg., Cleveland, Ohio. 389.4 meters, 770 kilocycles, 750 watts. Daily ex Sun, 11 am-12:15 pm, weather, markets. Daily ex Sat & Sun, 3:30-4 pm, weather, markets. Mon, Wed & Sat, 7-8 pm, musical. Tues, Thurs & Fri, 7-11 pm, musical. Sun, 3:30-5 pm, musical; 7-10 pm, musical. Eastern standard time. Slogan: "Goodyear Tires—WEAR."

**WEAU** Davidson Bros. Co., Sioux City, Iowa. 275 meters, 1090 kilocycles, 100 watts. Daily ex Mon, 8:35-9:35, 10:35-11:35 am, 12 noon-12:35 pm, 3:30-5 pm. Tues also, 6:30 pm. Sun, 2-4 pm, musical program. Central standard time.

**WEBC** Walter C. Bridges, 1011 N. 21st St., Superior, Wis. 242 meters, 1240 kilocycles, 100 watts. Central standard time.

**WEBH** Edgewater Beach Hotel, Chicago Evening Post, 5300 Sheridan Road, Chicago, Ill. 370.2 meters, 810 kilocycles, 2000 watts. Daily ex Sun, Mon, 7-8 pm, 9-10 pm, 11 pm-1 am (Sat, 11 pm-2 am). Sun, 10:40 am-12 noon, church service; 5-6 pm, 7-9 pm, musical program. Central standard time. Slogan: "Where Everybody's Happy."

**WEBJ** Third Avenue Railway System, 130th St. & Third Ave., New York, N. Y. 272.6 meters, 1100 kilocycles, 500 watts. Tues & Fri, 7 to 9 pm, popular & educational. Wed, 8 to 10 pm, popular & educational. Eastern standard time.

**WEBL** Radio Corp. of America, Woolworth Bldg., New York, N. Y. (portable). 226 meters, 1330 kilocycles, 100 watts. Eastern standard time.

**WEBQ** Tatc Radio Co., Harrisburg, Ill. 226 meters, 1330 kilocycles, 10 watts. Daily ex Sun, 7:15-7:30 pm, local news, markets. Wed, 8:15-9:15 pm. Sun, 7-8:30, church services. Central standard time. Slogan: "Blue Bird Station."



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LONG DISTANCE  
5 TUBE RADIO**

**\$25.00**

**EVERYBODY**, including experienced radio engineers said — it cannot be done. But we did it—produced a high grade, long distance single dial control radio to operate a loud speaker to retail for \$25.00—and yet allow liberal discount to agents.

This marvelous instrument is the result of five years hard work by an organization of trained radio engineers. It is no experiment — thousands are in use—the results speak for themselves.

**There Will Be a Radio In Every Home**

Thousands have been waiting for just such a radio—a real long distance, powerful instrument but—at a price they can afford.

It is here, and live wide awake salesmen will recognize their opportunity immediately—they won't lose a single minute writing for full information.

Just as there are 100 Fords to one high priced car, just so will there be 100 Vikings to every \$75.00 and \$100.00 radio—think what this means to men who get in on the ground floor right now.

**A \$25 Radio Which Will Equal a \$75 Radio**

Put a Model 599 Viking which retails for \$25.00 alongside any radio retailing for \$75.00 and even more. Compare them for ease of tuning—only one dial to tune on the Viking—distance received, volume and tone. The results will make any man say, "I'll save that \$50.00."

Radio is today the biggest and quickest selling line—thousands are being sold—salesmen have made unheard of profits. But here is a far greater, a far more interesting radio proposition than anyone ever dreamed of.

**You Should Make \$100.00 a Week Easily**

You can't help it—many will make more. Some will control a county—others will control many counties. We have the liveliest radio selling plan of today—instruments of all prices—a radio price to fit every pocketbook.

Any man who will follow our teaching cannot help but add big money to his present income and start to do it immediately. If you want more money here is your chance but you'll have to act quick—others will jump at this chance.

**Agents Wanted  
Make \$100.00 a Week**

**Sell Radio in Your Spare Time—Evenings**

You don't even have to give up your present position. The only time radio can be sold is in the evening—by demonstration. So here is a chance to add to your present income. During the past five years we have trained 4364 men in this very profitable business.

You'll be the first one with a real low priced long distance radio—your price will startle everybody—the results will be even far more startling. Once you demonstrate you're sure of a sale. No one can think of investing \$75.00 to \$100.00 in a radio when this instrument will get the same results and your retail price is only \$25.00. Just think of the advantage you have. Sell a radio for only \$25.00, and yet make a handsome commission.

**A Regular Radio at a Price Unheard Of**

Uses five No. 199 tubes, operates on three ordinary dry cells. Only one dial to tune—a feature generally only found in the highest priced instruments. Any child can tune the Model 599 VIKING—simply turn the dial. Cabinet is extremely attractive, 12 inches long, 8 inches high and 6 inches deep. The wood is covered with Keratol, embossed in a very attractive design. On the front are two very odd gold colored, colonial designs inserted in two panels. The base and ends are finished in a rough gold and black colored finish which together with the rich seal brown Keratol of the balance makes a cabinet that would be an ornament in any home.

The tuning is arranged so that it is accomplished by the use of one special low loss condenser and a basket weave coil. Sockets, rheostat, potentiometer and base board are all of bakelite. Three transformers give an abundance of volume for loud speaker. Parts will equal the average \$75.00 or \$100.00 radio instrument—only enormous production could possibly bring about this low price.

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Someone is going to get the big profit on the sales of these instruments in your community—is that someone going to be you? Write today for our 100 page book which fully describes not only this wonderful instrument but also a full line of radio at all prices. It's FREE for the asking.

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I am interested in selling your 5 tube set in this territory. Please send me your 100 page radio book, FREE.

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

**SEND FOR 100 PAGE FREE BOOK**

**WEBR** Hotel Worth, Buffalo, N. Y. 244 meters, 1230 kilocycles, 100 watts. Mon, Wed, Fri, 8:30-11 pm. Sun, church services. Slogan: "We Extend Buffalo's Regards."

**WEBW** Beloit College, Beloit, Wis. 267.7 meters, 1120 kilocycles, 500 watts. Sun, 4:25-5:30 pm, vesper services. Mon, 8-9 pm, concert. Central standard time.

**WEBZ** Savannah Radio Corp., Savannah, Ga. 263 meters, 1140 kilocycles. 50 watts. Mon, Wed, Fri, 8:30 pm. Eastern standard time.

**WEEL** The Edison Electric Illuminating Co. of Boston, 39 Boylston St., Boston, Mass. 348.6 meters, 860 kilocycles, 500 watts. Sun, 10:50 am-12 noon. Daily ex Sat, Sun, 6:45-10:45 am, 2-5 pm, 5:45-11 pm. Sat, 2-5 pm, 8-10:30 pm. Eastern time. Slogan: "The Friendly Voice."

**WEHS** Oliver G. Fordham, Evanston, Ill. 202.6 meters, 1480 kilocycles, 30 watts.

**WEMC** Emmanuel Missionary College, Berrien Springs, Mich. 316 meters, 950 kilocycles, 4000 watts. Sun, 11 am-8:15 pm, chapel services. Daily ex Sun, 8:05 am, Beacon Light Sacred Hour. Mon, Wed, 8:15 pm, miscellaneous, orchestra, etc. Fri, 9 pm, old-time songs, sacred songs, etc. Central standard time. Slogan: "The Radio Lighthouse."

**WENR** All-American Radio Corp., 4201 W. Belmont Ave., Chicago, Ills. 266 meters, 1130 kilocycles, 1000 watts. Sun, 2-3 pm, 3-4 pm, popular programs. Daily ex Sun & Mon, 1-3 pm. All-American popular program; 6-7 pm, dinner concert; 8-10 pm, popular program; 12-2 am, Midnight Frolic. Central standard time. Slogan: "W-E-N-R, Builders of Radio for the Years to Come."

**WEW** St. Louis University, University Station, St. Louis, Mo. 360 meters, 833 kilocycles, 1000 watts. Daily ex Sun, 9-10 am, 2-5 pm, government report. Tues, 7 pm, literary reading. Thurs, 7 pm, music, lectures. Sun, 2 pm, difficulties in religion answered; 7:15 pm, lecture. Central standard time.

**WFAA** Dallas News & Journal, Dallas, Tex. 475.9 meters, 630 kilocycles, 500 watts. Sun, 2:30-3:30, 6-8:30, 11-12 pm. Daily ex Sun, each half hour from 6:30 am-6 pm, 6:30-7:30 pm, 8:30-9:30 pm. Sun, Tues, Sat, 11-12 pm. Central standard time. Slogan: "Working For All Alike."

**WFAM** St. Cloud Daily Times, St. Cloud, Minn. 273 meters, 1100 kilocycles, 10 watts. No definite days to broadcast, but most programs are broadcasted on Mon, 8-10 pm. Central standard time. Slogan: "The Granite City of the World."

**WFAV** Dept. of Elec. Engineering, University of Nebraska, Lincoln, Nebr. 275 meters, 1090 kilocycles, 500 watts. Central standard time.

**WFBC** First Baptist Church, Knoxville, Tenn. 250 meters, 1200 kilocycles, 50 watts. Sun, 10:30 am, 7:30 pm, church services; 4 pm, concert sacred music. Central standard time.

**WFBE** Vande Walle Music & Radio Co., 208 W. 2nd St., Seymour, Ind. 226 meters, 1330 kilocycles, 10 watts. Mon, Wed & Fri, 7 to 9 pm. Central standard time.

**WFBG** Wm. F. Gable Co., Altoona, Pa. 277.8 meters, 1080 kilocycles, 100 watts. Sun, 10:45 am, church; 7:30 pm, church; 10:15 & 11:15 pm. Tues, 12:15 pm, organ; 3-6:30-8:30 pm. Wed, 12:15-3-6-8:30 pm. Fri, 12 noon, 3-6:30-8:30-11:15-9:30. Sat, 3-6:30-7:30-8:30-9:30. Eastern standard time. Slogan: "The Voice of the Alleghenies."

**WFBH** Concourse Radio Corp., Hotel Majestic, 72nd St. & Central Park West, New York City, N. Y. 272.6 meters, 1100 kilocycles, 500 watts. Daily, 11:30 pm. Mon, Tues & Fri, 2-7 pm; Wed, Thurs & Sats, 2-8 pm; Sun, 5-8 pm. Eastern standard time. Slogan: "Voice of Central Park."

**WFBJ** St. Johns University, Collegeville, Minn. 236 meters, 1270 kilocycles, 100 watts. Sun, 7-7:30 pm. Central standard time. Slogan: "In the Heart of the Landscape Paradise."

**WFBL** The Onandaga Hotel, Syracuse, N. Y. 252 meters, 1190 kilocycles, 750 watts. Mon, Wed, Fri, 3-4 pm, 6-10 pm. Tues, 6-11:30 pm. Thurs, 6 pm through 12:30 am. Sat, 2-5 pm, 6-9 pm, 10:30-12 midnight. Eastern standard time. Slogan: "When Feeling Blue, Listen."

**WFBM** Merchants Heat & Light Co., 515 Guaranty Bldg., Indianapolis, Ind. 268 meters, 1120 kilocycles, 250 watts. Sun, 9:30-10:45, 2 pm, 4:45 pm, 7:30 pm, church services. Daily ex Sat, Sun, 5:30 pm, sports, stock market reports; 10 pm, orchestra. Fri, 11 pm, request organ program. Central standard time. Slogan: "The Crossroads of America."

**WFBR** Fifth Infantry Maryland National Guards, Hoffman & Bolton St., Baltimore, Md. 254 meters, 1180 kilocycles, 100 watts. Daily ex Sun, 12 noon, dance music; 7-10 pm, sporting results and news. Tues, Thurs & Sat, 12 noon, 10 pm, 7 pm, general programs. Sun, 11 am. Central standard time. Slogan: "Home of the Star-Spangled Banner."

**WFDF** Frank D. Tallain, 321 1st Ave., Flint, Mich. Station at Police Bldg. 234 meters, 1280 kilocycles, 100 watts. Mon, Wed & Fri, 8 to 10:30 pm (also special broadcasts). Central standard time. Slogan: "Flint, the Motor City."

**WFI** Strawbridge & Clothier, Philadelphia, Pa. 394.5 meters, 760 kilocycles, 500 watts. Mon, Wed & Fri, 10:15 am-1 pm, markets and reports, recital and Betty Crocker; 3 pm, S & C tea room ensemble, market reports & recital; 6:40 pm, concert programs. Tues, Thurs & Sat, 10:15 am, market reports; 1-3 pm, S & C Tea Room ensemble, markets, reports & studio recital; 6:40 to 8 pm, concert and dance orchestra. Eastern standard time.

**WFKB** Francis K. Bridgman, 4536 Woodlawn Ave., Chicago, Ill. 217.3 meters, 1380 kilocycles, 500 watts. Daily ex Sun, Mon, 7-10 pm, classical and semi-classical music. Wed & Sat, children's stories. Central standard time. Slogan: "Station of Vesta Battery Corporation."

**WFRL** Flatbush Radio Laboratories, 1421 East 10th St., Brooklyn, N. Y. 205.4 meters, 1460 kilocycles, 100 watts. Eastern standard time.

**WGAL** Lancaster Elec. Sup. & Const. Co., Lancaster, Pa. 248 meters, 1210 kilocycles, 10 watts. On Wed, Fri, 5:45-6:15 pm, dinner concert. Wed, 11:15-1 am, organ concert. Eastern standard time. Slogan: World's Gardens At Lancaster."

**WGBB** Harry H. Carman, 217 Bedell St., Freeport, N. Y. 244 meters, 1230 kilocycles, 100 watts. Mon, Wed, Fri, 7:30-12 pm, musical program. Sun, 10:40 am to 12 noon. Church services, Freeport M. E. Church. Eastern standard time. Slogan: "The Voice of Long Island."

**WGBC** First Baptist Church, Memphis, Tenn. 278 meters, 1080 kilocycles, 10 watts. Sun, 9:55 am & 7:30 pm, church service. Central standard time.



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**UTAH STANDARD**

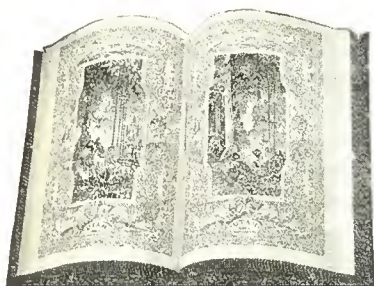
14" Bell

**22<sup>50</sup>**

*(The Speaker with the Golden Throat)*

**Utah Junior**  
11" Bell

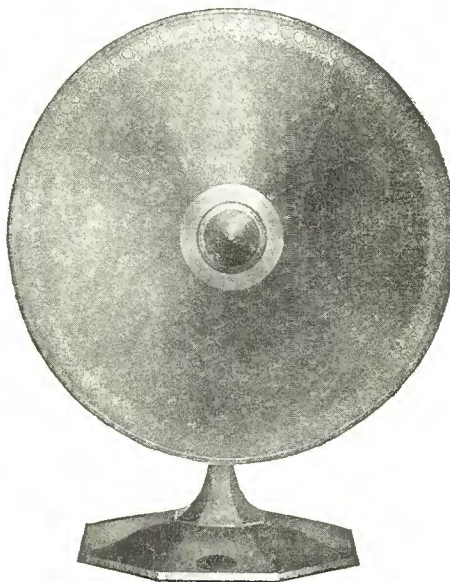
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assemblers*

**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.**

**Utah Super-Flex**



**0<sup>00</sup>**

Reg. U. S. Patent Office

**UTAH CONE SPEAKER**

Free edge—17½" high

**16<sup>00</sup>**

**UTAH RADIO PRODUCTS CO.**

1421 S. Michigan Ave., Chicago

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

**WGFB** The Finke Furniture Co., 307 Upper Seventh St., Evansville, Ind. 236.1 meters, 1270 kilocycles, 500 watts. Daily ex Sun, 7:15 am, morning worship service; 12:10 pm, news, markets, weather, etc.; 8:11 pm, music. Tues & Fri, 7-11 pm, musical program. Sun, irregular schedule. Central standard time. Slogan: "Gateway to the South."

**WGBR** Geo. S. Ives, 731 W. 5th St., Marshfield, Wis. 229 meters, 1310 kilocycles, 10 watts. Sun, 2-4 pm, musical. Central standard time. Slogan: "Wisconsin's Greatest and Best Radios."

**WGBS** Gimbel Brothers, Inc., 33rd St. & Broadway, New York, N. Y. 315.6 meters, 950 kilocycles, 500 watts. Daily ex Sun, 10-11 am, 1:30-2:30 pm, 3-4 pm. Mon, Wed, Fri, 6-7:30 pm. Tues, Thurs, Sat, 6-11:30 pm. Sun, 3:30-4:30 pm, 9:30-11:30 pm. Eastern standard time.

**WGBU** Chamber of Commerce, Fulford-by-the-Sea, Fla. 270 meters, 1080 kilocycles, 500 watts. Mon, Tues, Thurs, Fri, 12-1 pm, 6:30-7:30 pm, 11 pm-2 am. Wed & Sat, 12-1 pm, 6:30-7:30 pm, 10 pm-1 am. Sun, 9:30-11 pm. Eastern standard time.

**WGBX** University of Maine, Orono, Maine. 234.2 meters, 1280 kilocycles, 500 watts. Sun, 2 pm, musical. Wed, 7:30 pm, musical & educational. Eastern standard time.

**WGCP** Grand Central Palace & Clover Gardens, Lexington Ave. at 46th St., New York City. D. W. May—outlet, Newark, N. J. 252 meters, 1190 kilocycles, 500 watts. Daily ex Sun, 3-5:30 pm. Mon, Thurs & Sat, 6-12 pm. Tues, Wed, Fri, 7-8:30 pm. Sun, 7-9:30 pm. Eastern standard time. Slogan: "The Four Leaf Clover Station."

**WGES** Coyne Electrical School, Inc., 1300 W. Harrison St., Chicago, Ill. 315.6 meters, 950 kilocycles, 500 watts. Mon, 5-7 pm, pipe organ, musical. Tues, Wed, Thurs, Fri & Sat, 5-7 pm, semi-classical; 8-9 pm, 11-1 am, musical. Sun, 10:15-12 am, 5-7:40 pm, 11-12 pm, religious pipe organ music. Central standard time. Slogan: "World's Greatest Electrical School."

**WGHB** The George H. Bowles Developments, Clearwater, Fla. 266 meters, 1130 kilocycles, 500 watts. Mon, Wed, & Fri, 8:30-10 pm, musical programs. Tues & Thurs, 7-8 pm, orchestra. Eastern standard time. Slogan: "WGHB Inviting the World to the Springtime City."

**WGHP** George Harrison Phelps, Inc., Radio Division, 110 Rowena St., Detroit, Mich. 270 meters, 1110 kilocycles, 1500 watts. Mon, Tues, Wed, 6-10 pm, dinner concert, market report, children's chat, news, classical, etc. Thurs, Fri, 6-8 same as above, 6-10 pm, 10-11 pm, frolic; 11-12 pm, dance program. Eastern standard time.

**WGMU** A. H. Grebe & Co., Inc., Richmond Hill, L. I., N. Y. (Portable). 236 meters, 1270 kilocycles, 100 watts, class A. Unlimited schedule. Eastern standard time.

**WGM** Verne & Elton Spencer, 501 Cowan Ave., Jeannette, Pa. 372 meters, 806 kilocycles, 150 watts. Sun, 1:30-3 pm, music. Daily ex Sun, Wed, Sat, 7:30-9 pm, dance music. Popular program. Eastern time. Slogan: "Voice from the Glass City. Voice from the Hilltop."

**WGN** The Chicago Tribune, Drake Hotel, 140 East Walton Place, Chicago, Ill. 302.8 meters, 990 kilocycles, 1000 watts, class B. Daily ex Sun, 11:57 am, 12:40-3:30 pm, 5:30-5:57 pm, 6-7:30 pm, 8:30-11:30 pm. Tues & Thurs, 12:30 pm, farm talks. Sun, 12-1 pm, 1-5 pm, 9-10 pm. Central standard time.

**WGR** Federal Radio Corp., Hotel Statler, Buffalo, N. Y. 319 meters, 940 kilocycles, 750 watts. Sun, 10:45 am, church; 7:45 pm, church; 9:15 pm, concert. Mon, 12 noon, reports; 2:30 pm, program; 6:30, music; 7:30, reports; 8 pm-1 am, program. Tues, 12 noon, reports; 2:30 pm, program; 6:30 music; 7:30, reports; 8-11 pm, program. Wed, 12 noon, reports; 6:30 pm, music; 7:30, reports; 8-11 pm, program. Thurs, 12 noon, reports; 2:30 pm, program; 6:30 pm, music; 7:30 pm, reports; 8-11 pm, program. Fri, 12 noon, reports; 8 pm. Eastern standard time. Slogan: "Key City of Industry."

**WGST** Georgia School of Technology, Atlanta, Ga. 270 meters, 1110 kilocycles, 500 watts. Mon, 9-10 pm, "Tech Nite" program. Thurs, 7-8 pm, "Artist Series" program. Central standard time. Slogan: "The Southern School with the National Reputation."

**WGY** General Electric Co., 1 River Road, Schenectady, N. Y. 379.5 meters, 790 kilocycles, 5000 watts. Daily ex Sun, 11:55 am, 12:30 pm, 12:45 pm, 6 pm, 6:10 pm. Mon, Tues, Thurs, Fri, 2 pm. Tues & Thurs, 2:30 pm. Mon, Tues, Thurs, 6:30-7 pm. Thurs, 11:30 pm. Fri, 7 pm. Wed, 6:30 pm. Fri, 6:30 pm, 10:30 pm. Mon, 7:15 pm. Wed, Fri, 7 pm. Sat, 9:30 pm. Sun, 10:30-12 am, 5 pm, 7 pm, 7:30-8:45 pm, 8:15 pm. Eastern standard time.

**WHA** University of Wisconsin, Madison, Wis. 535.4 meters, 560 kilocycles, 750 watts. Mon, 8-9 pm, musical program. Wed & Fri, 8 am-8 pm. Sat, athletic events. Central standard time.

**WHAD** Marquette University - Milwaukee Journal Bldg., 4th & State Sts., Milwaukee, Wis. 275 meters, 1090 kilocycles, 500 watts. Sun, 3:15 pm, symphony concert. Mon, Tues, Wed, Thurs, Fri, Sat, 12 noon, news, musical program; 4 pm, studio program; 4:55 pm, stock quotations; 6 pm, market & financial news; 6:15 pm, dinner orchestra; 8:30 pm, popular program. Wed, 11:30 pm, midnight recital. Central standard time. Slogan: "The Voice of Wisconsin."

**WHAM** Eastman School of Music, Rochester, N. Y. 278 meters, 1080 kilocycles, 100 watts, class A. Daily ex Sun, 3:30-4 pm, 5-5:45 pm, 7-7:40 pm. Sun, 3:15 pm, chapel services. Eastern time.

**WHAP** Wm. H. Taylor Finance Corp., 393 Seventh Ave., New York, N. Y. 431 meters, 695.6 kilocycles, 1000 watts, class A. Daily ex Sat & Sun, 6:30-11 pm. Sun, 2:30-4:15 pm. Eastern standard time. Slogan: "The Station for Public Service."

**WHAR** Pioneer Broadcasting Station of Atlantic City, N. J. 275 meters, 1090 kilocycles, 500 watts. Sun, 10:45-1 pm, 2:15-3:10 pm, 7:45-10 pm. Daily ex Sun & Wed, 2-3 pm. 7:45-9 pm. Eastern standard time. Slogan: "Pioneer Broadcasting Station of Atlantic City."

**WHAS** The Courier Journal Co. & The Louisville Times Co., Louisville, Ken. 399.8 meters, 750 kilocycles, 500 watts. Sun, 9:57-10:40 am, church services; 4:30-5:30 pm, evening choral service. Mon, Tues, Wed, Thurs, Fri, Sat, 1-2 pm, orchestra; 3:15-5 pm, markets, music, sports, weather, etc. Tues, Wed, Thurs, Fri, Sat, 7:30-9 pm, concert. Central standard time. Slogan: "Old Kentucky Home."

**WHAZ** Radio Broadcasting Station, Rensselaer Polytechnic Institute, Troy, N. Y. 379.5 meters, 790 kilocycles, 1000 watts. Mon, 9 pm. Eastern standard time. Slogan: "Transcontinental and International Radiophone Broadcastingcasting from the Oldest College of Engineering and Science in America. Rensselaer Polytechnic Institute, Troy, N. Y."

**WHB** Sweeney Automotive & Electrical School, Kansas City, Mo. 365.6 meters, 820 kilocycles, 500 watts. Mon, Wed, Fri, 2-3 pm, music; 7-8 pm, educational. Tues, Thurs, 7-7:45 pm & 8-10 pm, musical. Sun, 9:40-10:45 am, 11 am-12:15 pm, 8-9:15 pm, services; 11:15-1 am, organ concert. Central standard time. Slogan: "The Heart of America."

**WHBA** Shaffer Music House, Oil City, Pa. 250 meters, 1200 kilocycles, 10 watts, class A, limited commercial broadcast. Mon, 8 pm until 11 pm, musical. Fri, 9 pm until 12 pm, musical. Eastern standard time.



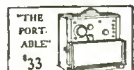
**CROSLLEY RADIO**  
All prices slightly higher west of Rocky Mts.



This little double-circuit 1-tube set has made long distance records.



4 tubes. Amazing efficiency. Crescendon equipped.



The 4-29 in portable form.



Five tubes, tuned radio frequency. Two stages non-oscillating radio frequency amplification. Crescendon, two stages audio frequency amplification.



5 tubes, 1-dial control acuminators, Crescendon, power tube adaptability.



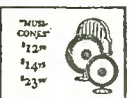
5 tubes. True-cascade amplification; non-oscillating and non-radiating.



In a mahogany console. 5-tube 5-50 receiver, Crosley Musicone speaker, ample compartment for batteries.



Double drum station selector! Musicone and room for batteries and accessories.



12-inch size, \$12.50. Super Musicone, \$14.75. Musicone Deluxe, \$23.50. Also beautiful Musicone console with room for batteries and accessories, as below.



**Crosley Features**

**"CRESCENDON"**

When, on ordinary radios, the ears must strain to catch a station miles away, a turn of the Crescendon on Crosley radios instantly swells reception to room-fil-

ling volume. An exclusive Crosley feature. **ALL-METAL SHIELDED CHASSIS**



This truly great radio achievement, found in several Crosley sets,

furnishes a substantial frame for mounting elements, produces excellent alignment of condensers, shields the units from each other, prevents interstage, improves the stability of the circuit, increases selectivity and saves costs by standardizing this phase of manufacture.

**THE SINGLE-DIAL STATION SELECTOR**

Nothing in radio equals the joy or the convenience of single dial control. Crosley single drum control enables you to find the stations sought without log book or "tuning"

**"THE ACUMINATORS"**

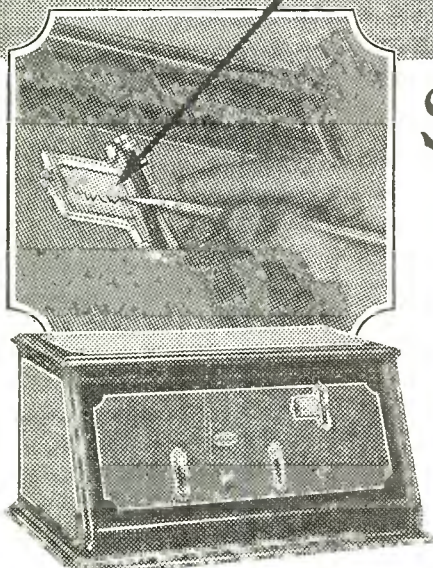
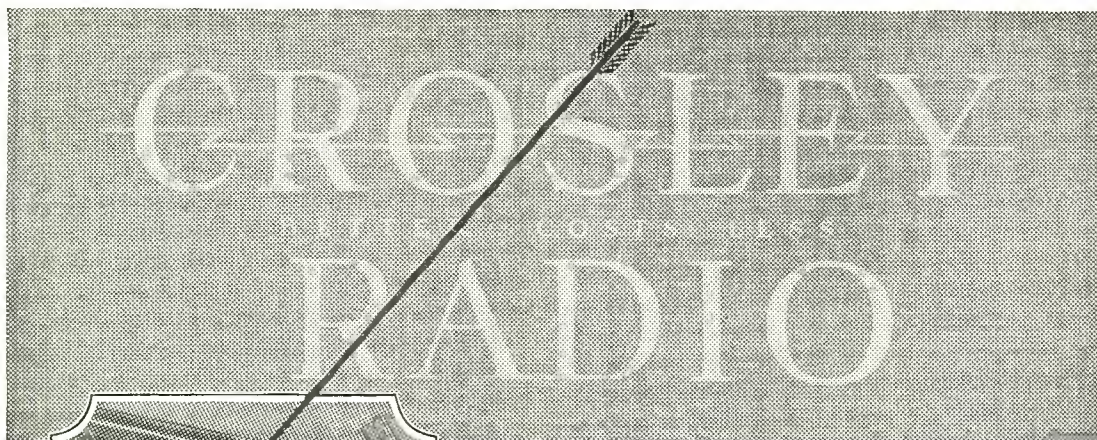
Crosley Acuminators permit tuning in—loud and clear—weak stations passed over and entirely missed by ordinary single dial radios. In tuning high powered and local stations they are not used.

**USE OF POWER TUBE**

Power tube adaptability marks the Crosley "5-50", "5-75" and "RFL" sets. This feature typifies Crosley provision for best radio reception at moderate cost. This feature is in keeping with all that is most progressive.

**HEAD PHONES \$3.00**

**QUALITY AND BEAUTY IN CABINETS AND CONSOLES**



# Single Dial Control 5 TUBES

## POWER TUBE ADAPTABILITY

One hand, one dial, one control—the goal towards which radio manufacturers have been striving—is now perfected in the famous Crosley **LOW-PRICED** models, 5-50 and 5-75.

Other new features incorporated in these remarkable 5-tube sets—features which make Crosley radios amazing in their performance, regardless of price—are as follows:

**The Crescendon**—a device that builds up full, satisfactory volume on weak and distant stations.

**The Acuminators**—these auxiliary tuners enable you to receive with great volume, because of sharp tuning, distant stations passed by and entirely missed on ordinary single dial control sets. With the use of the drum selector alone enough stations will parade by to satisfy everyone—but with the acuminators, even wider and better broadcast is opened to you.

**The All-Metal Chassis**—a type of construction which shields the various units and prevents interstage as well as external coupling. The result is a great saving in production costs and a greater efficiency in reception.

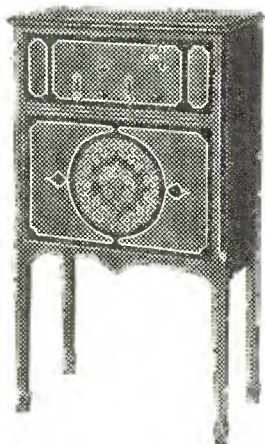
**Rich Mahogany Cabinets**—beautifully finished and artistically decorated. The use of such high grade material for cabinet work is possible only because of the tremendous production program for 1927.

The Crosley 5-50 and 5-75 are being welcomed by thousands of persons who have hesitated to replace their out-of-date equipment with sets containing the latest features because the cost was prohibitive. Now they can have the very latest developments in radio at a price that is easily within their reach—thanks to the genius of Crosley in reducing costs by mass production.

Go to your dealer—and learn what exquisite tone, wonderful selectivity and satisfactory volume are built into these two incomparable radios.

**TABLE MODEL 5-tube 5-50** Single dial control with graphic drum station selector. A mahogany cabinet of two-tone finish, beautifully trimmed with rose metal fittings. Incorporating 6 amazing features,—two of which (Acuminators and Crescendon) are exclusively Crosley's. Price slightly higher west of Rocky Mountains.

**\$50**



**\$75**

**CONSOLE MODEL 5 tube 5-75** Single dial control with graphic drum station selector. A mahogany cabinet, two-tone finish, into which is built the famous Crosley Musicone, cleverly concealed behind a silk screen. Cabinet will hold batteries and accessories. Stands 40 inches high. Rose gold trimmings. Price slightly higher west of Rocky Mountains.

**THE CROSLLEY RADIO CORPORATION, CINCINNATI—POWEL CROSLLEY, Jr.;**

Crosley manufactures radio receiving sets, which are licensed under Armstrong U. S. Patent No. 1,113,149 or under patent applications of Radio Frequency Laboratories, Inc., and other patents issued and pending. Owning and operating station WLW, first remote control super-power station in America. All prices without accessories.



**President**  
For Catalogue write Dept. 41

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

**WHBC** Rev. E. P. Graham, 627 McKinley Ave., Canton, Ohio. 254 meters, 1810 kilocycles, 10 watts. Mon, 8-8:30 pm, lecture, sermon. Eastern time. Slogan: "Dispel Ignorance."

**WHBD** Chamber of Commerce, Chas. W. Howard, 110 Chillicothe St., Bellefontaine, Ohio, 222.1 meters, 1350 kilocycles, 20 watts. Sun, 10:45 am, 7:30 pm. Daily ex Sun & Sat, 7:30-9 pm. Eastern standard time. Slogan: "Ohio's Highest Point."

**WHBF** Beardsley Spec. Co., Inc., 217 18th St., Rock Island, Ill. 222 meters, 1350 kilocycles, 100 watts. Mon, Wed, Sat, 9-11 pm. Sat, 2-4, 7-9 pm. Central standard time. Slogan: "Where Historic Blackhawk Fought."

**WHBG** John S. Skane, 1810 N. 4th St., Harrisburg, Pa. 230.6 meters, 1300 kilocycles, 20 watts, class A. Tues, 9:30-11:30 pm; Thurs, 9:30-12 pm; Sun, 9:15-10:30 pm. religious program. Eastern standard time. Slogan: "Where Harrisburg Broadcasts Gladness."

**WHBL** James H. Slusser, 1214 Erie Ave., Logansport, Ind. 215.7 meters, 1390 kilocycles, 50 watts, class A. Central standard time.

**WHBM** O. L. Carrell (Portable), 1506 No. American Bldg., 36 So. State St., Chicago, Ill. 215.7 meters, 390 kilocycles, 20 watts, class A. Central standard time.

**WHBN** First Ave. Methodist Church, 1st Ave. & 5th St., Petersburg, Fla. 238 meters, 1260 kilocycles, 10 watts, class A. Eastern standard time.

**WHBP** The Johnstown Automobile Co., 101 Main St., Johnstown, Pa. 256 meters, 1170 kilocycles, 100 watts, class A. Weds, 9 pm; Sat, 10 pm. Eastern standard time. Slogan: "The Voice of the Friendly City."

**WHBQ** Men's Fellowship Class of St. John's M. E. Church, South Bellevue and Peabody Aves., Memphis, Tenn. 233 meters, 1290 kilocycles, 50 watts, class A. Limited commercial. Wed, 8-9:30 pm, musical program. Sun, 9:45-10:45 am, services, Men's Fellowship class; 11 am, church service; 7:30 pm, church service. Central standard time. Slogan: "We have Best Quartet."

**WHBU** Riviera Theater & Bing's Clothing, 1002 Meridian St., Anderson, Ind. 218.8 meters, 1370 kilocycles, 10 watts, class A. Daily ex Sun, 9-9:30 am; 12-12:30 pm. Wed, Fri, Sun, 7-9 pm. Central standard time. Slogan: "The Home of Chief Anderson."

**WHBW** D. R. Kienzle, 4916 Chestnut St., Philadelphia, Pa. 215 meters, 1390 kilocycles, 100 watts, class A. Weds, pm. Eastern standard time.

**WHBY** St. Norbert's College, West De Pere, Wis. Green Bay-De Pere Broadcasting Station. 249.9 meters, 1200 kilocycles, 50 watts. Mon, 8-10 pm, orchestra, dance music. Wed, 5-6 pm, organ recital. Fri, 5-6 pm, musical, Peppy Collegians. Daily ex Sun, 5 pm, weather forecast. Daily, 5:45-6 pm, market reports & stock quotations. Central standard time.

**WHDI** Dunwoody Industrial Institute, 818 Superior Blvd., Minneapolis, Minn. 277.6 meters, 1080 kilocycles, 500 watts. Mon, Tues, Wed, Thurs, Fri, Sat, 7-8:35 am, time service program. Mon, 8-9 pm, popular hour. Wed, 9-10 pm, Big Hat prize drawing, music. Fri, 9-10 pm, popular hour. Central standard time.

**WHEC** Hickson Elec. Co., Inc., 36 South Ave., Rochester, N. Y. 258 meters, 1160 kilocycles, 100 watts. Sun, 10:45 am, church services; 5-6 pm, organ recital; 6-6:30 pm, symphony. Daily ex Sun, 12 noon, time flashes; 6:30 pm, dinner program; 7-9 pm, musical program. Sat, 10:30 pm-12 midnight, dance music. Eastern standard time. Slogan: "This Is Rochester—The City of Varied Industries."

**WHK** The Radio Air Service Corporation, Inc., Carnegie Hall, Cleveland, Ohio. 272.6 meters, 1100 kilocycles, 1000 watts. Sun, 10 am-10:30 pm, church & studio programs. Daily ex Sun, 12-12:45, popular noon program; 12:45-1 pm, farm flashes; 3:30-4 pm, housekeepers' chat; 6-8, dinner music & studio program; 8-9, specialties, concerts, studio programs, etc.; 9-10 pm, orchestra. Sat, 10-12 pm, WHK happy hours. Eastern standard time. Slogan: "Cleveland, the Convention City."

**WHN** George Schubel, 1540 Broadway, New York, N. Y. 361.1 meters, 830 kilocycles, 1000 watts. Sun, 11 am-12 midnight. Daily ex Sun, 2:15-12 midnight. Eastern standard time. Slogan: "Station of the Great White Way."

**WHO** Bankers Life Co., 1110 Liberty Bldg., Des Moines, Iowa. 526 meters, 570 kilocycles, 5000 watts. Daily ex Sun, 9:45-12 noon & 2 pm, markets; 7:30 to 9 pm, musical; 11 to 12 pm, musical reports, talks. Sun, 11 to 12:30 pm, 11 pm-midnight, musical programs. Central standard time. Slogan: "WHO (VHO) Bankers Company, Des Moines, Iowa."

**WHT** Radiophone Broadcasting Corp., Wrigley Bldg., 410 N. Michigan Blvd., Chicago, Ill. 238 meters, 1260 kilocycles, 3500 watts. Sun, 12 noon-3:45 pm, 5:30-11:30 pm. Daily ex Sun, 10 am-2 pm, 6-7:30 pm. Daily ex Sun & Mon, 7:45 pm-1 am. Central standard time. Slogan: "Write Home Tonight."

**WIAD** Howard R. Miller, 6318 N. Park Ave., Philadelphia, Pa. 250 meters, 1199 kilocycles, 100 watts, class A. Tue, Fri, 9 pm. Eastern standard time.

**WIAS** Home Elec. Co., Burlington, Iowa. 254 meters, 1180 kilocycles, 100 watts, class A. Tues, 8-9 pm. Thurs, 7-8 pm. Sat, 10:30-11 pm. Sun, 10:30 am, church. Central standard time. Slogan: "Burlington on the Mississippi."

**WIBA** The Capital Times and The Studio Station, 511 State St., Madison, Wis. 236 meters, 1270 kilocycles, 100 watts, class A. Mon & Wed, 8:30 to 10 pm. Sat, 12 midnight, Cuckoo Club Music. Central standard time. Slogan: "The Four Lakes City."

**WIBG** St. Paul's Protestant Episcopal Church, Elkins Park, Philadelphia, Pa. 222 meters, 1350 kilocycles, 50 watts, class A. Sun, 10:45 am, 3:45 pm. Eastern standard time.

**WIBH** Elite Radio Stores (Moriarty), 55 Hillman St., New Bedford, Mass. 210 meters, 1430 kilocycles, 30 watts, class A. Daily ex Sun, 12-1:30 pm. Eastern standard time. Slogan: "The Voice of New Bedford."

**WIBI** Frederick B. Zittrell, Jr., 369 Amity St., Flushing, L. I., N. Y. 218.8 meters, 1370 kilocycles, 5 watts, class A. Eastern standard time.

**WIBJ** O. L. Carrell, 1506 N. American Bldg., Chicago, Ill. (Portable). 215.7 meters, 1390 kilocycles, 50 watts, class A. Central standard time.

**WIBM** Billy Maine (Portable), 36 W. Randolph St., Chicago, Ill. 215.7 meters, 1390 kilocycles, 10 watts, class A. Daily ex Sun, 8:45-9:45 pm. Central standard time. Slogan: "The Gypsy Station."

# BE A RADIO EXPERT

*The Opportunity of a Lifetime*

Amazing money-making possibilities—Big Salaries—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.

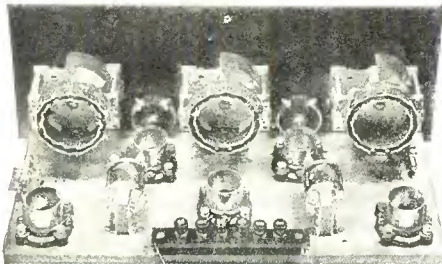
From a business and money-making standpoint, Radio fairly staggers the mind of anyone who gives it a moment's thought. Even men with little or no knowledge of its principles are making \$3,000 to \$10,000 a year. Radio is the fastest growing industry in the world. Everywhere people are crying for radios. 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

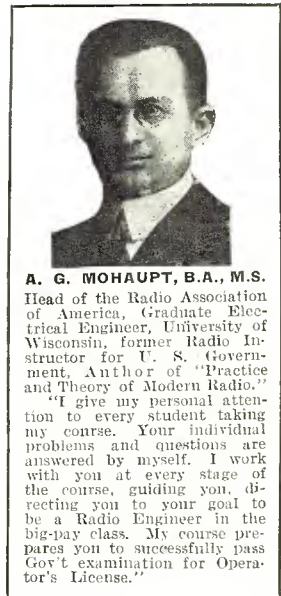
Get your share of the big money to be made in the most rapidly growing business of all time. Mail the coupon below for our big free book,



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—FIVE-TUBE TUNED RADIO FREQUENCY KIT

This set when completed has a range of over 1,000 miles on the loud speaker. It is very selective and gives excellent tone quality. Given free to every member taking our course. The building of this set gives you excellent practical experience—it combines the theory of the course with actual practice. The set becomes yours, and you can sell it at a price that will practically pay the cost of your training. Write about it now.

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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**

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Chicago, Ill.

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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 5-Tube Tuned Radio Frequency Kit FREE.

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

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

**WIBO** Nelson Brothers Bond & Mortgage Co., 6310 Broadway, Chicago, Ill. 226 meters, 1330 kilocycles, 1000 watts, class A. Daily, 2-4 pm. Daily ex Mon, 6-8 pm, music. Wed, 10 pm-12 midnight. Fri, 10 pm-2 am. Tues & Thurs, 12 pm-2 am, Midnight Jamboree. Sun, 10-12 pm, musical. Central standard time. Slogan: "Chicago's Uptown Radio Station."

**WIBR** Tri-State Radio Co., Thurman A. Owings, Mgr., Weirton, W. Va. 246 meters, 1220 kilocycles, 50 watts, class B. Fri, 8-11 pm. Eastern standard time.

**WIBS** New Jersey National Guard, 57th Infantry Brigade, 921 Edgewood Road, Elizabeth, N. J. (Portable). 202.6 meters, 1480 kilocycles, 10 watts, class A. Eastern standard time.

**WIBT** Orlando Edgar Miller, New York, N. Y. (Portable). 211.1 meters, 1420 kilocycles, 100 watts, class A. Eastern time.

**WIBU** The Electric Farm, R. F. D. No. 3, Poynette, Wis. 222 meters, 1350 kilocycles, 20 watts, class A. Central standard time.

**WIBW** Dr. L. L. Dill, Roselawn Addition, Logansport, Ind. 220 meters, 1360 kilocycles, 100 watts, class A. Daily ex Sun, 4-15 pm, markets. Tues & Sat, 6-7 pm, organ recital. Thurs, 9-10 pm, religious concert. Fri, 7-10 pm, high school basketball. Sun, 10:45 am-12 pm, 7-9 pm. Central standard time. Slogan: "WIBW On the Banks of the Wabash."

**WIBX** WIBX, Inc., Hotel Utica, Utica, N. Y. 234.2 meters, 1280 kilocycles, 150 watts. Sun, 10:30 am, 7:30 pm, church services; 4 pm, studio program. Mon, 8-10 pm, musical program. Tues, Thurs, 6:30-9 pm, musical program; 11 pm, Avon Theater program. Sat, 6:30-7:30 pm, dinner dance; 11 pm, WIBX Funfest. Eastern standard time. Slogan: "Utica, N. Y.—The Hub of the Empire State."

**WIBZ** A. D. Trum, 217 Catamo St., Montgomery, Ala. 230.6 meters, 1300 kilocycles, 10 watts. Fri, 9-10 pm. Sun, 12-1 pm. Central standard time. Slogan: "We Interest Business Zeal."

**WICC-WCWS** The Bridgeport Broadcasting Station, 1188 Main St., Bridgeport, Conn. 285 meters, 1060 kilocycles, 500 watts. Sun, 10:50 am-2 pm, church services. Tues, Fri, 11 am, home management; 8 pm, studio program. Mon, 7-9 pm, studio program. Wed, 5:45-10:30 pm, concert, musical, theater presentations, etc. Thurs, 8 pm, studio program. Fri, 6:30-8:30 pm, orchestra, studio program. Eastern standard time. Slogan: "The Industrial Capital of Connecticut."

**WIL** St. Louis Star and Benson Radio Co., St. Louis, Mo. 258 meters, 116.2 kilocycles, 250 watts, class A. Tues, Thurs & Sat, 4-5 pm. Thurs, 8-12 pm. Sat, 10-12 pm. Central standard time. Slogan: "Watch It Lead."

**WIOD** Carl G. Fisher, Miami Beach, Fla. 247.8 meters, 1210 kilocycles, 1000 watts. Slogan: "Wonderful Isle of Dreams."

**WIP** Gimbel Bros., Philadelphia, Pa. 508.2 meters, 590 kilocycles, 500 watts. Daily ex Sun, Mon & Fri, 6:45-7:30 am, 10-11 am, 1-2 pm, 3-4 pm, 6-7:30 pm. Tues, Thurs & Sat, 8 pm-12 midnight. Mon, Wed & Fri, 6:45-8 am, 10 to 11 am, 1-2 pm, 3-4:30 pm, 6-7:30 pm. Sun, 10:30 am to 12:30 pm, 4-6 pm, 7-9:15 pm, 9:15 pm to 12 midnight. Eastern standard time. Slogan: "Watch Its Progress."

**WJAD** Frank P. Jackson, Hotel Raleigh, 801 Austin Ave., Waco, Tex. 352 meters, 850 kilocycles, 500 watts. Mon, Tues, Thurs, Fri, 8:30-10:30 pm, musical. Wed, 8:30-9:30 pm, musical. Central standard time. Slogan: "Waco, Texas, All Around It."

**WJAF** J. A. Fenberg Radio Co., 113 State St., Detroit, Mich. 400 meters, 749.6 kilocycles, 50 watts. Sat, Sun, 9-11 pm, popular music. Mon, 8-11 pm, varied. Wed, 8-11 pm, popular orchestra. Fri, 8:30-12 pm, popular orchestra. Eastern standard time.

**WJAG** Norfolk Daily News, Norfolk, Neb. 270 meters, 1110 kilocycles, 200 watts. Daily, 12:15 pm, features, sports, word pictures, ball games, and athletic events. Central standard time. Slogan: "Home of Printers' Devil."

**WJAK** The Kokomo Tribune, Kokomo, Ind. 254.1 meters, 1180 kilocycles, 50 watts. Mon, 11:45 am, weather, markets, etc.; 7:30 pm, hour of music. Daily ex Sun, 11:45 am, 5 pm. Central standard time. Slogan: "One of Indiana's Most Beautiful Little Cities and the Home of the First Automobile."

**WJAM** D. M. Perham, 322 3rd Ave. W., Cedar Rapids, Iowa. 268 meters, 1120 kilocycles, 100 watts, class A. Tues, Thurs & Sat, 7-10 pm. Sun, 4 pm, vesper service. Central standard time.

**WJAR** The Outlet Company, 174 Weybosset St., Providence, R. I. 305.9 meters, 980 kilocycles, 500 watts, class B. Daily ex Sun, 1:05 pm, musical; 1:30, weather reports. Mon, 8 pm, 9 pm & 10 pm, musical programs & grand opera. Wed, 7:30 pm, music. Tues, 7:30, 8:30 & 9 pm, musical. Thurs, 8, 9 & 10 pm, music & entertainment. Fri, 7:30, 7:45, 8:20, 8:30, 9 & 11 pms, music & entertainment. Sun, 7:20 pm & 9:15 pm. Eastern standard time. Slogan: "The Southern Gateway of New England."

**WJAS** Pittsburgh Radio Supply House, 963 Liberty Ave., Pittsburgh, Pa. 275 meters, 1090 kilocycles, 500 watts. Sun, 11 am, church services, St. Patrick's Church; 2 pm, studio services. Daily ex Sun, 12 noon, church services, St. Patrick's Church; 7:30 pm, dance; 8 pm, studio concert; 10:30 dance program. Eastern standard time. Slogan: "World's Jolliest Aerial Station."

**WJAX** Municipal Radio Broadcasting Station, Jacksonville, Fla. 336.9 meters, 890 kilocycles, 1000 watts. Eastern standard time. Slogan: "Wonderful Jacksonville—In the Land of Sunshine."

**WJAZ** Care of The American Radio Broadcasting Corp., Chez Pierre Club, 247 E. Ontario St., Chicago, Ill. 329.8 meters, 910 kilocycles, 1500 watts. Sun, 4:30-6 pm, 7:30-9 pm. Tues, Wed, Thurs, 6:30-12 midnight, Fri, 6:30-1 am. Sat, 6:30-2 am. Central standard time.

**WJBA** D. H. Lentz, Jr., 301 Whitley Ave., Joliet, Ill. 206.8 meters, 1450 kilocycles, 50 watts, class A. Tues, 8-11 pm. Central standard time.

**WJBB** The Financial Journal, Inc., 126 13th St. N., St. Petersburg, Fla. 254 meters, 1180 kilocycles, 10 watts, class A. Eastern standard time. Slogan: "Land of Perpetual Sunshine."

**WJBC** Hummer Furniture Co., La Salle, Ill. 234.2 meters, 1280 kilocycles, 500 watts. Sun, 10-11 am, Catholic church services; 7:30-9:30 pm, Baptist church services. Mon, 8-10 pm, studio program. Tues, Thurs, Sat, 12:30-1 pm, organ concert. Sat, 1-2 pm, children's program. Central standard time. Slogan: "Better Homes Station."

**WJBI** Robert S. Johnson, 631 Broad St., Red Bank, N. J. 218.8 meters, 1370 kilocycles, 250 watts. Wed, 8 pm-12 midnight, entertainment. Eastern standard time.



## Wonderful *new* Loud Speaker



Acme K-3 Enclosed Single Free Edge Cone Speaker (shown above). Diameter of cone, 11 ins. Green bronze metal case. Price, \$18.50.

Acme K-1 Enclosed Double Free Edge Cone Speaker. Diameter of cone, 14 ins. Tan metal case. Price, \$25.00.

## You've *no idea* what a difference the Acme makes!

"I THOUGHT I was getting the best possible reproduction out of my set. But I found I really had *no idea* how clearly it could reproduce music, until I got your new Acme Loud Speaker. It certainly makes a surprising difference. . . ."

The wonderful new Acme Loud Speaker successfully reproduces voices and music, in your own home, as clearly as they were originally created in the broadcasting studio. It reproduces the voice of the singer in all its thrilling, tender beauty. It brings out the different personality in each voice, so that you can tell one voice from another. It recreates orchestral music so clearly that you can hear each instrument playing. It reproduces low notes and tones as clearly as high notes and tones. You hear the bass and treble, harmony and melody.

All this was not done in a moment. Acme engineers worked five years and made 256 experimental speakers, before they arrived at the new Acme enclosed Free Edge Cone and Acme Reproducing Unit, which together are responsible for this great increase in radio enjoyment.

*Hear this new Acme at your dealer's*

TRY OUT this new Acme for yourself. See if all we have said about it is not true. Compare it with others in the dealer's store. Drop in at your dealer's today and hear this remarkable new speaker. Made by Acme Apparatus Co., Pioneer Radio and Transformer Engineers and Manufacturers, Cambridge, Mass., U. S. A.

Acme Enclosed Free Edge Cones and Acme Reproducing Units (Designed for use exclusively with the free edge cone) eliminate resonance and preserve the tones, pure, round and clear. A fixed edge cone, to produce the same results, would have to be three times the diameter, too clumsy for your living-room. High notes are reproduced toward the center of the cone; low notes, toward the edge. The laws of vibration make it possible to produce low notes with a small cone, provided the edge is free and enclosed, and provided the reproducing unit is especially designed for use with a free edge cone.

Write us for circular describing full line of Acme products.

# ACME *-for amplification*

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

**WJBK** Ernest F. Goodwin, Ypsilanti, Mich. 233 meters, 1290 kilocycles, 10 watts, class A. Central standard time.

**WJBL** Wm. Gushard Dry Goods Co., 301 N. Water St., Decatur, Ill. 270 meters, 1110 kilocycles, 500 watts, class A. Mon, Wed & Sat, 9:30-11 pm. Central standard time.

**WJBO** Valdemar Jensen, New Orleans, La. 268 meters, 1120 kilocycles, 100 watts.

**WJBR** Gensch and Stearns, Omro, Wis. 217.1 meters, 1320 kilocycles, 50 watts.

**WJBU** Bucknell University, Lewisburg, Pa. 211.1 meters, 1420 kilocycles, 100 watts. Slogan: "In the Heart of the Keystone State."

**WJBV** George J. Cook, 9024 78th St., Woodhaven, N. Y. 288.3 meters, 1040 kilocycles, 100 watts. Sun, 1-5 pm, popular program. Tues, Thurs, 8-10 pm, popular program. Eastern standard time.

**WJBW** Serve-U-Radio Co., 2743 Dumaine St., New Orleans, La. 270 meters, 1110 kilocycles, 20 watts. Tues, Fri, 10-11 pm. Central standard time. Slogan: "The Serve-U-Radio Co."

**WJR** Jewett Radio & Phonograph Co. and Detroit Free Press, Detroit, Mich. 516.9 meters, 580 kilocycles, 5000 watts, class B. Daily ex Sun, 7-8 pm, 9-10 pm. Mon, Wed, Sat, 11:30 pm-1 am. Thurs, Sat, 10-11 pm. Eastern standard time. Slogan: "Where Joy Reigns."

**WJJD** Loyal Order of Moose, Mooseheart, Ill. Chicago programs from the Palmer House, Chicago, in co-operation with the Chicago Evening Post. 370.2 meters, 810 kilocycles, 1000 watts. Sun, 7:45 am, Catholic services; 9:40 am, Protestant; 1 pm, organ; 2 pm, Bible & song services; 4 pm, symphony orchestra. Daily ex Sun, 1 pm, orchestra; 2 pm, organ; 4 pm, Mooseheart program; 5:45 pm, dinner program. Daily ex Sun, Mon, 8 pm, studio; 10 pm, studio; 12 pm, studio. Central standard time. Slogan: "Every Child Is Entitled to a High School Education and a Trade."

**WJUG** Uda B. Ross, 30 Park Place, New York City, N. Y. 516.9 meters, 580 kilocycles, 250 watts. Daily on air. Unlimited time. Eastern standard time. Slogan: "The Jug."

**WJY** Radio Corporation of America, 33 W. 42nd St., New York, N. Y. 405.2 meters, 740 kilocycles, 1000 watts, class B. Tues, Thurs, Fri, 7:30-11:30 pm. Sun, 8:15-10:30 pm. Eastern standard time.

**WJZ** Radio Corporation of America, 33 W. 42nd St., New York, N. Y. 454.3 meters, 660 kilocycles, 5000 watts, class none. Sun, 6 to 10:30 pm. Daily ex Sun, 1-2 pm, 4-6 pm, 7-11:30 pm, miscellaneous program. Eastern standard time.

**WKAF** Radio Service Corporation, Hotel Antlers, Milwaukee, Wis. 261 meters, 1150 kilocycles, 500 watts. Sun, 4-6 pm, studio program. Mon, Fri, 10-11 pm, studio program. Wed, Fri, 7-8, 9-10 pm, popular studio program. Thurs, 2:30-3:30 pm, popular program. Slogan: "Wisconsin's Keenest Aerial Feature."

**WKAQ** Radio Corp. of Porto Rico, San Juan, Porto Rico. 340.7 meters, 880 kilocycles, 500 watts. Mon, 8-9 pm, Rialto Theater; 9-10:30 pm, studio program. Wed, 8-10 pm, musical band of San Juan. Fri, 9-10:30 pm. Local time (one hour earlier than E. S. T.) Slogan: "The Island of Enchantment."

**WKAR** The Michigan State College, East Lansing, Mich. 285.7 meters, 1050 kilocycles, 1000 watts. Sun, 6-8, church services. Daily ex Sun, 12-12:30, markets, weather, educational program. Tues, Thurs, 7-8 pm, educational program. Wed, 8-9:15 pm, musical program. Fri, 7-9:15 pm, state department program. Sat, football games, basketball games, afternoon & evening. Central standard time.

**WKAU** Laconia Radio Club, 480 Main St., Laconia, N. H. 224 meters, 1340 kilocycles, 50 watts. Fri, pm. Sun, 10:30 am, 6:30 pm. Eastern standard time. Slogan: "The Voice of the Winnepesaukee Lake Region."

**WKBB** Sanders Bros., 607 Jefferson St., Joliet, Ill. 282.2 meters, 1060 kilocycles, 150 watts, class A. Wed, 6-8:30 pm, dinner program. Thurs, 8:30-12 pm, good time program. Sun, 3-5 pm, classical; 8:30-12 pm, frolics. Central standard time.

**WKBC** H. L. Ansley, 1428 North 12th Ave., Birmingham, Ala. 225 meters, 1330 kilocycles, 10 watts. Tues, Thurs, Sat, 7:30-8 pm. Music. Sat, Sunday school talks on lessons for Sun. Central standard time.

**WKBE** K. & B. Electric Co., 59 Emerald Ave., Webster, Mass. 270.1 meters, 1110 kilocycles, 100 watts, class A. Mon, 8-11:30 pm. Eastern standard time.

**WKBM** WKBM Radio Broadcasting Co., 130 Broadway, Newburgh, N. Y. 215.7 meters, 1390 kilocycles, 100 watts. Sun evening, church services. Mon, dinner musical program. Tues, Thurs, 6-12 pm, studio program. Fri, 7-11 pm, studio program. Sat, 10:30 am, morning program; 9 pm, dance music. Eastern time.

**WKBQ** Starlight Amusement Park, 1100 E. 177th St., New York City, N. Y. 285 meters, 1152 kilocycles, 50 watts. Daily ex Sun. Irregular hours. Eastern standard time.

**WKJC** Kirk Johnson & Co., 16-18 W. King St., Lancaster, Pa. 258 meters, 50 watts, 1160 kilocycles. Sun, 9-10:30 pm. Mon, Wed, Fri, 8-10 pm.

**WKRC** The Kodel Radio Corp., Cincinnati, Ohio. 422.3 meters, 710 kilocycles, 1000 watts. Sun, 6:45-7 pm, 10-12 pm, 12-2 am. Mon, Wed, 6:15-7 pm, 8-10 pm, 12-2 am. Tues, 10-12 pm. Thurs, 8-10 pm. Sat, 10-12 pm. Central standard time. Slogan: "WKRC—K, Kodel—R, Radio—C, Corporation."

**WKY** E. C. Hull, H. S. Richards, Oklahoma City, Okla. 275.1 meters, 1090 kilocycles, 100 watts. Daily ex Sun, 9 am, 2:30 pm, markets, weather; 7-8:30, music. Sun, 11 am, 7:30 pm, services. Central time.

**WLAL** First Christian Church, 9th & Boulder Sts., Tulsa, Okla. 250 meters, 1200 kilocycles, 100 watts, class A. Wed, 9:30 pm. Sat, 7:30 pm. Sun, 7:30 pm, church. Central standard time.

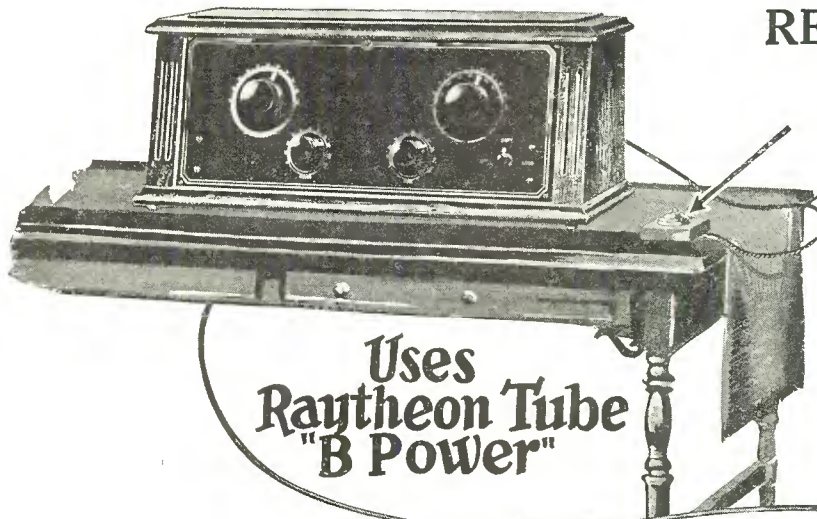
**WLAP** W. V. Jordon, 306 W. Breckenridge St., Louisville, Ky. 275 meters, 1090 kilocycles, 20 watts, class A. Thurs, Fri, 9:20-10 pm. Central standard time.

# Marvelous New STORAD

REMOTE CONTROL  
POWER  
SUPPLY

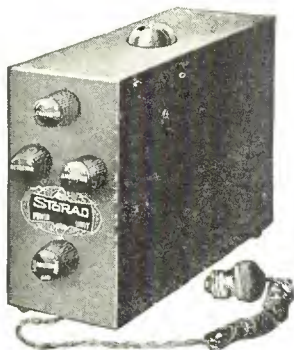
with

Set Control  
Button

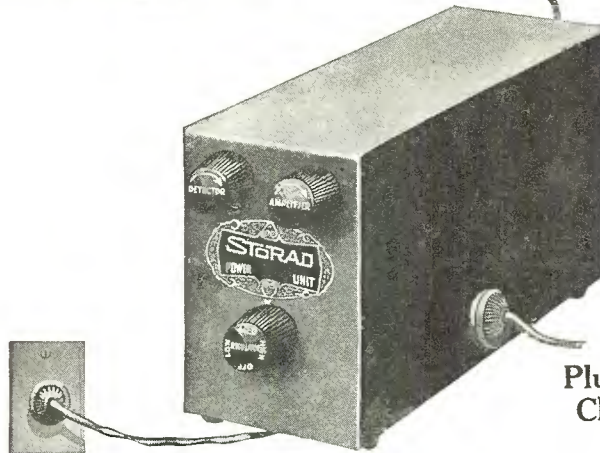


Uses  
Raytheon Tube  
"B Power"

Type 101X—"B Power" Supply, Raytheon Tube Type Unit operating on house lighting circuit. Three variable controls from 180 volts down. Has REMOTE CONTROL feature.



Type 201AX—"B Power" Supply and Trickle Charger. Combination unit illustrated here, combines Raytheon type "B" Eliminator with Storad Trickle Charger. Operates with REMOTE CONTROL.



Plug in Trickle  
Charger Here

## Unique, Practical and an Exclusive Storad Feature!

Here is the kind of Power Supply you have been waiting for—REMOTE CONTROL—the kind that is controlled with one button placed where you want it. Place your eliminator, charger and batteries where you wish—cellar, clothes press, or cabinet—you do not have to touch them to turn them on or off. The control button turns off the set and eliminator and turns on the Trickle Charger at the same time.

### Interchangeable With Other Units

You do not have to use all Storad Units to enjoy this REMOTE CONTROL feature. A Storad Trickle Charger will work with any make of eliminator and operate it by REMOTE CONTROL, or you can use a Storad 101X "B Power" with another make Trickle Charger and enjoy the same advantages.

### Raytheon "B Power"

Storad "B" Power Units having the REMOTE CONTROL feature are Raytheon Tube Type. Storad Exclusive Circuit (Patent Pending). Tobe Deutschmann Heavy Duty Condensers are used throughout.

### 100% Over Capacity

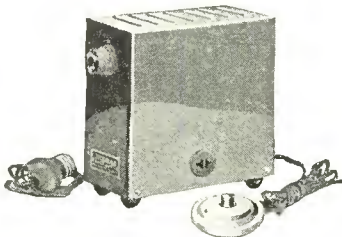
That's why Storad Power Supply will work on any set without hum. Storad Heavy Duty Units have ample power for UX171 Power Tubes even when used on the largest sets.

### No More Power Worries

Put a Storad on your circuit and your power worries are over. You will have current—lots of it—when you want it. Storad Power Supply is the result of three years of research work and one year of actual test.

Insist on Storads from your dealer or write us direct

The Storad Manufacturing Company  
2411 Detroit Avenue, Cleveland, Ohio



Type 701X Trickle Charger. Sufficient capacity for "A" Batteries used with larger sets. Variable Control regulates charging current from 1/2 to 1 amp. Has REMOTE CONTROL feature.

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

**WLB** University of Minnesota, Minneapolis, Minn. 277.6 meters, 1080 kilocycles, 500 watts.

**WLBL** Wisconsin Department of Markets, Stevens Point, Wis. 277.6 meters, 1080 kilocycles, 500 watts. Mon, Tues, Wed, Thurs, Fri, Sat, 8-9-10-11 am, 12 noon, 1 pm, markets. Mon, 8 pm, musical program. 1st, 3rd, 5th Sat of month, 8 pm, musical program. 2nd, 4th Sat of month, 10 pm, musical program. Central standard time. Slogan: "Wisconsin, Land of Beautiful Lakes."

**WLIB** Liberty Magazine, Chicago, Ill. 302.8 meters, 990 kilocycles, 4000 watts. Daily ex Sun & Mon, 7-8 pm, 9-10 pm & 11-12 pm. Sun, 4-5 pm. Central standard time. Slogan: "Liberty—A Weekly for Everybody."

**WLIT** Lit Bros., Philadelphia, Pa. 395 meters, 760 kilocycles, 500 watts, class B. Daily ex Sun, 12-1 pm, 2-3 pm, 4:30-5 pm. Mon, 12 noon to 11 pm. Tues, 11 am to 8 pm. Wed, 12 noon to 11 pm. Thurs & Sat, 12 noon to 8 pm. Fri, 12 noon to 12 midnight. Eastern standard time. Slogan: "The Quaker City Siren."

**WLS** Sears Roebuck Agricultural Foundation, Chicago, Ill. 345 meters, 870 kilocycles, 5000 watts. Sun, 10:45-12, U. of C.; 12-1 pm, organ; 7-9 pm, Little Brown Church. Mon, 6:30, 7-7:30, 7:45, markets; 9-9:30-10-10:30-11-11:30-11:45-1-1:25-2, Tues, Thurs same as Mon, also, 2:30, Home Makers' Hour; 6-9, musical program. Wed, Fri, same as Tues evening programs, 6-12 pm. Sat same as Wed, with exception of Homemakers' hour. Central standard time. Slogan: "World's Largest Store. Work Better, Live Better, Sell Better."

**WLSL** Lincoln Studios, Inc., Providence, R. I. 440.9 meters, 680 kilocycles, 500 watts.

**WLTS** Lane Technical High School, 1225 Sedgwick St., Chicago, Ill. 258 meters, 1160 kilocycles, 100 watts. Fri, 1-2 pm. Tues, 1-2:30 pm, educational & musical. Central standard time.

**WLW** The Crosley Radio Corp., 3401 Colerain Ave., Cincinnati, Ohio. 422.3 meters, 709 kilocycles, 5000 watts. Sun, 9:30 am-8:50 pm, church services. Mon, Tues & Sat, 8 am-9 pm, concerts, orchestra, etc. Wed, 8 am-11 pm. Thurs, 8 am-12:15 am, novelties, etc. Fri, 8 am-4 pm, weather, etc. Central standard time. Slogan: "What Listeners Want."

**WLWL** Missionary Society of St. Paul the Apostle, 425 W. 59th St., New York, N. Y. 384.4 meters, 780 kilocycles, 5000 watts. Sun, 8-9:15 pm, church services. Mon, 8-11 pm, musical program, vocal numbers, etc. Tues, Wed, Thurs, 9-11 pm, musicals, lectures, popular talks, etc. Eastern standard time.

**WMAC** Clive B. Meredith, Cazenovia, N. Y. 275 meters, 1090 kilocycles, 500 watts. Sun, 3:30 pm, choral singing; 9:30 pm, popular program. Mon, 8:30, semi-classical program; 7:30, Weekly Letter to Dad. Daily ex Sun & Mon, 7:30 pm. Tues, Autobiography of Infamous Bugs. Wed, Chats with Weatherman; 8:30, popular program. Thursday, Primer for Town Farmers. Fri, 7:30 pm, Agricultural Interview; 8:30 pm, classical program. Sat, Farm News Digest. Eastern time. Slogan: "Voice of Central New York."

**WMAF** Round Hills Radio Corp., South Dartmouth, Mass. 440.9 meters, 680 kilocycles, 1000 watts, class B. Eastern standard time.

**WMAK** Lafayette Broadcasting Studios, Inc., Hotel Lafayette, Buffalo, N. Y. 365 meters, 1130 kilocycles, 500 watts. Sun, 10:25 am-7:50 pm, church services. Daily ex Sun, 12 noon, farm flashes; 6:15 pm, dinner program; 7:15 pm, daily news items; 7:30 pm, weather, health, etc.; 8 pm, studio program, concerts, recitals, etc. Tues, Wed, Thurs, 10:30 pm, musical program. Thurs, 11:30 pm, organ recital. Eastern time.

**WMAL** M. A. Leese Optical Co., 712 11th St., Washington, D. C. 212.6 meters, 1410 kilocycles, 100 watts, class A. Tues, Thurs & Sat, 7 pm, varied. Eastern Standard time.

**WMAN** First Baptist Church, Columbus, Ohio. 278 meters, 1080 kilocycles, 50 watts, class A. Sun, 10:30-12 noon; 7:30-9 pm, church services. Eastern standard time.

**WMAQ** The Chicago Daily News, 15 N. Wells St., Hotel LaSalle, Chicago, Ill. 447.5 meters, 670 kilocycles, 1000 watts. Daily ex Sun & Mon, 10 to 11 am, 12 noon to 1:45 pm, 2:45 to 7 pm, 8 to 10 pm. Mon, 10 am to 11 am, 12 noon to 1:45 pm, 2:45 to 7 pm. Central standard time.

**WMAZ** Kingshighway Presbyterian Church, St. Louis, Mo. 248 meters, 1210 kilocycles, 100 watts, class A. Sun, 11 am-12 pm, 8-9 pm, church services. Central standard time.

**WMAZ** Mercer University, Macon, Ga. 261 meters, 1150 kilocycles, 500 watts, class A. Mon, Thurs, 10-11 pm, musical. Tues & Fri, 8-9 pm, sacred music. Wed, 11-12 pm, musical program. Fri, 9-11 pm, musical. Central standard time. Slogan: "Watch Mercer Attain Zenith."

**WMBB** American Bond & Mortgage Co., 6201 Cottage Grove Ave., Chicago, Ill. 250 meters, 1200 kilocycles, 500 watts. Sun, 3-6 pm, popular concert program; 7:40-9 pm, Christian Science services; 9-11 pm, popular program. Daily ex Sun, Mon, 7-8:30 pm, semi-classical program; 9-11 pm, popular program. Central standard time. Slogan: "World's Most Beautiful Ballroom."

**WMBC** Michigan Broadcasting Co. (F. G. Siegel), Hotel Addison, Detroit, Mich. 256 meters, 1170 kilocycles, 100 watts. Sun, 6:30-10 pm, dinner hour, studio program. Daily ex Sun, 6:30-8:30 pm, dinner hour. Mon, Tues, Wed, 10-12 pm, studio; 12-1 am, midnight frolic. Thurs, Fri, Sat, 8-10 pm, studio; 12-1 am, midnight frolic. Eastern standard time. Slogan: "The Singing Announcer."

**WMBF** Fleetwood Hotel, Miami Beach, Fla. 384.4 meters, 780 kilocycles, 500 watts. Daily, 7:30 pm-12:30 am, orchestra. Tues, silent night. Eastern time. Slogan: "Wonderful Miami Beach Fleetwood."

**WMBI** The Moody Bible Institute of Chicago, 153 Institute Place, Chicago, Ill. 288.3 meters, 1040 kilocycles, 500 watts. Sun, 3:30-5:30 pm, 7-9 pm, Bible classes. Daily ex Sun, 7-7:30 am, morning worship; 10:30-11:30 am, missionary hour, Bible study; evening, 8:30-9:30, Bible study. Central standard time. Slogan: "The West Point of Christian Service."

**WMC** Commercial Publishing Co., The Commercial Appeal, 30 N. 2nd St., Memphis, Tenn. 499.7 meters, 600 kilocycles, 1000 watts. Sun, 11 am, church services. Daily ex Sun, 9:45 am, markets. Mon, Wed, Fri, 12 noon, music. Tues, Thurs, 12 noon, markets. Mon, 8 pm, farm talks. Tues, 7:45 pm, bridge game. Thurs, 8 pm, music. Mon, Tues, Fri, Sat, 8:30-11 pm, music, frolic. Central standard time. Slogan: "WMC, Memphis, Down in Dixie."

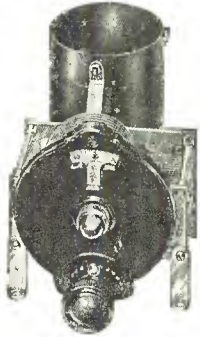
**WMCA** Hotel McAlpin, New York, N. Y. 340.7 meters, 880 kilocycles, 500 watts. Sun, 10:30 am-midnight. Mon, Wed, Fri, Sat, 10:30 am-midnight. Tues, Thurs, 10:30 am-2 am. Eastern standard time. Slogan: "Where the Great White Way Begins."

**WMRJ** Peter J. Prinz, 10-12 New York Ave., Jamaica, N. Y. 227.1 meters, 1320 kilocycles, 5 watts. Sun, 9:30 pm-12 midnight, dance music & popular program. Tues, 8:30 pm-11:30 pm, dance music, popular program. Thurs, 8:30 pm-11:30, semi-classical, popular program. Eastern time. Slogan: "The Gateway to the Sunrise Trail."

**WMSG** Madison Square Garden, New York, N. Y. 302.8 meters, 900 kilocycles, 500 watts.



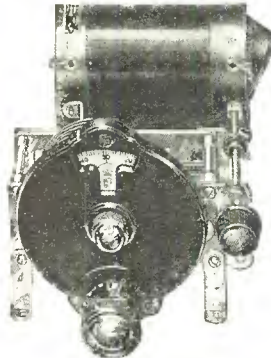
# To Build Good Radio Sets



**BD-1B WITH "B" DIAL**

NATIONAL TUNING UNIT BD-1B consists of a BROWNING-DRAKE spacewound inductance coil, mounted on a .0005 NATIONAL "EQUICYCLE" (SLF) Condenser and covering the broadcast range. The inductance has the lowest R. F. resistance recorded for a coil of this type. The condenser uses three-quarters instead of one-half turn, thus still further spacing out the stations. A NATIONAL VELVET-VERNIER 4-inch dial is included.

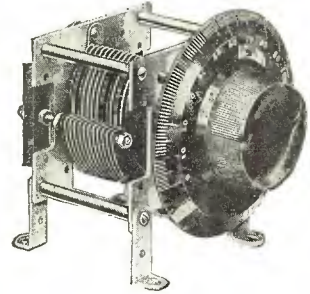
Price ..... \$10.25  
 With ILLUMINATED Type C Dial..... 10.75  
 Also furnished with NATIONAL EQUIMETER (SLW) Condenser at \$1.00 less than above list.



**BD-2B WITH "B" DIAL**

The BD-2B NATIONAL Tuning Unit combines a BROWNING-DRAKE spacewound Transformer with a .00025 NATIONAL "EQUICYCLE" Condenser. The primary of the BROWNING-DRAKE Transformer is SLOW wound—a unique BD feature, and one of the essential reasons why these units perform so well. THE NATIONAL VELVET-VERNIER Dial is known from coast to coast for its perfection and constancy of action. It is now also made as Type C with an ILLUMINATED Dial.

Price—BD-2B, with Type B Dial as shown, \$13.75  
 With Type C ILLUMINATED Dial ..... 14.25  
 Also furnished with NATIONAL EQUIMETER (SLW) Condenser at \$1.00 less than above list.



**EM-500 WITH "A" DIAL**

The NATIONAL "EQUIMETER" Condensers (straight-line wavelength) are as popular as ever among broadcast listeners and Radio amateurs. Made in all capacities from 50 to 1,000 MMF.

Type A NATIONAL VELVET-VERNIER Dials,—the original and matchless dials for operation of variable condensers,—are supplied with these condensers.

Price— 50 MMF.....\$5.00  
 250 MMF..... 6.00  
 500 MMF..... 6.50



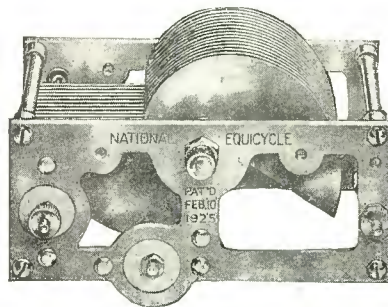
**THE ILLUMINATED DIAL (Type C)**

To meet the demand for a dial to make logging of stations easy in any part of a room at night, without respect to the room lights, the NATIONAL COMPANY, INC., has brought out the ILLUMINATED Dial Type C,—a VELVET-VERNIER product. This has the same variable ratio of from 6-1 to 20-1, the same perfection of construction and operation, beauty of appearance and ease of attachment, as the Type B VELVET-VERNIER Dial.

It has in addition a tiny invisible 6-volt lamp, which brilliantly lights the scale. It is usually connected with the filaments so that one switch lights the tubes and dials together. Extra 6-volt lamps, \$0.20. 4 1/2-volt lamps, \$0.35 each.

Made in either clockwise or counter-clockwise and with 360° divisions (0-200) or in Dual Range—180° (0-100-0).

Price—In nickel finish.....\$3.00  
 In gold finish..... 3.50



**THE NATIONAL "EQUICYCLE" CONDENSERS**

These Variable Condensers are unlike any others because their SLF plates revolve three-quarters instead of one-half turn, to cover the tuning range, resulting in a greater spacing of crowded stations than is possible with a 180° movement. Shape of plates developed by Prof. Field of Harvard University and Carl A. Heilmann of Washington, D. C. Plates and frame are made of aluminum with brass working parts and hard rubber insulation. The prices include either Type A or Type B NATIONAL VELVET-VERNIER Dial. The ILLUMINATED Type C Dial is furnished for \$0.50 additional.

Price—250 MMF.....\$7.00  
 350 MMF..... 7.25  
 500 MMF..... 7.50



**NATIONAL IMPEDAFORMERS**

No matter how sensitive or selective a Radio set may be, it gives little real satisfaction if the quality of its audio amplification falls below modern standards.

The NATIONAL IMPEDAFORMERS have been designed for quality audio amplification. Each of the three units contains a .1 Mfd. TOBE Condenser and a LYNCH Resistor. The first unit has also an R.F. Choke, which is a real necessity for perfection of reproduction. Three impedafomers, three tube sockets and a rheostat are all that is necessary for an audio amplifier which is the last word in power and faithfulness of reproduction. Price—NATIONAL IMPEDAFORMERS,

Type B, each.....\$5.50

The NATIONAL RADIO SET ESSENTIALS listed above, may be easily built by you into a modern receiving set,—capable of distance, able to separate stations sharply, of fine appearance,—easy to operate and easy to listen to. Send for Bulletin 116-C-B.  
 National Company, Inc., now also makes Power Transformers, Filter Chokes, Filter Condenser Blocks, using TOBE Condensers, and Tone Filters for B-Eliminator and Power Amplifier construction,—both for Raytheon and other rectifying tubes. Send for special literature, mentioning CITIZENS RADIO CALL BOOK.

BE SURE YOU GET THE GENUINE  
**NATIONAL**  
 RADIO PRODUCTS

NATIONAL CO., INC., Engineers & Manufacturers; W. A. READY, Pres., 110 Brookline St., Cambridge, Mass.

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

**WNAB** The Shepard Stores, Winter St., Boston, Mass. 280.2 meters, 1070 kilocycles, 100 watts, class A. Daily ex Sun, 3 to 4 pm, daily Phonophone record hour. Eastern standard time.

**WNAC** The Shepard Store, Winter St., Boston, Mass. 430.1 meters, 697 kilocycles, 500 watts. Sun. 10:45 am, church services; 1:2 pm, musical concert; 7:05-7:15 pm, church services. Daily ex Sun, 10:30-11:30 am, women's club; 12:15-1 pm, church services; 1-2 pm, luncheon concert; 4-5 pm, music; 6-6:30 pm, children's club; 6:30-7:30, dinner dance; 7:30-8 pm, news and talks; 8-10 pm, concert. Sat, 10:05 pm, dance program. Eastern time.

**WNAD** University of Oklahoma, Norman, Okla. 254 meters, 1180 kilocycles, 500 watts, class A. Mon, Tues, Wed, Thurs, 12:30-1 pm, music; 3:30-4:30 pm, jazz orchestra; 7:15-8 pm, talks; 10:30-12 pm, music. Sun, 9:15-10:30 pm. Central standard time. Slogan: "The Voice of Soonerland."

**WNAL** R. J. Rockwell, 5019 Capitol Ave., Omaha, Nebr. 258.5 meters, 1160 kilocycles, 500 watts, class A. Tues, Fri, 7:30-9 pm. Central standard time. Slogan: "Pioneer Station of Omaha."

**WNAP** Wittenberg College, Springfield, Ohio. 248 meters, 1210 kilocycles, 100 watts, class A. Central standard time.

**WNAT** Lensing Bros. Co., Spring Garden & Ninth St., Philadelphia, Pa. 250 meters, 1200 kilocycles, 100 watts, class C. Wed, 6:50 pm until midnight, musical. Sat, 8 pm until midnight. Eastern standard time. Slogan: "We Never Are Tired."

**WNAX** Dakota Radio Apparatus Co., Yankton, S. Dak. 244 meters, 1230 kilocycles, 100 watts, class A. Daily ex Sun, 11:30 am, markets and weather. Tues, Thurs, Sat, 5 pm, musical. Central standard time. Off air until first of September.

**WNBH** New Bedford Hotel, Pleasant St., New Bedford, Mass. 247.8 meters, 1210 kilocycles, 250 watts. Sun, 11 am-12:15 pm, church services. Mon, Fri, 6-11 pm, musical program. Tues, Wed, Thurs, Sat, 7-7:15 pm, news flashes. Wed, 6-7 pm, dinner concert. Eastern standard time.

**WNJ** Radio Shop of Newark, 89 Lehigh Ave., Newark, N. J. 252 meters, 1190 kilocycles, 500 watts, class A. Daily ex Mon & Thurs, 6-6:30 pm, 8:30-12 pm, dance music. Eastern standard time. Slogan: "The Voice of Newark."

**WNOX** Peoples Tel. & Tel. Co., 313 Commerce St., Knoxville, Tenn. 268 meters, 1120 kilocycles, 500 watts, class A. Mon, Wed, Fri, 8-10 pm. Central standard time. Slogan: "Smoky Mountain Station."

**WNYC** City of New York, New York City, N. Y. 526 meters, 570 kilocycles, 1000 watts, class B. Daily ex Sun, 6-11 pm. Mon, Wed, Fri, 11 am-12:30 pm. Sun, irregular. Eastern standard time. Slogan: "Municipal Broadcasting Station of the City of New York."

**WOAI** Southern Equip. Co., San Antonio, Texas. 394.5 meters, 760 kilocycles, 2000 watts. Sun, 11 am-7:45 pm, church services. Daily ex Sun, 10 am, weather, markets, etc.; 2:30-3 pm, music; 3-4:45 pm, news, music, children's story telling, etc. Daily ex Sat, Sun, Mon, 8:30-9:30 pm, varied program. Central standard time.

**WOAN** The Vaughan School of Music, Lawrenceburg, Tenn. 282.8 meters, 1060 kilocycles, 500 watts, class B. Daily ex Sun, 9-10 pm, musical. Central standard time. Slogan: "Watch Our Annual Normal."

**WOAW** The Voice of the Woodmen of the World Life Insurance Association, Headquarters Bldg., Omaha, Nebr. 526 meters, 570 kilocycles, 1000 watts. Sun, 9 to 10:45 am, 2 to 4 pm, 6 to 7 pm, religious services; 9 to 11 pm, religious. Mon, Tues, Thurs & Fri, 8 to 9 am, stock reports; 10-11:30 am, 12:30 to 2 pm, stock reports & musical; 4 to 6 pm, miscellaneous; 6-7:30 pm, dinner concert; 9 to 11, concert. Sat, regular programs till 7:30 pm. Additional programs under the Omaha Chamber of Commerce. Central standard time. Slogan: "The Fraternal Station at Omaha."

**WOAX** Franklin J. Wolff, the Monument Pottery Co., Trenton, N. J. 240 meters, 1250 kilocycles, 500 watts. Daily ex Sun, 10:05-12:45 pm, music, weather forecast, police reports, crop reports for New Jersey. Eastern standard time. Slogan: "The Voice from Trenton."

**WOC** The Palmer School of Chiropractic, Davenport, Iowa. 483.6 meters, 620 kilocycles, 5000 watts. Sun, 1-2 pm, orchestra; 6:30 pm, church; 8:15-9:15 pm, 10-11 pm, orchestra. Daily ex Sun, 1:57-6 pm, time signals, markets. Mon, 3-3:30 pm, home management; 5:45-6 pm, chimes & sports. Tues, 7-9:30, WEA; 9:30 pm, musical or lecture. Wed, 4-4:45 pm, musical; 9-9:30 pm, WEA; 9:30-10:30 pm, organ. Thurs, 7-7:30 pm, WEA; 7:30-8, Quartette Plowboys; 8-10 pm, WEA; Fri, 7-7:30 pm, Ivory Twins; 7:30-8:30 pm, Melody Mexicos; 8:30-9:30 pm, musical from WEA; Sat, 8-9 pm, WEA. Central standard time. Slogan: "Where the West Begins and in the State Where the Tall Corn Grows."

**WOCB** Orlando Broadcasting Co., P. O. Box 451, Orlando, Fla. 293.7 meters, 1021 kilocycles, 50 watts. Daily ex Sun, 3-4 pm, 7:30-8 pm. Sat, 6-7 pm. Eastern time. Slogan: "Orlando, City Beautiful."

**WOCL** Jamestown Furniture Assoc., Jamestown, N. Y. 275.2 meters, 1090 kilocycles, 15 watts, class A. Sun, 10:30 am & 7:30 pm, church service. Mon, 9 to 9:15 pm, 9:15 to 12 midnight, educational feature popular program. Eastern standard time.

**WODA** The O'Dea Temple of Music, 115 Ellison St., Paterson, N. J. 390.9 meters, 767 kilocycles, 250 watts. Sun, 10:30 am, 7:30 pm, church services. Daily ex Sun, 12-1 noon; 5-7 pm, studio; 8-11 pm, studio. Tues, 11:30-12:30 am, Nite Club. Thurs, 11-12 midnight, Nite Club. Fri, 10:30-11:30 pm, dance; 11:30-12:30 am, Nite Club. Eastern standard time. Slogan: "The Voice of the Silk City."

**WOI** Elec. Engineering Dept., Iowa State College, Ames, Iowa. 270 meters, 1110 kilocycles, 750 watts, class B. Daily ex Sun, 9:30 am, weather, markets; 10:15 am, weather & markets; 12:30 pm, chimes, weather, markets & educational talks; 9:30 pm, weather. Mon & Thurs, 7:30 pm, educational talks, program. Sun, 10:45 am, chimes; 11 am, college chapel. Central standard time.

**WOK** Neutrowound Radio Mfg. Co., Homewood, Ill. 217 meters, 1380 kilocycles, 5000 watts. Sun, 6-12 pm, organ concert, orchestra. Daily ex Sun & Mon, 6-7:45 pm, 8-9 pm, 9:20-12 pm. Central standard time.

**WOKO** Otto Baur, Dyckman Radio Shop, 138 Dyckman St., New York City. 233 meters, 1290 kilocycles, 50 watts, class A. Mon, Thurs, Sats, 7-12 pm. Tues & Fri, 7-12 pm, non-regular. Eastern standard time.

**WOO** John Wanamaker, Philadelphia, Pa. 508.2 meters, 590 kilocycles, 500 watts. Daily ex Sun, 11 am, music; 11:30, weather; 11:55 am, time signals; 12 noon, music; 4:40 pm, news reports; 4:45 pm, musical; 9:55 pm, time signals; 10:02 pm, weather report. Mon, Wed, Fri, 7:30-11 pm, concerts. Sun, 10:45 am, or 7:45 pm, 2:15 pm, Sunday School musical program; 6 pm, organ recital. Eastern standard time.

**WOOD** Hotel Rowe, Grand Rapids, Mich. 241.8 meters, 1240 kilocycles, 5000 watts. Daily ex Sat & Sun, 7:35-11 pm. U. S. farm school, musical program, presentation, air mail hour, nut club. Central standard time. Slogan: "The Furniture Capital of America."



"Marvelous!" "Unbelievable!" "What a Bargain!" Every day we receive scores of letters from users of the amazing new Roll-O "B" Battery Eliminator praising this invention to the skies. It does all that any higher priced "B" Eliminator can do—and more!

**Forget Battery Troubles Forever**  
All you do is hook up this Roll-O Eliminator to your set and sit back to the greatest radio pleasure of your life. No more batteries to worry about. Enjoy better reception, sharper tuning. Don't worry because "B" batteries run down and spoil the reception of your set.

easy instructions. Made to last years. Solidly built in beautifully finished metal case with genuine Bakelite top.

**Order Today—10 Days Trial**

Now, for no more than the cost of good "B" batteries you can own a Roll-O Eliminator that will make batteries unnecessary forever. Pin a dollar bill to coupon and mail today. Postman will deliver Eliminator to you. Deposit \$6.95 (plus few cents postage) with him. Use Eliminator 10 days. If not delighted with results, return it within ten days and receive your money. Don't delay. Act quick to become one of the thousands of enthusiastic users.

**Read This Proof!**

I have received the Roll-O "B" Battery Eliminator and I am greatly pleased with it. We did not know we had a good radio till we hooked up your Eliminator. To me, it is a 100% perfect Eliminator.  
Detroit, Mich.

So far it has given me very good service.  
Perth Amboy, N. J.  
Recently received a "B" Eliminator. Works fine.  
Akron, Ohio  
The eliminator is working perfectly.  
Louisville, Ky.

I received the Eliminator and will say that its performance is all I could ask.  
Waterman, Cal.

Your "B" Eliminator received and worked satisfactory. Please send me another one at once. Do you give agencies for local counties? I can sell several of these here.  
Zanesville, O.

I have your "B" Eliminator and like it very much.

Names on request.

**Operates on All Sets**

Works perfectly on any direct or alternating current, giving up to 90 volts and using full wave of the power supply. Hooks up in a moment to any set up to six tubes. Constant voltage assures more power.

**Completely Equipped—No Extras to Buy**

Five minutes after you receive this Eliminator you can be enjoying its advantages. Comes to you completely equipped, together with simple,

**Trickle Charger, \$3.95**

Charges "A" or "B" batteries using ordinary house current. Hooked to your "A" battery gives complete "A" power unit. Send \$1.00 with order. Pay \$2.95, plus few cents postage, to postman when he delivers your charger C. O. D.  
Use for ten days. If not more than satisfied, return it and get your money back.

**Send \$1.00 with this Coupon**  
*only!*

The Roll-O Radio Co.,  
Dept. Q-15,  
3rd and Sycamore Sts.,  
Cincinnati, Ohio.

Gentlemen: I attach \$1.00. Please send Roll-O Eliminator to me C. O. D. for \$6.95 (plus a few cents postage) on special 10-day Trial Guarantee.

Name.....  
Address.....  
Town.....State.....

**THE ROLL-O RADIO CO.**

Dept. Q-15, 3rd & Sycamore St., Cincinnati, Ohio

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

**WOQ** Unity School of Christianity, 917 Tracy Ave., Kansas City, Mo. 278 meters, 1080 kilocycles, 1000 watts, class B. Tues, 8-9:30 pm, devotional musical program. Thurs, 7-8 pm, educational; 8-10 pm, musical. Sat, 8-10 pm, classical music; 10-11 pm, special radio healing service. Sun, 11 am-12:30 pm, morning services; 7-9:30 pm, evening services. Central standard time.

**WOR** L. Bamberger & Co., 46 Bank St., Newark, N. J. 405.2 meters, 740 kilocycles, 500 watts, class B. Mon, 3:45 pm, 5:15-12 pm. Tues & Thurs, 5:15-7:30 pm. Wed, 5:15-11 pm. Fri, 5:15-6:30 pm. Sat, 3 pm, 6:30-12 pm. Eastern standard time.

**WORD** Peoples Pulpit Association, Webster Hotel, 2150 Lincoln Park West, Chicago, Ill. 275 meters, 1090 kilocycles, 5000 watts. Sun, 10-11 am, 2:30-4 pm, 7-8 pm, 9-11 pm. Mon, Tues, Wed, Thurs, Fri, Sat, 9:10-9:30 am, 12:10-12:30 noon, 7-8 pm, 9-10 pm, 11-12 pm. Central standard time. Slogan: "The Watch Tower, Radio WORD."

**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 am, 1-2-3-5 pm (Sat ams only). Mon, Wed & Fri, 8-11 pm. Sun, 9-10 am, 7:30-9:30 pm. Central standard time. Slogan: "Watch Our State."

**WOWO** The Main Auto Supply Co., 215 W. Main St., Fort Wayne, Ind. 227 meters, 1320 kilocycles, 500 watts. Sun, occasionally. Mon, Wed, Thurs, noon & night. Tues-Fri, Sat, noon. Central standard time. Slogan: "Wayne Offers Wonderful Opportunities."

**WPAK** North Dakota Agricultural College, Fargo, North Dakota. 275 meters, 1090 kilocycles, 50 watts. Mon, Wed & Fri, 7:30 pm, during school terms. Central standard time.

**WPCC** North Shore Congregational Church, Wilson Ave. & Sheridan Road, Chicago, Ill. 258 meters, 1160 kilocycles, 500 watts. Sun, 11 am, 3:30 pm, 7:45 pm, church services, and afternoon Gospel Studio Service. Wed, 7 pm, Gospel music and Bible hour. Fri, 7:30 pm, Gospel music and Bible hour. Slogan: "We Preach Christ Crucified."

**WPDQ** The Norwood Station, Hiram L. Turner, 121 Norwood Ave., Buffalo, N. Y. 205.4 meters, 1460 kilocycles, 250 watts, class A. Tues, Wed & Sat, 8-11 pm. Sat, 11:30 pm-1:30 am. Eastern standard time.

**WPG** Municipality of Atlantic City, Atlantic City, N. J. 299.8 meters, 1000 kilocycles, 5000 watts, class B. Sun, 3:15 pm until 12 midnight, summer schedule. Mon, Tues, Thurs, Fri & Sat, 1:30 pm to midnight. Eastern standard time.

**WPRC** Wilson Printing & Radio Co., 1740 Fifth St., Harrisburg, Pa. 215.6 meters, 1390 kilocycles, 100 watts, class A. Mon, Wed & Fri, 9-11:30 pm. Eastern standard time. Slogan: "The Capital City of the Keystone State."

**WPSC** Pennsylvania State College Dept. of Elec. Engineering, State College, Pa. 261 meters, 1050 kilocycles, 500 watts, class A. Mon, Wed & Fri, 7-11 pm. Eastern standard time. Slogan: "The Voice of the Titany Lion."

**WQAA** Horace A. Beale, Jr., Parkersburg, Pa. 220 meters, 1360 kilocycles, 500 watts, class A. Eastern standard time.

**WQAC** Gish Radio Service, 108 E. 8th St., Amarillo, Texas. 234 meters, 1280 kilocycles, 100 watts, class A. Sun, 11:30 to 12:30 am; 3 to 4:30 pm; 7:30 to 9:30 pm. Central standard time. Slogan: "The Bible, the Whole Bible and Nothing But the Bible."

**WQAE** Moore Radio News Station, 41 Main St., Springfield, Vt. 246 meters, 1220 kilocycles, 50 watts, class A. Sun, 10:30 am, church services. Eastern standard time.

**WQAM** Electrical Equipment Co., 42 N. W. 4th St., Miami, Fla. 285.5 meters, 1050 kilocycles, 750 watts. Sun, 11 am-7:30 pm, church services. Daily ex Sun, 11:45-12:15 noon; evening programs vary. Eastern time. Slogan: "The Most Southern Broadcasting Station in the U. S."

**WQAN** Scranton Times, 222 Spruce St., Scranton, Pa. 250 meters, 1200 kilocycles, 100 watts, class A. Daily ex Sun, 12:30-1 pm; 4:30-5 pm. Tues & Fri, 8-10:30 pm. Sat, 10:30-12 pm. Eastern standard time. Slogan: "The Voice of the Anthracite."

**WQAO** Calvary Baptist Church, 123 W. 57th St., New York, N. Y. 361 meters, 833 kilocycles, 500 watts, class B. Wed, 8-9 pm, mid-week evening services. Sun, 11 am-12:30 pm, church services; 3-4:30 pm, Bible study class; 7:45-9:30 pm, evening services. Eastern standard time. Slogan: "The Bible, the Whole Bible, and Nothing but the Bible."

**WQJ** Calumet Baking Powder & Rainbo Gardens Station, Clark & Lawrence, Chicago, Ill. 447.5 meters, 670 kilocycles, 500 watts. Mon, 11 am-12 noon, 1:45-2:45 pm, home economics. Tues, Wed, Thurs, Fri & Sat, 11 am-12 noon, 1:45-2:45 pm, 7-8 pm, 10 pm-2 am. Central standard time. Slogan: "Chi-Caw-Go."

**WRAF** The Radio Club, Inc., 719 Michigan Ave., LaPorte, Ind. 223.8 meters, 1340 kilocycles, 100 watts. Sun, 10:15 am, church services; 8 pm, music. Mon & Thurs, 8:30 pm. Central standard time. Slogan: "The City of Maples."

**WRAC** Economy Light Co., 1105 Ludington St., Escanaba, Mich. 256 meters, 1170 kilocycles, 100 watts, class A. Sun, 6:30 to 8 pm, classical. Mon & Fri, 10:30 to 11 am, household hints and weather forecast; 6:30 to 7 pm, late news and weather forecast followed by musical program. Tues & Thurs, same as Mon & Fri. Wed, 10:30 to 11:30 am, household hints & weather forecast. Sat, 10:30 to 11 am, household hints & weather forecast; 6 to 6:30 pm, late news & weather forecast, followed with dance program. Eastern standard time. Slogan: "The Gateway to Cloverland."

**WRAM** Lombard College, Galesburg, Ill. 243.8 meters, 1230 kilocycles, 100 watts, class A. Mon, 7 pm, bedtime stories; 8 pm, educational; 9-11 pm, musical. Central standard time.

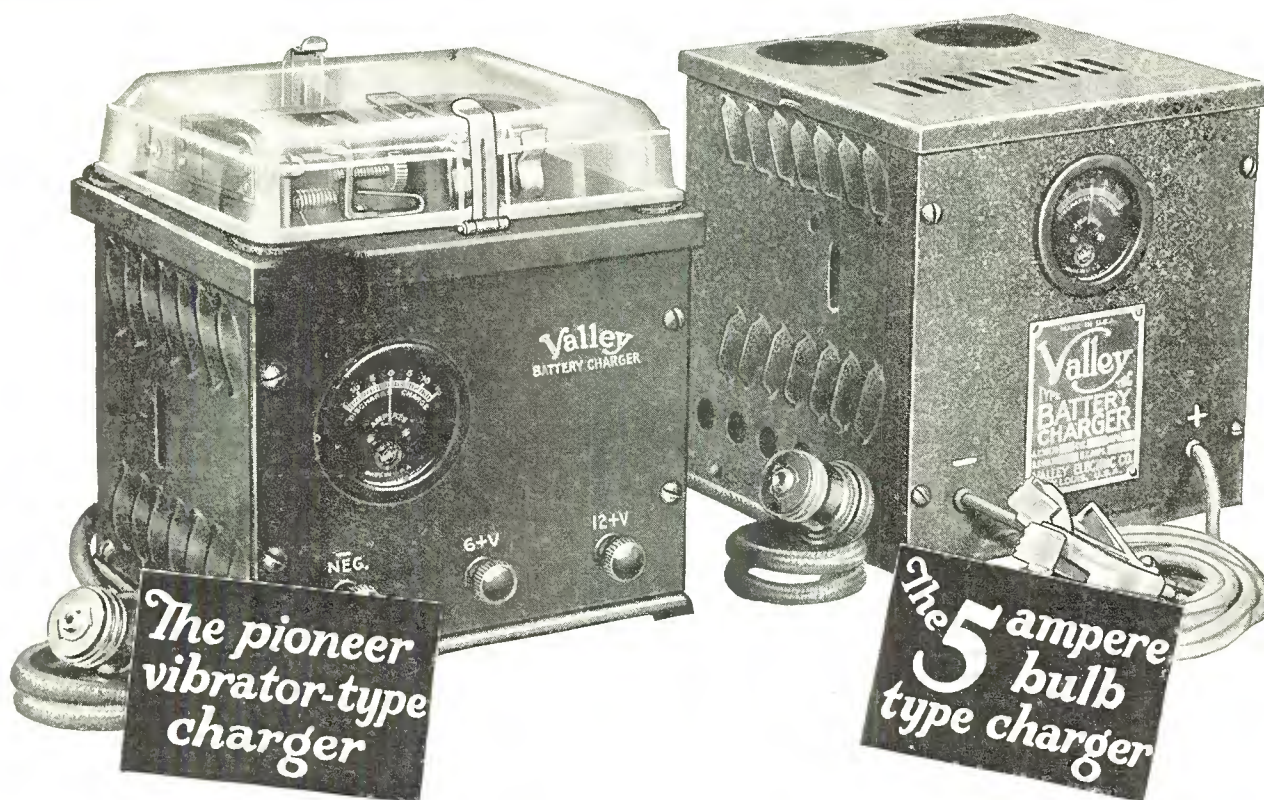
**WRAV** Antioch College, Yellow Springs, Ohio. 263 meters, 1140 kilocycles, 100 watts, class A. Wed, 8 pm, 9 pm, music & educational. Sun, 7 pm. Central standard time.

**WRAW** Avenue Radio & Electric Shop, 460 Schuyler Ave., Reading, Pa. 238 meters, 1260 kilocycles, 10 watts, class A. Tues, 9 pm, EST entertainment. Thurs, 10 pm. Eastern standard time. Slogan: "The Schuyler Valley Echo."

**WRAX** Flexon's Garage, Gloucester City, N. J. 268 meters, 1120 kilocycles, 500 watts, class A. Eastern standard time.

**WRBC** Immanuel Lutheran Church, Valparaiso, Ind. 277.6 meters, 1080 kilocycles, 500 watts, class A. Sun, 10:30-12 noon, 7:30-9 pm, church service. Mon, 7:30-9 pm, diversified program. Central standard time. Slogan: "World Redeemed by Christ."

**WRC** Radio Corporation of America, 14th & Park Road, N. W., Washington, D. C. 468.5 meters, 640 kilocycles, 1000 watts, class B. Sun, 11 am-12:30 pm, church services; 4-5:30 pm, church; 6:20-10:15, musical. Mon, Tues, Wed, Thurs, Fri & Sat, 6:45 am to 11 pm, varied. Eastern standard time. Slogan: "The Voice of the Capital."



**The pioneer vibrator-type charger**

**The 5 ampere bulb type charger**

## Use either one for a dependable source of "A" battery current



**Valley B Power Unit**

Supplies plate voltage from the house lighting circuit. For sets of 12 tubes or less. Can be used with a power tube. Is equipped with

famous Raytheon Tube—"for reliable reception."



**Valleytone Radio Receiver**

A 5-tube, tuned radio frequency receiver which affords the perfect combination of selectivity, tone, volume and range. Two-dial control. Antenna control. Wired so that use of power tube is optional.

You can get the famous Valley Battery Charger in both vibrator and bulb types. Use either one for a dependable source of A battery current.

**The Vibrator Type:** This is the pioneer of radio battery chargers. Nearly a quarter of a million of this type of Valley Charger has gone into service all over the world.

Charges 6-volt batteries at 6 amperes, 12-volt batteries at 3 amperes. Quiet, efficient. Cannot harm the battery.

Mounted in black case with bakelite panel and glass top. Pleasing in appearance and will harmonize with fin-

est radio receiver. Complete with cord and plug, and leads and clips.

**The Twin Bulb Type:** The twin bulb design of this Valley Charger overcomes the only objection to the bulb type charger, i.e., the slow charging rate.

Using both bulbs, you have a 5-ampere charger. Using only one bulb, you have a 2½-ampere charger. Thus the charging rate and the purchase of one bulb or two are entirely optional.

Absolutely noiseless. Built in handsome black grained metal case. Complete with cord and plug, and leads and clips.

**VALLEY ELECTRIC CO. (Radio Division) ST. LOUIS, MO.**

*District Offices: Boston, Chicago, Cleveland, Indianapolis, Kansas City, Minneapolis, New York, Philadelphia, San Francisco*

# Valley Electric

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

**WRCO** Wynne Radio Co., Raleigh, N. C. 252 meters, 1190 kilocycles, 100 watts, class A. Sun, 10:45 am. Irregular programs at present. Eastern standard time.

**WREC** Wooten's Radio & Elec. Co., Coldwater, Miss. 254 meters, 1180 kilocycles, 10 watts. Daily ex Sun, 6-8 pm. Sun, 4-5 pm. Central standard time. Slogan: "The Most Powerful 10-Watt Station in the World."

**WREO** The Reo Motor Car Co., Lansing, Mich. 285.5 meters, 1050 kilocycles, 500 watts, class B. Daily ex Sun, 6-7 pm, 10 pm. Tues, Thurs, 8:15-10 pm. Sat, 10-12 midnight. Sun, 10 am, chimes; 10:30 am & 7:30 pm, church. Eastern standard time. Slogan: "Watch Reo."

**WRHF** Washington Radio Hospital Fund, Washington, D. C. 256 meters, 1170 kilocycles, 50 watts. Eastern standard time.

**WRHM** Rosedale Hospital, Inc., Nicollet & 44th St., Minneapolis, Minn. 252 meters, 1190 kilocycles, 50 watts, class A. Thurs, 9-11 pm, music. Sun, 1:30-2:30 pm, children's hour; 2:30-4:30 pm, music; 9:15-10:30 pm. Central standard time.

**WRK** Doron Bros. Elec. Co., Hamilton, Ohio. 270 meters, 1110 kilocycles, 100 watts, class A. Fri, 8:15 pm, music, lectures. Sun, 10:15 am, 7:30 pm, church services. Central standard time. Slogan: "The Oldest Station in Existence."

**WRM** University of Illinois, Urbana, Ill. 273 meters, 1100 kilocycles, 1000 watts, class A. No definite schedule. Musical concert broadcasted once a week, no definite time selected. Central standard time.

**WRMU** A. H. Grebe & Co., Inc., Motor Yacht "MuJ," New York, N. Y. (Portable). 236 meters, 1270 kilocycles, 100 watts. Unlimited schedule. Eastern standard time.

**WRNY** The Roosevelt, New York City, N. Y. 373.8 meters, 802 kilocycles, 500 watts. Sun, 3-5:30 pm, 12-1 am. Daily ex Sun, 11-1 pm. Mon, Tues, Sat, 7-11 pm. Wed, Thurs, 6:45-10:30 pm. Fri, 7-12 midnight. Sat, 12-1 am. Eastern standard time. Slogan: "The Radio News Magazine Station."

**WRR** City of Dallas, Dallas, Tex. 245.8 meters, 1220 kilocycles, 500 watts. Daily ex Sun, Wed, 12-1 pm, 5-5:30, 6-7, 8-9. Mon, 11-12 midnight. Fri, 11-12 midnight. Wed, 5-5:30 pm. Thurs, 9:30-10:30 pm. Central time. Slogan: "City of Achievements."

**WRST** Radiotel Mfg. Co., Inc., 5 First Ave., Bay Shore, N. Y. 215.7 meters, 1390 kilocycles, 250 watts. Daily ex Sun, 12 noon-1 pm. Mon, Wed & Fri, 7-11:30 pm, concerts. Tues & Thurs, 8 to 11:30 pm. Sat, 7-11:30 pm. Sun, 11 am-12:45 pm, church services; 7-11 pm, musical concert. Eastern standard time. Slogan: "Bay Shore, Garden Spot of Long Island."

**WRVA** Larus & Brothers Co., Inc., Richmond, Va. 256 meters, 1170 kilocycles, 1000 watts. Mon, Thurs & Fri, 8:30-11 pm. Wed, 12:30 to 1:30 pm. 8:30 to 11 pm. Eastern standard time. Slogan: "Carry Me Back to Old Virginny."

**WRW** Tarrytown Radio Research Laboratory, Tarrytown, N. Y. 272.6 meters, 1100 kilocycles, 500 watts, class A. Mon, 7-8 pm, children's period; 9-11:30 pm, entertainment & orchestra. Tues, Thurs, Fri, Sat, 9-11:30 pm, entertainment, talk, orchestra. Wed, 10-11:30 pm, entertainment, orchestra. Sun, 8-9 pm, services; 10:30-11:30 pm, musical. Eastern standard time. Slogan: "Everything in Radio."

**WSAI** United States Playing Card Co., Cincinnati, Ohio. 325.9 meters, 920 kilocycles, 5000 watts. Sun, 11 am, church services; 4 pm. Dr. Cadman; 7:45 pm, chimes; 8 pm, sermon; 9:15 pm, Atwater-Kent Hour. Mon, 7-10 pm, musical, grand opera. Daily ex Sun, Mon, Fri, Sat, 7-10:30 pm. Sat, 7:45-12 midnight. Central standard time. Slogan: "The Gateway to Dixie."

**WSAJ** Grove City College, Grove City, Pa. 229 meters, 1310 kilocycles, 250 watts. Irregular schedule. Eastern standard time.

**WSAN** Allentown Call Publ. Co., Inc., Allentown, Pa. 229 meters, 1310 kilocycles, 100 watts, class A. Tues, Thurs & Sats, 8:15 pm, musical. Eastern standard time. Slogan: "We Serve Allentown Nationally."

**WSAR** Doughty & Welch Elec. Co., 46 No. Main St., Fall River, Mass. 254 meters, 1180 kilocycles, 100 watts, class A. Daily ex Sun, 12-1 pm. Sun, 10:30-12 m. Eastern standard time.

**WSAX** Zenith Radio Corp., 332 So. Michigan Ave., Chicago, Ill. 268 meters, 1120 kilocycles, 100 watts, class A. (Portable). Central standard time.

**WSAZ** Chase Elec. Shop, Pomeroy, Ohio. 244 meters, 1230 kilocycles, 50 watts, class A. Sat, 2 pm. Sun, 10:30 am, 2:30 pm. Eastern standard time.

**WSB** The Atlanta Journal, care Biltmore Hotel, Atlanta, Ga. 428.3 meters, 700 kilocycles, 1000 watts. Sun, 9:30 am-5 pm, church services. Daily ex Sun, 10 am, homemakers' half hour, market reports, etc.; 10:30 am, public school program; 12 noon, organ recital, songs, etc.; 1 pm, Radio Farm Service; 2:30 pm, market reports, etc.; 6 pm, public school program; 6:20 pm, garden message. Mon, 8 pm, Sears-Roebuck Agricultural Foundation program; 10:45 pm, concert, organ, skylark, etc. Tues, 8 pm, church choir. Thurs, Fri, Sat, 8 pm, club, orchestra, etc. Central standard time. Slogan: "The Voice of the South."

**WSBC** The World Battery Company Station, 1219 S. Wabash Ave., broadcasting from New Southern Hotel, Chicago, Ill. 268.3 meters, 1040 kilocycles, 1000 watts. Sun, 5-7 pm, classical; 9-1 am, popular program. Mon, 5:30-7 pm, dinner concert. Daily ex Sun, Mon, 6:30-8:30 pm, dinner concert; 9:30-1 am, popular program. Central standard time.

**WSBF** Stix, Baer & Fuller, 6th & Washington Ave., St. Louis, Mo. 273 meters, 1100 kilocycles, 250 watts. Sun, 9 to 10 pm, theater; 11 pm to 1 am, Marigold Garden dance and revue. Mon, 1 pm, 3 to 4 pm, 7:30-8, 8-9, 9 pm, musical talks. Tues, 1 pm, 3 to 4 pm, popular. Wed & Fri, 12 noon-1 pm, 3-4 pm, 7:30-8 pm, 8-9 pm, music. Thurs, 12 noon to 1 pm, 3 to 4 pm, popular. Sat, 12 noon to 1 pm, 3 to 4 pm. Central standard time.

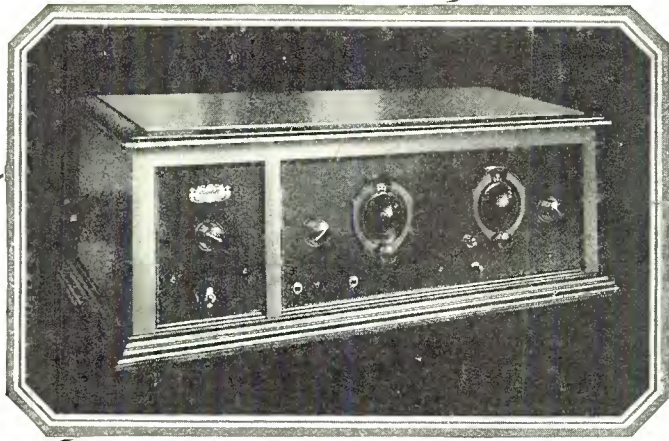
**WSBT** South Bend Tribune, South Bend, Ind. 315 meters, 951.8 kilocycles, 250 watts, class B. Mon, 7:15 to 10 pm, C. S. Wed, 7:15 to 9:15 pm, 12 midnight to 1 am. Fri, 7:15 pm to 9:30 pm. Slogan: "Voice of the Hoosier State."

**WSDA** The City Temple, New York City, N. Y. 263 meters, 1140 kilocycles, 250 watts, class A. Thurs, 7:45-9:30 pm. Sat, 10:45 am-1 pm. Sun, 7:30-9:30 pm. Eastern standard time.

**WSKC** World's Star Knitting Company, Bay City, Mich. 260.7 meters, 1150 kilocycles, 500 watts. Sun, 11 am. Daily ex Sun, 12-1 pm, dinner hour; 4 pm, news events, features. Mon, Wed, 9-11 pm, request program. Sat, 11 pm-2 am. Eastern standard time. Slogan: "Where the Summer Trails Begin."

**WSM** The National Life and Accident Ins. Co., Inc., Seventh Ave. N. & Union St., Nashville, Tenn. 282.8 meters, 1060 kilocycles, 1000 watts. Mon, Wed, Fri, & Sat, 6:30 pm, dinner music; 7 pm, bed time stories. Mon, 7:30 pm, community program. Mon, Wed, Sat, 10 pm, studio concert. Sun, 10:30 am, 7:30 pm, church services. Central standard time. Slogan: "We Shield Millions."

**WSMB** Saenger Amusement Co. & Maison Blanche Co., 1401 Tulane Ave., New Orleans, La. 319 meters, 940 kilocycles, 500 watts, class B. Daily ex Sun, 12:30-1:30 pm, 6:30-7:30 pm, 8:30-10:30 pm, entertainment. Central standard time. Slogan: "America's Most Interesting City."



\$ 231

with 5 McCullough AC  
Tubes and Rectron 213  
*without Loud Speaker*

# Clearartone LEADS THE WAY

Here is the first successful  
low-priced set to elim-  
inate "A" and "B" batteries

EVERYBODY was waiting for a set that would eliminate "A" and "B" Batteries without being high-priced. Here it is at last. The Clearartone Radio Electric Model 110, operating from the house current and using no fluids or acids. And the price, including 5 McCullough AC Tubes and Rectron 213 (without loud speaker), is only \$231.00. What other set has such advantages at this figure?

The Clearartone Electric Model 110 abolishes the battery problem by using McCullough AC Tubes. They are undoubtedly the greatest achievement in

radio today. The set has won the approval of such eminent authorities as Professor Wilcox, of the Armour Institute of Technology, of Chicago.

This set is the result of five years of exclusive radio receiving set manufacturing. You will marvel at its tone quality and volume. And the selectivity, which is attained by two vernier dial controls, is exceptionally acute. The high quality of workmanship insures a set which will give years of satisfactory service, fully guaranteed by a manufacturer of the highest standing in the radio industry.

THE CLEARARTONE RADIO COMPANY

2434 Gilbert Avenue

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Cincinnati, Ohio

—DEALERS—

Let us tell you how this set will help you do away with losses due to heavy service costs. We have some interesting facts and figures for YOU.

# CLEARARTONE *Complete* RADIO SETS

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

**WSMH** The Shattuck Music House, 207 Washington St. N., Owosso, Mich. 240 meters, 1250 kilocycles, 20 watts, class A. Daily, 8 pm, vocal & instrumental music. Sat, 10 pm, popular music. Sun, 10 am, church service. Eastern standard time.

**WSMK** The S. M. K. Radio Corp., 812 Gibbons Hotel, Dayton, Ohio. 275.2 meters, 1090 kilocycles, 500 watts, class A. Daily, 12 noon-1 pm, dinner music. Daily ex Sun, 4-4:30 pm, news reports. Daily ex Sun & Wed, 6-7 pm, dinner concert; 8-10:30 pm, studio concert. Sat, "Dum Dora Club" midnite frolic. Central standard time. Slogan: "The Home of Aviation."

**WSOE** School of Engineering of Milwaukee, 415 Marshall St., Milwaukee, Wis. 245.8 meters, 1220 kilocycles, 500 watts, class A. Daily ex Sat & Sun, 5:30-6:30 pm, Twilight Hour; 9-11 pm. Sat, 2 pm, markets & weather; 9-11 pm, review. Sun, 7:30-8:30 pm, services. Central standard time. Slogan: "In the Land of the Sky Blue Waters."

**WSRO** Radio Company (Harry W. Fahrlander), 409 High St., Hamilton, Ohio. 252 meters, 1190 kilocycles, 100 watts, class A. Tues & Fri, 8-10 pm. Sun, 2-4 pm. Central standard time. Slogan: "We Sell Radio Only."

**WSSH** Tremont Temple Baptist Church, Boston, Mass. 261 meters, 1150 kilocycles, 100 watts. Sun, 10:15 to 12 noon, 6:30 pm to 9 pm.

**WSUI** University of Iowa, Capitol & Washington Sts., Iowa City, Ia. 484 meters 620 kilocycles, 500 watts. Sun, 4 pm, vespers; 9:30 pm, hymns. Daily ex Sun, 10:30 am, news, music; 12:25 pm, news, music. Wed, 9 am, high school program; 10:30 am, music, news. Mon, 4 pm, Women's Club hour; 7:30 pm, radio correspondence courses; 9 pm, music; 11:15 pm, organ. Sat, 7:30 pm, athletic contests. Central standard time. Slogan: "A Voice from Old Cold."

**WSVS** Seneca Vocational School, Seneca & Hydraulic Sts., Buffalo, N. Y. 218.8 meters, 1370 kilocycles, 50 watts. Wed & Fri, 8 to 10:30 pm, musical program. Slogan: "Watch Seneca Vocational School." Eastern standard time.

**WSWS** Bligh-Whittington Co., Straus Bldg., 310 S. Michigan Ave., Chicago, Ill. 275.8 meters, 1090 kilocycles, 1000 watts. 6 to 7 pm, classical and semi-classical concert program; 8 to 9 pm, semi-classical and popular radio artists; 10 to 11 pm, dance music and feature entertainment; 12 midnight to 1 pm, radio round table entertainment. Mon, silent night. Central standard time.

**WSY** Alabama Polytechnic Institute, Auburn, Ala. 250 meters, 1200 kilocycles, 500 watts, class A. Central standard time.

**WTAB** Fall River Herald Pub. Co., 231 Pocasset St., Fall River, Mass. 266 meters, 1130 kilocycles, 100 watts, class A. Daily ex Sun, 6:15 pm, organ recital. Mon, Thurs, 10:45 am, home economics hour. Tues & Thurs, 7:30 pm, musical program. Eastern standard time.

**WTAD** Robert E. Compton, 412 Wabash Ave., Carthage, Ill. 236 meters, 1270 kilocycles, 50 watts, class A. Central standard time.

**WTAG** Worcester Telegram Publ. Co., 52 Front St., Worcester, Mass. 545.1 meters, 550 kilocycles, 500 watts. Daily ex Sun, 10:30 am-2 pm, 4-5 pm. Mon, Wed & Fri, 7:15 pm. Tues, Thurs & Sat, 5-14 pm, "The Twinkle Twinkle Story Teller." Daily ex Sat, 8 pm. Eastern standard time. Slogan: "The Voice from the Heart of the Commonwealth."

**WTAL** Toledo Broadcasting Co., Waldorf Hotel, Toledo, Ohio. 252 meters, 1190 kilocycles, 10 watts. Sun, 7:30-9 pm. Mon, Wed, Fri, 8-10 pm. Tues, Thurs, Sat, 8-9 pm. Eastern standard time. Slogan: "The Gateway to the Sea."

**WTAM** Willard Storage Battery Co., 246 E. 13th St., Cleveland, Ohio. 389.4 meters, 770 kilocycles, 3500 watts. Sun, 11 am-10:15 pm. Mon, Tues, Wed, Thurs, Fri, Sat, 10:45-11 am, 12:30-1:30 pm, 2:30-3:30 pm, 6 pm-12 midnight. Eastern standard time. Slogan: "The Voice from the Storage Battery."

**WTAQ** S. H. Van Gordon & Son, Eau Claire, Wis. 254 meters, 1180 kilocycles, 100 watts, class A. Daily ex Sun, 10:30 am, 12:15 pm, 6:15 pm, weather, markets; 6:30 pm, code. Tues, 8 pm, Fri & Sun, 7:30 pm. Central standard time. Slogan: "The Voice of the Wilderness."

**WTAR** Reliance Elec. Co., Inc., 519 W. 21st Ave., Norfolk, Va. 261 meters, 1150 kilocycles, 100 watts, class A. Daily ex Sun, 6 pm, weather, markets & news. Eastern standard time. Slogan: "Down in Old Virginia."

**WTAW** Agricultural & Mechanical College of Texas, College Station, Texas. 270 meters, 1110 kilocycles, 500 watts, class A. Wed & Fri, 8-9 pm. Sun, 11 am. Central standard time.

**WTAX** Williams Hardware Co., 115 S. Vermillion St., Streator, Ill. 231 meters, 1300 kilocycles, 50 watts, class A. Tues, 8 to 10 pm. Thurs, 8 to 12 pm. Central standard time.

**WTAZ** Thomas J. McGuire, Lambertville, N. J. 261 meters, 1150 kilocycles, 15 watts, class A. Mon, 8-10 pm, musical. Eastern standard time.

**WTIC** The Travelers Insurance Co., 700 Main St., Hartford, Conn. 475.9 meters, 630 kilocycles, 500 watts. Mon, Fri, 12 noon-1 pm. Daily ex Sun, Mon, Fri, 12 noon-12:30 pm. Daily ex Sun, Wed, 6 pm-11 pm. Fri, Sat, 6 pm-12 midnight. Eastern time. Slogan: "The Insurance City."

**WTRC** 20th Assembly District Regular Republican Club, 62 Woodbine St., Brooklyn, N. Y. Sun, 2-6 pm, general entertainment. Mon, 8-11 pm, musical program, sports, news items. Tues, Wed, Fri, 7-11 pm, general program. Eastern time.

**WWAE** Electric Park (L. J. Crowley), Plainfield, Ill. 384.4 meters, 780 kilocycles, 10 watts, class A. Daily ex Sun, 12:30-1:30 pm, 9-12 midnight. Sun, 10:50-12:15 pm, church; 3:30-4:30 pm, musical. Central standard time.

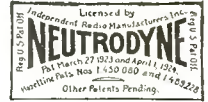
**WWJ** Evening News Association, 615 Lafayette Blvd., W. Detroit, Mich. 352.7 meters, 850 kilocycles, 1000 watts. Sat, 9 pm, same as W.E.A.F. Sun, 7:20 pm, same as W.E.A.F. Daily ex Sat & Sun, 6 pm, dinner concert; 8 pm, entire program from W.E.A.F. Eastern standard time.

**WWL** Loyola University, New Orleans, La. 275 meters, 1090 kilocycles, 100 watts, class A. Sat, 7:30-8:30 pm. Central standard time.

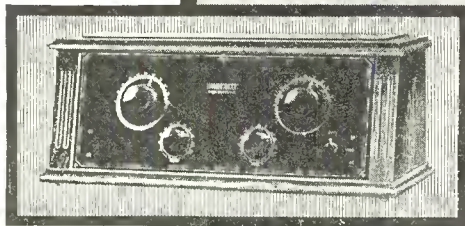
**WWRL** Woodside Radio Laboratories, 4130 58th St., Woodside, L. I., New York. 258.5 meters, 1160 kilocycles, 100 watts. Sun, 2-7 pm. Mon, 10 pm-2 am. "At Home Party." Wed, Fri, 8-11 pm. Eastern standard time.



# Just try a WORKRITE

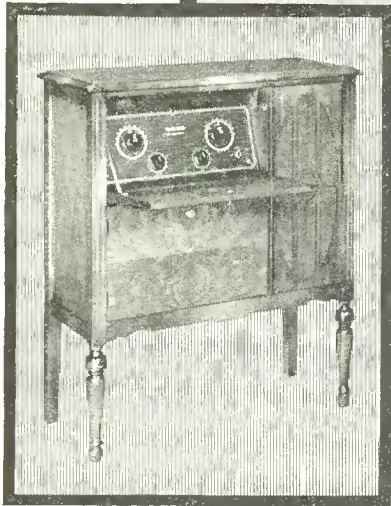


## The Sensation of the Season



**WorkRite Model 16**  
A 6-tube Neutrodyne Receiver. Two-dial control. Beautiful walnut cabinet with panel to match, gold trimmed.

Price \$80.00



**WorkRite Model 26**

The same circuit and control as Model 16 mounted in a handsome walnut console cabinet. Three-way switch. Large built-in *cone speaker*. Wired for power units. Best value console on the market today.

Price \$160.00

**WorkRite Model 36**

(See large illustration in center)

The supreme accomplishment of the season. Six-tube transformer and resistance coupled Neutrodyne circuit. TWO-IN-ONE dial operates all three condensers from one control. Has three-way switch. Large built-in *cone speaker* 24" wide. Beautiful walnut cabinet, is a pleasing piece of furniture.

Price \$210.00



### WORKRITE Radios WORKRITE

#### Practical Refinements

in Control and Circuits

together with more attractive cabinets and fittings make the new WorkRite Super Neutrodyne radios the sensation of the season. This is a big Neutrodyne year and WorkRite is one of the leading licensed Neutrodyne.

*All WorkRite models are designed to operate with power units from lamp socket or with batteries.*

All console models have built-in *cone speakers*.

A WorkRite Super Neutrodyne will satisfy your every radio desire. Visit a licensed WorkRite dealer today or write us for beautifully illustrated literature.


**The WorkRite Manufacturing Co.**  
1827 E. 30th St. Cleveland, Ohio

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

# U. S. Broadcasting Stations Listed by States

- Alabama:**  
 Auburn, WAPI, WSY  
 Birmingham, WBRC, WKBC  
 Montgomery, WIBZ
- Alaska:**  
 Hobron, KGL  
 Juneau, KFIU
- Arizona:**  
 Flagstaff, KFXV  
 Phoenix, KFAD, KFCB  
 Prescott, KPJM  
 Tucson, KGAR
- Arkansas:**  
 Fayetteville, KUOA  
 Hot Springs, KTHS  
 Newark, KGCC
- California:**  
 Berkeley, KRF  
 Burlingame, KFOB  
 Catalina Island, KFOW  
 Chico, KFWH  
 Fresno, KMJ  
 Hollywood, KFOZ, FKWB  
 Holy City, KFQI  
 Lake Pine Knot, KFXB  
 Long Beach, KFON  
 Los Angeles, KFI, KFPG,  
 KFPR, KFSG, KHJ,  
 KMTR, KNRC, KXX,  
 KTBI  
 Oakland, KFUS, KFUU,  
 KFWM, KGO, KLS,  
 KLN, KTAB, KZM  
 Oxnard, KFVF  
 Pasadena, KPCC, KPSN  
 Sacramento, KFBK  
 San Diego, KFPC, KFSD  
 San Francisco, KFRC,  
 KFVZ, KFWI, KGTT,  
 KJBS, KPO, KUO  
 San Jose, KFAF, KQW  
 Santa Maria, KSMR  
 Stockton, KWG  
 Upland, KFVC  
 Venice, KFVD
- Colorado:**  
 Colorado Springs, KFUM,  
 KFXF  
 Denver, KFEL, KFUP,  
 KFVR, KFNJ, KLZ,  
 KOA  
 Greeley, KFKA  
 Gunnison, KFHA  
 Trinidad, KFBS
- Connecticut:**  
 Hartford, WTIC  
 New Haven, WDRC  
 Storrs, WCAC
- Delaware:**  
 Wilmington, WDEL
- District of Columbia:**  
 Takoma Park, WBES  
 Washington, D. C., WCAP,  
 WMAL, WRC, WRHF
- Florida:**  
 Clearwater, WGHB  
 Fulford-by-the-Sea, WGBU  
 Jacksonville, WJAX  
 Miami Beach, WTOD,  
 WMBF, WQAM  
 Orlando, WDBO, WOCB  
 Pensacola, WCOA  
 St. Petersburg, WHBN,  
 WJBB  
 Tampa, WDAE
- Georgia:**  
 Atlanta, WDBE, WGST,  
 WSB  
 Macon, WMAZ  
 Savannah, WEBZ
- Hawaii:**  
 Honolulu, KGH, KGU
- Idaho:**  
 Boise, KFAU, KFDD  
 Kellogg, KFEY  
 Pocatello, KSEI
- Illinois:**  
 Carthage, WTAD  
 Chicago, KYW, WEBH,  
 WFNH, WFKB, WGES,  
 WGN, WAAF, WBBM,  
 WBBZ, WBCN, WCFL,  
 WHBM, WHT, WIBJ,  
 WIBM, WIBO, WJAZ,  
 WLIB, WLS, WLTS,  
 WMAQ, WMBB, WMBI,  
 WORD, WPCC, WQJ,  
 WSAN, WSBC, WSW5  
 Decatur, WBAC, WJBL  
 Evanston, WEHS  
 Galesburg, WRAM  
 Harrisburg, WEBQ  
 Homewood, WOK  
 Joliet, WCLS, WJBA,  
 WKBB  
 La Salle, WJBC  
 Moseheart, WJJD  
 Plainfield, WWAE  
 Rockford, KFLV  
 Rock Island, WHBF  
 Streator, WTAX  
 Tuscola, WJZ  
 Urbana, WRM  
 Zion, WCBD
- Indiana:**  
 Anderson, WHBU  
 Culver, WCMA  
 Evansville, WGBF  
 Ft. Wayne, WCWK,  
 WOVO  
 Indianapolis, WFMB  
 Kokomo, WJAK  
 LaPorte, WRAF  
 Logansport, WHBL, WIBW  
 Seymour, WFBE  
 South Bend, WSBT  
 Valparaiso, WRBC  
 West Lafayette, WBAA
- Iowa:**  
 Ames, WOI  
 Boone, KFGQ  
 Burlington, WIAS  
 Cedar Rapids, KWCR,  
 WJAM  
 Clarinda, KSO  
 Council Bluffs, KOIL  
 Davenport, WOC  
 Decorah, KGCA  
 Des Moines, WHO  
 Fort Dodge, KFII  
 Iowa City, KIQP, WSUI  
 Le Mars, KWUC  
 Marshalltown, KFJB  
 Muscatine, KFYD, KTNT  
 Oskaloosa, KFHL  
 Shenandoah, KFNF, KMA  
 Sioux City, KFMR, WEAU
- Kansas:**  
 Concordia, KGCN  
 Independence, KFVG  
 Junction City, KFJC  
 Lawrence, KFBU  
 Manhattan, KSAC  
 Russell, KFQO  
 Wichita, KFH, KFOT
- Kentucky:**  
 Louisville, WHAS, WLAP
- Louisiana:**  
 New Orleans, KTUE,  
 WABZ, WBBS, WCBE,  
 WJBO, WJBW, WSMB,  
 WWL  
 Pineville, KFVU  
 Shreveport, KFDX, KSBA
- Maine:**  
 Bangor, WABI  
 Orono, WGBX  
 Portland, WCSH
- Maryland:**  
 Baltimore, WFBR, WBAL,  
 WCAO, WCBM
- Massachusetts:**  
 Boston, WEEL, WATT,  
 WBZA, WNAB, WNAC,  
 WSSH  
 Dartmouth, WMAF  
 East Springfield, WBZ
- Michigan:**  
 Bay City, WSKC  
 Berrien Springs, WEMC  
 Detroit, WGHE, WCX,  
 WJR, WJAF, WJR,  
 WKAR, WMBC, WWJ  
 Escanaba, WRAK  
 Flint, WFDF  
 Grand Rapids, WASH,  
 WOOD  
 Lansing, WREO  
 Mt. Clemens, WABX  
 Oosso, WSMH  
 Petoskey, WBBP  
 Port Huron, WAFD  
 Royal Oak, WAGM  
 Ypsilanti, WJBK
- Minnesota:**  
 Collegeville, WFBJ  
 Minneapolis, WAMD, WCCO,  
 WDCY, WHDI, WLB,  
 WRHM  
 Northfield, KFMX, WCAL  
 St. Cloud, WFAM  
 St. Paul, KFOY  
 South Minneapolis, KFDZ  
 Welcome, KFVN
- Mississippi:**  
 Coldwater, WREC  
 University P. O., WCBH
- Missouri:**  
 Cape Girardeau, KFVS  
 Cartersville, KFVW  
 Columbia, KFRU  
 Independence, KLDS  
 Jefferson City, WOS  
 Kansas City, KWKC,  
 WDAF, WHB, WOQ  
 Kirksville, KFZZ  
 Moberly, KFFP  
 St. Louis, KFOA, KFVO,  
 KFVF, KMOX, KSD,  
 WEW, WIL, WMAV,  
 WSBF  
 University City, KFVE
- Montana:**  
 Havre, KFBB  
 Missoula, KUOM
- Nebraska:**  
 Clay Center, KMMJ  
 David City, KFOR  
 Hastings, KFKN  
 Lincoln, KFAB, WFAV  
 Norfolk, WJAG  
 Oak, KFEO  
 Omaha, KFOX, KOCH,  
 WAAW, WNAL, WOAV  
 Shelby, KGBY  
 University Place, WCAJ  
 Wayne, KGCH
- New Hampshire:**  
 Laconia, WKAV  
 Tilton, WBRL
- New Jersey:**  
 Atlantic City, WHAR, WPG  
 Camden, WCAM  
 Elizabeth, WBS  
 Gloucester, WRAX  
 Lambertville, WTAZ  
 Newark, WAAM, WBS,  
 WNJ, WOR  
 North Plainfield, WEAM  
 Paterson, WODA  
 Red Bank, WJBI  
 Trenton, WOAX
- New Mexico:**  
 Albuquerque, KFLR, KFVY  
 State College, KOB
- New York:**  
 Bay Shore, WRST  
 Brooklyn, WFRL, WBBC,  
 WBBR, WTRC  
 Buffalo, WGR, WMAK,  
 WPDQ, WSVS
- Canton, WCAD  
 Cazenovia, WMAC  
 Freeport, WGBB  
 Ithaca, WEAI  
 Jamaica, WMRJ  
 Jamestown, WOCL  
 Kingston, WDBZ  
 Long Island, WGMU,  
 WBOQ, WIBI, WWRL  
 New York, WEBJ, WEBL,  
 WEBR, WEBH, WHBS,  
 WGCP, WBNY, WEAF,  
 WHAP, WHN, WBIT,  
 WJUG, WJY, WJZ,  
 WKBQ, WLWL, WMCA,  
 WMSG, WNYC, WOKO,  
 WQAO, WRMU, WRNY,  
 WSDA  
 Richmond Hill, WAHG  
 Rochester, WABO, WHAM,  
 WHEC  
 Schenectady, WGY  
 Syracuse, WFBL  
 Tarrytown, WRW  
 Troy, WHAZ  
 Utica, WIBX  
 Woodhaven, WJBW**
- North Carolina:**  
 Asheville, WABC  
 Charlotte, WBT, WJBC  
 Raleigh, WRCO
- North Dakota:**  
 Bismark, KFVY  
 Devils Lake, KDLR  
 Fargo, WDAY, WPAK  
 Grand Forks, KFJM
- Ohio:**  
 Akron, WADC  
 Bellefontaine, WIIBD  
 Canton, WHBC  
 Cincinnati, WAAD, WKRC,  
 WLW, WSAI  
 Cleveland, WEAR, WDBK,  
 WHK, WTAM  
 Columbus, WEAO, WAIU,  
 WMAN  
 Dayton, WSMK  
 Hamilton, WRK, WSRO  
 Pomeroy, WSAZ  
 Springfield, WCSO, WNAP  
 Toledo, WABR, WTAL  
 Wooster, WABW  
 Yellow Springs, WRAV
- Oklahoma:**  
 Bristow, KVOO  
 Chickasaw, KOCH  
 Norman, WNAD  
 Oklahoma City, KFJF,  
 WKY, KFJR  
 Tulsa, WLAL
- Oregon:**  
 Astoria, KFJI  
 Corvallis, KOAC  
 Portland, KFEC, KFIF,  
 KFJR, KFVW, KGW,  
 KOIN, KTBR
- Pennsylvania:**  
 Allentown, WCBA, WSAN  
 Altoona, WFBG  
 East Pittsburgh, KDKA  
 Grove City, WSAJ  
 Harrisburg, WABB, WBAK,  
 WHBG, WPRC  
 Haverford, WABQ  
 Jeannette, WGM  
 Johnstown, WHBP  
 Lancaster, WGL, WKJC  
 Lewisburg, WJBU  
 Oil City, WHBA  
 Parkersburg, WQAA  
 Philadelphia, WFI, WABY,  
 WCAU, WHBW, WIAD,  
 WIBG, WIP, WLIT,  
 WNAT, WOO  
 Pittsburgh, KQV, WCAE,  
 WJAS  
 Reading, WRAW  
 Scranton, WOAN  
 State College, WPSC  
 Wilkes-Barre, WBAX,  
 WBRE
- Porto Rico:**  
 San Juan, WKAQ
- Rhode Island:**  
 Cranston, WDFW  
 Providence, WEAN, WCBR,  
 WJAR, WLSL
- South Carolina:**  
 Charleston, WBBY
- South Dakota:**  
 Brookings, KFDY  
 Rapid City, WCAT  
 Vermillion, KUSD  
 Yankton, WNAX
- Tennessee:**  
 Chattanooga, WDOD  
 Knoxville, WFBC, WNOX  
 Laurenceburg, WOAN  
 Memphis, WGBB, WHBQ,  
 WMC  
 Nashville, WBAW, WDAD,  
 WSM
- Texas:**  
 Amarillo, WDAG, WQAC  
 Austin, KUT  
 Beaumont, KFDM  
 Beeville, KFRB  
 Brownsville, KWVG  
 College Station, WTAW  
 Dallas, WFAA, WRR  
 Dublin, KFPL  
 El Paso, WDAH, KFXH  
 Fort Worth, KFJZ, KFQB,  
 KFRO, WBAF  
 Galveston, KFLN, KFUL  
 Greenville, KFPM  
 Houston, KFVI, KFVJ,  
 KFYO, KPRC  
 San Antonio, KGCM,  
 WCAR, WOAI  
 San Benito, KFLU  
 Waco, WJAD
- Utah:**  
 Logan, KFND  
 Ogden, KFUR  
 Salt Lake City, KDYL,  
 KFOO, KFUT, KSL
- Vermont:**  
 Burlington, WCAX  
 Springfield, WQAE
- Virginia:**  
 Arlington, NAA  
 Norfolk, WBBW, WTAR  
 Richmond, WBBL, WRVA  
 Roanoke, WDBJ
- Washington:**  
 Everett, KFBL  
 Lacey, KGY  
 Olympia, KFRV  
 Pullman, KFRX, KWSC  
 Seattle, KFOA, KFQW,  
 KGBS, KOMO, KJR,  
 KTW  
 Spokane, KFIO, KFPY,  
 KHQ  
 Tacoma, KMO  
 Walla Walla, KOWW  
 Yakima, KFIQ
- West Virginia:**  
 Weirton, WIBR
- Wisconsin:**  
 Beloit, WEBW  
 Camp Lake, WCLO  
 Eau Claire, WTAQ  
 Fond du Lac, KFIZ  
 Green Bay, WHBY  
 Madison, WHA, WIBA  
 Marshfield, WGBR  
 Milwaukee, WHAD, WKAF,  
 WSOE  
 Omro, WJBR  
 Poynette, WIBU  
 Stevens Point, WLBL  
 Superior, WEBC
- Wyoming:**  
 Laramie, KFBU


Test Tubes with a



**Sterling Tube Tester**

\$7.50


Test Batteries with a



**Sterling Pocket Meter**

\$1.00 to \$4.00  
—or mount one on your panel \$3.00 to \$5.00

Does the Storage "A" Battery need recharging?



**Sterling Charge Indicator**

\$2.00

Find out with a  
The clean, external test.

**Steady, High Class Performance**

# More Power

**to your radio reception and no "B" & "C" Batteries to think about**

No. 97 "B" & "C" Power Unit Uses improved type Raytheon tube. Price complete with tube, \$55.00. or No. 99 "B" Power, complete with tube, \$45.00.



**T**HE Sterling "B" & "C" Power supplies up to 180 volts at 50 milliamperes; has selective terminals for high and low powered receivers, combination high, low and off operating switch, control knobs for detector and amplifier voltages and all terminals on rear where they belong. Guaranteed against electrical and mechanical hum.

The No. 97 is especially recommended for sets using the No. 171 and 210 Power Tubes—gives C voltages in addition.

**The Sterling Manufacturing Co.**  
Cleveland Ohio

**TELEVISION DESIGN  
Battery Eliminator**

A low priced eliminator, Sterling quality using type CX 313 tube, especially recommended for Radiolas 25-28 and other receivers having 2 to 5 large tubes or more than 5 peanut tubes.  
RT-41 "B" Eliminator, price \$22, less tube.



# Sterling "B" Power

Renew run down tubes with a

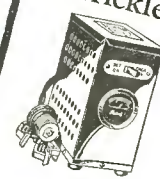
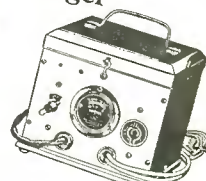


**Sterling Reactivator**

\$12.50 (meter-equipped) \$3.75 (non-metered)



Bulb or Vibrating Type Battery Charger or Trickle Charger

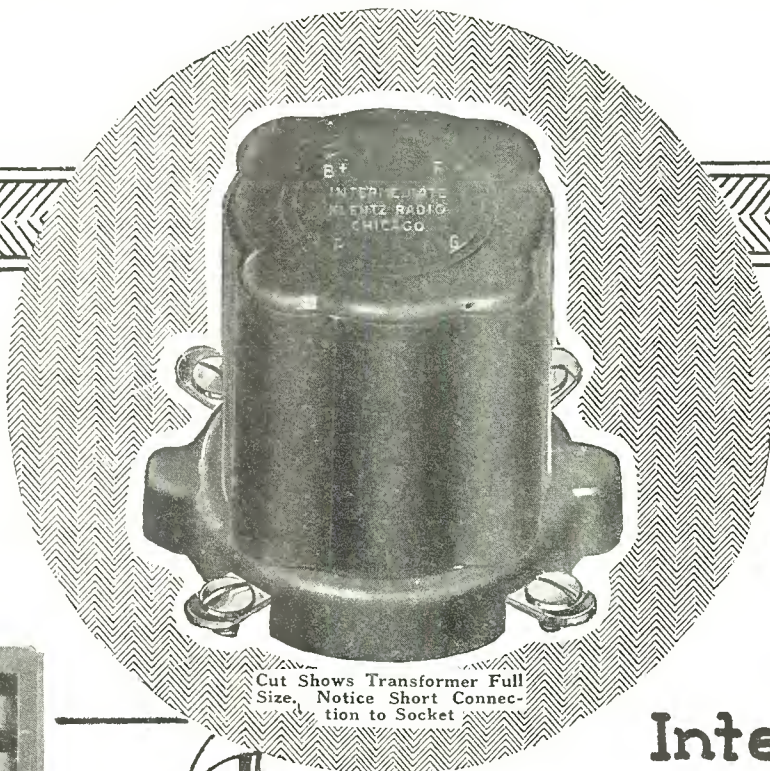
\$13.50 to \$25.00

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

# U. S. Broadcasting Stations

## LISTED BY WAVELENGTHS

Meters	Call	Town	Meters	Call	Town	Meters	Call	Town	Meters	Call	Town	Meters	Call	Town
202.6	KPNB	Lake Pine Knot, Calif.	233	WJWK	Epsilanti, Mich.	252	KFWB	Hollywood, Calif.	270	WDRE	Atlanta, Ga.	325.9	WSAI	Cincinnati, O.
202.6	KGBY	Shelby, Neb.	233	WOKO	New York, N. Y.	252	KOAW	Wickassaw, Okla.	270	WGST	Atlanta, Ga.	325.9	WJAZ	Chicago, Ill.
202.6	WJHS	Evanson, Ill.	234	KFTP	Denver, Colo.	252	WFBL	Syracuse, N. Y.	270	WJAG	Norfolk, Neb.	326.1	KQW	San Jose, Calif.
202.6	WIBS	Elizabeth, N. J.	234	KEVZ	San Francisco, Calif.	252	WGCP	New York, N. Y.	270	WJBL	Decatur, Ill.	326.1	KTNT	Muscatine, Ia.
204	WABB	Harrisburg, Pa.	234	KMFJ	Fresno, Calif.	252	WBBS	New Orleans, La.	270	WJWB	New Orleans, La.	326.1	WBZ	East Springfield, Mass.
205	KFVD	Venice, Calif.	234	WFDE	Flint, Mich.	252	WBS	Newark, N. Y.	270	WOL	Ames, Ia.	326.1	WBZA	Boston, Mass.
205.4	KFND	Logan, Utah	234	WQAC	Amarillo, Tex.	252	WNIJ	Newark, N. J.	270	WRK	Hamilton, Ohio	326.1	KFMN	Northfield, Minn.
205.4	KFNY	Flagstaff, Ariz.	234.2	WQAG	Minneapolis, Minn.	252	WRHM	Minneapolis, Minn.	270	WRAW	College Station, Tex.	326.9	WCAL	Northfield, Minn.
205.4	WPHL	Brooklyn, N. Y.	234.2	WRGX	Orono, Me.	252	WRO	Hamilton, Ohio	270.6	WKBE	Webster, Mass.	326.9	WCAM	Camden, N. J.
205.4	WPDQ	Buffalo, N. Y.	234.2	WCVK	Ft. Wayne, Ind.	252	WTO	Toledo, O.	272.6	WELF	New York, N. Y.	326.9	WJAX	Jacksonville, Fla.
206.8	WABW	Wooster, Ohio	234.2	WIBC	La Salle, Ill.	252	WTFL	Denver, Colo.	272.6	WEHL	New York City	327	KXX	Los Angeles, Calif.
206.8	WABA	Joliet, Ill.	234.2	WIBC	La Salle, Ill.	254	KFEL	Albuquerque, N. Mex.	272.6	WRW	Tarrytown, N. Y.	327.1	KFAB	Lincoln, Neb.
207	KGTT	San Francisco, Calif.	236	KPLU	San Benito, Tex.	254	KFLR	Albuquerque, N. Mex.	272.6	KPAD	Phoenix, Ariz.	327.1	KSAC	Manhattan, Kan.
208	KNRC	Los Angeles, Calif.	236	KWKC	Kansas City, Mo.	254	KFWH	Chico, Calif.	273	KFIZ	Fond du Lac, Wis.	327.1	WQAO	San Juan, Porto Rico
209.7	KFYO	Texas, Tex.	236	WFBJ	Collegeville, Minn.	254	WFBR	Baltimore, Md.	273	KPKA	Greeley, Colo.	340.7	WMOA	New York, N. Y.
209.8	KSMR	Santa Maria, Calif.	236	WGMC	Richmond Hill, N. Y.	254	WABC	Asheville, N. C.	273	KFPY	Spokane, Wash.	344.6	WCBD	Zion, Ill.
210	KGCN	Concordia, Kan.	236	WBOQ	Richmond Hill, N. Y.	254	WCAJ	University Place, N. Y.	273	WEAM	St. Cloud, Minn.	345	WLS	Chicago, Ill.
210	WCRB	Providence, R. I.	236	WBWA	Allentown, Pa.	254	WCAJ	University Place, N. Y.	273	WELA	West Lafayette, Ind.	348.6	KOB	State College, N. Y.
210	WBH	Bedford, Mass.	236	WIBA	Madison, Wis.	254	WCB	Ithaca, N. Y.	273	WDAE	Tampa, Fla.	348.6	KWSC	Pullman, Wash.
211.1	KFWO	Avalon, Catalina Island	236	WRNU	New York, N. Y.	254	WJBC	Canton, O.	273	WRM	Urbana, Ill.	348.6	WEEI	Boston, Mass.
211.1	WBRT	New York, N. Y.	236	WTAD	Carthage, Ill.	254	WIAS	Burlington, Ia.	273	WSPF	St. Louis, Mo.	352	WJAD	Waco, Tex.
211.1	WJWB	Lewisburg, Pa.	236.1	WGBE	Evansville, Ind.	254	WJBB	St. Petersburg, Fla.	273	KFBH	Havre, Mont.	352.7	WVJ	Detroit, Mich.
212.5	KPWW	South Portland, Ore.	236.1	KFDX	Shreveport, La.	254	WJBB	St. Petersburg, Fla.	273	KFSG	Los Angeles, Calif.	360	WEW	St. Louis, Mo.
212.6	WMAJ	Washington, D. C.	236.1	KFOO	Salt Lake City, Utah	254	WNAD	Norman, Okla.	273	KQV	Pittsburgh, Pa.	361	WQAO	New York, N. Y.
214	WCFR	Joliet, Ill.	236.1	KFOO	Salt Lake City, Utah	254	WRDC	Coldwater, Miss.	273	WFAV	Lincoln, Neb.	361.1	WFH	New York, N. Y.
214.2	KPWF	St. Louis, Mo.	236.1	KFOO	Salt Lake City, Utah	254	WSAR	Fall River, Mass.	273	WABZ	New Orleans, La.	361.2	KGO	Oakland, Calif.
214.2	KPWF	Oxnard, Calif.	236.1	KFOO	Salt Lake City, Utah	254	WTAQ	Eau Claire, Wis.	273	WABZ	New Orleans, La.	365	WMAK	Buffalo, N. Y.
214.2	KPNR	Oakland City, Okla.	236.1	KFOO	Salt Lake City, Utah	254	WFRT	Fort Worth, Tex.	273	WAGY	Royal Oak, Mich.	365.6	WDAF	Kansas City, Mo.
215	KJMI	Prescott, Ariz.	238	KFBX	Phoenia, Ariz.	254	WJAK	Kokomo, Ind.	273	WBAK	Harrisburg, Pa.	365.6	WBH	Kansas City, Mo.
215	WJWB	Philadelphia, Pa.	238	KFWU	Pineville, La.	256	KFYD	Yakima, Wash.	273	WBT	Charlotte, N. C.	367	WEAN	Providence, R. I.
215.6	WPRC	Harrisburg, Pa.	238	KFYJ	Houston, Tex.	256	KFYD	Muscatine, Ia.	273	WCAC	Storrs, Conn.	370.2	WEHD	Chicago, Ill.
215.7	KPOW	Seattle, Wash.	238	KMTR	Los Angeles, Calif.	256	KRE	Berkeley, Calif.	273	WCAO	Baltimore, Md.	370.2	WJJD	Mooseheart, Ill.
215.7	KFNJ	Denver, Colo.	238	WBPP	Petersky, Mich.	256	WRAX	Wilkes-Barre, Pa.	273	WHAD	Milwaukee, Wis.	372	WGM	Jeanette, Pa.
215.7	WBFB	Chicago, Ill.	238	WBNS	Petersburg, Fla.	256	WDD	Chattanooga, Tenn.	273	WHAR	Atlantic City, N. J.	373.8	WNY	New York, N. Y.
215.7	WBFB	Chicago, Ill.	238	WBNS	Petersburg, Fla.	256	WHBP	Johnstown, Pa.	273	WJAS	Pittsburgh, Pa.	374.8	KRHU	Laramie, Wyo.
215.7	WBFB	Chicago, Ill.	238	WBNS	Petersburg, Fla.	256	WHBC	Detroit, Mich.	273	WLAP	Louisville, Ky.	374.8	KVVO	Bristow, Okla.
215.7	WBFB	Chicago, Ill.	238	WBNS	Petersburg, Fla.	256	WRAC	Escabana, Mich.	273	WMAZ	Cazenovia, N. Y.	379.5	WGY	Schenectady, N. Y.
215.7	WBFB	Chicago, Ill.	238	WBNS	Petersburg, Fla.	256	WRHF	Washington, D. C.	273	WRPD	Chicago, Ill.	379.5	WILAZ	Troy, N. Y.
215.7	WBFB	Chicago, Ill.	238	WBNS	Petersburg, Fla.	256	WRVA	Richmond, Va.	273	WRBK	Fargo, N. Dak.	380	KFCB	San Diego, Calif.
215.7	WBFB	Chicago, Ill.	238	WBNS	Petersburg, Fla.	256.4	WASH	Grand Rapids, Mich.	273	WRW	Minneapolis, Minn.	384.4	KIR	Seattle, Wash.
217	KPRN	Pullman, Wash.	240	KFVE	University City, Mo.	258	KPRN	Garrettsville, Mo.	273	WKY	Oklahoma City, Okla.	384.4	WLWL	New York, N. Y.
217	WOK	Homewood, Ill.	240	KFVE	University City, Mo.	258	KFUL	Garrettsville, Mo.	273.1	WOC	Jamestown, N. Y.	384.4	WMBF	Miami Beach, Fla.
217.3	KFAB	San Jose, Calif.	240	KFVE	University City, Mo.	258	KOCH	Omaha, Neb.	273.2	WOMK	Dayton, Ohio	384.4	WVAE	Plainfield, Ill.
217.3	WFKB	Chicago, Ill.	240	KFVE	University City, Mo.	258	WAAD	Cincinnati, O.	273.2	WSWK	Chicago, Ill.	389.4	WPAR	Cleveland, O.
217.3	KFCJ	Junction City, Kan.	240	KFVE	University City, Mo.	258	WADQ	Akron, O.	276	WEAU	Sioux City, Iowa	389.4	WTAM	Cleveland, O.
218.8	KFRW	Olympia, Wash.	240	KFVE	University City, Mo.	258	WLEC	Rochester, N. Y.	276.6	WHDI	Minneapolis, Minn.	390.9	WODA	Paterson, N. J.
218.8	WIBU	Anderson, Ind.	240	KFVE	University City, Mo.	258	WKJC	Lancaster, Pa.	277.6	KGY	Lacey, Wash.	394.5	KHQ	Spokane, Wash.
218.8	WIBI	Flushing, I.L. N.Y.	240	KFVE	University City, Mo.	258	WLTS	Chicago, Ill.	277.6	WCAU	Philadelphia, Pa.	394.5	WFJ	Philadelphia, Pa.
218.8	WJBI	Ped Bank, N. J.	240	KFVE	University City, Mo.	258	WPCG	Chicago, Ill.	277.6	WDZ	Tuscola, Ill.	394.5	WOAI	San Antonio, Tex.
218.8	WBSV	Buffalo, N. Y.	240	KFVE	University City, Mo.	258.5	WMA	Culver, Ind.	277.6	WMB	Minneapolis, Minn.	394.5	WPL	Philadelphia, Pa.
220	KFTT	Oakland, Calif.	241.8	WOOD	Grand Rapids, Mich.	258.5	WNAL	Omaha, Neb.	277.6	WLB	Stevens Point, Wis.	399.8	WHAS	Louisville, Ky.
220	KJBS	San Francisco, Calif.	241.8	WOOD	Grand Rapids, Mich.	258.5	WNRJ	Woodside, L. I., N. Y.	277.6	WRBC	Valparaiso, Ind.	400	WJAF	Detroit, Mich.
220	WBWB	Logansport, Ind.	242	KFPM	Greenville, Tex.	259	KPUS	Oakland, Calif.	277.6	WRBG	Altoona, Pa.	405.2	KHJ	Los Angeles, Calif.
220	WCOA	Waco, Pa.	242	KFPM	Greenville, Tex.	259	KFYV	Albuquerque, N. Mex.	277.8	KPFM	Grand Forks, N.D.	405.2	WJY	New York, N. Y.
222	WBBW	Norfolk, Va.	242	KFPM	Greenville, Tex.	260.7	KMEX	Mexico City, Mex.	278	KVPM	Vermillion, S.D.	405.2	WOR	Newark, N. J.
222	WBHD	Bellefontaine, O.	242	KFPM	Greenville, Tex.	260.7	KSMR	Pocatello, Idaho	278	KWVC	Waverly, Ia.	410	WBR	Tilton, N. H.
222	WBHF	Rock Island, Ill.	242	KFPM	Greenville, Tex.	260.7	WSSK	Bay City, Mich.	278	KWVG	Waverly, Ia.	416.4	WBK	Brooklyn, N. Y.
222	WIBG	Philadelphia, Pa.	242	KFPM	Greenville, Tex.	260.7	KFOA	St. Louis, Mo.	278	WGBC	Memphis, Tenn.	416.4	WCO	St. Paul and Minneapolis, Minn.
222	WIBT	Poyntelle, Wis.	242	KFPM	Greenville, Tex.	261	KFOO	Russell, Kan.	278	WAAF	Chicago, Ill.	422.3	WKR	Cincinnati, O.
222.1	WBES	Takoma Park, Wash.	242	KFPM	Greenville, Tex.	261	KFUT	Salt Lake City, Utah	278	WAAV	Omaha, Neb.	422.3	WLW	Cincinnati, O.
222.1	WBES	Takoma Park, Wash.	242	KFPM	Greenville, Tex.	261	KFUT	Salt Lake City, Utah	278	WABO	Pocheater, N. Y.	428.3	KPO	San Francisco, Calif.
222.1	WBES	Takoma Park, Wash.	242	KFPM	Greenville, Tex.	261	KFUT	Salt Lake City, Utah	278	WHAM	Rochester, N. Y.	428.3	WSB	Atlanta, Ga.
222.1	WBES	Takoma Park, Wash.	242	KFPM	Greenville, Tex.	261	KFUT	Salt Lake City, Utah	278	WHAN	Columbus, O.	430.1	WNAC	Boston, Mass.
222.1	WBES	Takoma Park, Wash.	242	KFPM	Greenville, Tex.	261	KFUT	Salt Lake City, Utah	278	WIOA	Boise, Idaho	430.1	WHAP	New York, N. Y.
222.1	WBES	Takoma Park, Wash.	242	KFPM	Greenville, Tex.	261	KFUT	Salt Lake City, Utah	278	WJAG	Decatur, Ia.	434	RGCH	Wayne, Neb.
222.1	WBES	Takoma Park, Wash.	242	KFPM	Greenville, Tex.	261.7	KFJK	Oklahoma City, Okla.	280.2	KMOX	St. Louis, Mo.	434.5	NAA	Arlington, Va.
224	WBJG	Charlotte, N. C.	243.8	KGAR	Tucson, Ariz.	261	KFUT	Salt Lake City, Utah	280.2	KOAC	Corwallis, Ore.	440.9	KLDS	Independence, Mo.
224	WKAJ	Lacoma, N. C.	243.8	WAAM	Minneapolis, Minn.	261	KFUT	Salt Lake City, Utah	280.2	KNAB	Boston, Mass.	440.9	WDFW	Craunton, R. I.
224	WBGH	Birmingham, Ala.	243.8	WAAM	Minneapolis, Minn.	261	KFUT	Salt Lake City, Utah	280.2	KNBB	Boston, Mass.	440.9	WLSL	Providence, R. I.
224	WBHM	Chicago, Ill.	243.8	WAAM	Minneapolis, Minn.	261	KFUT	Salt Lake City, Utah	282.8	WQAN	Lawrenceburg, Tenn.	440.9	WMAF	South Dartmouth, Mass.
224	KFTU	Ogden, Utah	243.8	WAAM	Minneapolis, Minn.	261	KFUT	Salt Lake City, Utah	282.8	WSM	Nashville, Tenn.	440.9	WOS	Jefferson City, Mo.
224	KFVS	Cape Girardeau, Mo.	243.8	WAAM	Minneapolis, Minn.	261	KFUT	Salt Lake City, Utah	282.8	KOWW	Walla Walla, Wash.	447.5	WMAQ	Chicago, Ill.
224	WBJG	Charlotte, N. C.	243.8	WAAM	Minneapolis, Minn.	261	KFUT	Salt Lake City, Utah	285	WKBB	New York, N. Y.	447.5	WOB	Chicago, Ill.
224	WKAJ	Lacoma, N. C.	243.8	WAAM	Minneapolis, Minn.	261	KFUT	Salt Lake City, Utah	285 1/2	WQAM	Miami, Fla.	454.3	KTV	Seattle, Wash.
224	WBGH	Birmingham, Ala.	243.8	WAAM	Minneapolis, Minn.	261	KFUT	Salt Lake City, Utah	285.7	WREO	Lansing, Mich.	454.3	KFOA	Seattle, Wash.
224	WBHM	Chicago, Ill.	243.8	WAAM	Minneapolis, Minn.	261	KFUT	Salt Lake City, Utah	285.7	WRAR	East Lansing, Mich.	454.3	WJZ	New York, N. Y.
224	KFTU	Ogden, Utah	243.8	WAAM	Minneapolis, Minn.	261	KFUT	Salt Lake City, Utah	285.7	WRAR	East Lansing, Mich.	461	KFNK	Shenandoah, Ia.
224	KFVS	Cape Girardeau, Mo.	243.8	WAAM	Minneapolis, Minn.	261	KFUT	Salt Lake City, Utah	285.7	WRAR	East Lansing, Mich.	461	KMA	Shenandoah, Ia.
224	WBJG	Charlotte, N. C.	243.8	WAAM	Minneapolis, Minn.	261	KFUT	Salt Lake City, Utah	285.7	WRAR	East Lansing, Mich.	461.3	WAPI	Anbun, Ala.
224	WKAJ	Lacoma, N. C.	243.8	WAAM	Minneapolis, Minn.	261	KFUT	Salt Lake City, Utah	285.7	WRAR	East Lansing, Mich.	461.3	WCAE	Pittsburgh, Pa.
224	WBGH	Birmingham, Ala.	243.8	WAAM	Minneapolis, Minn.	261	KFUT	Salt Lake City, Utah	285.7	WRAR	East Lansing, Mich.	461.3	WAPI	Anbun, Ala.
224	WBHM	Chicago, Ill.	243.8	WAAM	Minneapolis, Minn.	261	KFUT	Salt Lake City, Utah	285.7	WRAR	East Lansing, Mich.	467	KFL	Los Angeles, Calif.
224	KFTU	Ogden, Utah	243.8	WAAM	Minneapolis, Minn.	261	KFUT	Salt Lake City, Utah	285.7	WRAR	East Lansing, Mich.	468.5	WRC	Washington, D. C.
224	KFVS	Cape Girardeau, Mo.	243.8	WAAM	Minneapolis, Minn.	261	KFUT	Salt Lake City, Utah	285.7	WRAR	East Lansing, Mich.	468.5	WCAP	Washington, D. C.
224	WBJG	Charlotte, N. C.	243.8	WAAM	Minneapolis, Minn.	261	KFUT	Salt Lake City, Utah	285.7	WRAR	East Lansing, Mich.	475.9	WFAA	Dallas, Tex.
224	WKAJ	Lacoma, N. C.	243.8	WAAM	Minneapolis, Minn.	261	KFUT	Salt Lake City, Utah	285.7	WRAR	East Lansing, Mich.	475.9	WBP	Ft. Worth, Tex.
224	WBGH	Birmingham, Ala.	243.8	WAAM	Minneapolis, Minn.									



Cut Shows Transformer Full Size. Notice Short Connection to Socket

A 100 kilocycle Air Core

## Intermediate Transformer

The efficiency of your "Super" depends on the quality of the intermediate frequency transformers. Klentz air core transformers are designed to give maximum efficiency.

### 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.

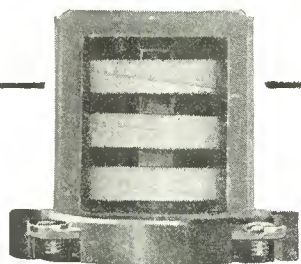
Complete set of three prints 50c postpaid

Salient Features. 100 K. C. 2-1 ratio air core perfect matching stagger winding. Bakelite construction throughout. Quality of tone, Selectivity, Amplification and Distance. 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.

Oscillator coupler is same style as intermediate transformer.

## Klentz Radio Co.

2324 No. Sawyer Ave., Chicago, Ill.



This "cut-away" view of the Klentz Transformer shows the Stagger windings which assure its perfect performance at all times.

### Jobbing the following lines:

- Jewell Electrical Instrument Co.
- Thordarson Mfg. Co.
- Yaxley Mfg. Co.
- Amsco
- Micamold Condenser
- Precise Mfg. Co.
- Spaulding Mfg. Co.
- Belden Mfg. Co.
- Potter Mfg. Co.
- Pioneer Radio Corp.
- Radio Appliance Lab.
- Splitdorf Elect. Co.

.0001 Matched set of Four.....\$1.50  
 .00015 Matched set of Four..... 1.50  
 All sizes of Matched Condensers in stock.

### COUPON

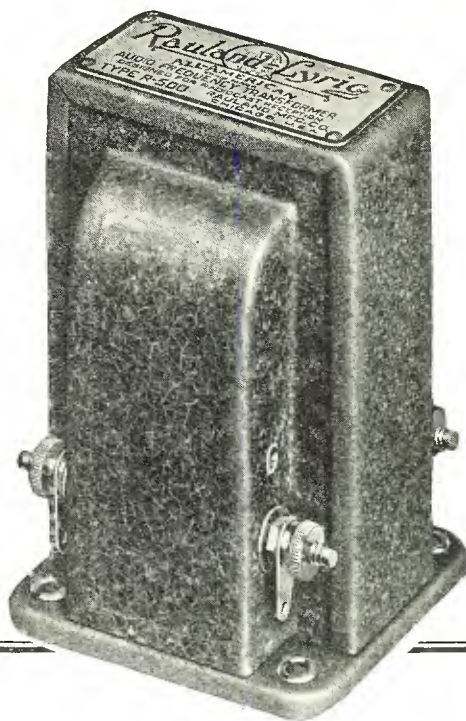
Please send circular describing Transformers.

.....  
 .....  
 .....



# Still the undisputed leader

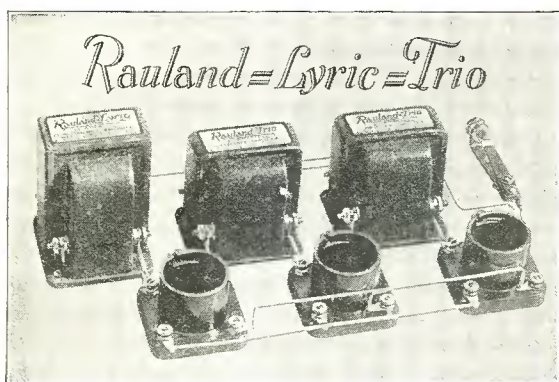
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AUDIO TRANSFORMER



If you love music, and want your radio set to reproduce tones *faultlessly*, there is one audio transformer you can absolutely depend on—the famous Rauland-Lyric.

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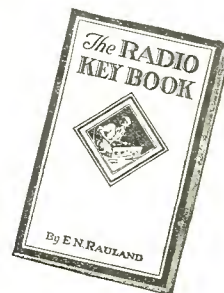
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Write for “Modern Audio Amplification”,  
a free book, describing this fine unit.

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You'll enjoy reading it—48 pages of interesting, up-to-the-minute facts about radio, simply told. Also full construction details of all leading types of circuits. Send 10 cents (coin or stamps) to cover postage and mailing cost.



**ALL-AMERICAN RADIO CORPORATION**

4221 Belmont Avenue, Chicago, Illinois

OWNING AND OPERATING STATION WENR 266 METERS

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

# Foreign Radio Broadcasting Stations

	Call Letters	Wave-lengths, meters,	Power, watts		Call Letters	Wave-lengths, meters,	Power, watts
<b>ALASKA</b>				<b>Prince Edward Island</b>			
Anchorage: Chovin Supply Co.....	KFAD	280	100	Summerside: R. T. Holman, Ltd.....	CHLC	268	25
Juneau: Alaska Electric Light & Power Co.....	KFIU	226	10	<b>New Brunswick</b>			
<b>ALGERIA</b>				Muneton: Canadian National Railways.....			
Algiers: Colin & Fils.....	8DB	310	100		CNRA	322	500
<b>ARGENTINA</b>				<b>Quebec</b>			
Buenos Aires: No data. Received at Pernambuco and Valparaiso.....	LOO	250	1000	Montreal: Northern Electric Co., Ltd.....	CHYC	411	750
Argentine Association of Broadcasters.....	LOR	400	500	E. Fontaine.....	CHRC	341	5
No data.....	LOT	272.7	1000	La Presse Publishing Co.....	CKAC	410.7	1200
Francisco J. Brusa.....	LOV	352	1000	Canadian Marconi Co.....	CFCF	410.7	1650
Grand Splendid Theatre.....	LOW	325	1000	Canadian National Railways. Uses equipment of other local stations.....	CNRA	.....	.....
Radio Cultura Magazine.....	LOX	375	500	<b>Ontario</b>			
Radio Nacional.....	LOY	313	100	Hamilton: Jack V. Elliott, Ltd.....	CFCU	340.7	500
University of La Plata.....		425	1000	Wentworth Radio Supply Co.....	CKOC	340.7	50
<b>AUSTRALIA</b>				Brantford: Brant Radio Supply Co., Ltd.....			
<b>New South Wales</b>				Huntsville: A. Staples.....			
Bathurst.....	2MK	288	100	Iroquois Falls: Abitibi Power & Paper Co.....	CFCH	499.7	250
New Castle.....	2HD	288	100	Kingston: Monarch Battery Co.....	CYMC	267.7	20
Northbridge: Otto Sandel.....	2UW	263	500	Queens University.....	CFRC	267.7	500
Sydney: Burgin Electric Co.....	2BE	326	100	Kitchener: O. Rumpel.....	CJCF	248	25
Broadcasters Sydney Ltd.....	2BL	353	5000	Burketon Junction: Canadian Broadcasting Corp. Projected.....		329.5	5000
Farmer & Co. Ltd. Labor Party.....	2FC	11,100	10,000	London: London Free Press Printing Co., Ltd.....	CJGC	330	500
Electrical Utilities Supply Co.....	2UR	297	250	Ottawa: J. R. Booth, Jr.....	CHXC	434.5	250
<b>Victoria</b>				Canadian National Railways.....			
Brighton: Projected. No data.....	3PB	.....	.....	Dr. G. M. Geldert. (For Ottawa Radio Assn.).....	CKCO	435	100
Melbourne: Associated Radio Co. of Australia Pty. Ltd.....	3AR	484	1600	Prescott: Radio Association of Prescott.....	CFLC	297	50
Broadcasting Co. of Australia Pty. Ltd.....	3LO	371	5000	Preston: Wallace Russ.....	CKPC	248	7½
O. J. Nilson & Co.....	3UZ	319	100	Scarboro Station: Universal Radio Co. of Canada.....	CJYC	291	500
L. J. Hellier: Wangaratta Sports Depot.....	3WR	303	100	Toronto: Star Publishing & Printing Co.....	CFCA	356.9	500
Mildura: R. J. Egge.....	3EO	286	100	Toronto Radio Research Society.....	CHNC	356.9	500
<b>Queensland</b>				E. Eaton Co.....			
Brishane: Dr. V. McDowell. Under construction.....	4CM	278	250	Domion Battery Co., Ltd.....	CKCL	356.9	500
Radio Manufacturers Ltd. Projected.....	3MB	337	260	Canadian Broadcasting Corp. Projected.....	CKNG	329.5	5000
Queensland Government.....	4QG	385	5000	Northern Electric Co. Uses equipment of other local stations.....	CHIC	.....	.....
Rockhampton: Queensland Govt. Projected.....	4RN	323	500	Jarvis Street Baptist Church. Uses equipment of other stations.....	CJBC	.....	.....
Toowoomba: Gold Radio Elec. Service.....	4GR	294	100	Evening Telegram. Uses equipment of local stations.....	CJSC	.....	.....
<b>Tasmania</b>				Canadian National Railways. Uses equipment of CKY.....			
Hobart: Association Radio Co. of Australia Ltd. to be replaced by a 3000-watt (Input) station to be operated by the Tasmanian Broadcasting Pty. Ltd.....	7ZL	525	250	Thorbold: D. J. Fendell. Suspended.....	CNRT	247.8	75
<b>South Australia</b>				<b>Manitoba</b>			
Adelaide: Central Broadcasting Co.....	5CL	395	5000	Winnipeg: Manitoba Telephone System.....	CKY	384.4	500
E. J. Hume. Operated by 5DN Pty. Ltd.....	5DN	313	500	Canadian National Railways. Uses equipment of CKY.....	CNRW	.....	.....
Millswood Auto & Radio Co.....	5MA	.....	.....	<b>Saskatchewan</b>			
Marshall & Co.....	5MC	273	500	Regina: R. H. Williams & Sons, Ltd.....	CHWC	297	15
<b>Western Australia</b>				Leader Publishing Co., Ltd.....			
Perth: Westralian Farmers, Ltd.....	6WF	1250	5000	Manitoba Telephone System.....	CKY	384.4	500
<b>AUSTRIA</b>				Canadian National Railways. Uses Station CKCK equipment.....			
Vienna: Oesterreichischer Radioverkehrs A. G. broadcasts three 2-hour programs daily, including music (opera and popular), weather and market reports and news. Reception reported at Antwerp, Teheran Smyrna, Tunis.....	ORV	517.2	1500	Canadian National Railways. Uses equipment of CKY.....	CNRW	.....	.....
Oesterreichischer Radioverkehrs A. G. Testing; to replace above station in the near future.....	ORV	488	10,000	Saskatoon: The Electric Shop.....	CEQC	329.5	500
Graz: Oesterreichischer Radioverkehrs A. G. (Note: The Oesterreichischer Radioverkehrs A.G. has had stations projected for Bregenz, Innsbruck, Klagenfurt, Linz and Salzburg for some time, though reports do not show that any action toward construction has been taken.)		365.8	500	International Bible Students' Association.....	CHUC	329	500
<b>BELGIUM</b>				Wheaton Electric Co.....			
Brussels: Radio Belgique station owned and operated by the Radio Belgique Co.....	SBR	481	1500	Canadian National Railways. Uses equipment of other local stations.....	CNRS	.....	.....
Liege: Radio Wallonie station.....		205	.....	Unity: Horace N. Stovin.....	CHSC	356.9	250
Radio Central station.....		294.1	.....	<b>Alberta</b>			
<b>BRAZIL</b>				Calgary: W. W. Grant Radio, Ltd.....			
Bahia: Radio Sociedade do Bahia.....		250	500	Calgary Herald.....	CFAC	434.5	500
Bello Horizonte: National Telegraph Service.....		400	500	Canadian National Railways. Uses equipment of other local stations.....	CNRC	.....	.....
Fortaleza: Radio Club.....		.....	30	<b>Edmonton</b>			
Pernambuco: Radio Club. One hour daily and two hours three days each week.....		310	300	Edmonton: International Bible Students' Assn.....	CHCY	517	250
Port Alegre: Radio Society. Broadcasts one hour daily. To be replaced by 50-watt station.....		380	80	Radio Supply Co., Ltd.....	CFCK	516.9	100
Radio de Janeiro: Radio Society. Daily programs by local artists.....		400	1000	Edmonton Journal.....	CJCA	516.9	500
National Telegraph Service, Praia Vermelha Station. Operated by Radio Club. Daily news and concerts.....		312	500	Canadian National Railways. Uses equipment of other local stations.....	CNRE	.....	.....
Rio de Janeiro: No data. Phonograph records broadcast 2 to 4 pm daily, concerts from 7 to 9 pm three or four days each week.....		.....	10	Lethbridge: J. E. Palmer.....	CJOC	268	50
Santos: No data.....		.....	10	<b>British Columbia</b>			
Sao Paulo: Dias Carneiro & Co., operated by the Radio Club of Sao Paulo.....		400	100	Burnaby: International Bible Students' Assn.....	CFVC	411	500
Radio Club of Sao Paulo Broadcasts Hotel Terminus orchestra and phonograph records daily.....		350	10	Kamloops: N. S. Dagleish & Sons and Weller & Weller.....	CFJC	268	15
<b>CANADA</b>				New Westminster: Westminster Trust Co.....			
<b>Nova Scotia</b>				Vancouver: A. Holmstead & William Hanlon.....			
Halifax: (Carlton Hotel station, Northern Electric Co., Ltd.).....	CHNS	322	100	Radio Corporation of Vancouver.....	CFYC	410.7	10
<b>CHILE</b>				Daily Province.....			
Antofagasta: Senor J. Pedreny.....	CHAO	.....	200	First Congregational Church.....	CKFC	410.7	50
Santiago: El Mercurio, newspaper.....		360	1200	Canadian National Railways.....	CNRV	291.1	500
Fratelli Castagneto.....		320	100	Sprott-Shaw Radio Co. Suspended.....	CFQC	410.7	.....
Chilean Broadcasting Society.....	CRC	385	350	Pyramid Temple Society. Uses equipment of other local stations.....	CUKC	.....	.....
Commercial Radio Co.....		350	30	<b>Chile</b>			
Tacna: Chilean Government.....	CRCT	550	1000	Valparaiso: Antonio Cornish.....	ACB	400	50
Valparaiso: Antonio Cornish.....		400	50				

	Call Letters	Wave-lengths, meters,	Power, watts		Call Letters	Wave-lengths, meters,	Power, watts	
<b>CHINA</b>					<b>Cie. Francais de Radiophonie.</b> Reception reported at Teneriffe, Jerusalem, Brussels, Rome, Teheran, Smyrna, Barcelona.....			
Shanghai: Kellogg Switchboard & Supply Co. Operates four hours daily between 9:45 am and 11 pm.....		365	100		1750	4000		
(Note: Stations have been reported in other Chinese cities, but the present operation is very doubtful. The above station is the only one mentioned in more recent reports.)								
<b>CHOSEN</b>					Superior School of Ministry of Posts, Telegraphs and Telephones. Reception reported at Rome.....FPTT			
Seoul: Under construction.....	JODK	.....	.....		459.4	500		
<b>COSTA RICA</b>					Paris: Radio Paris.....	1750	.....	
San Jose: Government. Under construction.....	.....	.....	.....		477.8	.....		
<b>CUBA</b>					Paris: Ecole Supérieure.....	350	.....	
Central Ekia: Elia Sugar Co.....		300	500		Pic du Midi.....	220	50	
Salvador Rionda.....	7SR	350	500		St. Etienne: Radio Club Forezien.....	200	100	
Cienfuegos: Jose Ganduxe.....	6BV	260	200		Strasbourg: Radio Club.....	200	100	
Havana: Cuban Telephone Co.....	PWX	400	500		Toulouse: La Radio. Reception reported at Rome, Barcelona.....	389.6	2000	
Bernardo Barrie.....	2BB	250	15		Ministry of Posts, Telegraphs and Telephones, Aerodrome station.....	294.1	2000	
Frederick W. Borton.....	2BY	260	100		(Note: The Ministry of Posts, Telegraphs and Telephones has had stations under construction at Angers, Bordeaux, Lille, Nice and Strasbourg for some time.)			
El Pais.....	2EP	355	400	<b>GERMANY</b>				
Credito y Construction Co.....	2HP	295	100	Berlin: Postal Authorities. Konigswusterhausen station. Relays Vox Haus programs. Reception reported at Rome, Constantinople, Bergen, Algiers.....				
Jose Lara.....	2LR	235	50		1300	5000		
Manuel y Guillermo Salas.....	2MG	284	20	Postal Authorities. Vox Haus station.....				
Mario Garcia Velez.....	2OK	360	100		507	2250		
Columbia Radio & Cycle Co.....	2OL	225	100		566	400		
Raoul Karman.....	2RK	315	20		1300	1600		
Roberto E. Ramierz.....	2RW	270	20	Bremen: Nordische Rundfunk A. G. Relays Hamburg programs.....				
Benito Vieta Ferro.....	2UF	265	10		400	700		
Santiago: Alberto Ravelo.....	8BY	250	100		Breslau: Schlessische Funkstudde. Received at Rome. To be replaced by station with 10,000 watts input.....	357.1	4000	
Tuinucu: Frank H. Jones.....	6JK	272	100		Cassel.....	272.7	.....	
Frank H. Jones.....	6KW	340	100		Dortmund: Mitteldeutscher Rundfunk A. G. Relays Leipzig programs.....	283	300	
<b>CZECHOSLOVAKIA</b>					Dresden: Mitteldeutscher Rundfunk A. G. Relays Leipzig programs.....	294.1	300	
Bratislava.....	.....	300	.....		Elberfeld: Suspended.....	468.8	300	
Brunn: (Radio Journal station).....	.....	441.2	500		Frankfurt-on-the-Main:			
Radio Journal.....	OKB	400	.....		Sudwestdeutscher Rundfunkdeinst.....	394.7	300	
Kazici.....	.....	1150	.....		Gleitwitz.....	250	1500	
Kbely.....	.....	348.9	5000		Hamburg: Noreischer Rundfunk A. G.....	428.6	2000	
Prague: (Strasnice station).....	.....	.....	.....		Hanover: Nordischer Rundfunk A. G. Relays Hamburg programs.....	297	1500	
Radio Journal.....	OKP	.....	.....		Kassel: Sudwestdeutscher Rundfunkdienst.....	283	300	
<b>CANARY ISLANDS</b>					Kiel.....	254.2	300	
La Laguna: Servando Ortoll Delmotte.....	EAJ5	280	50		Konigsberg: Ostmarken Rundfunk A. G.....	241.9	300	
Las Palmas: Canary Islands Radio Club.....	.....	300	6		Leipzig: Mitteldeutscher Rundfunk A. G.....	322.6	300	
Club Radio Canarias.....	.....	300	6		Muenster: Westdeutscher Funkstunde A. G.....	303	600	
Teneriffe: Servando Ortoll Delmotte.....	EAR5	120	100		Munich: Deutsche Stunde in Bayern.....	535.7	300	
<b>CEYLON</b>					Norddeich.....	1800	.....	
Colombo: Ceylon American Wireless Association.....	.....	800	2000		Nuremberg.....	329.7	.....	
<b>DENMARK</b>					Stettin.....	252.1	.....	
Copenhagen: Copenhagen Radio Broadcasting station (Government owned).....	.....	337	500		Stuttgart.....	379.7	.....	
Hjorring: Relay station (Government owned).....	.....	1250	500		Strasbourg.....	200	.....	
Odense: Relay station (Government owned).....	.....	810	250	<b>GREAT BRITAIN</b>				
Ryvang.....	.....	1150	.....	Aberdeen.....				
Soro: Ministry of War. Replaced station at Ryvang....	.....	1150-2400	1000		2BD	491.8	1500	
<b>ESTHONIA</b>					Bradford.....	254.2	.....	
Tallinn.....	.....	350	.....		Birmingham: Received at Antwerp, Brussels, Rome.....	491.8	1500	
<b>EGYPT</b>					Bournemouth: Received at Antwerp, Teneriffe, Jerusalem.....	6BM	306.1	
Morocco					Cardiff: Received at Antwerp and Rome.....	5WA	353	
Casablanca: Radio Club de Maroc.....	CNO	250	500		Daventry: Received throughout Europe, northern Africa and Asia Minor.....	5NX	1600	
Senegal					Dundee.....	2DE	288.5	
St. Louis Radio Club Senegalaise (Projected).....	.....	300	100		Edinburgh.....	2EH	288.5	
Tunisia					Glasgow.....	5SC	405.4	
Tunis: French Army.....	OCTU	50	500		Hull.....	6KH	288.5	
Cairo: Amateur station: unknown.....	.....	300	6		Leeds-Bradford.....	2LS	297	
<b>FINLAND</b>					Liverpool.....	6LV	288.5	
Jyvaskyla: Nuoren Voiman Liiton Radioyhdistys.....	.....	297	200		London: Received at Teneriffe, Strasbourg, Brussels, Rome, Barcelona, Tunis.....	2LO	361.4	
Bjoreborg: Under construction by the Nuoren Voiman Liiton Radioyhdistys.....	.....	255.3	.....		Manchester: Received at Rome.....	2ZY	384.6	
Hango: Nuoren Voiman Liiton Radioyhdistys.....	.....	259.6	200		New Castle: Received at Brussels, Rome.....	5NO	312.5	
Helsingfors—Radio Bataljong.....	.....	240	.....		Nottingham.....	5NG	288.5	
Helsingfors: Finnish Civil Guard. Broadcasts concerts daily and special programs. Reception reported at Tallinn (Esthonia).....	.....	500	500		Plymouth.....	5PY	288.5	
Military station at Skatudden, a suburb, supported by the public. Broadcasts concerts and other programs irregularly. Reception reported at Tallinn.....	.....	318	750		Sheffield.....	6FL	288.5	
Mikkeli: Nuoren Voiman Liiton Radioyhdistys.....	.....	561	100		Stoke on Trent.....	6ST	288.5	
Pori: Nuoren Voiman Liiton Radioyhdistys.....	.....	255.3	100		Swansea.....	5SX	288.5	
St. Michael: Nuoren Voiman Liiton Radioyhdistys, under construction.....	.....	561	500	<b>HAWAII</b>				
Tammerfors: Nuoren Voiman Liiton Radioyhdistys. Broadcasts concerts and other programs irregularly.....	3NB	368	250	Honolulu: Marion A. Mulrony.....				
Tampere.....	.....	373	250		KGU	270	500	
Uleaborg.....	.....	233	100	<b>HAITI</b>				
<b>FRANCE</b>					Port au Prince: Government projected.....			
Angen: Department of Lot et Garonne.....	2BD	297	250	<b>HOLLAND</b>				
Angers: Ministry of Posts, Telegraphs and Telephones.....	.....	275.2	500	Amsterdam.....				
Bezier.....	.....	95	.....		PCFF	2125	.....	
Bordeaux: Ministry of Posts, Telegraphs and Telephones.....	.....	238.1	500		Amsterdam.....	760	.....	
Caen.....	.....	277.8	.....		Antwerp.....	508.5	.....	
Greenoble: Ministry of Posts, Telegraphs and Telephones.....	.....	380	150		Bloemendall.....	566	.....	
Issy-les-Moulineaux: Ministry of War.....	QGA	1800	500		DeBilt.....	1100	.....	
Lyon: Dubanchet & Trolliet, Station Radio Lyon.....	.....	291.3	2000	<b>HUNGARY</b>				
Ministry of Posts, Telegraphs and Telephones, Station La Doua, named for suburb in which located.....	YN	476.2	500	Budapest: Meugeyetemi Radio Magyar Tavisirati Iroda. Broadcasts market reports and news.....				
Marseilles: Ministry of Posts, Telegraphs and Telephones.....	.....	309.3	300		555.6	2000		
Mont de Marsen.....	.....	400	300	<b>ICELAND</b>				
Montpellier: Radio Montpellier station.....	.....	220	200	Reykjavik.....				
Paris: Eiffel Tower station. Ministry of Posts, Telegraphs and Telephones.....	FL	2650	5000	<b>INDIA</b>				
Journal Petit Parisian.....	5NG	333	500	Bombay: Bombay Presidency Radio Club.....				
Petit Parisian. Reception reported at Rome.....	.....	340.9	500		2FV	387	220	
Societ Francais Radioelectrique.....	FL	1780	100		Walter Rogers & Co.....	2AX	226	
Societe Francais Radioelectrique.....	SAJ	.....	.....		Calcutta: Radio Club of Bengal.....	2BZ	800	
					Owner not reported.....	5AF	425	
					Karachi: Karachi Radio Club.....	.....	425	
					Madras: Crampton.....	220	120	
					Rangoon: Radio Club of Burma and Wireless Club of Burma. Broadcasts musical programs every Sunday.....	450	40	
				<b>NORTH IRELAND</b>				
				Belfast.....				
					2BE	326.1	1500	
				<b>IRISH FREE STATE</b>				
				Dublin: Government.....				
					2RN	319.1	1500	



Call	Wave-length, meters	Power, watts	Call	Wave-length, meters	Power, watts
<b>ITALY</b>			<b>SPAIN</b>		
Rome: Unione Radiofonica Italiana. Broadcasts concerts and news, 8:30 to 11 o'clock pm daily. Receptions reported at Antwerp, Jerusalem, Lille, Smyrna, Damascus, Barcelona, Tunis and Alexandria. This is at present the station best received throughout the Levant. To be replaced by a station now under construction, of 2600 watts power.....	IRO	422.6 1200	Barcelona: Radio Barcelona Station. Associated Nacional Radiofusion.....	EAJI	280.4 200
Milan: Unione Radiofonica Italiana. (Note: The Unione Radiofonica Italiana has stations at Florence, Naples and Palermo projected or under construction.)		315.8 1200	Bilbao: Radio Carlton Station. Radio Club Vizcaya.....	EAJ9	434.8 200
<b>JUGO-SLAVIA</b>			Radio Vizcaya Station. Don Armando de Otera.....	EAJ11	418 400
Belgrade.....	HFF	1650 2000	Vizcaya Radio Broadcasting Station broadcasts music, provided by local talent, and considerable advertising from 10 to 12 pm daily.....		294.1 200
Zagreb: Under construction.....		275.2	Cadiz: Don Francisco de la Liesca.....	EAJ3	400 550
<b>LATVIA</b>			Don Jan Iaborra.....	EAJ10	330 1000
Riga.....		480 2000	Carthagena: Don Enrique de Orbe.....	EAJ16	297 150
<b>MEXICO</b>			Madrid: Don Antonio Castilla.....	EAJ4	275.2 1000
Chihuahua: Federal Government State Capital station.....	CZF	325 250	Radio Iberica Station.....	EAJ6	577 1000
Guadalajara: Federal Military Command.....	FAM	490 1000	Union Radio.....	EAJ7	372.4 1000
Radio Club.....		280 10	Don Vicente Coyonecho, projected.....	EAJ12	200
Mazatlan: Castulo Llamas.....	CYR	475 250	Association of Radio.....	EAJ15	490 1000
Mexico City: Elfrin R. Gomez.....	CYA	300 500	Radio Espana.....		334 300
Jose J. Reynosa, operated by El Buen Tono, cigarette factory.....	CYB	275 500	Malaga: Cia Iberica de Telecomunicacion.....	EAJ25	254.2 1000
Miguel S. Castro, operated by Le High Life, newspaper.....	CYH	375 100	Oviedo: Don Arburo Cima.....	EAJ19	201.3 1000
Raoul Azcarraga, operated by Universal.....	CYL	400 500	Salamanca.....	EAJ22	204.1
Martinez y Zetina.....	CYO	425 100	Saragossa.....	EAJ23	325
El Excelesior-Parker.....	CYN	325 500	San Sebastian: Don Sabino Ucelayeta.....	EAJ8	272.7 500
Department of Education.....	CZE	350 500	Seville: Seville Radio Club.....	EAJ5	344.8 150
Monterey: Roberto Reyes.....	CYM	275 100	Don Mannel Garcia Ballesta.....	EAJ17	330 100
Constantino de Tarnava. Under construction.....	CYS		Don Jorge la Riva, projected.....	EAJ21	1000
Oaxaca: Frederico Zenilla.....	CYF	265 100	Valencia: Radio Corporation.....	EAJ14	400 500
Puebla: Augustin del P. Zaenz.....	CYU	312 100	Under construction.....	EAJ24	360
Tampico: El Mundo. Suspended.....			<b>STRAITS SETTLEMENTS</b>		
Cipriano Sagon S en C.....	CYQ	322 100	Amateur Wireless Society of Malaya: 2-hour program broadcast each Sunday evening, and children's concert on Wednesdays. Received at Colombo, Ceylon.....		270 100
Vera Cruz: Manuel Angel Fernandez. Recently inaugurated for broadcasting advertising of an American product.....	CYC	337 50	<b>SWEDEN</b>		
Yucatan: Partida Socialista del Sureste.....	CYY	548 100	Drebo.....	SMTI	237 250
<b>JAPAN</b>			Boden: Radiojanst.....	SASE	454.5 1000
Nagoya: Nagoya Radio Broadcasting Co. Broadcasts daily 9 am to 9 pm; Sundays and holidays, 12m to 9 pm. Program consists of music, weather and market reports, etc.....	JOCK	360 1500	Eskilstuna: Radio Club. Relays Stockholm programs 4 days each week, broadcasts local programs other days.....	SMUC	275.2 150
Osaka: Osaka Radio Broadcasting Co. Programs in English and Japanese. 1500-watt station projected.....	JOBK	385 500	Falun: Radio Club. Relays Stockholm programs 4 days each week, broadcasts local programs other days.....	SMZK	400 250
Osaka Broadcasting station (Proj.).....	JIBK	385 1000	Gavle: Radio Club. Relays programs 4 days each week, broadcasts local programs other days.....	SMXF	204.1 250
Tokyo: Tokyo Radio Broadcasting Co. Programs in English and Japanese. 155-watt.....	JOAK	375 1000	Goteburg: Radiojanst.....	SASD	260.9 500
<b>KWANTUNG</b>			Helsingborg.....		235 250
Dairen: Government Bureau of Communications employs a commercial station. Daily programs broadcast, consisting of music, educational and entertainment numbers.....		400	Jonkoping: Jonkoping Runradiostation. Relays Stockholm programs 4 days each week, broadcasts local programs other days.....	SMZD	572 250
<b>LUXEMBURG</b>			Kalmar.....		253
Luxemburg.....		217.4 250	Kalmas.....		253 250
<b>MOROCCO</b>			Karlsborg: Radiojanst. Relays Stockholm programs 4 days each week, broadcasts local programs other days.....	SASF	1350 1000
Casablanca: Radio Club of Morocco: Omega Station.....	CNO	250 500	Karlskrona: Relays Stockholm programs 4 days each week, broadcasts local programs other days.....		196 200
<b>NETHERLANDS</b>			Karlstadt: Karlstadt Runradiostation. Relays Stockholm programs 4 days each week, broadcasts local programs other days.....	SMXG	500 80
Hilverman: Nederlandsche Seintoellen Fabriek and Hilversum Dreadloze Omroep. Reception reported at Teheran.....		1050 1000	Kristinehamn.....	SMTY	202.7
<b>NEW ZEALAND</b>			Linkoping: Radio Club. Relays Stockholm programs 4 days each week, broadcasts local programs other days.....	SMUV	588.2 350
Auckland: Newcome (Ltd.).....	1YL	260 500	Malmo: Radiojanst.....	SASC	229 500
Auckland Radio Service.....	134	260 200	Norrkoping.....	SMVV	272.7 250
La Gloria Gramophone.....	1YB	260 50	Orebro: Suspended.....	SMTI	566
Christchurch.....			Ostersund.....		720
Dunedin: Otago University.....	4XO	140	Saffle.....		245 500
British Electrical & Engineering Co.....	4YA	310-370 500	Stockholm: Radiojanst.....	SASA	416.7 100
Radio Supply Co.....	4YO	370 500	Snudsvall: Radiojanst.....	SASD	545.6 500
Gisborne: Gisborne Radio Co.....	2YM	335 500	Trollhattan: Trollhattans Runradiostation.....	SMXG	294.1 50
Wellington: Broadcastings (Ltd.).....	2YB	275 15	Varborg.....		340 100
Dominion Radio Co.....	2YK	275 500	Umea: Relays Stockholm programs 4 days each week, broadcasts local programs at other times, irregularly.....		252.1 180
<b>NORWAY</b>			<b>SWITZERLAND</b>		
Oslo: Broadcasting Company A. S.....		370.4 1500	Basle: Aerodrome. Projected.....		1000 300
Bergen Broadcasters.....		468.8 500	Berne: Radio Berne Station. Radio Club of Berne.....		411 1500
Bergen Broadcasters. Projected.....		468.8 1500	General Post and Telegraph Office.....		302 1500
<b>PERU</b>			Geneva: Radio Broadcasting Society of Geneva. Broadcasts music and news.....		760 500
Lima: Peruvian Broadcasting Co. (Ltd.).....	OAX	360 1500	Lausanne: Champ de l'Air Station (Societe Romande de Radiotelephonie Lausanne).....	HB2	850 600
<b>POLAND</b>			Zurich: Hoengg Station. Radio Genossenschaft Zurich University. Reception reported at Antwerp, Brussels, Rome, Vienna.....	RGZ	500 500
Warsaw.....		400	<b>TUNISIA</b>		
<b>PORTUGAL</b>			Tunis: French Army. Two musical programs broadcast each week.....	TUA-OCTU	1450 500
Lisbon: Grandes Armazens de Chido. Suspended.....	PAA	320 500	French Army. Two musical programs broadcast each week.....	OCTU	45
<b>PHILIPPINES</b>			<b>TURKEY</b>		
Manila: I. Beck Department Store.....	KZ1B	260 20	Stamboul. Station reported projected.....		
<b>PORTO RICO</b>			<b>URUGUAY</b>		
San Juan: Radio Corporation of Porto Rico.....	WKAQ	340 500	Montevideo: Crandon Institute.....		500
<b>RUSSIA</b>			<b>UNION OF SOUTH AFRICA</b>		
Kiev.....		211.9	Cape Town: Cape Publicity Association.....	WAMG	400 500
Leningrad.....		940	Durban: Town Council.....		350 500
Leningrad.....		310	Grahamstown.....		400
Moscow: Central.....	RDW	1450	Johannesburg: Assn. Scientific and Tech. Societies.....	JD	450 500
Radio Paredatcha.....		420	Cape Town: Cape Peninsula Broadcasting Assn., Broadcasts 54 hours per week, programs by paid orchestra and local talent.....		375 1200
Popoff.....		79	<b>VENEZUELA</b>		
Popoff.....		25	Caracas: Empress Venezolana de Radiotelefonía. Under construction.....		360 1000
Popoff.....		1010	Colombo: Ceylon Government. Replaced private station; new equipment, placed in use in January, 1926.....		365 100
Trades Union.....		450			
Nijni Novgorod.....		1400			
<b>SALVADOR</b>					
San Salvador: Division of Telephones and Telegraphs broadcasts concerts Monday & Friday nights at 8:15.....		500			
<b>SENEGAL</b>					
St. Louis: Senegal Radio Club projected.....		300 100			



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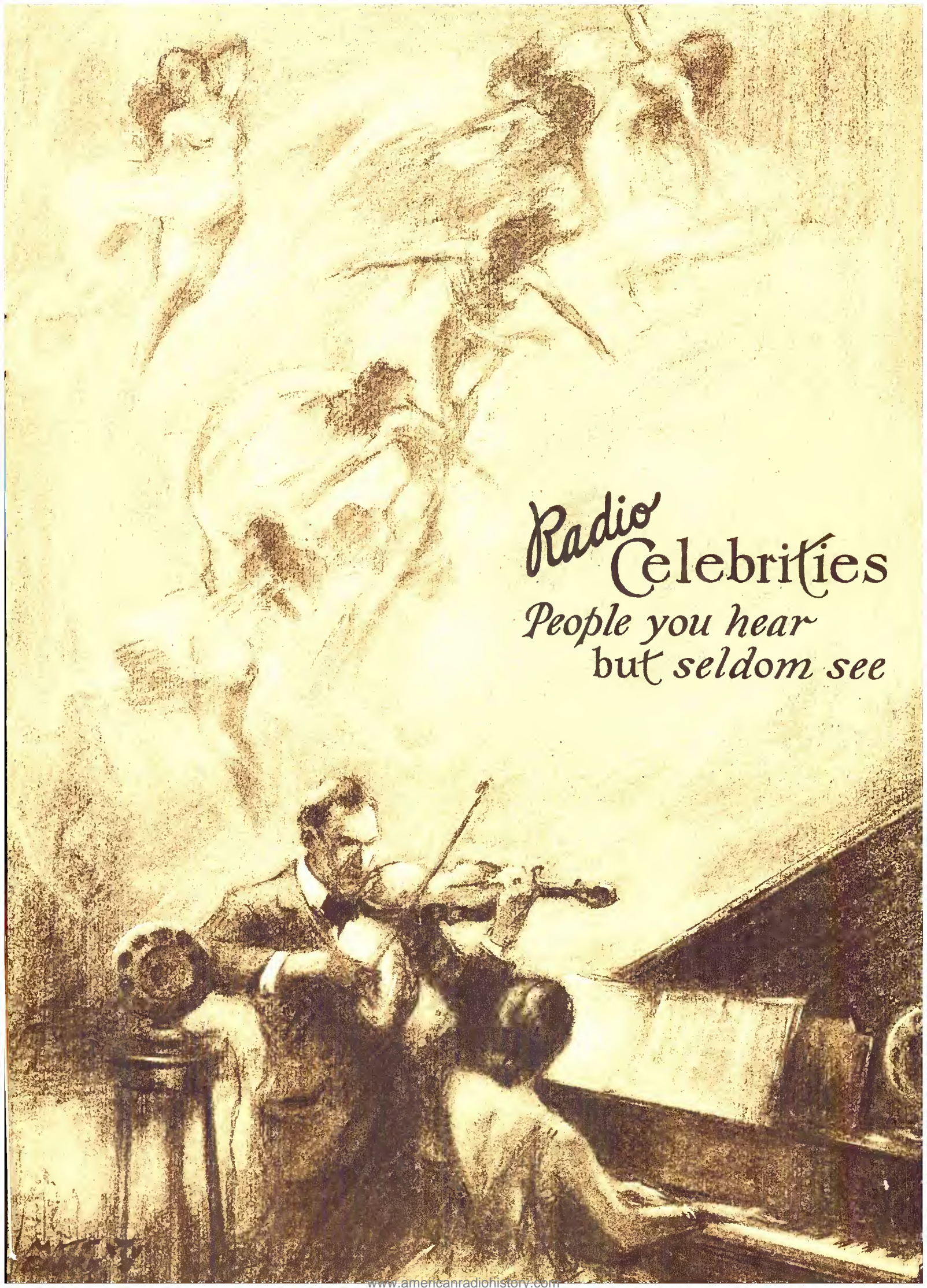
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Mrs. Refuge Raye Loving, Lyric Soprano heard occasionally over KFDM, Beaumont, Texas



Variety Entertainers heard over KFPM, Greenville, Texas



Charles H. Gabriel, Jr., Chief Announcer and Program Director of KLX, Oakland, Calif. 34 and married. Native of San Francisco, Calif. Formerly newspaper man, college teacher, concert pianist and composer. Known as "Gabe"



Cloyd K. Young, Banjo Soloist of KFAB, Lincoln, Neb. Known as "Curley." Also member of the Buick Master Six Orchestra. 23 and married



At left: Hulda Helen Edwards, Soprano Soloist of KOA, Denver, Colo. Native of St. Louis, Mo. Formerly in the Insurance business. At right: G. Ralph Crowder, Announcer and player of pipe organ and piano over KOA. Native of Birmingham, Ala. Formerly heard over KYW, Chicago. 24 and married



Olive M. Fletcher Pianist of KFAB, Lincoln, Neb. Native of Orchard, Neb. Student at the U. of Neb.



Miss Mary E. Vogt, Organist of WOO, Philadelphia, Pa.



William N. Mahon, Announcer of KGW, Portland, Ore. Formerly newspaper man. Irish, but born in Manila, P. I. Filled in for a few minutes at Station KGW about three years ago and has been there ever since. 21 and single



Above: Leslie Adams, Chief Announcer of KFI, Los Angeles, Calif. "Les" also whistles charmingly, plays the piano beautifully and is occasionally heard over the Acolian Pipe Organ Recitals. At right: Virginia Flohri, Lyric Soprano heard over KFI. 28 and single. The daughter of the famous illustrator and portrait painter, Emil Flohri. Native of N. Y. C. Known as the "Radio Nightingale". Has also had considerable concert and opera experience

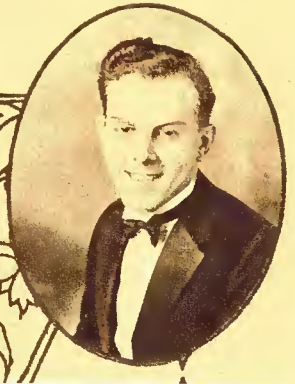


At left above: Mrs. Gertrude Davis Winroth, solo pianist and accompanist of KFKX, Hastings, Neb. Native of Highland Park, Ill. 27 and married. Formerly heard over WOR, KYW, WMAQ and WEAF. Teaches piano when not broadcasting. At right: Harry F. Russell, Announcer and Baritone heard over KFKX. Mr. Russell is a Hastings business man, Vice-Pres. of the Clarke-Buchanan Co., Vice-Pres. of the Hastings Chamber of Commerce and very active in civic affairs. Graduate of Hastings College a fluent speaker and a baritone singer of note 34 and married





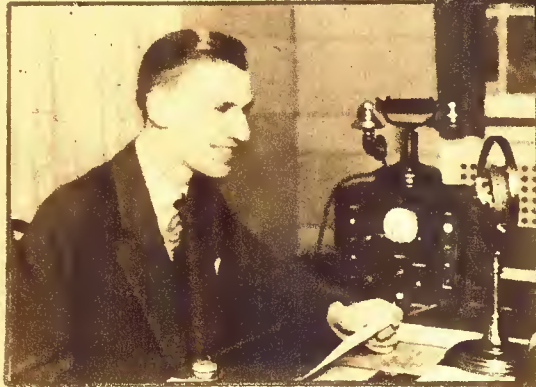
Corrine Jordan, Accompanist and Assistant Studio Director of WBBM, Chicago. Half of the team of the "Two Jays"



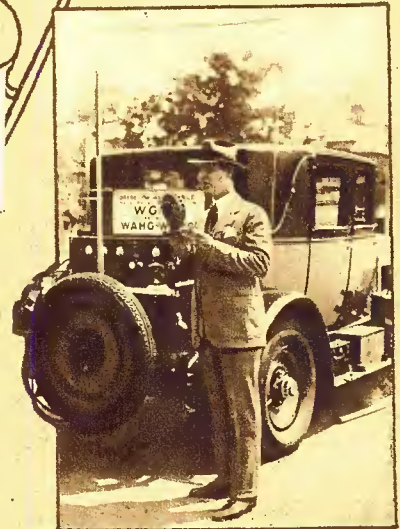
Fred Jeske, Assistant Announcer and the other half of the team of the "Two Jays" of WBBM, Chicago



Charlie Garland, Announcer and Studio Director of WBBM. Native of McComb, Miss. Previous to broadcasting was organist and orchestra pianist. 30 and married



Floyd Falch, Chief Announcer of WBBM



Thornton Fisher, Sports Announcer of WAHG at his relay broadcasting station WGMU which operates in conjunction with WAHG and WBOQ, the twin broadcasters of Richmond Hill, L. I.



Leo Fitzpatrick, Chief Announcer of WJR, Detroit, Mich.



Right: Wm. H. McDonnell, Announcer, Director and co-owner of WBCN, Chicago, Ill. Left: Merle "Big Boy" Yagle, Musical Director of WBCN. Previous to broadcasting had his own orchestra, produced amateur theatricals and made a little "Spare Money" playing baseball. 34 and married



Ralph Shugart, Announcer of WJJD, Mooseheart, Ill.



John D. Kuhns, Announcer of WBZ, Boston, Mass. Native of Dayton, Ohio. Formerly a teacher. Now studying architectural engineering at Mass. Inst. of Technology. Also announcer for Harvard Football Games



Dorothy Curtis, Pianist of WBZ, Boston, Mass. Also concert pianist, soloist and formerly identified with WNAC and WEEI. Above: Edwin J. McEnelly and his Singing Orchestra of WBZ





Charles Darl Bethmann, Staff baritone and assistant announcer of WHAP, N. Y. C. Native of Easton, Pa. Formerly school teacher. 26 and single. Formerly heard over WEA and WJZ



Mark A. Rigg, Jr., Managing Director and Announcer of WGR, Buffalo, N. Y. Native of Pittsburgh, Pa. Formerly a salesman



Dave Ward, chief announcer and studio director of KFQZ, Hollywood, Calif. 26 and Married. Native of Pine Bluff, Ark. Formerly known as the "Dean of the Banjo 'uke" in Vaudeville

At left: Vincent H. Percy, Organist WEAR, Cleveland, Ohio. One of the original radio organists. Above: Hotel Cleveland Orchestra, heard over WEAR. Ivan Francis, cellist, is the director. Play classical and semi-classical music only



Kenneth Salisbury, Chief Announcer of WMAK, Buffalo, N. Y. Is also radio editor of the Buffalo Times



Donald H. Clark, Announcer and staff artist of WGBS, N. Y. C. Native of Pulaski, N. Y. Was formerly identified with newspaper work. 24 and single



Quin A. Ryan, Announcer and Director of WGN and WLIB, Chicago. Has announced more spectacular events than any broadcaster in the Middle West. Has done the Kentucky Derby for two years from Louisville; the Indianapolis 500 mile auto race from Indianapolis; the Scopes evolution trial from Dayton, Tenn.; and football games from all over the country. In the Fall of 1925 he was chosen as one of the two official announcers of the World Series, with Graham McNamee of WEA. Mr. Ryan is a native of Chicago. 27 and single. Was formerly connected with newspaper work and publishing



T. Stanley Perry, Musical Director and Tenor of WGHP, Detroit, Mich. Native of Redditch, England. Formerly tenor and stage director of the Sheehan English Opera Co. Has also done considerable concert work 35 and married



At right: The Georgia Minstrel Boys, heard over WGY, Schenectady, N. Y.; also WRC, Washington, D. C. and WJZ, N. Y. City. From top to bottom: Ellsworth Page, Kolin Hager, Asa Coggeshall and William Fay. Above: Kolin D. Hager, Chief Announcer and studio manager of WGY. Native of Albany, N. Y. Opened both KOA of Denver and KGO of Oakland, Calif. Was formerly concert soloist. Wrote several war songs while in service



Robert J. Coleman, Chief Announcer and pianist of WEAO, Columbus, Ohio. Native of New Albany, Ind. Previous to broadcasting was supervisor of music in public schools and traveling representative of the Educational Dept of the Victor Talking Mach. Co., 33 and married



Above: John R. George, Chief Operator of WPG, Atlantic City, N. J. Right: Alice Warren Sachse, Program Director of WPG. Each Monday night conducts the feature "A Regular Little Journey to the Homes of Great Musicians". She is a piano soloist of national reputation



Ethel Rattav Fowler, Pianist and Hostess of WPG, Atlantic City, N. J. Formerly newspaper writer. Broadcasts the regular Tuesday feature "Resort Footlight and Fashion Flashes"



Ernest Rogers, Announcer and musician heard over WSB, Atlanta, Ga. with his African Harp. Founder of the Red Head Radio Club and composer of "Willie the Weeper"



Lambdin Kay, Director and Announcer of WSB, Atlanta, Ga. Native of Brooklyn, N. Y. Known as "The Little Colonel". 34 and single. Formerly reporter and department editor of Atlanta Journal



Paul A. Greene, Announcer and Manager of WSAI, Cincinnati, Ohio. Native of Rogers, Texas. 28 and single



Jane Upperman, Colorature Soprano, heard over WSAI, Cincinnati, Ohio



James K. Dobbs, Assistant Announcer of WSB, Atlanta, Ga. Known as "Bishop." Also editor of the Atlanta Journal Radio Section



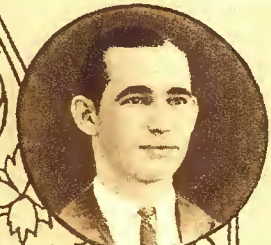
Maurice Wetzel, Announcer and Station Director of WOOD, Grand Rapids, Mich, 31 and married. Was formerly advertising salesman, copy-writer and maker of QRS player rolls



Guy W. Simon, Pastor of First Presbyterian Church, Lansing, Mich., who is heard over Station WREO. Native of McComb, Ohio. 52 and married



Quartette heard from WREO, Lansing, Mich. Left to right: Raymond Hamilton, James Lyon, Kenneth Buckingham and Raymond Lynn Bowers



Glenn J. Buell, Violinist and Director of "Glenn Buell and His Melody Men," heard over WREO, Lansing, Mich. 24 and married





Albert Carney, Organist of WHT, Chicago, Ill. Native of Dubuque, Iowa, 33 and single. Previous to broadcasting, was an organist in several of the large Chicago and Denver theaters. Also a composer



Eduard A. Davies, Director and Chief Announcer of WIP, Philadelphia, Pa. 35 and married. Was formerly concert and operatic baritone and for two years was President of the Philadelphia Operatic Society



Patrick Henry Barnes, Chief Announcer and Program Director of WHT, Chicago. Native of Sharon, Pa. Author of "A Buck on Leave" Written while he was in the Service. Formerly on the stage, also movie actor, author and salesman



Margery C. Beyer, heard over WHN, N. Y. City



Otis Vaughan, Assistant Announcer of WOAI, San Antonio, Tex.



At left: J. Lewis Reid, Announcer of WJZ, N. Y. C. Native of Brooklyn, N. Y. Formerly musical comedy actor and stage manager and prior to that, news writer. 28 and married and the father of three year old Muriel Reid who sings on the air. At right: John B. Daniel, Announcer of WJZ, and WJY. Born in London, England, but educated in the U. S. Formerly in vaudeville, musical comedy and concert work; also newspaper music critic. He is the son of Tom Daniel, the celebrated Basso



Major Lawrence Mott, owner and operator of KFWO, Avalon, Catalina Island, Calif. Native of N. Y. City. 41 years of age and single. Major Mott says: "Radio is my avocation; writing is my vocation; travel, big game shooting, cruising and fishing my occupations"



The Campus Serenaders of WHAZ, Troy, N. Y.



Left: Leslie Joy, Announcer of WEA, N. Y. C. Graduate of Peekskill Military Academy of Peekskill, N. Y. and University of Pennsylvania. During the World War served as Lieut. in capacity of Artillery Balloon Observer. Has a bass-baritone voice of remarkable quality and has appeared in many concerts and oratorios. Has also played comedy roles with the Savoy Opera Co., presenting Gilbert & Sullivan operas. Right: Mathilde Harding, Accompanist and hostess of WEA. Native of Washington, Pa. In her first appearance before the WEA microphone she accompanied the mysterious "Silver Masked Tenor". 21 years of age and single

Arnold Morgan, Announcer of WEA, N. Y. C. Born in Oklahoma but his early youth was spent in Portland, Ore. Formerly a teacher of voice and during the World War was connected with the Coast Artillery. Also is now the tenor soloist of Grace Episcopal Church of Brooklyn, N. Y.

Left: Ralph C. Wentworth, Announcer of WEA. Native of Seattle, Wash. 34 and married. Possesses a very pleasing bass voice and has studied extensively in the U. S. and Europe. Has done considerable concert work. At right: Winifred T. Barr, accompanist of WEA. Widely known as a musician of note. Following the armistice of the World War, she was twice enlisted for entertainment overseas with the A. E. F. and much of her time is still given to appearances as solo pianist or accompanist before ex-service men



Theodore J. Hahn, Announcer of Station WCAP, Washington, D.C. Native of Baltimore, Md. 29 and single. Formerly a lawyer. Is now Assistant Manager of the Business Office of C. & P. Tel. Co., known as "Ted"



Russell Pratt at the piano and Frederick Daw standing. "The Men of 1001 Songs," WMAQ Chicago



"Bernice," Pianist of WCX, Detroit, Mich. Native of Sault Ste. Marie, Mich. 20 and single. Conducts the Red Apple Club. Formerly identified with station WGHP



Hector R. Skifter, Announcer and Manager of WCAL, Northfield, Minn. Native of Northfield. Known as "Skif"



Arthur M. Harding, Station Director of KUOA, Fayetteville, Ark. 41 and married. Native of Pine Bluff, Ark. Formerly Director of General Extension, U. of Ark.



Richard F. Hire, violinist of WCBD, Zion, Ill. Native of Ligonier, Ind. Graduate of American Conservatory of Music, Chicago. 23 and married



Mrs. L. J. Hire, violinist and pianist of WCBD, Zion, Ill. Native of Fall River, Mass. Has appeared in concert work for many years. Is a member of the Hire Trio, consisting of L. J. Hire and her son Richard F. Hire



John A. Studebaker, Announcer and clarinet player of WCBD, Zion, Ill. Native of Park Rapid, Minn. Now studying at Northwestern University Dental College



Esmeralda Berry Mayes, Pianist and violinist of KSD, St. Louis, Mo.



Left: Rodmen Hendrickson, Chief Announcer of KTAB, Oakland, Calif. 38 and married. Also in the wholesale lumber business. Right: Ray Martin Bitzer, Announcer and Chief Engineer of KTAB. 33 and married. Native of Muscatine, Iowa. Known as "Smiling Ray". Previously radio engineer in U. S. Navy



C. Marcus Wienand, Announcer and Educational Director of KTCL, Seattle, Wash. Native of Eau Claire, Wis. 30 and married



Uncle Ben, tells the bedtime stories over KSL, Salt Lake City, Utah



Edna Riesel Adams, the girl who whistles and sings over KPRC, Houston, Texas. 28 and single. Native of Galveston, Texas. Known as the "Sweetheart of the Air." She is also a church soloist and a member of the Houston Post-Dispatch staff



G. C. Arnoux, Announcer and Director of KTHS, Hot Springs, Ark. Native of N. Y. City. Formerly connected with WBAP, Ft. Worth, Texas



Above: Martha Estelle Hayes, who sings over KOB, State College, N. Mex. Native of Spartanburg, S. Car. Is usually accompanied on the banjo by her sister Minnie Bess Hayes who is also a student at the State College. Right: Minnie Bess Hayes, who plays the banjo and sings with her sister Martha Estelle Hayes over KOB



Alfred P. Daniel, Announcer and Program Director of KPRC, Houston, Texas. 37 and single. Formerly heard over WEV and WCAK. Originator of "Kotton Port Rail Center" slogan



Harold Fair, pianist of KOIL. 24 and single. Has played with several nationally known orchestras. Formerly heard over WQJ, WIBO, WHT, WEBH, all of Chicago and WWJ of Detroit



The Mona Motor Oil Twins, of KOIL, Council Bluffs, Iowa. Have broadcasted over 89 stations in the U. S and Canada



Donald R. Hill and his ukelele. Heard over KOIL. 20 and single. Plays his own accompaniment to his songs, on the ukelele



J. Alban Becker, Announcer of WOWO, Ft. Wayne, Ind. Known as "Al." 28 and single



At left: Anne M. Spangle, Accompanist and Publicity Manager of WOWO, Ft. Wayne, Ind. 23 and single. Formerly Classified Adv. Manager on newspaper. At right: Dorothy Durbin, Pianist and Program Director of WOWO. Native of Calumet, Mich. 34 and married. Is also a teacher of piano



Carl H. Schwieters, Announcer WOWO Ft. Wayne, Ind.



Pennsylvania Male Quartet, a regular feature of WLIT, Philadelphia, Pa. Left to right: John S. Hinkel, first tenor; Wm. H. Carmint, second tenor and director; Ernest Freas, baritone and Chas. D. Long, Bass



Snedden Weir, Chief Announcer and Studio Manager of WMCA, N. Y. City. Native of Stirling, Scotland. 34 and married. Has a fine baritone voice and is frequently heard in song recitals



Peter MacArthur, Announcer and Scotch Baritone of WOC, Davenport, Iowa. Native of Greenock, Scotland. Known as "Pete, the Bobby Burns of the Air". Formerly on the stage with Sir Harry Lauder, Andreas Dippel and Schuberto. 40 and married



Paul J. Vipperman, Tenor of WOC, Davenport, Iowa. Native of Spartanburg, S. Car.



Harriet Lee, Contralto, heard over WOK



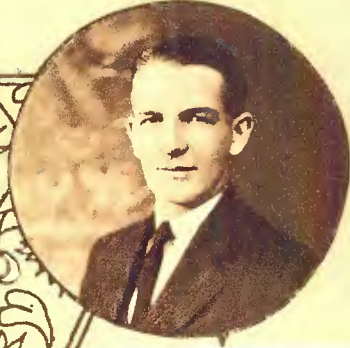
H. C. Hogencamp, Announcer of WODA, Paterson, N. J. Native of Paterson, N. J. Formerly connected with station WBAN



Above: Freddie Witmer, 12 year old pianist of WOK, Chicago. Freddie is now attending High School and when he graduates expects to go to College and study Law. He says, "I love music and would rather play than eat". Was formerly heard over WHT and WEBH. At right: Herman Sinaiko, Staff Violinist and Studio Director of WOK



Edward Prince, Announcer and Operator of WODA, Paterson, N. J.



Leona Brown Woodcock, Assistant Program Director and soprano of WTAM, Cleveland, O.

At left: John T. Vorpe, Announcer and Publicity Director of WTAM, Cleveland, O. Formerly identified with publicity and newspaper work. 27 and single. At right: Harold Gallagher, Announcer of WTAM. Formerly connected with stations WJAX and WEAR. 21 and single

Ralph B. Humphrey, Announcer of WTAM, Cleveland, O. 29 and single. Known as "Hump"



Dana S. Merriman, Musical Director of WTIC, Hartford, Conn. Native of Bristol, Conn. Known as "Merry." 34 and married. Previous to broadcasting was conductor, organist and music supervisor of public schools



Elmer G. Hoelzle, Director and Announcer of WRVA, Richmond, Va. The voice you hear singing "Carry Me Back to Old Virginy" each night at the close of WRVA Program. 40 and single. Formerly heard over WDAH, El Paso, Tex.

Trio from Detroit News Orchestra, WWJ, Detroit, Mich. Karl Chase, violinist, Valbert P. Coffey, pianist and Frederick Broeder, cellist. A very popular program feature of this station



At left: Selma Erickson, Norwegian Soprano heard over WCCO, Minneapolis, Minn. Through her radio work she was asked to sing at Gov. Christianson's Reception for Pres. and Mrs. Coolidge last year. Above: Elsie Nuessle Yoerg, Coloratura Soprano heard over WCCO. At right: Paul Johnson, Chief Announcer of WCCO. Native of Maple Valley, Wis. Student in College of Medicine and Dentistry, Univ. of Minn.



Germaine Bissonette, Accompanist and hostess of WWJ, Detroit, Mich. Native of Ottawa, Ont., Can. Known as "Gerry." Formerly teacher of piano



Edgar Thompson Steel Works Quartet; heard over KDKA, Pittsburgh, Pa. Top row, left to right: Evan Floyd, Second Tenor, Louis Mason, Alto; bottom row: Chas. E. Price, First Tenor, Chas. Loomis, Bass, Clarence Drylie, baritone.



Louis L. Kaufman, Announcer KDKA, Pittsburgh, Pa. 23 and single. Also studying law and expects to be admitted to bar in 1927. Graduate of Penn State College



Reginald Baxter, Studio Director of WTAL, Toledo, Ohio



Right: Gertrude L. Brannon, Pianist of KTNT, Muscatine, Iowa. Also teaches piano. Left: Marvin C. Lucke, Announcer of KTNT. 22 and single. Studied pipe organ at Ill. Wesleyan College, Bloomington, Ill. and piano at Troy Conservatory of Music, Troy, Mo.



Horace W. Feyle, Announcer of WWAD, Philadelphia, Pa. Known as the "Whistling Announcer." 33 years of age and married



Alfred Hall, Chief Announcer of WRNY, N. Y. City



Frank Westphal and his All-American Pioneers, exclusive artists of WENR, Chicago. Their specialty is dance music



Brian McDonald, Announcer and Manager of WJAS, Pittsburgh, Pa. Also tenor soloist. 28 and single



Tom Catton, Announcer and Managing Director of KFBI, San Francisco, Calif. Native of New Haven, Conn. Originator of the Cuckoo Club and Chief of the Tom Cat Club

Caroline Lee, "The Virginia Girl and her Spanish Guitar." Staff entertainer at WGHB, Clearwater, Fla. 24 and married. Native of Richmond, Va. Formerly connected with WSB of Atlanta



Mrs. Blanche G. Waters, Assistant Announcer and Bedtime Story Teller of WTAG, Worcester, Mass. Noted for her work on the air for children. Club known as "The Twilight Scouts." Age 29 and married



Billy Knight, Announcer and Director of WIL, St. Louis, Mo., known as "The Little Ole Professor." 29 and married. Native of Kansas City, Mo. Has been in theatrical work since five years of age



Phil Fischer's Novelty Californians who broadcast over KFWA, Ogden, Utah.



Mrs. Blanche J. Sharp, Program Director of WTAR, Norfolk, Va.



Herman H. Hohenstein, Announcer and Director of KFUD, St. Louis, Mo. Native of Peoria, Ill. Formerly a Lutheran Minister



Right: Charlie Wellman, Announcer, Manager and vocalist of KFWE, Hollywood, Calif. 30 years of age and married. Formerly a vaudeville entertainer. Native of Masonville, Iowa. Known as "Don't Go Way Folks" Charlie. Above: Harry G. Keiper and his Movieland Orchestra, a delightful feature of KFWE



Warren K. Howe, Musical Director of WJAZ, Chicago, Ill.



Mrs. Luetta Minick Armstrong, soloist of KFNF, Shenandoah, Iowa. Sings the old time melodies



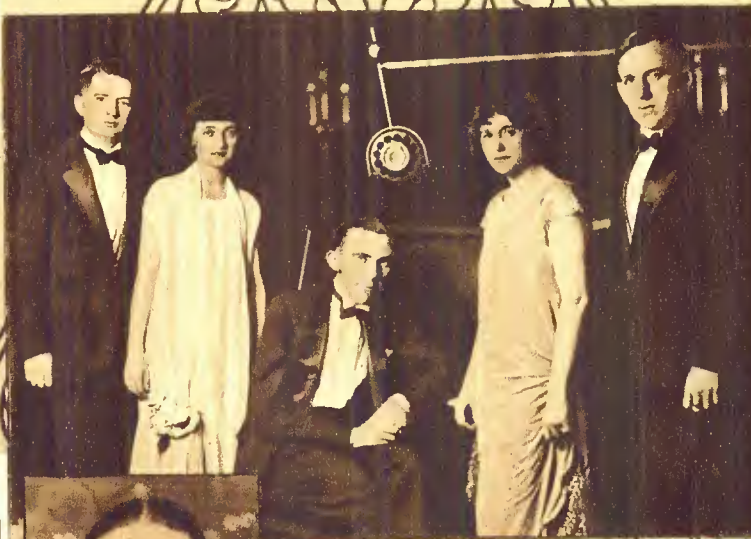
At left: Ashley C. Dixon, Jr., Operator of KFJR, Portland, Ore. 18 years of age. Native of Chicago, Ill. At right: Ashley C. Dixon, Sr., Announcer and Director of KFJR. Known as "Dix". Native of Chicago, Ill. Formerly an Investment Banker



Miss Mern Reitler, staff violinist of KLZ, Denver, Colo. Native of Greeley, Colo. Previously an orchestra leader



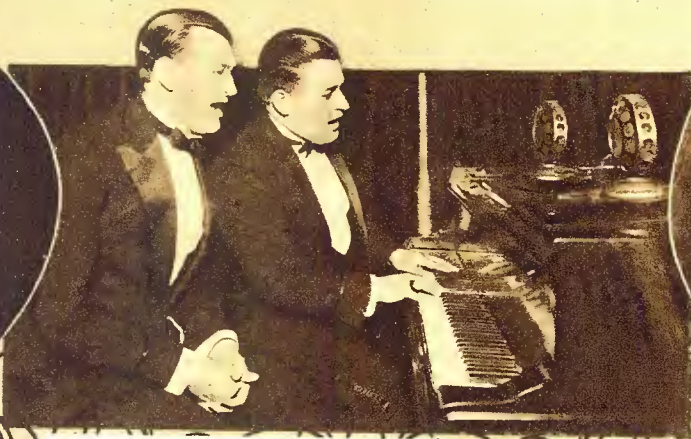
John E. Fetzer, Announcer of WEMC, Berrien Springs, Mich. Native of Lafayette, Ind. During summer of 1925, visited all leading broadcast stations of Europe. Formerly radio engineer and operator



Above: The Ethereal Quartette who entertain exclusively for KFRU, Columbia, Mo. Left to right: Fred L. Yates, tenor, Mrs. Zola Mascho, soprano, Paul Craker, pianist, Mrs. Gertrude Freeland, alto and W. Harry Clarke, bass. All residents of Bristow, Okla. Left: Gale H. Curtright, Chief Announcer and Manager of KFRU. Native of Paris, Mo. 22 years of age. Known as "Hatch"



Raymond C. Dettloff, Staff Pianist for WHAD, Milwaukee, Wis. Student at Marquette University. Has composed a number of piano compositions and intends to make concert work his profession

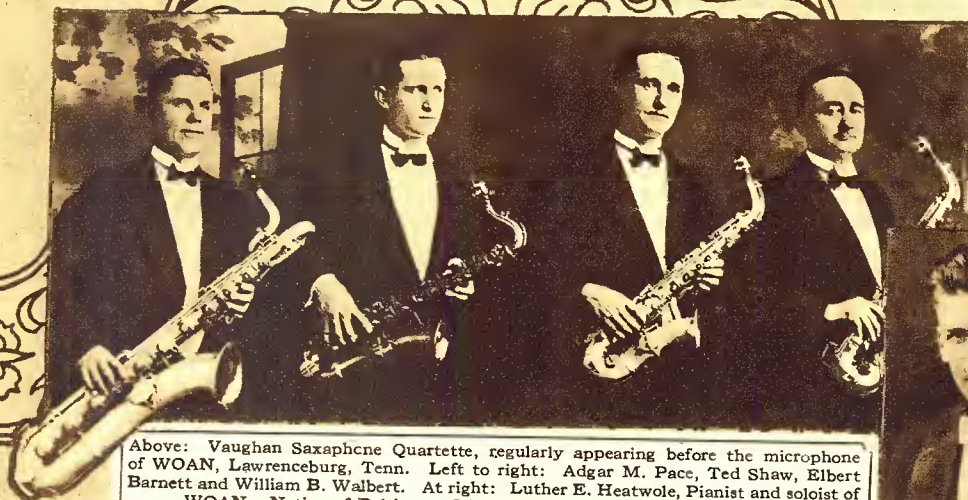


At left: Ford Rush, the "Ford" of Ford and Glenn, the Lullaby Boys of WLS, Chicago. Native of Columbia, Miss. Formerly salesman for music Publishing house. 36 and married. At right: Glenn Rowell, the "Glenn" of Ford and Glenn, the Lullaby Boys of WLS. Native of Pontiac, Ill. 27 and married



At right: Mrs. Mary C. Puncke, of the Research Division of WLS, Chicago, Ill. Mrs. Puncke broadcasts to the farm women of the Nation. Native of Amsterdam, Holland. 39 and married and has three sons. Graduate of Amsterdam College. Came to U. S. in 1909 and went to homestead in Alberta, Can. in 1911. Returned to Chicago in 1924 and now doing research work and giving farm women the benefit of her experience. Above: Donald F. Malin, Chief Announcer of WLS. Native of Tama, Iowa. Formerly a newspaper man. Graduate of Iowa State College. 29 and married

At the left above: William Charles Stoess, Announcer, Violinist and studio director of WLW, Cincinnati, O. 24 and married. Known as Bill and his hobby is pipes. At the right above: Louis John Johnen, Announcer of WLW. Interlocutor for the famous Burnt Cork Minstrels which he started as a novelty for the air audience. He says that he is single; in fact "the only eligible announcer in Cincinnati". At right: Irene Downing, organist and pianist heard over WLW. She is also a teacher of piano and plays the organ in theatres. 26 and single

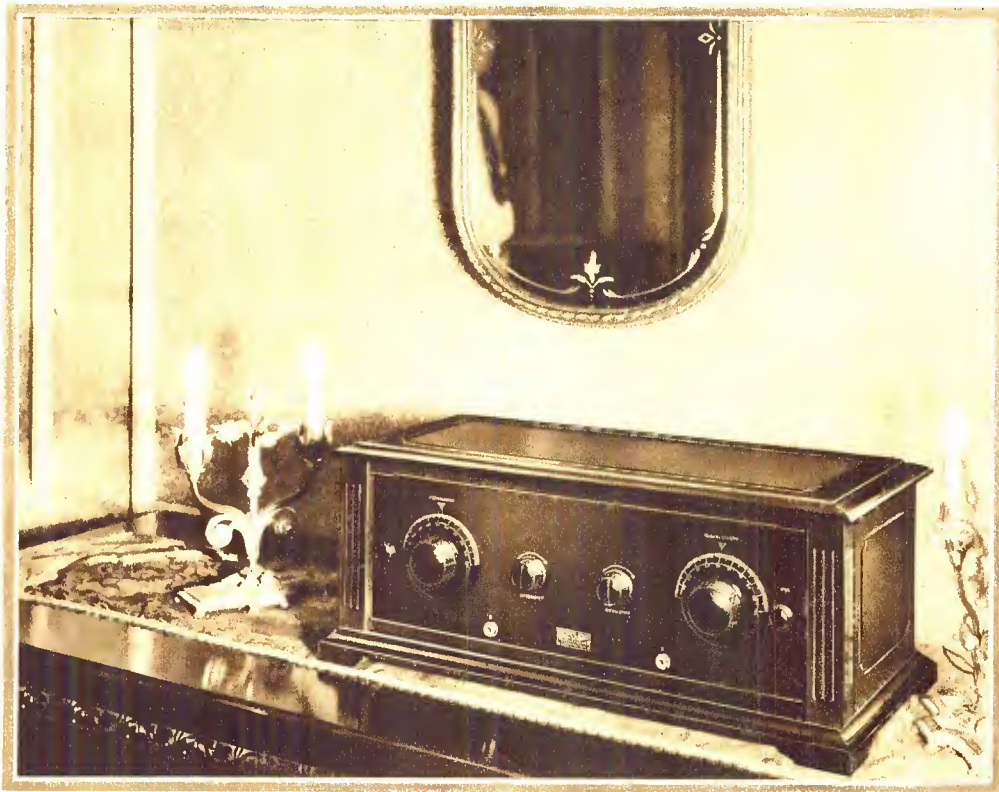


Above: Vaughan Saxophone Quartette, regularly appearing before the microphone of WOAN, Lawrenceburg, Tenn. Left to right: Adgar M. Pace, Ted Shaw, Elbert Barnett and William B. Walbert. At right: Luther E. Heatwole, Pianist and soloist of WOAN. Native of Baltimore, Md. Known as "Luke". 33 and single





# BROWNING-DRAKE RADIO



## BUILT to ENDURE

**E**VER since Glenn H. Browning and Frederick H. Drake set a mathematical standard of design for radio frequency transformers, during the summer of 1923 at Cruft Laboratory of Harvard University, Browning-Drake Radio has won the praise and good will of thousands of radio experts. The one stage of scientifically designed radio frequency, incorporating the Browning-Drake transformer, together with the flexibility of a two-control receiver is unsurpassed for satisfactory all around performance. And the Browning-Drake has been designed to endure.

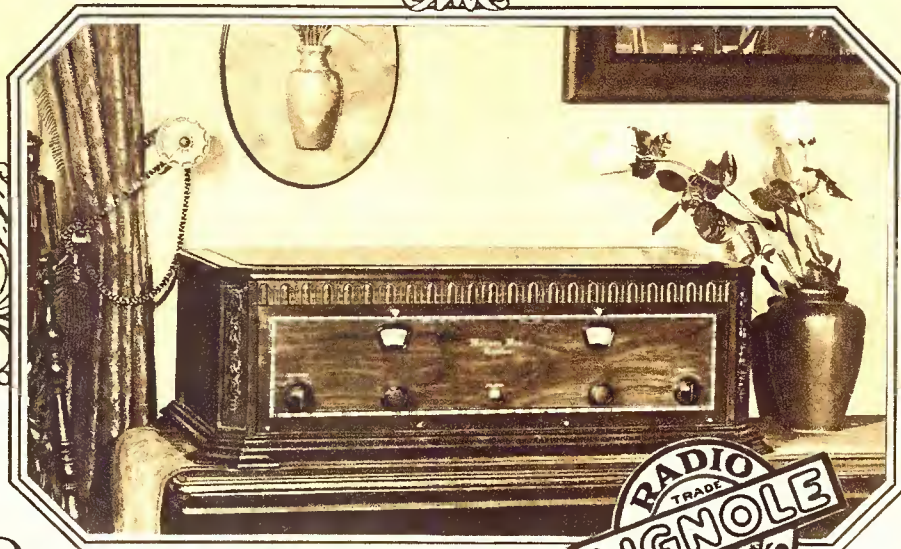
Every set is built for permanence. Every receiver is carefully assembled to give wonderful, mellow

tone . . . true selectivity . . . ample volume and unusual distance range. And this performance is insured not only for today, or this year, but for years to come. Browning-Drake has no yearly models, yet improvements measuring up to the Browning-Drake standard, are from time to time being adopted, as proved worthy.

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*DEALERS: No reputable dealer can afford to overlook the Browning-Drake opportunity. Every Browning-Drake dealer has made money. Every customer has been permanently pleased. Write or wire TODAY for proposition.*

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BRIGHTON, MASS.



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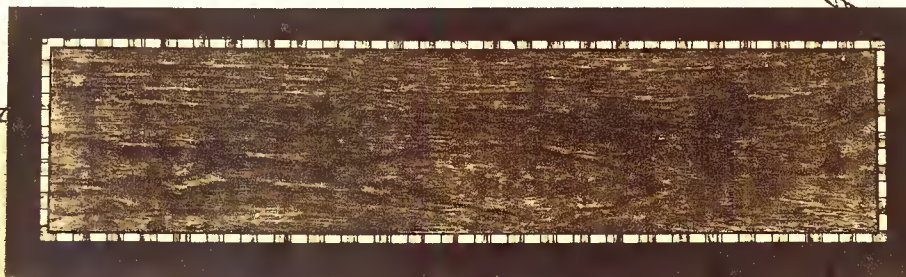
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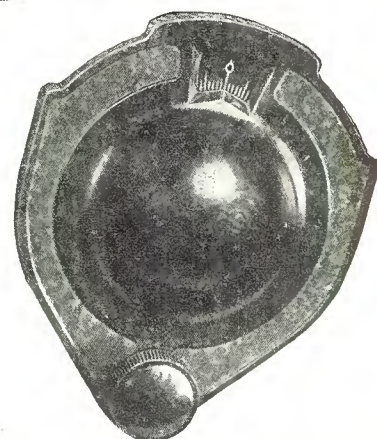


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*Tell 'Em You Saw It in the Citizens Radio Call Book*

# Supreme in MUSICAL PERFORMANCE!

*Tschaikowsky, Bee thoven, Brahms* — would you listen with rapture to the rendition of their master pieces by the "hungry six" corner band? You would not!

Then why distort the masterful programs of the better broadcasting stations to the "hungry six" type of reception when Thordarson transformers are available at every dealer's?

Thordarson transformers are found in the majority of quality receivers, where musical performance is the first consideration — A conclusive proof of the musical supremacy of Thordarson amplification.

# THORDARSON RADIO TRANSFORMERS



**R-200**  
*Amplifying Transformer*

The transformer for the musical epicure. Has unusually faithful reproductive powers. Specified on such quality receivers as Zenith, Kennedy and Howard... **\$8.00**



*Standard Amplifying Transformer*

A good reproducing transformer suitable for the requirements of the average ear.  
2 to 1 ratio.....\$5.00  
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*Autoformer All Frequency Impedance Amplifier*

Amplifies every note in the musical scale. An impedance with a step-up ratio, giving the even amplification of the impedance with the amplification increase **\$5.00** of the transformer.....



**R-210**  
*Power Compact*

A complete foundation unit for power amplification and B-supply. Contains a power supply transformer and two chokes for power amplifier using UX-210 **\$20.00** power tube.....



**R-171**  
*Power Compact*

Similar to the R-210 type but designed for UX-171 power tube and Raytheon rectifier. Contains buffer condensers as well as power supply transformer and **\$15.00** chokes.....



**R-197**  
*Power Supply Transformer*

A Power Supply Transformer designed for B-supply using the R. C. A. UX-213 type full wave rectifying tube. Will **\$7.00** supply up to 180 volts B.....



**R-196**  
*30 Henry Choke*

Designed either as a filter or an output choke. Completely shielded. Current carrying capacity 80 MA. Inductance 30 henries. D. C. resistance 280 **\$5.00** ohms.....



**R-76**  
*Speaker Coupling Transformer*

An output transformer designed as a protective device to keep the high direct current voltage of power amplification out **\$6.00** of the speaker unit.....

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

# The Six Tube Shielded Neutrodyne Receiver

Here Is a Receiver, the Result of Considerable Experimentation  
Which, When Properly Constructed, Will Perform in a  
Manner Equal to That of the Best of Factory  
Built Shielded Receivers

The Design of This Receiver Was Developed, and All Illustrations  
Made, in the Citizens Radio Laboratory\*

**T**HE neutrodyne receiver, which was introduced to the radio public in 1923, is considered by engineers to be one of the most outstanding and fundamental developments in the history of the art.

During the early period of broadcasting the radio public was forced to rely entirely upon the regenerative type of receiver. As the art of broadcasting increased in magnitude and great numbers

The original regenerative receiver could not possibly fulfill these rigid requirements of selectivity and simplicity. Only one selector or tuning circuit was available, which was insufficient to give a high degree of selectivity. The use of additional circuits to bring about a selectivity increase resulted in a loss of sensitivity. Many attempts were made to associate vacuum tubes with these additional selector circuits, so that the loss of sensitivity

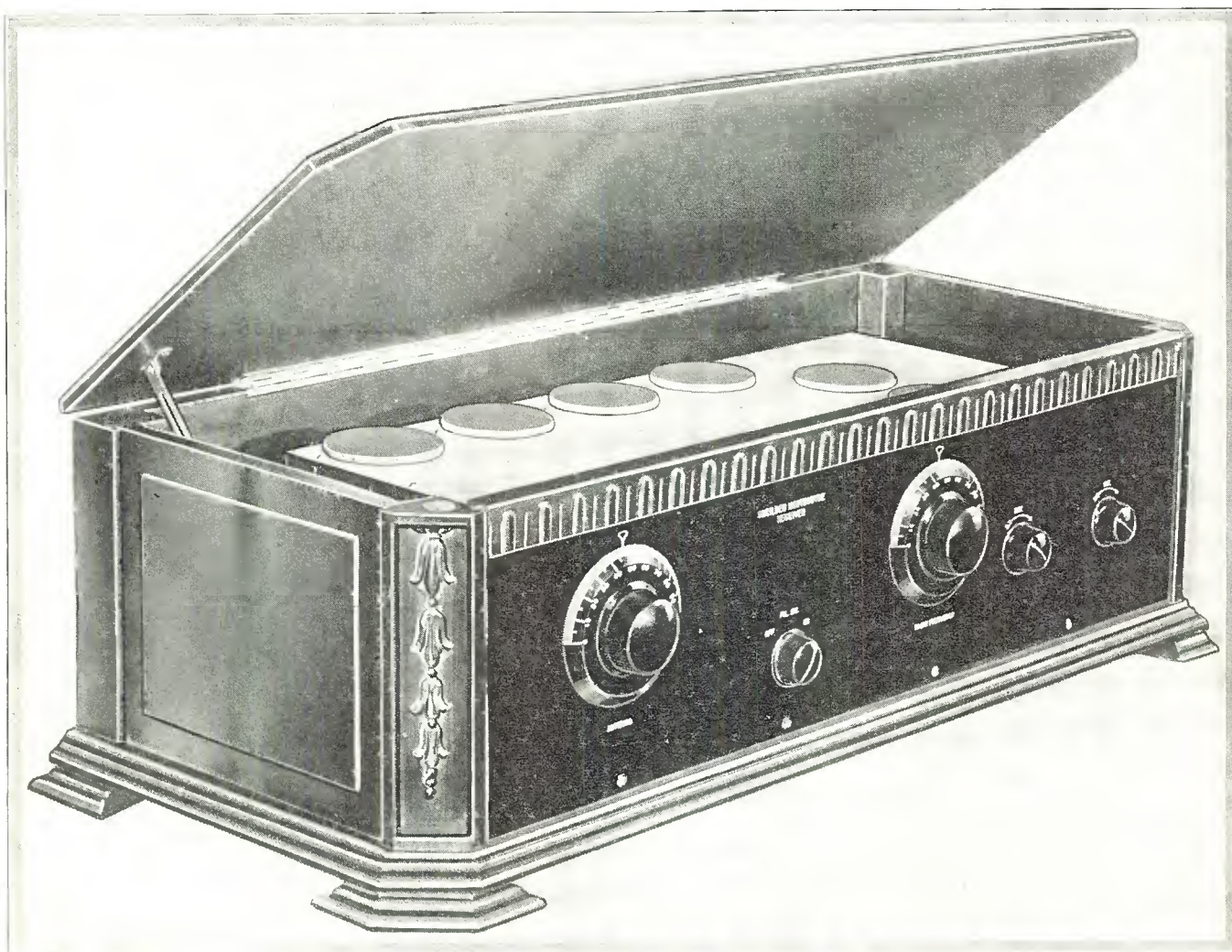


Photo A. The Shielded Neutrodyne installed in a cabinet

of stations came on the air, the problem of selectivity grew to immense proportions. In the beginning, when only a few stations were broadcasting, selectivity was an unknown factor to the radio enthusiasts. At the present time, due to the broadcasting congestion, selectivity is one of the prime factors, and every non-technical user gives it first consideration. And this is not without justification, for tremendous amplification and sensitivity are useless when the ability of the receiver to break through local broadcasting interference is not present.

It also became apparent that if radio was to meet with great popular favor, the receiving system used in the home necessarily had to be greatly simplified.

\*A technical treatise on the Shielded Neutrodyne Receiver, more elaborate and complete than published herewith, has been prepared by our engineering staff. It will be sent upon the receipt of 25 cents in stamps or coin.

previously mentioned could be overcome. This was the first attempt at radio frequency amplification. A serious trouble was encountered in these experiments, however, due to the inherent oscillating characteristic of the vacuum tube. The use of several tubes linked together through coupling circuits, resonant or partially resonant to the broadcasting frequency, gave rise to almost uncontrollable oscillation tendencies. When systems of this kind were adjusted so as to be non-oscillatory, an improvement over the simple regenerative system was noted in respect to selectivity, but because of the critical nature of the non-oscillatory state, the purpose was entirely defeated in respect to simplification of control.

However, with the introduction of the Neutrodyne circuit, a receiver was made available to the public which did not incorporate the objectionable qualities found in the regenerative type

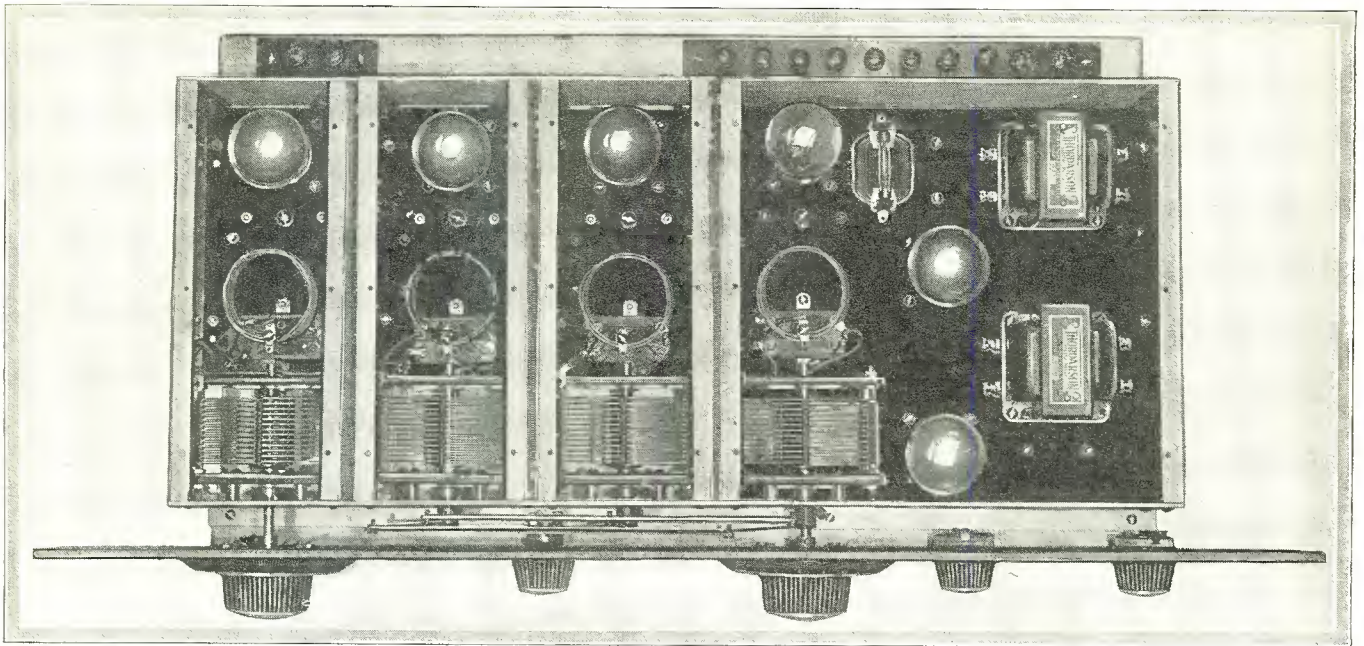


Photo B. Top view of receiver with cover removed. Note the entire absence of unsightly wires

of receiver. The novel feature of the receiver was in the method of neutralizing the capacity between the grid and plate elements of the tube in combination with the elimination, to a certain degree, of the electro-magnetic coupling between successive tuned stages. The innovation of this circuit had such a far-reaching influence that the aspect of radio broadcasting, with regard to receivers, was entirely changed. Few circuits have enjoyed the popularity which has been accorded the Neurodyne. The fact that it is fundamentally sound is demonstrated by the large number of manufacturers who still use this type of circuit.

The introduction of high power in radio broadcasting has made it imperative that highly selective receivers be designed to combat the increase in interference. This has been largely accomplished by two methods. One has been the design of more efficient transformers; the other, the proper shielding of the various sections of the receiver so that electro-magnetic pick-up and interaction between stages were negligible. The latter is by far the more efficient, but owing to the tremendous expense incurred in the development of the design of a shield and the production methods necessary for the economical manufacture of it, receivers of this type have not been procurable except in a commercially made form.

Many home constructors have felt the urge to build a completely shielded set, but have not been able to do so because of their limited facilities for the proper assembly of such a receiver.

The Citizens Radio Laboratory, after extensive experimentation, have developed a completely shielded Neurodyne receiver, easily built by the home constructor. This receiver, when properly constructed, and neutralized, will perform in a manner equal to that of the best of factory-built radio sets.

#### LIST OF PARTS

- 1—Echo Aluminum Shield (complete)
- 1—7x28x3/16-inch Drilled and Engraved Micarta Front Panel
- 1—8 $\frac{7}{8}$ x9 $\frac{7}{8}$ x3/16-inch Drilled Micarta Sub-panel
- 3—3 $\frac{3}{8}$ x6 $\frac{1}{8}$ x3/16-inch Drilled Micarta Sub-panels
- 3— $\frac{3}{4}$ x7 $\frac{3}{4}$ x3/16-inch Drilled Micarta Terminal Strips
- 1—1x3x3/16-inch Drilled Micarta Terminal Strip
- 1—1x10x3/16-inch Drilled Micarta Terminal Strip
- 4—Benjamin Type 9035 Radio Frequency Transformers
- 6—Benjamin Type 9044 UX Cushion Sockets
- 1—Carter 6-ohm Midget Rheostat
- 1—Carter 25-ohm Midget Rheostat
- 1—Carter 2-ohm Fixed Resistance

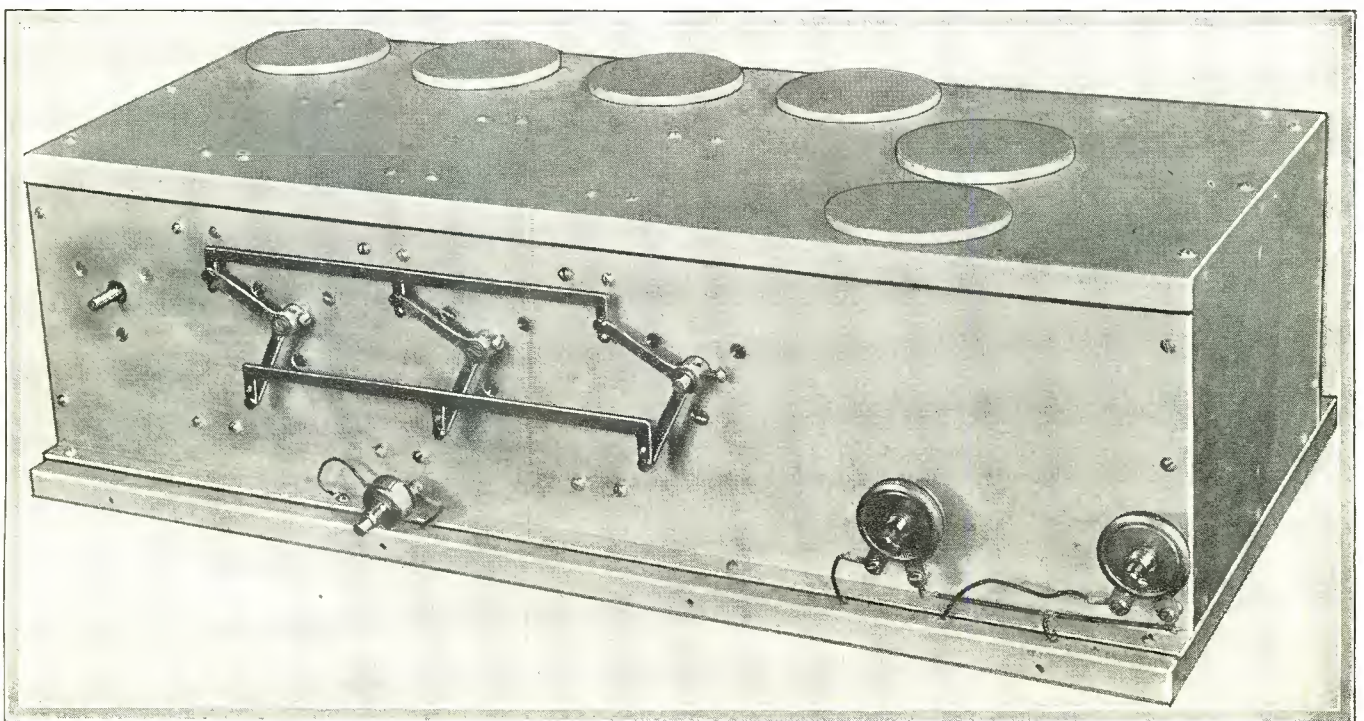


Photo C. Completed receiver ready for the front panel. The filament switch completes the circuit between the negative "A" battery and the shield

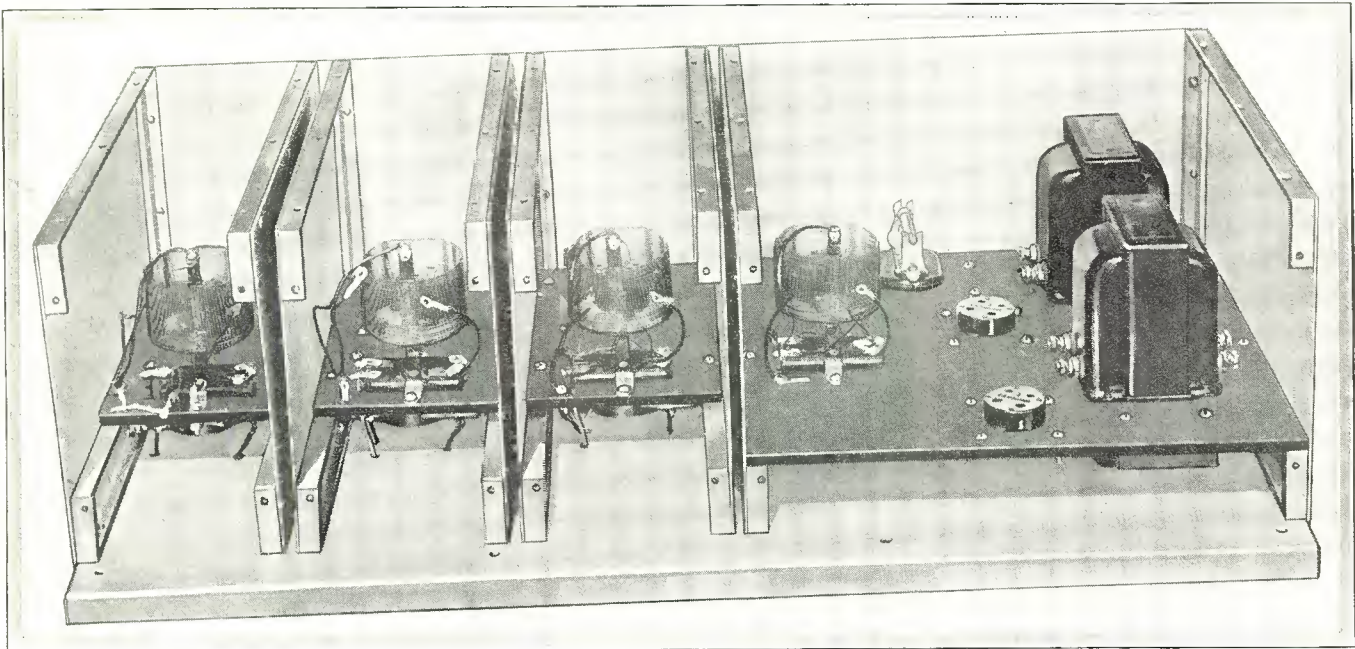


Photo D. Front view of receiver with top and front removed

- 1—Carter 4-ohm Fixed Resistance
- 1—Carter Midget Filament Switch
- 4—General Radio Type 247-F .0005 mfd. Variable Condensers
- 1—Silver Marshall No. 632 Link Motion
- 1—Sangamo 1 mfd. By-Pass Condenser
- 2—National 4-inch Type "A" Vernier Dials
- 3—Sangamo 0.5 mfd. By-Pass Condensers
- 1—Sangamo .00025 mfd. Fixed Condenser with Clips
- 1—Sangamo .002 mfd. Fixed Condenser
- 1—Sangamo .005 mfd. Fixed Condenser
- 12—Eby Engraved Binding Posts
- 3—Special Radio Frequency Choke Coils\*
- 2—Thordarson R-200 Audio Transformers
- 3—XL Model "G-1" Neutralizing Condensers
- 1—XL Model "N" Neutralizing Condenser
- 1—Lynch 2-megohm Grid Leak
- 1 Roll of Celatsite Flexible Wire in each of the following colors: Black, Red, Green, Yellow, and Brown

\*These coils can be obtained from our laboratory.

The prospective constructor of the Shielded Neutrodyne Receiver may feel a certain apprehension as to the ease with which the receiver may be built. If a systematic method is followed, no difficulty will be experienced in correctly building the receiver. The construction is accomplished by a number of major operations, namely, the assembly of the shield; wiring of the individual radio frequency and audio frequency amplifiers; their insertion into the shield; the making of interstage connections; the assembly of the front aluminum panel on which the tuning condensers are mounted; the neutralizing of each stage; the mounting of the Micarta front panel, and the numerous minor details which are necessary to place the receiver in operation. Each of these particular operations will be described at length below.

The complete aluminum shield is supplied in "knock-down" form. It is carefully made and correct in mechanical design, each part thoroughly fabricated, with all holes drilled and the proper ones tapped. Machine screws for assembling the shield and holding it rigidly together are supplied with the shield. The base of the shield is first taken and the eight partitions mounted

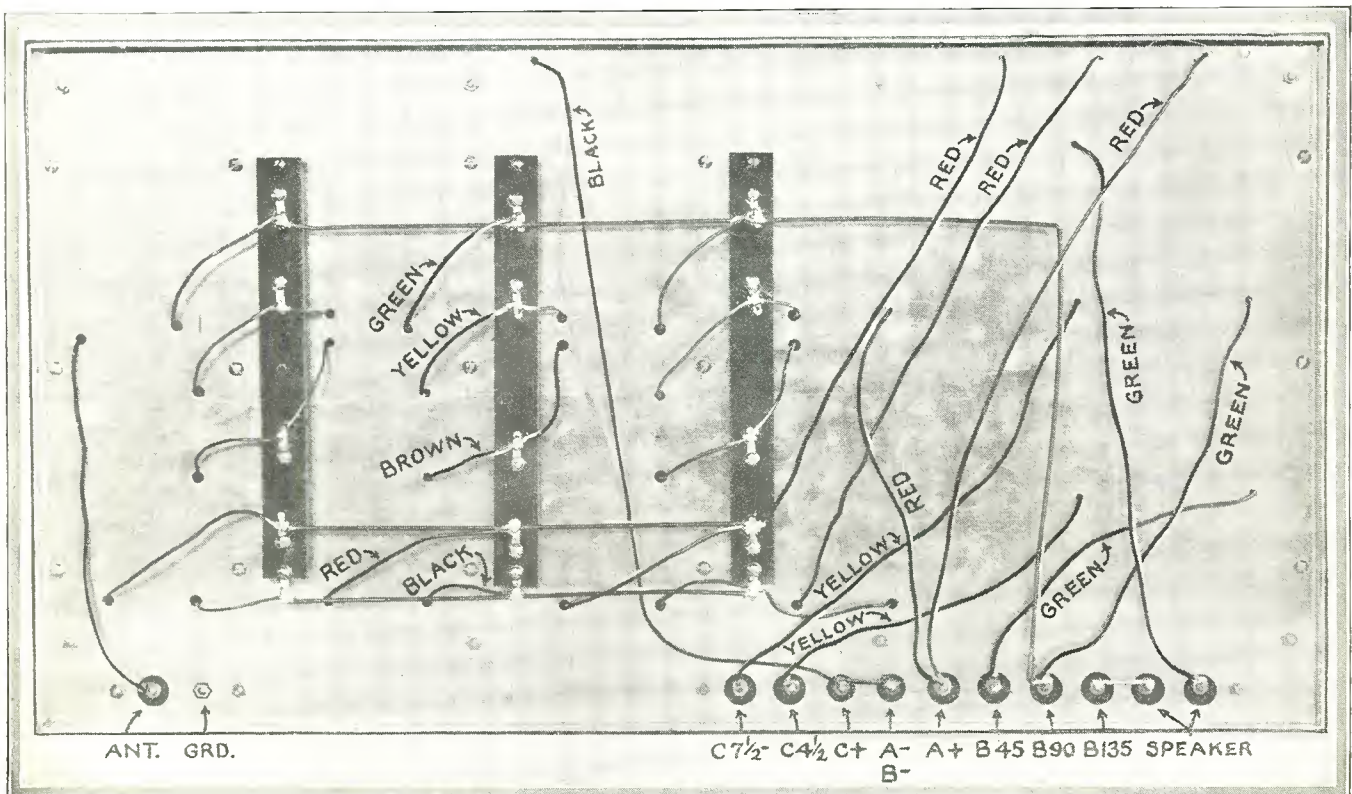


Photo E. Bottom view of receiver, showing the color of the different wires

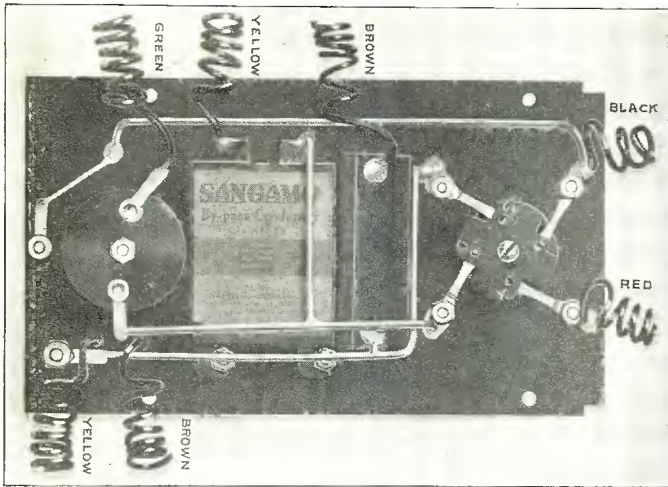


Photo F. Bottom view of radio frequency amplifier

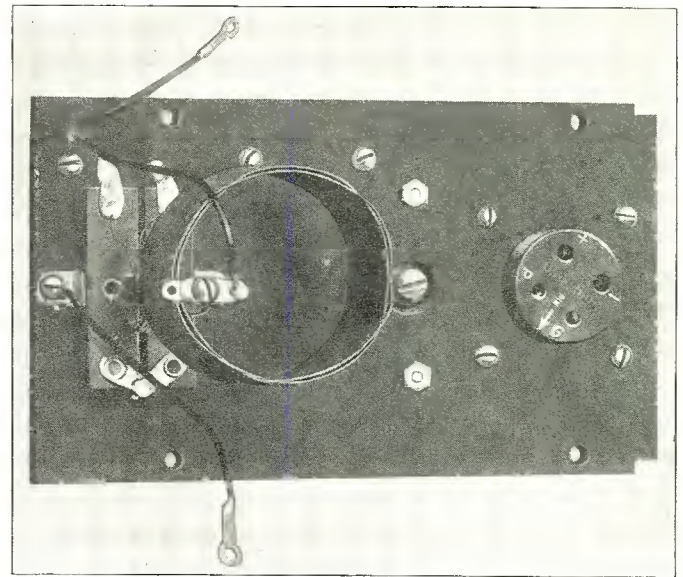


Photo H. Top view radio frequency amplifier. Note the two wires for connection to tuning condenser

upon it. There are two types of partitions—the left and the right. They are easily recognized by the location of the  $\frac{3}{8} \times \frac{3}{8}$ -inch aluminum rod upon which the stage assemblies are mounted. In four of the partitions the aluminum rod is at the left side with the opening in the cast frame to the front, and on the other four the aluminum rod is on the left side with the opening in the cast frame also at the front. In each case the height of the aluminum rod from the bottom of the partition is the same.

Fasten each partition securely to the base by means of screws, being sure that the screws are not absolutely tight. The three Micarta strips mounted on the under side of the aluminum base to establish a terminal point for connections between stages, are also mounted in their respective positions by the screws with which the partitions are fastened into place. The correct location of these strips are accurately shown on the photographic reproduction of the under side of the shield. Soldering terminals are placed at convenient intervals on the strips and are held in place by 6-32 screws  $\frac{1}{4}$  inch long, fastened to the insulating material. Each of the terminals are insulated from the shield with the exception of the negative "A" terminal, which makes contact directly through one of the mounting screws holding the strip in position. A spacer, approximately  $\frac{1}{4}$  inch thick, is placed under each end of the strip to raise it above the metal and prevent any short circuit between terminals.

Next, mount the rear panel by fastening it securely to the base with bolts and nuts, and to the partitions by means of screws. After the rear panel has been mounted, go over each screw in turn and carefully tighten it so that considerable pressure is applied between the partition and the part being clamped to it. This is very important, since an absolutely tight joint must prevail at the junction of any two parts.

Next, take the short terminal strip and mount it on the left end of the base at the rear, over the single  $\frac{9}{16}$ -inch hole. The antenna and ground posts are mounted on this strip—antenna post to the left. A soldering lug is placed on the under side of

the strip and securely clamped to it with the nut supplied with the binding post. The lug or screw should not make contact in any way with the aluminum. However, in the case of the ground terminal, the binding post is placed through the terminal strip and fastened against the aluminum by means of the nut furnished with the binding post. In this way the ground connection is automatically made to the shield, and if all clamping screws holding the shield together are securely tightened, a complete metallic connection is made throughout the shield. The hole at each end of the terminal strip is used for fastening it on the base. Inasmuch as no connections are made to these screws, there is no need of insulating them from the shield.

Next, repeat the assembly of the binding posts on the long strip placed over the series of  $\frac{9}{16}$ -inch holes on the right end of the base toward the rear. These binding posts should be placed in the same order as they are shown on the large graphic illustration in Fig. 4. No connections whatsoever are made between the shield and any of the binding posts on this terminal strip. The same method is used in securely fastening this strip to the baseboard as is used in the other, namely, by means of the two mounting screws, one at each end of the strip.

The next step is the assembly of the three separate stages of radio frequency amplification. The panels may be secured already cut and completely drilled. This will obviate any difficulty in properly mounting the parts. However, if the constructor desires to drill and cut his own panels a complete template is shown in Fig. 1. Great care must be exercised, in drilling and cutting the panels, to carefully follow dimensions and properly countersink holes where necessary. If care is not taken, trouble will be experienced in parts not fitting accurately.

Begin the assembly of each amplifier by mounting the 0.5 mfd.

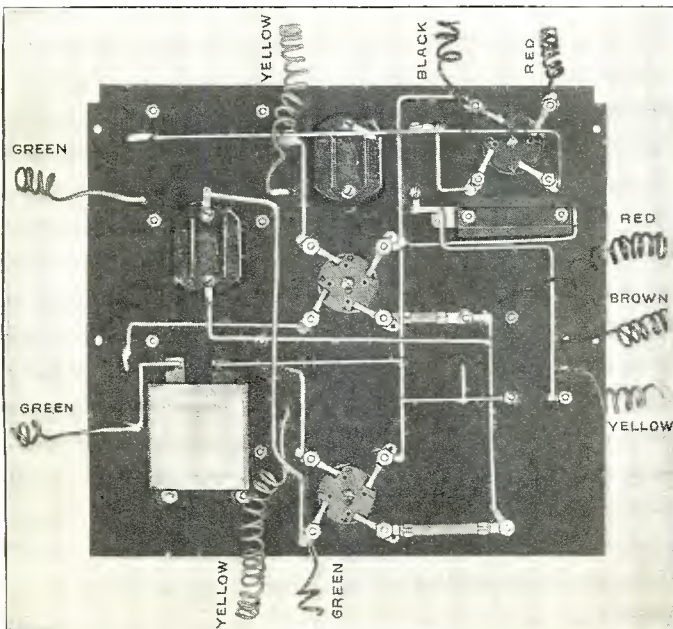


Photo J. Bottom view of detector-audio amplifier unit

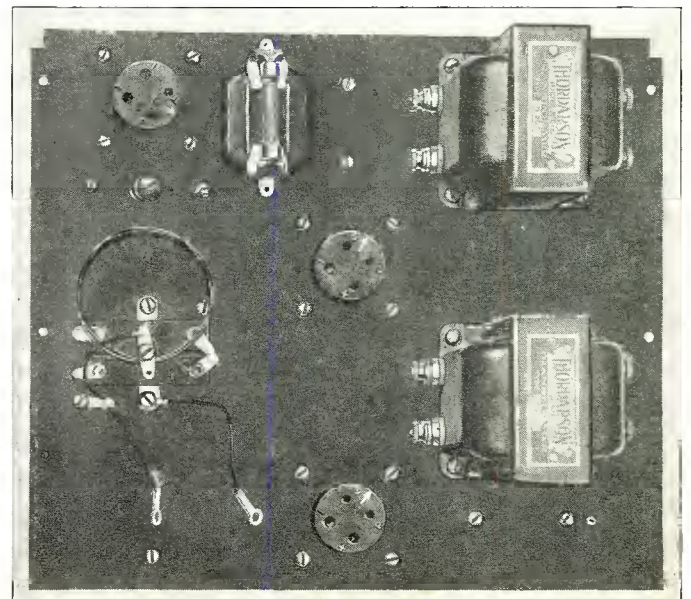


Photo G. Top view of detector-audio amplifier unit



Sangamo by-pass condenser, the radio frequency choke coil, the XL Model G-1 neutralizing condenser and the Benjamin socket, on the under side of the panel. Before mounting the neutralizing condenser, cut off the projecting bakelite mounting at each end. This is necessary, since it would prevent the insertion of the individual assemblies into the shield. The condenser then is mounted by means of two flat-head machine screws through the sub-panel fastened by two nuts on the upper side. When the amplifier is correctly assembled the adjusting screw of the neutralizing condenser will project through a hole in the top side of the panel, as will the upper part of the socket. Next, mount the Benjamin coil in position, taking great care not to change the form of the coil or injure it in any way. These coils are entirely self-supporting, and their construction, therefore, is more or less fragile. In making connections to the terminals of the coil use great care that the soldering iron does not come in close proximity to the coil itself or the mounting standard, since the material used in its construction is of an inflammable nature and will easily ignite. With ordinary care there is no danger of this happening, but a word of advice at this time will not be amiss. Next place a lug on each side of the sub-panel and fasten them securely against the panel by means of a screw through the hole in the lower left-hand corner of the panel, viewed from above. This hole is at the opposite end from the notched-out portion of the panel. These lugs are for the purpose of establishing connections between the transformer and tuning condenser. Then wire each unit completely, as shown on the schematic wiring diagram or graphic illustration, with 12-gauge bare tinner copper bus bar.

The difference between the antenna coupling stage and the radio frequency stages is only in one connection. The antenna coupling stage does not use the tap on the coil, while the radio frequency stages do.

Next, solder a length of the correctly colored Celatsite insulated flexible wire to each of the terminals shown in either the photographs or wiring diagrams. The length of these wires should be approximately 18 inches. Next, assemble the combination detector stage and two-stage audio amplifier by following a somewhat similar method as used in the radio frequency stages. Two Sangamo fixed mica by-pass condensers, one 1 mfd. Sangamo by-pass condenser, three Benjamin sockets, a Model "N" XL condenser, and two Carter fixed resistances—one four ohms, the other two ohms, are mounted on the under side of the detector and audio amplifier unit. Two Thordarson R-200 audio transformers, a .00025 mfd. Sangamo grid condenser, with a two megohm Lynch grid leak, and the last radio frequency transformer are mounted on the upper side of the panel. As in the case of the other panels, care should be exercised to properly locate holes and countersink them where required, if the constructor cuts and drills his own panel. The projecting metal terminal of the Model "N" condenser which is at the left end of the panel, nearest the partition, is cut off to prevent contact being made with the aluminum rod upon which the sub-panel rests. Bus bar is used in the wiring of the apparatus mounted on this unit. The Celatsite wiring is also used in this assembly for making connections outside of the unit.

Five colors of Celatsite flexible wire are used in the assembly

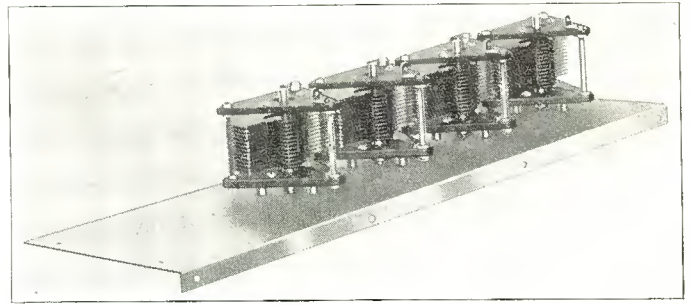


Photo K. Assembled front panel with condensers

of each of the units, as follows: The "A" battery positive leads are in red; the "A" battery negative leads are black; all "B" battery positive leads and the plate lead of the last audio tube are green; the neutralizing leads from the tap on the coils are in yellow, as are the 4½ and 7½ volt negative "C" battery leads; the lead between the neutralizing condenser and the succeeding stage is brown. The black wire is also used for the flexible leads from the radio frequency transformers to the variable condensers tuning them. These should be approximately 4 inches long, with a soldering lug at one end. The other end is soldered to the top lug of the pair mentioned above. This method makes it comparatively easy to fasten them to the respective terminals on the condensers. The two red flexible leads from the "F" positive terminals of the fixed resistances controlling the two audio tubes, and positive filament terminal of the detector tube should be made sufficiently long to extend to the 25-ohm detector tube rheostat, mounted on the front panel, and the "A" positive binding post at the rear of the shield, respectively.

After each of the units has been completely assembled and wired accurately, check each connection against either the schematic wiring diagram or large graphic illustration. This should be done very carefully, since any discrepancies in wiring which may occur will necessitate the complete disassembly of the receiver at some later time, if the discrepancy is to be corrected. After each unit has been carefully checked and the necessary corrections made, each unit should be inserted into its respective compartment of the shield, the flexible wires inserted through the holes of the base and pulled taut. Four screws are then inserted in the mounting holes of each unit and the unit securely fastened to the aluminum rods forming its support. Repeat this process on each of the units until all are securely fastened in place and all wires project underneath the base. Next, connect the interconnecting wires between stages to the proper terminals on the terminal strips located under the shield. By referring to the large graphic illustration, schematic wiring diagram or photographs, little difficulty will be experienced in hooking up the proper wires, since a red wire will be fastened to a red wire, green wire to a green, etc.

At this stage of the assembly, a completely wired receiver

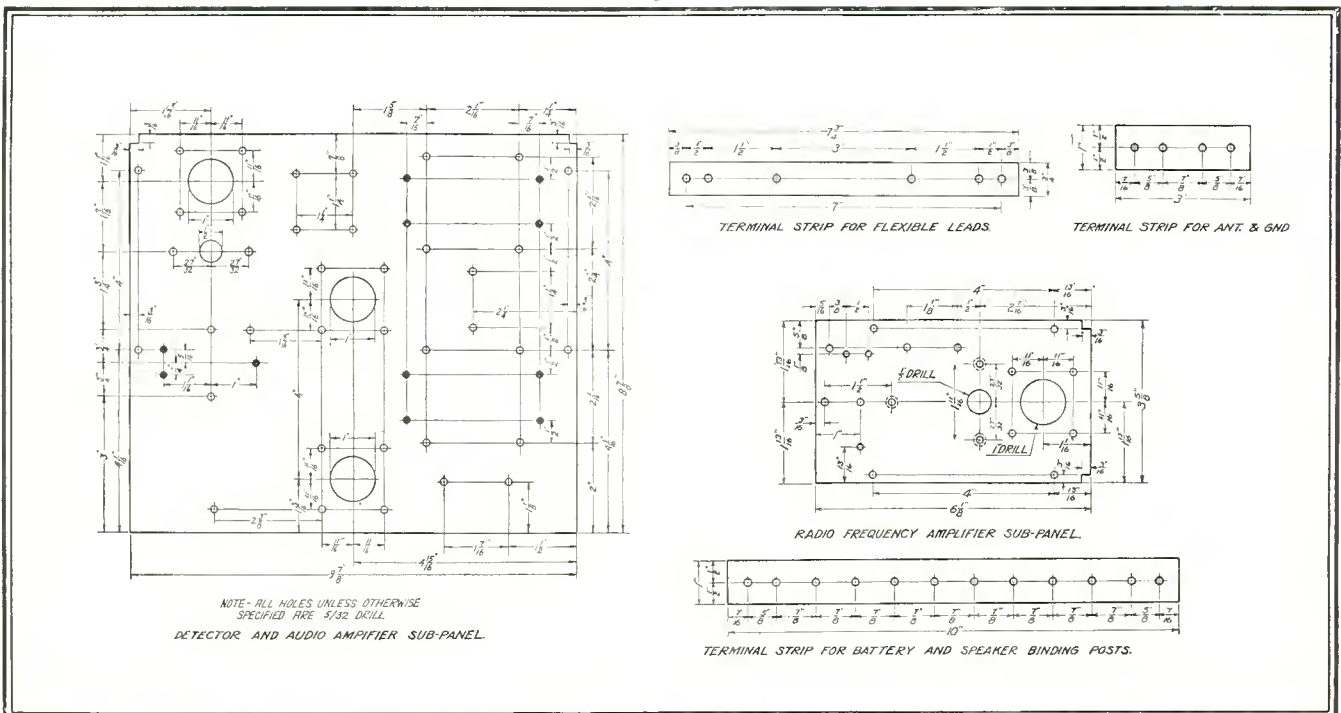


Fig. 1. Layout of sub-panels and terminal strips. Holes shown solid are for wires

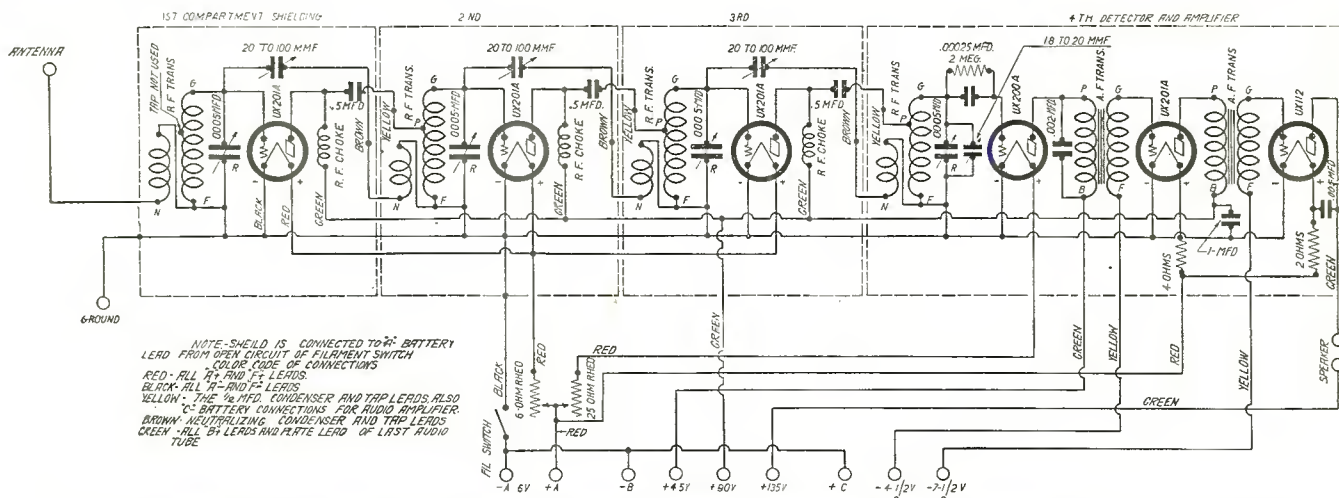


Fig. 3. Schematic wiring diagram of complete receiver. Note colors which are used for making the various connections

should be at hand, with the exception, that the top and front portions of the shield are not in place. Mount each of the four tuning condensers upon the aluminum front panel in such a manner that the stator portion is at the top. With a hacksaw remove 1/4 inch from the ends of each of the center condensers. The condenser assembly should then be mounted into place on the shield and connections made to the flexible leads which are present on each of the assemblies. Screw terminals are provided on each of the condensers by the manufacturer, thereby allowing connections to be made easily by placing a soldering lug under the screw. Then install the filament switch by soldering a wire between one of its terminals and one of the mounting screws holding the aluminum front panel into place. The other side of the switch has the wire connected to it, which is soldered to the negative "A" battery binding post. This completely isolates the shield from the "A" negative terminal except when the set is in operation. Next connect the two rheostats into the circuit. Place the formed top over the shield and securely fasten it to same by inserting and tightening the screws which clamp it to the partitions. Carefully examine the complete shield and note whether any screws are at all loose. As has been mentioned before, it is imperative that all screws be tight, since each part must make perfect contact with the part to which it is held.

Next place a UX 201-A tube in each of the sockets, with the exception of the detector and the last stage of audio frequency amplification, which require a UX 200-A and UX 112 tube respectively. Connect antenna, ground and "A" battery to the proper terminals at the rear of the receiver and observe whether each of the tubes lights properly and is controlled by the proper rheostat or resistance, and also whether the filament switch operates properly. Then touch one of the "A" battery wires to each of the remaining binding posts on the strip and observe whether any of the tubes light. If there is no indication that a tube lights except when the "A" battery is properly connected, it is safe to connect all "B" batteries, "C" batteries and speaker.

Place a cast aluminum cap over each of the holes, with the exception of the third compartment. Place a dial on each of the tuning condensers and tune in some local station whose signal is not too loud. Adjust the controls so that the signal is at maximum volume. Then remove the third radio frequency amplifier tube from its socket. Again adjust the dials until the signal is heard at loudest volume. Then remove the negative filament wire which is soldered to the third terminal strip on the base so that the third tube will not light. The signal will, however, still be heard, much weaker than when the tube was lit. With a long

piece of wooden dowel, one end of which is sharpened like a screwdriver, adjust the neutralizing condenser in the compartment, holding the unlit tube until signals are inaudible or very faint. Removal of tube will cause signal strength to be increased very appreciably. Placing it again in its socket will reduce the signal to its former value. This indicates complete neutralization of that particular stage.

Solder the filament lead to its proper terminal again. Repeat the process on the second tube and first tube in turn, keeping the caps over the various stages which are not being neutralized. In order to be positive that proper neutralization is present, it is advisable that the neutralization process be repeated.

Next remove the dials which were used for tuning of receiver in the neutralizing process, and adjust the plates of each of the three condensers, which will be controlled by the link motion, so that they are fully enmeshed. These are the two condensers which have had their shafts shortened, and the one to their right. Then rotate the link motion on each of the condensers as far to the right as possible. At this point, the lever arrangement on each of the shafts will be in contact with it and prevent the link motion from turning any further. Fasten the link motion to each of the condensers by turning down the screw in the collar over the shaft. The outside edge of the gang control should be flush with the end of the shafts which have been shortened, and underflush to the extent of approximately 1/4 inch on the condenser near the center of the panel.

Mount the two Velvet Vernier Dials on the Micarta front panel. Slipping the dials over the shaft of the condensers tuning the antenna stage and the detector stage, securely fasten the panel to the base by means of machine screws and nuts, at the same time mounting the filament switch and two rheostats which have been previously connected to the wires projecting through the base. The condensers should be entirely enmeshed and the dial indicating 100, when properly adjusted.

The receiver should not squeal or oscillate violently when tuned by the antenna and gang controls. If care is observed in attaching the link motion, selectivity will come as a matter of course, but in the event that the condensers have a slight discrepancy as to capacity, which is not probable, a balancing condenser across the detector input is provided by which the detector stage may be adjusted to allow full strength on weak signals. This balancing condenser is installed in a manner similar to the neutralizing condensers used in the radio frequency stages. If once adjusted properly, this balancing condenser need not again be touched.

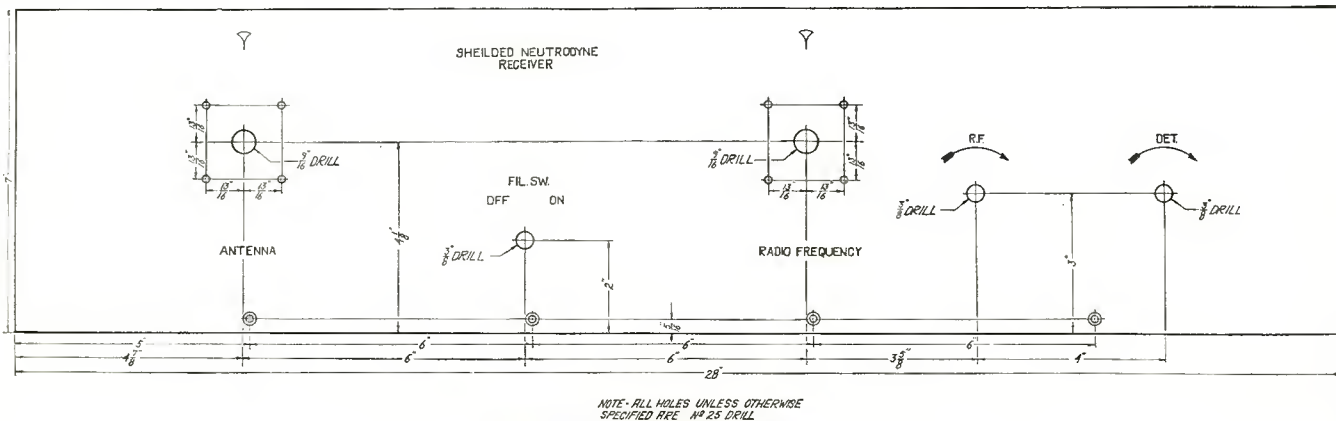


Fig. 2. Front panel layout showing location of holes

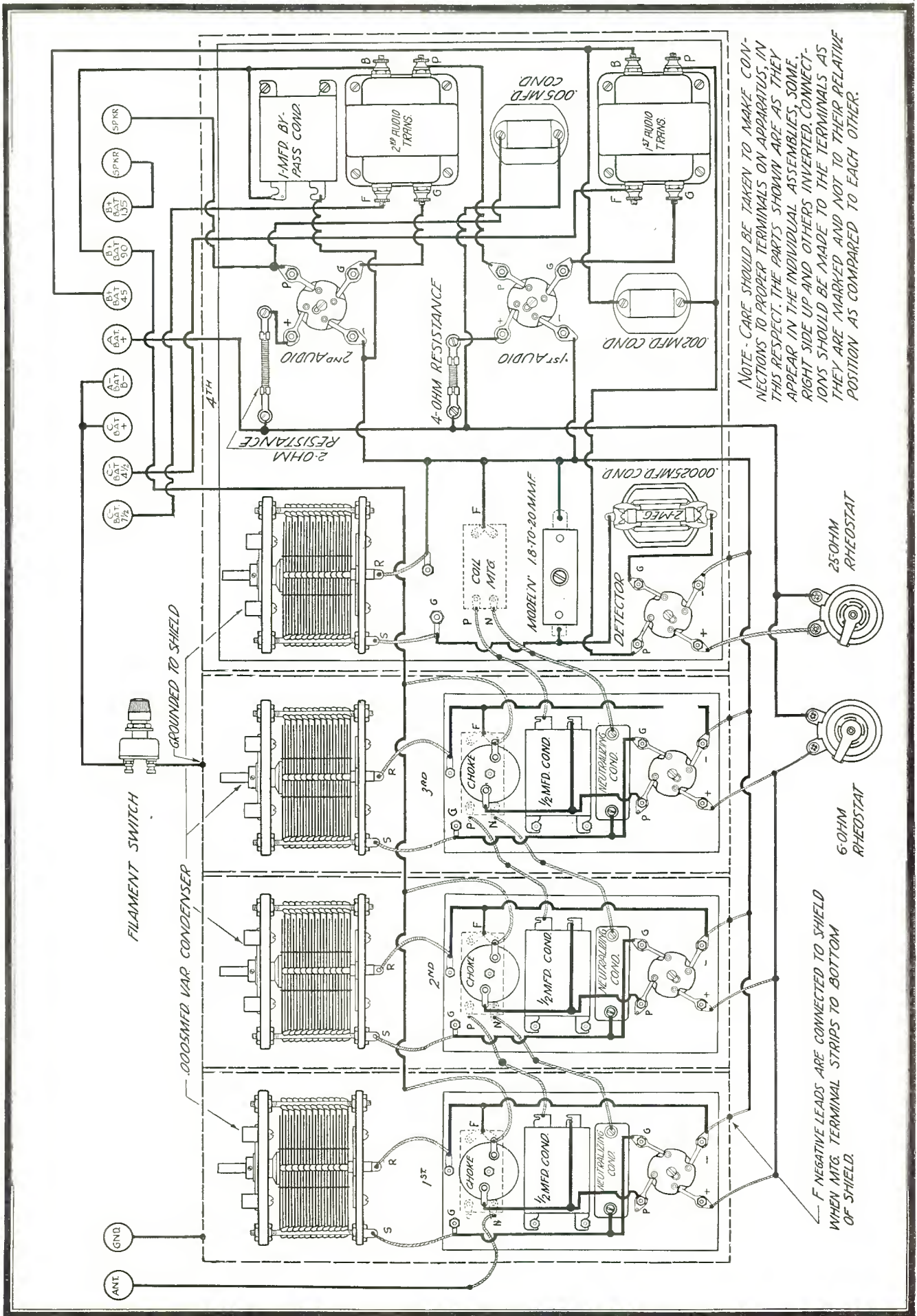


Fig. 4. Graphic illustration of complete receiver

# Karas Equamatic

## The Five Tube Wonder Circuit that has the Whole Country Talking—Listening—and BUILDING

HOW would you like to build a five tube radio frequency receiver that brings in every station WITH EQUAL VOLUME AND CLEARNESS from one end of the dial to the other?

How would you like to have a receiver that possesses an ALMOST UNBELIEVABLE SELECTIVITY—that enables you to CUT RIGHT THROUGH powerful local stations—to reach out after DX whenever you want to, WITHOUT THE SLIGHTEST POSSIBILITY OF LOCAL INTERFERENCE, and with an entire absence of scratchy, raspy, so-called static noises.

How would you like to own a receiver whose SWEET, CLEAR, PURE, MELLOW TONES were full-rounded, distinct and NATURAL—never fuzzy, blurry or distorted?

You can have such a set in the KARAS EQUAMATIC. You can easily and quickly build this receiver yourself in a remarkably short time. You can possess THE FINEST RADIO RECEIVER in your neighborhood—one which will out-perform any other set regardless of price or size.

The KARAS EQUAMATIC is something NEW in radio—something BETTER—something more PRECISELY ENGINEERED—something INFINITELY MORE EFFICIENT—than ANY OTHER RECEIVER ever before offered to all who really know radio and who want THE BEST.

It has been rightly called the KARAS EQUAMATIC FIVE TUBE WONDER CIRCUIT. It's a set the like of which radio fans have never before seen.

Engineers who have examined it—who have studied its principle of operation—who have exhaustively tested its performance under every conceivable condition—have been amazed at the manner in which it has SOLVED THE BIGGEST PROBLEM OF RADIO, in a simple, easily understood, AUTOMATIC manner—and solely through its application of absolutely correct engineering principles. Practically every prominent radio magazine in the country is now featuring this circuit.

Radio fans who have built the KARAS EQUAMATIC FIVE TUBE WONDER SET have also discovered that here at last is something entirely new in their whole radio experience—a new kind of TONE QUALITY—a new demonstration of VOLUME AND SELECTIVITY—plus a new principle of AUTOMATIC TUNING that makes all other systems obsolete because lacking in the very essentials that a radio set should possess to be in keeping with present day knowledge and scientific development.

### Superb Tone Quality—An Equamatic Sensation

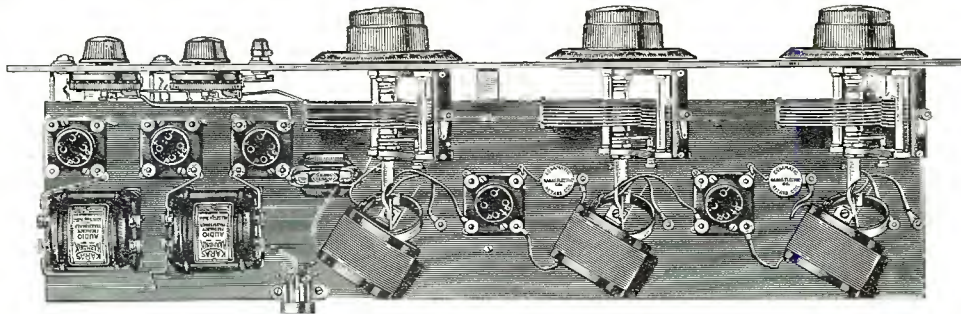
It was no small feat to design a radio receiver in which ALL OF THE MANY PERPLEXING PROBLEMS OF TUNING have been FINALLY and DEFINITELY solved through the invention of KARAS AUTOMATICALLY TUNED INDUCTANCE COILS and other KARAS parts—but it was a STILL GREATER ACHIEVEMENT to produce in the KARAS EQUAMATIC a TONE QUALITY that is ENTIRELY NEW in the field of radio frequency. THE KARAS EQUAMATIC has a marvelous golden tone that has been both the goal and the despair of radio set manufacturers ever since the era of broadcasting began.

You will find in the KARAS EQUAMATIC a quality of richness, fullness and of true tonal beauty. It's tone is never harsh—it is never coarse—just PURE, CLEAR, SWEET MELODY at every wavelength setting of the dials—for EVERY station.

The remarkable tone of the KARAS EQUAMATIC is due to peak efficiency at all wavelengths and to the scientifically correct mechanical and electrical characteristics of the circuit and to the use of KARAS HARMONIK AUDIO FREQUENCY AMPLIFYING TRANSFORMERS, which amplify all of the many vital harmonics and rich overtones that combine to form what we know as audible musical sounds.

### Equamatic Selectivity Is Unsurpassed

Naturally you want a receiver that has the UTMOST SELECTIVITY. In the KARAS EQUAMATIC you will find a complete realization of all you ever have hoped for in this direction. The entire problem of selectivity has been solved by the EQUAMATIC principle, combined with the use of KARAS ORTHOMETRIC STRAIGHT FREQUENCY LINE VARIABLE CONDENSERS and KARAS MICROMETRIC VERNIER DIALS. Because of this remarkable selectivity there is NO OVERLAPPING OF STATIONS. Each station comes in clear and sharp and full tone at its proper place on the dial.



Equamatic System Licensed Under King Patents Pending

The selectivity of the circuit is accompanied by a remarkable volume, due to a big gain per each stage of radio frequency and to the employment of the powerful KARAS HARMONIK TRANSFORMERS for two audio stages.

Easy to Build This Wonder Set Notice in the illustration of the EQUAMATIC RECEIVER how clean cut and easily wired this set actually is. EVEN THOUGH YOU MAY NEVER BEFORE HAVE BUILT A RADIO SET, you can build this one—build it easily and quickly—get from it far better results than you can obtain from the finest and most expensive manufactured set you can buy.

A 16-page manual of simple wiring diagrams and complete instructions for assembling this receiver is packed with each set of KARAS EQUAMATIC INDUCTANCE COILS. In this manual are minutely detailed instructions for the placing of every wire—the making of every connection—the correct positioning of every part. With the aid of this manual and the necessary KARAS parts you can have this wonderful receiver in operation in a remarkably short time. To build the EQUAMATIC RECEIVER you will need the KARAS parts listed on the accompanying coupon, plus other standard parts easily obtainable anywhere.

Order Today from Your Dealer or Direct from Us

Thousands of dealers throughout the country can supply the necessary Karas parts for building this powerful, rich-toned and selective receiver. If your local dealer is not able to fill your order, you can secure your Karas parts direct from us by filling out and mailing the coupon. SEND NO MONEY. Just hand the postman the price of the parts plus a few cents postage.

Order your parts from your dealer or from us TODAY. Build one of these sensationally better five tube EQUAMATIC RECEIVERS right away, so that you can enjoy all of the pure, rich, full tone qualities—the remarkable selectivity—and the superb volume that it has to offer you in return for a few hours most pleasantly spent in building this totally satisfactory set.

Order your parts from your dealer or from us TODAY. Build one of these sensationally better five tube EQUAMATIC RECEIVERS right away, so that you can enjoy all of the pure, rich, full tone qualities—the remarkable selectivity—and the superb volume that it has to offer you in return for a few hours most pleasantly spent in building this totally satisfactory set.

Order your parts from your dealer or from us TODAY. Build one of these sensationally better five tube EQUAMATIC RECEIVERS right away, so that you can enjoy all of the pure, rich, full tone qualities—the remarkable selectivity—and the superb volume that it has to offer you in return for a few hours most pleasantly spent in building this totally satisfactory set.

KARAS ELECTRIC CO.  
1009 Association Bldg.  
Chicago, Ill.

### Essential Parts of the Karas Equamatic Sensation

Karas Equamatic Inductance Coils are packed three in a carton, and come to you with complete manual of simple diagrams and instructions, all necessary nuts, screws and binding posts, ready for mounting in your receiver. Price, set of three coils.....\$12.00

Karas Special 17 Plate Orthometric Condensers, three of which are used in the Equamatic Receiver have special extended shafts upon which to mount the primary coils of the Inductances. Price, each.....\$7.00

Karas Harmonik Audio Frequency Amplifying Transformers are essential to the tone quality success of the Equamatic Receiver. Two of these are used for the two stages of audio frequency amplification. Price, each.....\$7.00

Karas Equamatic Retard Coils, two of which are used, were designed especially for the System. Price, each.....\$1.00

Karas Equamatic Sub-Panel Brackets. To insure the necessary exact positions of primary and secondary coils these brackets are essential. Price, set of three.....70c

Karas Micrometric Dial. It has a 63 to 1 vernier and tunes to 1/1000 of an inch. Price.....\$3.50

Karas Electric Co.,  
1009 Association Building,  
Chicago, Illinois

Please send me set of 3 Equamatic Inductance Coils, \$12.00; 3 special Orthometric Condensers with extended shafts, \$7.00 each; 3 Micrometric Vernier Dials, \$3.50 each; 2 Harmonik Audio Transformers, \$7.00 each; 2 Equamatic Retard Coils, \$1.00 each; and 3 sub-panel brackets, 70c, for which I will pay postman \$60.20, plus postage, upon delivery. It is understood that I have the privilege of returning any of this apparatus for full refund any time within 30 days if it does not prove entirely satisfactory.

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

(If cash accompanies order we will ship postpaid.)

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

# The Equamatic Receiver

## A Tuned Radio Frequency Receiver Using a New System of Radio Frequency Control

**T**HE continual development of efficient tuned radio frequency circuits has brought forth few recent inventions which have aroused a greater interest than the Equamatic System of radio frequency control. It is one of the outstanding development of the year and bids fair to enjoy the popularity accorded the

inductances at varying frequencies, is provided, so that the presence of any variation of conditions or apparatus employed in the circuit may be compensated for by adjusting the coupling to the proper value.

The tuned radio frequency receiver of today is so designed that a fixed relation is held at all times between the primary and secondary

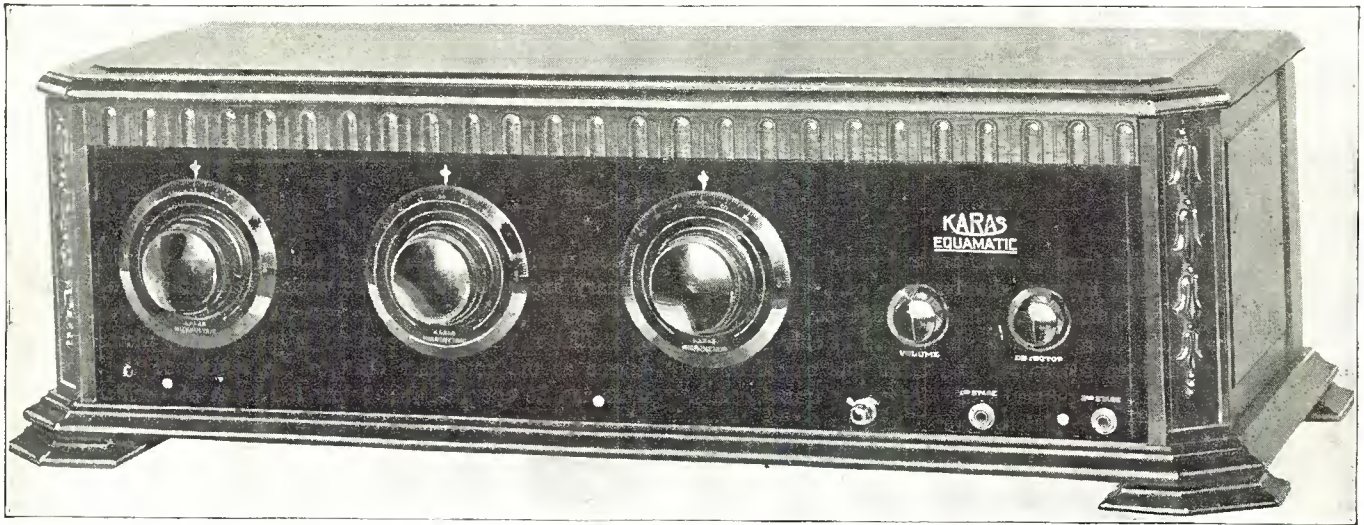


Photo A. Front view of receiver mounted in cabinet

various Neutrodyne circuits of two and three years ago. The fact that the radio public is interested has been manifested in many ways, notably by the many communications received from our readers requesting detailed information on the system itself and a practical application of it in a receiver. In response to these requests we are herewith giving a short description of the invention and a means of utilization in an easily constructed receiver.

circuits, and the fact that a variation in coupling is necessary in order to obtain maximum energy transfer at any frequency, is practically ignored.

The inherent electrical characteristics of a tuned radio frequency transformer with fixed inductances and coupling, are such that the impedance, or resistance of an inductive coil to an alternating current varies approximately directly with the frequency. Inasmuch as the

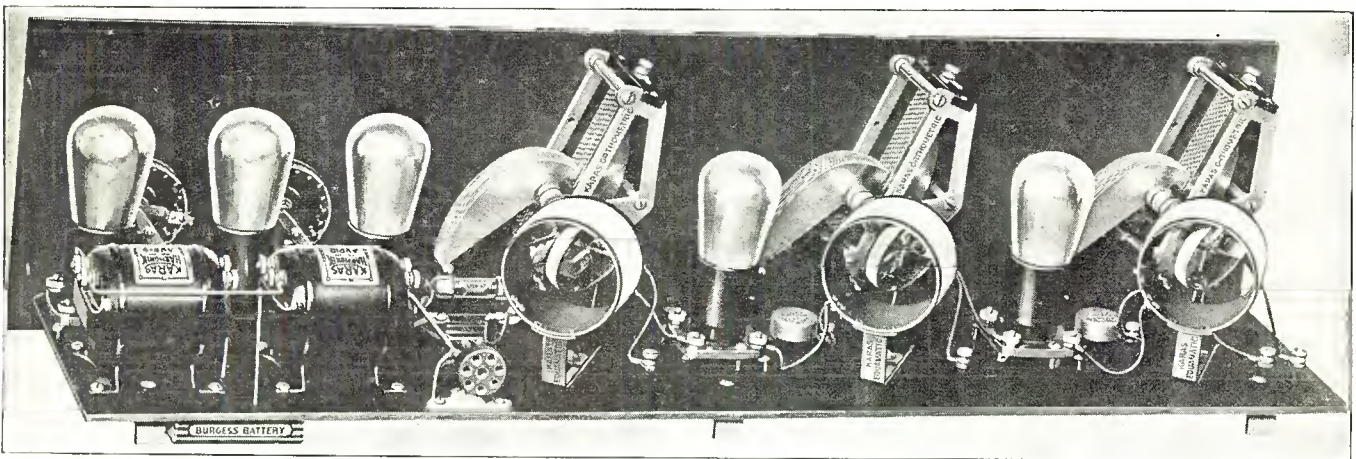


Photo B. Rear view of completed receiver

The object of the Equamatic System is to provide a composite variation of the radio frequency transformer coupling and the tuning element so that they shall automatically and simultaneously always reach their most efficient operating point at any frequency within the range of the receiver. An adjustable compensating coupler for controlling, in any required degree, the transfer of energy between

energy transfer between the primary and secondary is in direct proportion to the impedance, it is conceivable that a much greater inductance, to compensate for a decrease in impedance, is required in a primary coil to tune to 600 meters than is required to tune to 200 meters. It is also compatible that in order to obtain an optimum transfer of energy at every wavelength setting it is necessary that a

primary of increased inductance be used for every 10-kilocycle decrease in frequency.

There are 100 broadcasting channels between 200 and 600 meters. Therefore, to obtain maximum broadcast efficiency at any frequency, 100 separate primary coils, each having the exact number of turns, even to the fractional part of a turn, would be required. Since that many separate primary coils would be impractical and out of the question, the only logical solution has been to design a tuned radio

observed that the wavelength of greatest energy transfer, or efficiency, is no longer at 600 meters, but at some lower wavelength. An effect has thereby been obtained identical to both the removal of a number of turns from the 14-turn primary winding or the use of a separate closely coupled primary of exactly the correct number of turns for maximum efficiency at that wavelength. By loosening or tightening the coupling between the windings, highest efficiency may be attained at 300 meters, 400 meters, or any other desired wavelength within the

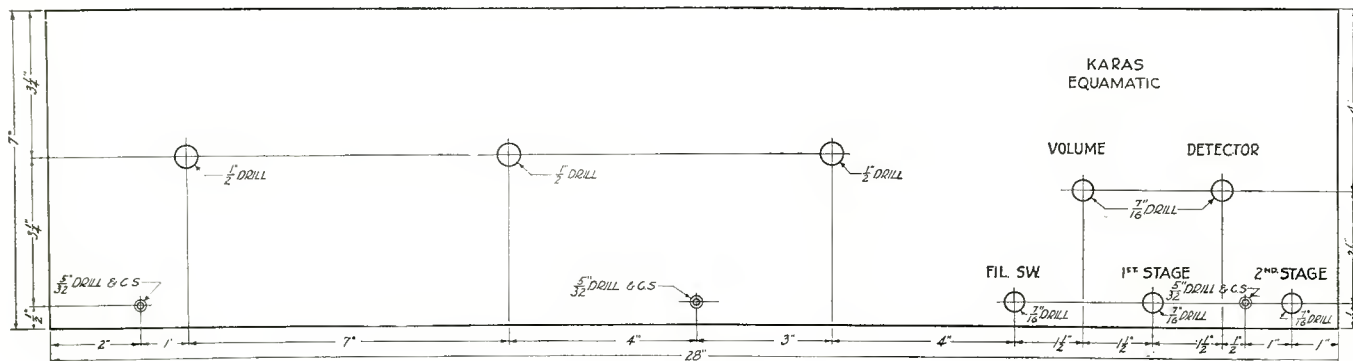


Fig. 1. Panel layout

frequency transformer with fixed inductances and coupling, using but a single primary coil. The inherent disadvantage of using a single primary coil in a transformer whose tuning range covers a wide band, is that a maximum energy transfer is realized at only one frequency. This fact has been recognized and taken into consideration by radio engineers in designing tuned radio frequency transformers. There is a great difference of opinion, nevertheless, as to the proper frequency at which the maximum energy transfer should take place.

For the sake of illustration assume that a transformer is designed so that it will operate at maximum efficiency when tuned to 300 meters. The inductance in the primary is just right to give maximum energy transfer when the secondary is tuned to 300 meters or 1000 k.c. If a frequency other than 300 meters is tuned in, two conditions are established. First, if the frequency is lower than 1000 k.c. the efficiency of the transformer is lowered due to insufficient primary inductance with attendant decrease of energy transfer. Second, if a higher frequency than 1000 k.c. is tuned in, the primary inductance is too high and out of proportion to the secondary, and the energy transfer is of such magnitude that violent oscillations occur. To overcome this tendency to oscillate, various methods have been resorted to. As a whole, the methods prevent oscillation effectively,

broadcast spectrum. In other words, if the coupling between the primary and secondary can be varied (with the primary having the necessary number of turns to operate the tubes just under the point of oscillation when the secondary is tuned to 600 meters) in the same degree as the condenser changes the tuning of the secondary, the tubes can be operated just below the point of oscillation, regardless of frequency, thus transferring an optimum value of energy to the secondary over the entire range.

The only method of obtaining this automatic variation in coupling is to have a mechanical connection between the tuning condenser and the primary so arranged that the primary is drawn away from the secondary at exactly the proper rate to keep in step with the reduction in capacity of the tuning condenser. For practical purposes the mechanism must be simple and compact, yet capable of easy adjustment to permit varying range or mechanical movement, while at all times permitting a progressively increasing electrical action. Furthermore, the movement must be stable, precise, uniform and without backlash.

The Equamatic System, licensed under King Patents Pending, and incorporated in the receiver described herewith, successfully fulfills these requirements. The primary is entirely separate from the second-

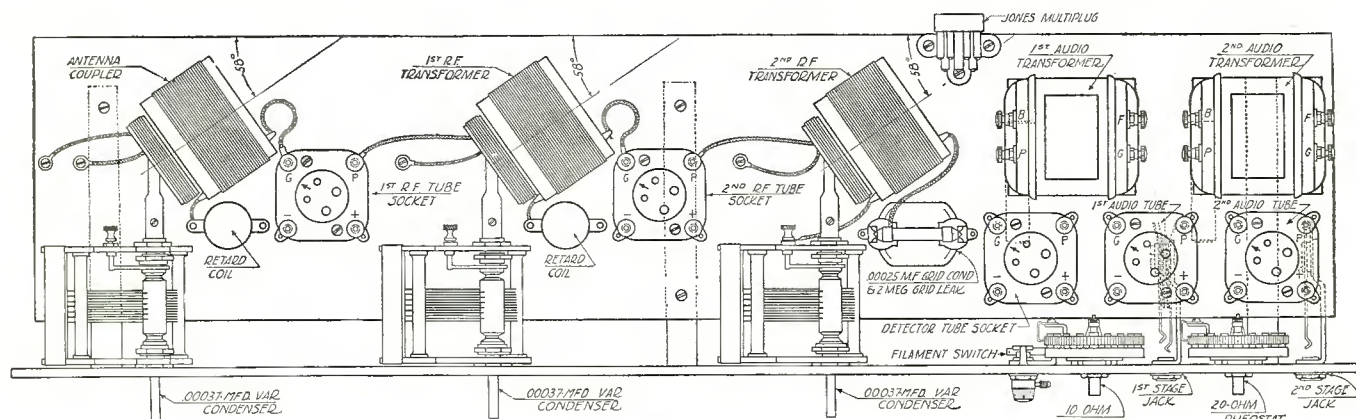


Fig. 2. Top view of receiver. Parts shown with dotted lines are mounted on bottom side of subpanel

but only at a sacrifice, the general effect being a decided broadening of tuning and a distinct loss of sensitivity and selectivity.

Continuing, assume that in order to obtain an optimum value of energy transfer to a secondary winding tuned to 600 meters, a tightly coupled primary consisting of 14 turns of wire is necessary. If the coupling between the primary and secondary is loosened and the secondary again tuned for maximum transfer of energy, it will be

ary, being attached to the extended shaft of the tuning condenser and capable of being angularly adjusted to it. The secondary, in addition to being angularly variable with respect to the position of the shaft of the condenser, is adjustable, by pushing it forward over the primary or backward away from the primary, so as to afford any practical, useful degree of coupling with the primary. It is often desirable to compensate for the losses incurred in the natural aging

of tubes or depreciation of "A" batteries. This is easily accomplished by tightening the coupling between the primary and secondary windings.

In this receiver the primary and secondary coils are so completely variable with respect to each other and the axis of the condenser shaft, that practically any degree of coupling and any rate of varia-

tion of coupling is obtainable by simple and quickly made adjustments of the primary and secondary. Once adjusted, the variation of the coupling is provided automatically by the turning of the condenser dial. The correct rate of variation is determined by the angle at which the secondary coil is placed with respect to the axis of the shaft of the condenser. Physical and electrical characteristics of the coils are such that the correct angle is 58 degrees. Incidentally, this angle is also the proper one to prevent overlapping of magnetic fields.

This absolutely correct rate of variation of coupling can be secured only when the coil is used in connection with a 180 degree straight line frequency condenser.

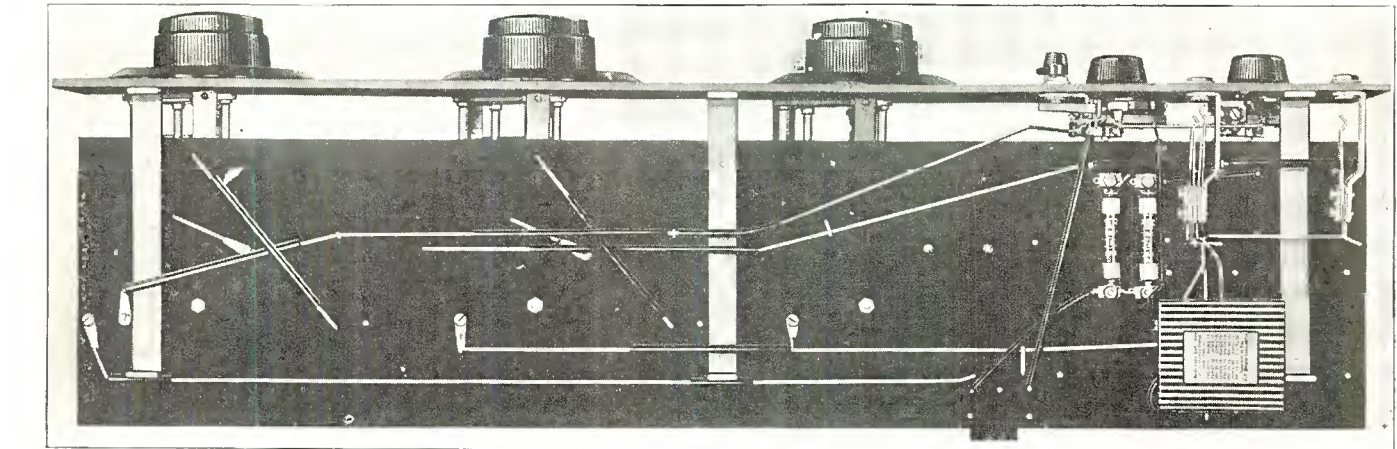


Fig. 3. Bottom view of receiver showing arrangement of parts secured to subpanel

The comparative amplification of the Equamatic System in respect to the ordinary "loss stabilized" receiver is of such magnitude that the advantage of co-ordination of transformer coupling with wavelength control can only be appreciated in the actual operation of the receiver.

The correct location of all mounting holes is accurately shown as well as the necessary engraving. Three countersunk holes are provided along the bottom edge of the panel for attaching the special brackets which support the subpanel.

Figure 2 is a baseboard layout and shows all of the apparatus mounted into place upon the subpanel and front panel. Each piece of apparatus has its terminals plainly marked so that the correct loca-

tion of the antenna. Varying the degree of coupling between the primary and secondary of the antenna coupler adapts the receiver to individual conditions. With an extremely long antenna, whose fundamental is 600 meters, minimum coupling would be required at that frequency and greater coupling for all lower wavelengths. However, if the fundamental were 350 meters, minimum coupling would be needed at that point and correspondingly greater coupling on either higher or lower wavelengths.

In Figure 1 is shown a layout of the front panel of the receiver. The correct location of all mounting holes is accurately shown as well as the necessary engraving. Three countersunk holes are provided along the bottom edge of the panel for attaching the special brackets which support the subpanel.

Figure 2 is a baseboard layout and shows all of the apparatus mounted into place upon the subpanel and front panel. Each piece of apparatus has its terminals plainly marked so that the correct loca-

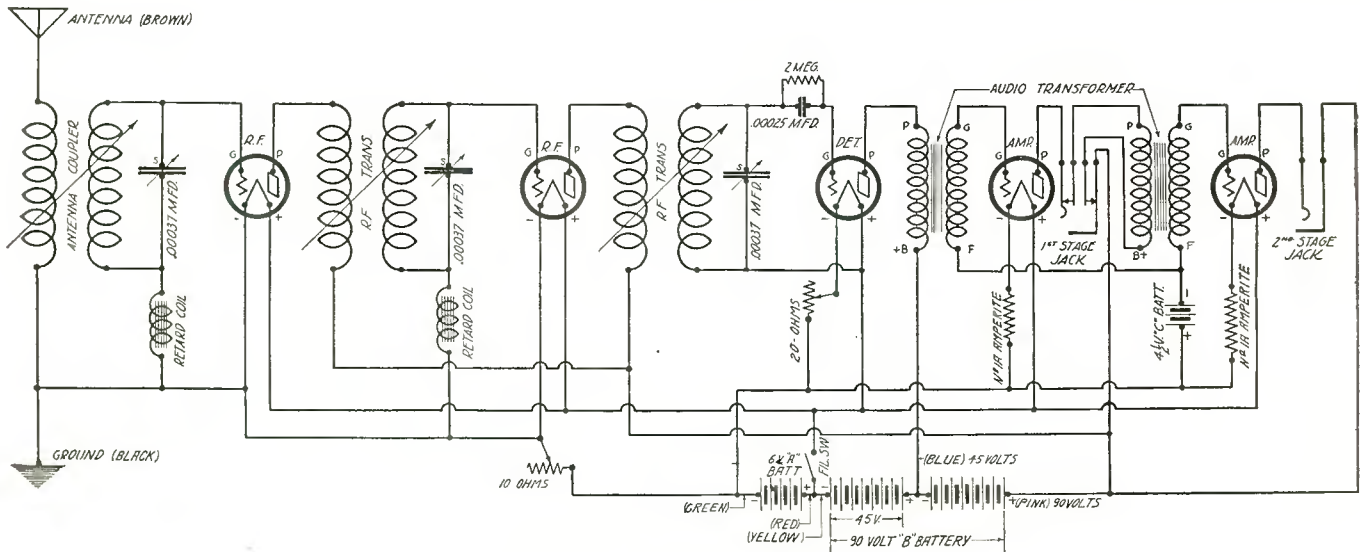


Fig. 4. Schematic wiring diagram

The receiver described herewith uses a standard tuned radio frequency circuit consisting of two stages of radio frequency amplification, detector and two stages of transformer coupled radio amplification. The use of an adjustable primary and secondary enables full advantage to be taken of the amplification factor of the tubes. It is not necessary to establish a positive bias on the grid of the detector

tion of each part, with respect to the terminal of adjacent pieces of apparatus, will insure short leads.

Figure 3 is a layout of the subpanel and shows the location of all the holes necessary for the mounting of the parts as well as the holes through which the wires pass when making the necessary connections between the apparatus above and below the subpanel. Three holes

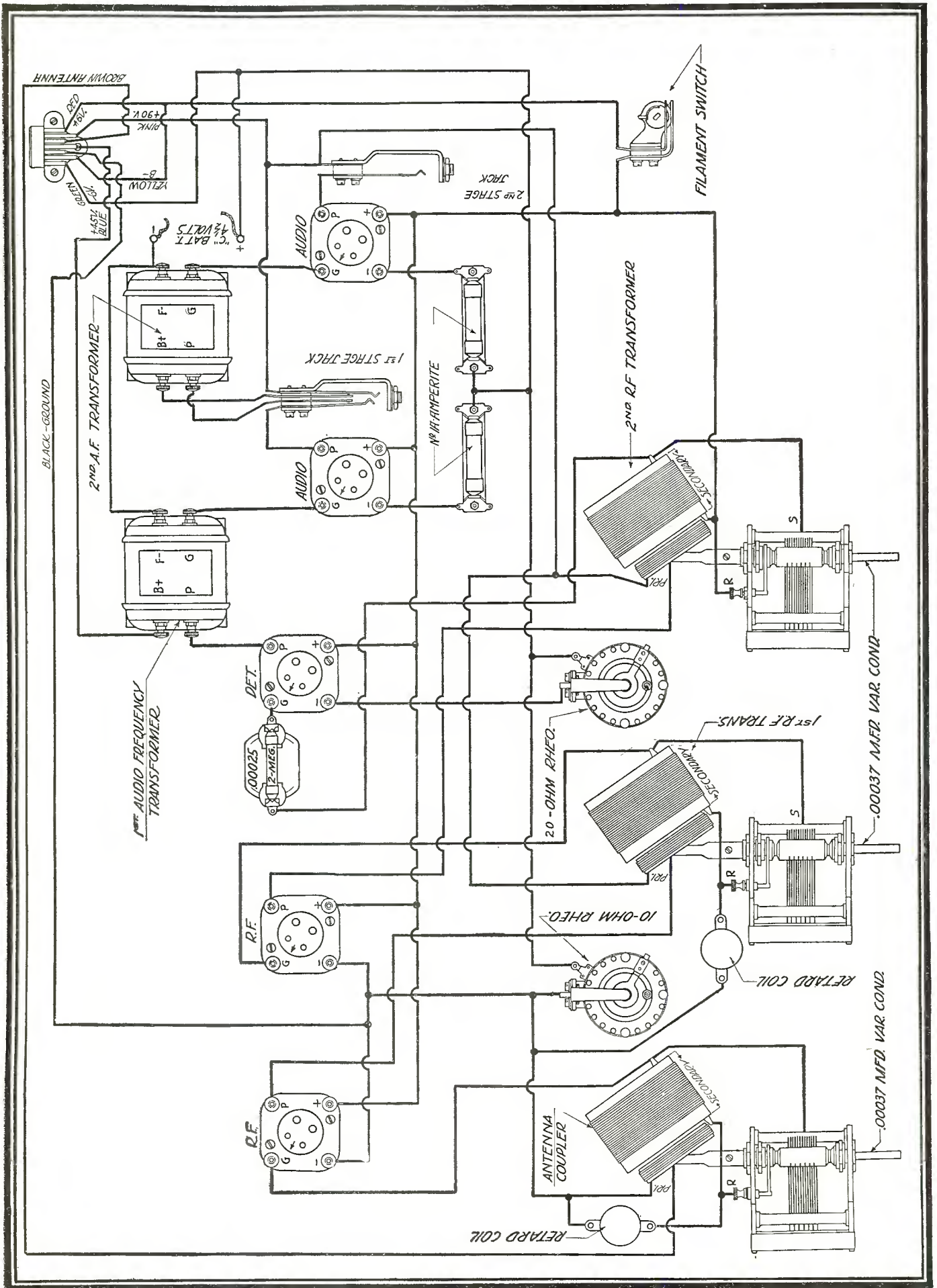


Fig. 5. Graphic wiring diagram. Check this carefully with receiver when completely wired



are provided for the clamping screws which normally hold the secondary in its proper position. These holes are drilled and tapped for No. 8-32 screw. The holes for mounting the Jones multi-plug, the sockets and the audio transformers are  $\frac{1}{8}$ -inch drill and tap for No. 6-32 machine screw. Six holes for mounting the brackets supporting the subpanel are shown, with an extra heavy line around the actual hole. They are countersunk from the top side of subpanel for No. 6 oval head machine screws. Two holes are provided between the detector tube socket and the first audio tube sockets. They are  $\frac{1}{8}$ -inch drill and tapped for No. 6 machine screws, and are for the purpose of mounting the two Amperites against the under side of the subpanel. The three lines shown adjacent to the tapped holes for clamping the secondary are at an angle of 58 degrees. They will facilitate the correct angular adjustment of the secondary so as to insure the proper angle to prevent interstage coupling. Those holes which are shown solid are No. 42 drill and are for the purpose of allowing hook-up wires to pass through the panel.

Figure 6 is a layout of the sub-panel itself. Those holes shown solid are No. 42 drill and are for the purpose of allowing hookup wires to pass through the sub-panel from one side to the other. The holes shown with an extra circle around them are No. 25 drill and

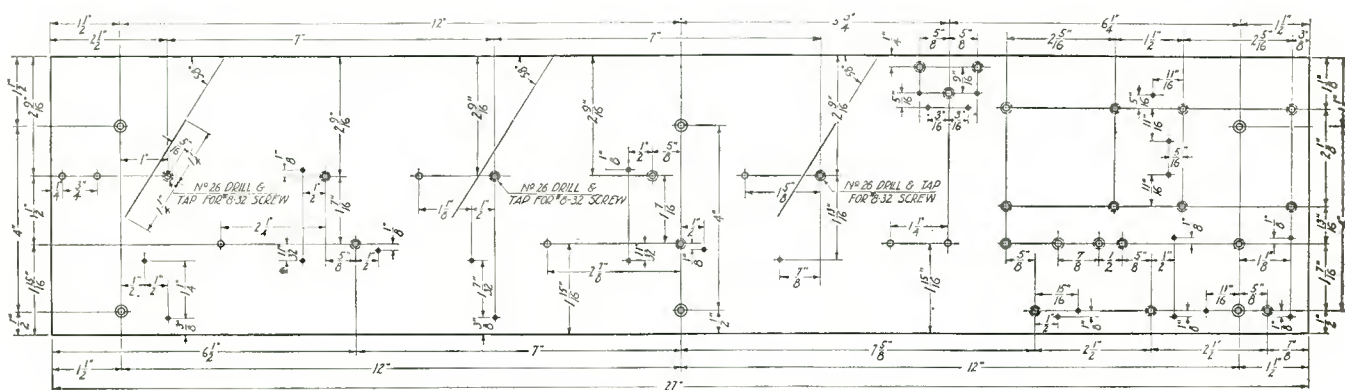


Fig. 6. Sub-panel template showing location of all holes necessary for properly mounting apparatus, as well as holes through which connecting wires pass

countersink for No. 6 machine screw. Other holes having a dotted circle around them are  $\frac{1}{8}$ -inch drill and tap for No. 6-32 machine screw. All other holes are No. 25 drill.

Figure 4 is a schematic wiring diagram of the complete receiver and gives all connection to the various pieces of apparatus. The two radio frequency tubes are controlled by a 10-ohm Yaxley air-cooled rheostat, while the detector tube is regulated by a 20-ohm Yaxley air-cooled rheostat. The two audio tubes have Amperites in their filament leads, thereby insuring an automatic adjustment of the filament temperature.

No difficulties will be experienced in wiring up this receiver, although the work will be expedited by mounting the apparatus on the subpanel only and making all possible connections before assembling the front panel and mounting it in place.

A  $4\frac{1}{2}$  volt "C" battery is used in the audio. The battery is mounted on the under side of the subpanel under the audio transformers.

After the wiring of the set is completed, carefully check all connections against the large graphic illustration shown in Figure 5. Make those corrections in wiring that are necessary and then connect the batteries to the receiver by means of the Jones plug and cable. Connect the "A" battery first in order to test the filament circuit. Insert a 201-A tube in each socket and turn up the rheostats. If the tubes light and are properly controlled, the filament circuit is in proper working order. Then disconnect the positive "A" battery wire and connect all the other wires in the battery cable, in turn, to the positive "A" battery. If any of the tubes light, there is an incorrect connection in the circuit, which must be located before connecting the "B" battery. If everything appears to be in proper working order the batteries may all be connected, the phones plugged in the first jack, and the antenna and ground connected to the receiver.

Adjust the rheostats so that approximately 5 volts are applied to

the tubes and slowly tune the variable condensers. The receiver should respond as soon as it is placed on the air, providing a station is broadcasting.

Adjust the secondary coils so that the bracket supporting the coils is parallel to the 58 degree line engraved on the subpanel. With the condenser plates entirely enmeshed adjust the primary so that maximum coupling is established. Tighten the set screw on the sleeve holding the primary and slowly push the secondary forward over the primary, after again tuning in a station, being careful to maintain the 58 degree angle. Withdraw the secondary again until oscillation ceases. Then securely fasten the secondary to the subpanel and repeat the operation with each of the other transformers. When the coils are properly adjusted it will be possible to tune the receiver over the entire broadcasting spectrum without the set oscillating at any wavelength.

Any antenna of reasonable wavelength can be used in conjunction with this receiver. Sometimes the set will not perform at maximum efficiency, in which case the reversal of the coupling between the primary and secondary of the antenna coupler will help materially. In other words, minimum coupling is used at the upper end of the broadcast band, while maximum is used at the lower end.

#### LIST OF PARTS

These parts or any reasonable substitute will give satisfactory results:

- 1—Drilled and Engraved Formica Front Panel, 7x28x3/16-inch
- 1—Formica Drilled Subpanel, 6x27x3/16-inch
- 3—Karas Equamatic R. F. Transformers
- 3—Karas Orthometric Extended Shaft .00037 Mfd. Condensers
- 3—Karas Micrometric Vernier Dials
- 2—Karas Harmonik Audio Transformers
- 2—Karas Equamatic Retard Coils
- 3—Karas Equamatic Subpanel Brackets
- 1—Yaxley 10-ohm Air-Cooled Rheostat
- 1—Yaxley 20-ohm Air-Cooled Rheostat
- 1—Yaxley No. 4 Interstate Phone Jack
- 1—Yaxley No. 1 Open Circuit Phone Jack
- 1—Yaxley Filament Switch
- 1—Sangamo .00025 Mfd. Fixed Condenser with Grid Leak Clip
- 1—Lynch 2-megohm Grid Leak
- 2—No. 1-A Amperites
- 1—National Carbon  $4\frac{1}{2}$ -volt "C" Battery
- 1—Jones Multi-plug with 8-foot Battery Cable
- 5—Benjamin UX Cushion Sockets
- 12—No. 6-32x3/8-inch Oval Head Brass Machine Screws
- 12—No. 6-32x3/4-inch Round Head Brass Machine Screws
- No. 6-32x3/8-inch Round Head Brass Machine Screws
- 1—Package Kester Solder
- 30—Feet Belden No. 12 Tinned Copper Wire
- 24—Kellogg Tinned Soldering Lugs

# RADIO'S

*greatest receiver—*

## THE WORLD'S RECORD SUPER

6000 to 8000 Miles Consistent Reception on a Loop

### Selectivity

The following is a report of tests made by Radio Age Magazine with a World's Record Super in Chicago:

"The World's Record Super is extremely selective. . . . KDKA comes through clean and sharp without any interference from WGN below or WGES above that channel. Three stations between WJAZ and WGES (WSMB-KOA-WSAI) come in without the slightest difficulty of an overhang from either WGES below them or WJAZ above them. The same applies to KTNT being received without interference from WJAZ.

A little higher on the band WDAF at Kansas City is brought in without a trace of WEBH, and above the latter station, KTHS may be held during their entire program without a break-over from Edge-water. WGY, WTAM, WOAI, who lie between WEBH and WHT may be separated easily.

Against WQJ-WMAQ the Radio Corporation Station WJZ comes through with excellent volume and no hangover from the adjoining local station. KFNF, KFI, WRC, WBAP all come in nicely between WQJ below and WCFL above. WHO is copied solid for over an hour without any disturbance from KYW.

### Tone

The World's Record Super possesses a tone quality of surprising naturalness at all volumes. It is a veritable revelation in realistic reproduction that amazes engineers and amateurs alike.

### Distance

No other receiver has approached the marvelous DX Records that the World's Record Super has established, and it is safe to say none will for years to come.

### Verified World's Records

The authenticity of the startling achievements of the World's Record Super (as listed below) is based upon hundreds of verifications by leading Broadcasting Stations and Publications from coast to coast.

1.

On March 17th established new World's Records for LOOP AERIAL RECEPTION—8,375 miles with Loud Speaker Volume.

2.

On the night of March 29th, established new World's Record with the reception of SIX FOREIGN STATIONS distant 6,000 miles or more.

3.

Established new World's Record for GREATEST NUMBER OF BROADCASTING STATIONS heard that are located 6,000 or more miles away.

4.

Established new World's Record for MOST CONSISTENT RECEPTION, night after night, of Stations 6,000 miles or more distant—117 programmes from 19 different Foreign Stations, heard between December 27th and April 10th.

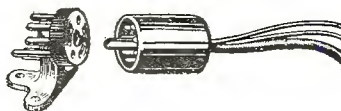
Parts used and recommended by E. H. Scott,



**R-400**  
**SELECTONE** Untuned Transformer—R400—has specially designed closed iron core, which limits interstage coupling and is impregnated in a vacuum so that all characteristics of coil remain constant. The coil design gives an extremely high amplification. Can be used in any circuit requiring a long wave transformer.  
**PRICE \$6.00**

**R-410**  
**SELECTONE** Tuned Stage Transformer—R410—is air core. Each transformer is matched to within one turn before sealing in case. The matching of these filters is so perfect that where extreme selectivity is desired, two can be used and are guaranteed to match perfectly.  
**PRICE \$6.00**

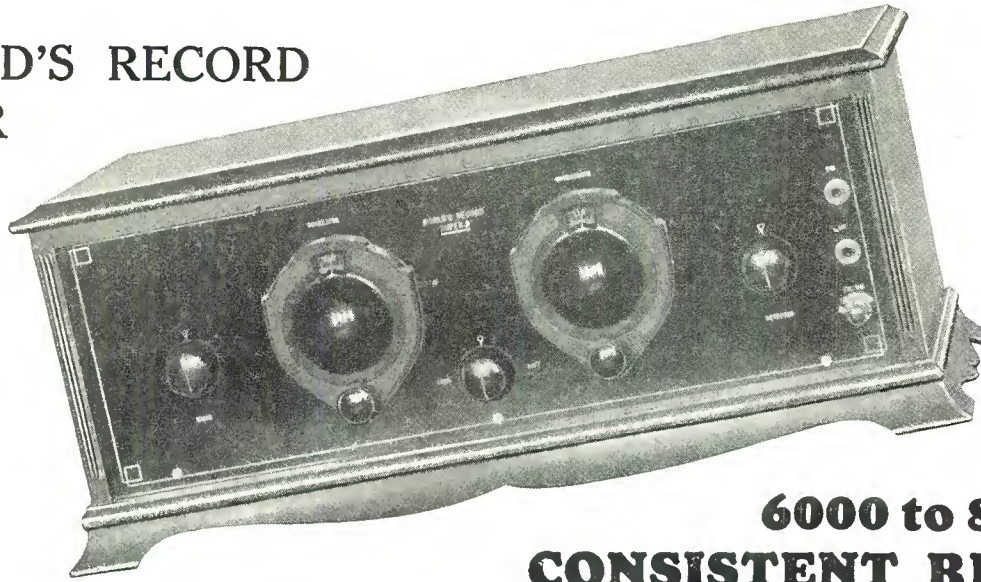
**Jones**  
**MULTI-PLUG**  
THE STANDARD SET CONNECTOR



In use by over 1/2 million satisfied customers. Standard equipment on many reliable receivers.  
B-M Multiplug, 4 feet complete..... \$3.50  
B-M Multiplug, 8 feet complete..... 4.50

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

# THE WORLD'S RECORD SUPER



Read  
Article  
Following

## 6000 to 8000 MILES CONSISTENT RECEPTION!

*You can build an exact duplicate of the World's Record Super Easily and Successfully*

### Parts Required for the World's Record Super

- |   |  |
|---|--|
| 1 Panel 21x7x3/16.....                    | 1 Dubilier Condenser, .001 mfd.....        |
| 1 Wood Baseboard, 20x9.....               | 1 Dubilier Condenser, .005 mfd.....        |
| 2 Rauland Lyric Audio Transf.....         | 1 Dubilier Condenser, .00025 mfd.....      |
| 2 Carter Rheostats (6 ohms).....          | 1 XL Variodenser, Type N.....              |
| 1 Carter High Pot resis. 500,000.....     | 2 Selectone L. W. Transformers, R400....   |
| 1 Carter Jack No. 1, single circuit.....  | 2 Selectone L. W. Transformers, R410....   |
| 1 Carter Jack No. 2A.....                 | 1 Dubilier Grid Leak, 2 megs.....          |
| 1 Carter Fil. Switch.....                 | 1 Jones Multiplug and Cable.....           |
| 2 Remler Condensers .0005 mfd.....        | 6 Binding Posts.....                       |
| 1 Elkay Resistance 3/4 amp. and Mount...  | 2 Pieces of Bakelite for Posts, 3x3/4x3/16 |
| 8 Frost Sockets.....                      | 2 Kurz-Kasch Vernier Dials.....            |
| 1 Thor Coupler, No. 460.....              | 12 Lengths of Bus Wire.....                |
| 2 Dubilier Condensers, .1 mfd. Type 907.. | 3 dozen Screws, 5/8.....                   |
| 1 Dubilier Condenser, .00025 mfd.....     | 100 Kellogg Soldering Lugs.....            |
| 1 Dubilier Condenser, .002 mfd.....       | 1 Small Can Kester Rosin Core Solder.....  |

With the parts here listed, anyone can build an exact duplicate of the remarkable World's Record Super with a screw driver, pliers and soldering iron. Building instructions make it almost impossible to err in construction and if followed carefully, assure the builder of a receiver that will duplicate the tremendous performance of the original model. Build the World's Record Receiver and you will have at small cost the finest Radio Set obtainable today.

Complete Set of Parts, List Price, \$86.60

### PARTS MANUFACTURERS

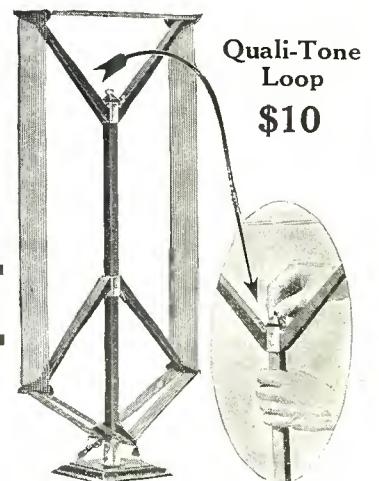
Scott Transformer Co.  
7620 Eastlake Terrace, Chicago

Thor Radio Mfg. Co.  
35 S. Dearborn St., Chicago

Carter Radio Co.  
300 S. Racine Ave., Chicago

(Loop) Duro Metal Products  
Company  
2649 N. Kildare Ave., Chicago

Howard B. Jones  
618 S. Canal St., Chicago

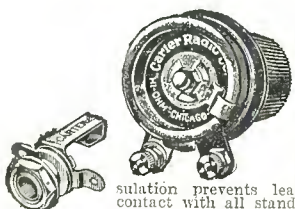


Patented

The Quali-Tone Loop was used exclusively on the World's Record Super and was in great part responsible for the marvelous records that remarkable receiver established. Note adjustment feature that keeps wires taut always. Get the QUALI-TONE for better reception.

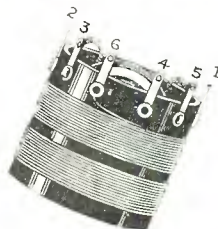
### Designer of the World's Record Super

#### CARTER No. 5 HI-Ohm



A stable, non-inductive, wire-protected variable resistance. Resistance characteristic curve gives straight line current variation insuring uniform control.  
Price \$2.00

Carter No. 1 and 2 A Short Jack. Smallest on market. Heavy Bakelite insulation prevents leakage. Makes good contact with all standard plugs.  
Price 25c and 30c



#### Thor Coupler

This coupler has a balanced winding giving an even output from 200 to 500 meters.  
List Price \$3.50

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

# How to Build the Latest World's Record Super

Here Is Full Constructional Data on a Remarkable Receiver That Holds Verified World's Records for DX Reception

All illustrations and construction data prepared by the  
Citizens Radio Laboratory

**A**BOUT 18 months ago reports of remarkable reception of stations located 6,000 miles or more from the receiving point on a set using 9 small dry cell tubes, created considerable interest among DX fans. Within a period of 13 weeks no less than four new World's Records were established, among them a world's record for the reception of voice on a receiver using a loop aerial—8,375 miles. In all 119 programs were logged from 19 different stations, all 6,000 miles distant or more.

The receiver was used in location where it was not possible to charge a storage battery, hence the reason for the use of the small tubes. Two of these were used in the last stage of audio to handle the volume without distortion, as the new power tubes were not then available. The receiver to be described uses storage battery tubes throughout with one power tube in the last stage and has considerably more volume than the original set.

The World's Record Super is, of course, a superhetrodyne, and, as most set builders are aware, the degree of success you have with this type of receiver lies principally in the efficiency and perfect matching of the intermediate frequency transformers. Mr. Scott, who built the original receiver and established the DX records, has specialized for the last three years in experimental work on superhetrodynes and the design of the transformers used in them, and the model to be described uses the latest product of his laboratory, the Selectone Long Wave Transformers.

Two Selectone air core transformers are used as filters to secure the necessary selectivity, and two Selectone iron core transformers are used to step up the amplification. Real long distance reception is only possible when all transformers used are perfectly matched. If these do not all peak exactly alike your overall amplification will be low.

Where each transformer has a different peak, the receiver has no selectivity and very poor tone quality. The Selectone Transformers used in the World's Record Super are a laboratory product, very carefully matched. The air core filter transformers are

actually matched to within one turn before sealing in the bakelite case. No extra condenser is required to tune the filter, as a condenser of correct capacity is placed across the primary. After transformer coils are peaked and matched they are sealed inside of case with condenser.

The iron core transformers have a closed core of special design which limits stray fields and makes it possible to place transformers quite close together without danger of causing instability or coupling. Both laboratory and air tests have proved that properly designed iron core transformers give a much higher amplification than the air core type. The iron core increases the magnetic coupling between primary and secondary and causes a much greater transfer of energy than can be secured where no iron is used. Just enough iron is used in the core to broaden the peak sufficiently without decreasing the selectivity or cutting side bands. The result is clear, distortionless amplification and tone quality that makes the receiver a pleasure to listen to.

The Thor oscillator coupler is of the balanced winding type, with both grid and plate circuits tuned. The pick-up coil is wound on a movable rotor, so that the coupling can be adjusted, to secure maximum selectivity and sensitivity. Both a tube and loop oscillator coupler are each tuned by a .0005 variable condenser, which has an insulated shaft coming through to front of panel. If a condenser is used with a non-insulated shaft, trouble will be experienced with body capacity.

Although regeneration is employed to increase the selectivity and sensitivity of the loop circuit, a plate condenser is not

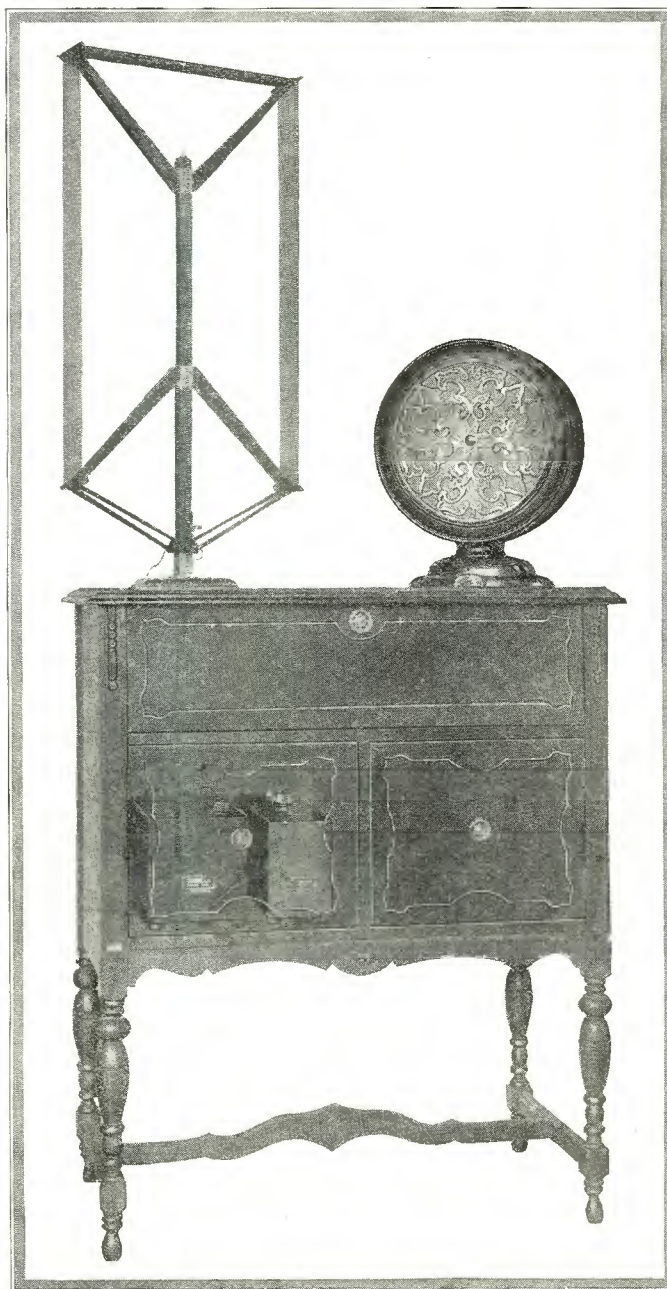


Photo A. Front view showing receiver mounted in console with accessories

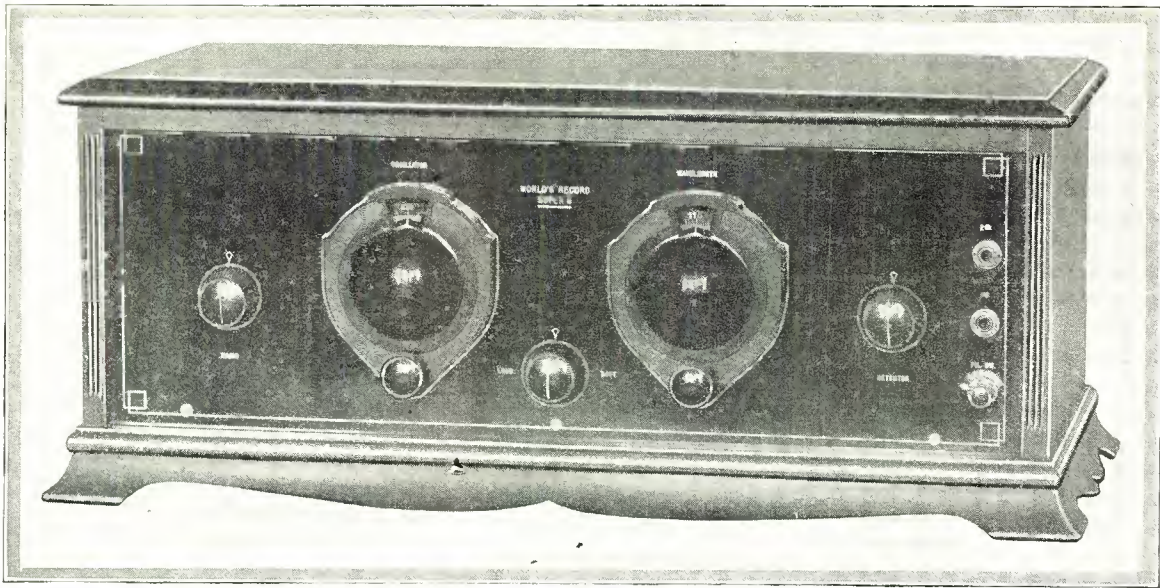


Photo B. Front view of receiver mounted in cabinet

used, as it has been found that with the large tubes this adjustment is not critical, so a semi-variable type is used. This removes a control from the front of the panel. To adjust, tune in a station on about 350 meters and after setting, it can be forgotten, except perhaps when you are going after a particularly distant station, when you may be able to use a little more regeneration with good results.

On referring to the circuit diagram it will be noted that two Carter rheostats are used, one for the oscillator and detectors, the other for the three intermediate stages. Neither of these controls are critical; in fact, they can be adjusted at the beginning of the evening and left set and the volume controlled by means of the variable resistance across the primary of the third intermediate transformer. The two audio tubes are controlled by a  $\frac{3}{4}$ -amp. resistance.

To reduce radiation as much as possible and suppress harmonics,  $22\frac{1}{2}$  volts are used on the plates of the oscillator and first detector. No grid leak or condenser is used on the first detector, but detection is obtained by biasing the grid with the voltage drop across the rheostat. A 1-mfd. condenser is used to localize the oscillator circuit and by-pass the  $22\frac{1}{2}$ -volt "B."

The intermediate stages have 90 volts on the plates. The grids are biased with from 3 to 6 volts. The best value can be found very quickly by experiment.

The second detector will generally give the best results with  $67\frac{1}{2}$  volts on the plate, but from 45 to 90 volts can be tried and the voltage giving the best results used. The first audio has 90 volts on the plate with the grid return lead connecting to the grid returns on the intermediates.

Both the primary and secondary of the first audio transformer are by-passed. If these condensers are omitted trouble may be experienced with R. F. feeding through to the audio. A .005-mfd. condenser is also used between the plate of the last audio and A negative to improve tone quality, particularly when a cone speaker is used. The effect of a .0005 mf. condenser can be tried between P. of 1st Det. and A—.

Photo B shows the front view of the complete receiver and photo C shows a rear view. Notice the simple layout and how the parts have been placed to insure short leads.

Fig 2 shows a baseboard layout giving the exact location of every part. The rheostats, variable tuning condensers and jacks can be mounted separately on the front panel and placed to one

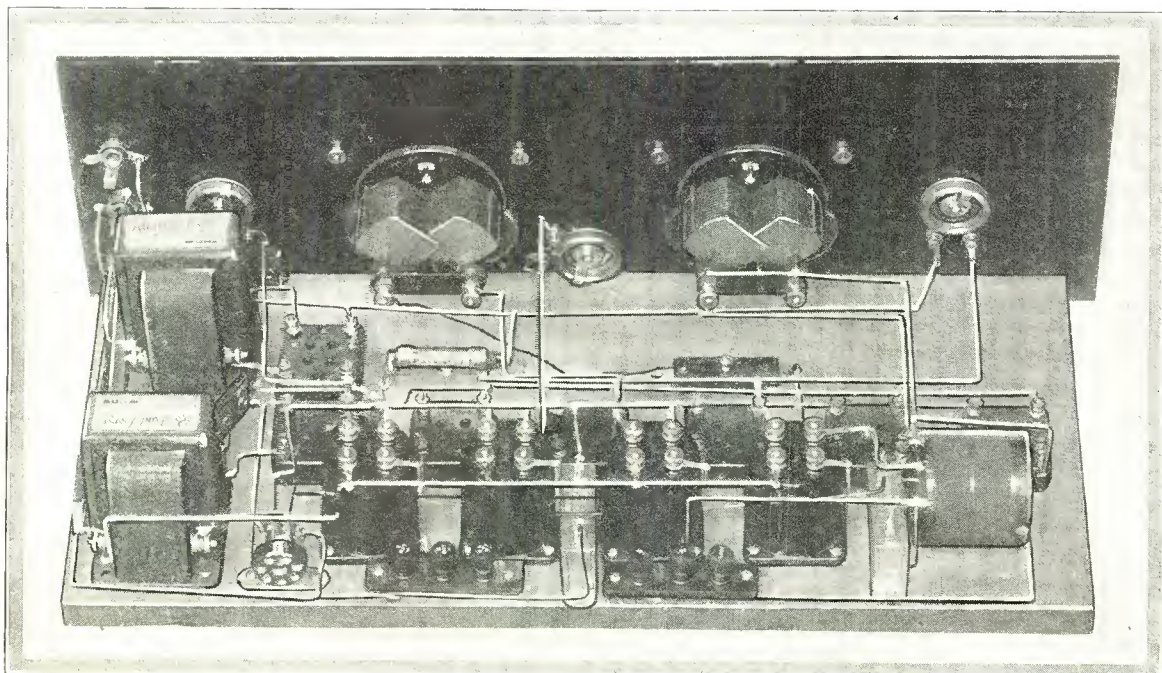


Photo C. Rear view of completed receiver

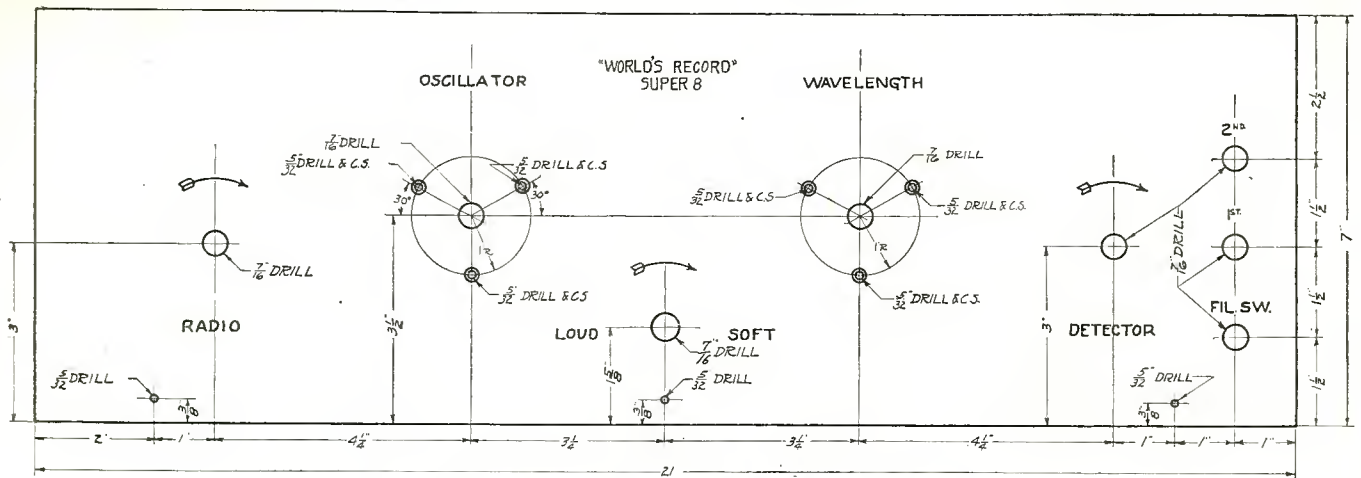


Fig. 1. Panel layout showing size and location of holes

side while the remaining apparatus is mounted on the baseboard prior to wiring.

We have submitted the wiring diagram in two forms. In the graphic illustration as shown in Fig. 3, every part is drawn out in detail, and this should be used in checking over the wiring when it is complete. For the more advanced radio fan, the schematic wiring diagram which is shown in Fig. 4 can be used.

The "World's Record Super" is shown in photo "A" installed in the Model 10 Charlotte Furniture Company's console. Genuine walnut is used in its construction, with the doors of butt walnut, and the tops and ends plain. A high grade and very durable finish is applied, consisting of several coats of lacquer, which is waxed. A complete self-contained "B" power supply and trickle charger is used for supplying the necessary plate voltages for the proper operation of the circuit as well as keeping the storage battery at full charge. Appropriate controls for varying the different voltages are provided. The trickle charger uses no acid, but rectifies by means of a gas tube. This unit, known as the type 201, is manufactured by the Storad Manufacturing Company of Cleveland, Ohio. The Troubadour speaker and Qualitone loop are both manufactured by the Duro Metal Products Company of Chicago. The loop is entirely collapsible, being provided with a thumb-screw arrangement by which the wires are kept taut at all times. The cabinet in Photo "B" is one of the many models made by the Signal Electric Company of Menominee, Michigan.

(If any further information is desired regarding the accessories shown, a request direct to the manufacturer will bring full descriptive information.)

LIST OF PARTS

- 1—21x7x3/16-inch Insuline Panel
- 1—20x9-inch Wood Baseboard

- 1—Signal 7x21-inch Cabinet
- 2—Rauland Lyric Audio Transformers
- 2—Carter 10-ohm Rheostats
- 1—Carter 500,000-ohm Potentiometer
- 1—Carter Open Circuit Jack
- 1—Carter Closed Circuit Jack
- 1—Carter Filament Switch
- 2—Remler .0005-mfd. Variable Condensers
- 1—Elkay 3/4-ampere Resistance with mounting
- 8—Frost Sockets
- 1—Thor No. 460 Coupler
- 2—Dubilier 1-mfd. Condensers
- 1—Dubilier .0025-mfd. Fixed Condenser
- 1—Dubilier .002-mfd. Fixed Condenser
- 1—Dubilier .001-mfd. Fixed Condenser
- 1—Dubilier .005-mfd. Fixed Condenser
- 1—Dubilier .00025-mfd. Condenser
- 1—Dubilier 2-megohm Grid Leak
- 1—XL Model "N" Variodensar
- 2—Selectone R400 Long Wave Transformers
- 2—Selectone R410 Long Wave Transformers
- 1—Jones Multiplug and Cable
- 6—Eby Binding Posts
- 1—Qualitone Loop
- 2—Kurz-Kasch Vernier Dials
- 100—Kellogg Soldering Lugs
- 1—Can Kester Rosin Core Solder
- 50 Feet Belden No. 12 Copper Tinned Wire

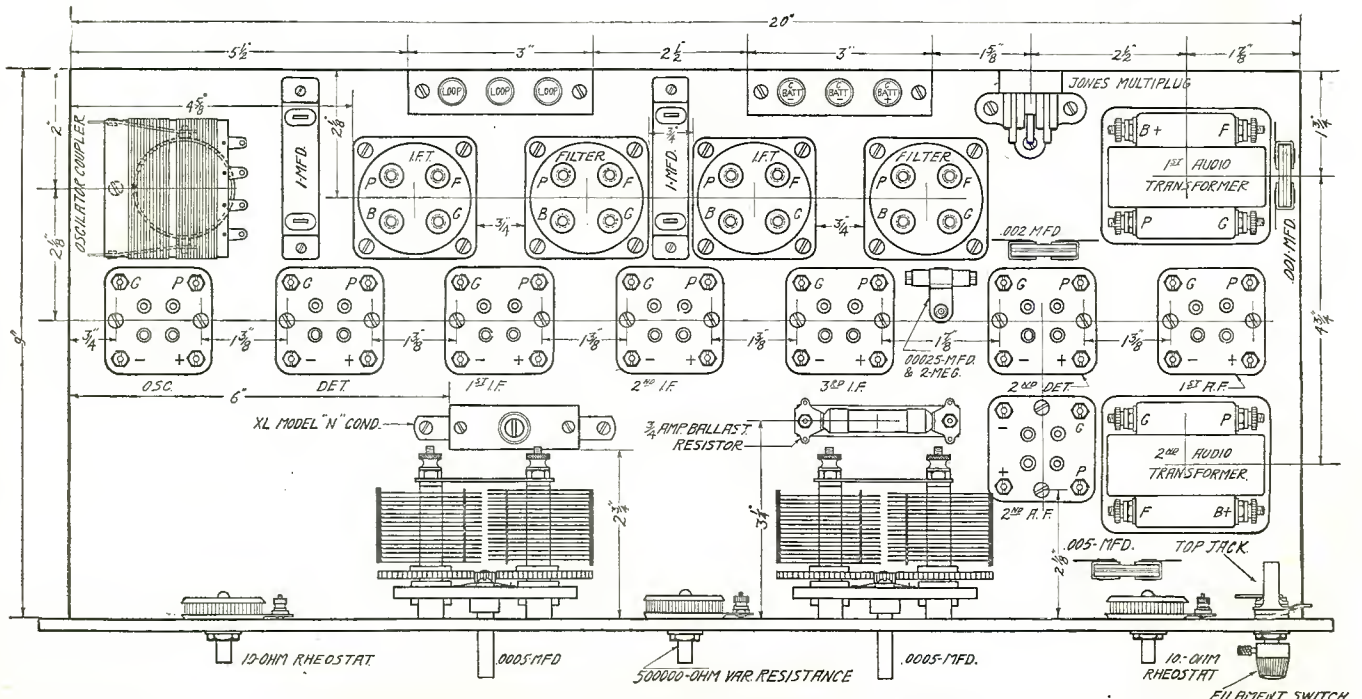


Fig. 2. Baseboard layout showing arrangement of apparatus

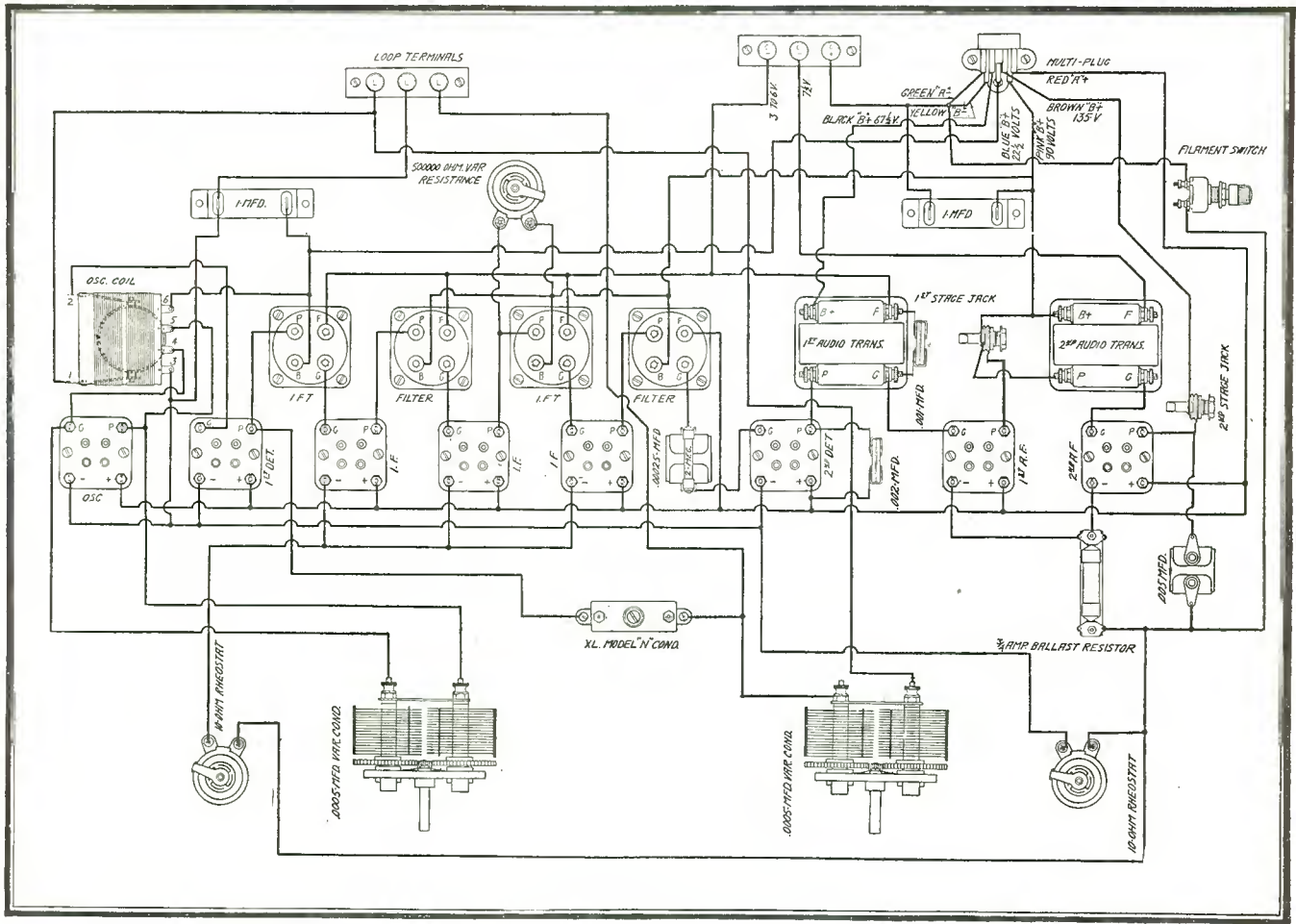


Fig. 3. Graphic illustration showing each connection in entire receiver

To obtain maximum efficiency from any receiver, all connections must be perfect. Use a good hot soldering iron, leaving the copper tip on joint long enough to thoroughly flow solder into it. Badly soldered joints made high resistance connections, which often account for lack of volume and distance. The contacts on sockets are fastened with a nut and screw. Make sure these nuts are tight before screwing sockets to baseboard. A loose nut on socket will result in noisy operation.

Although this receiver tunes very sharply, it is not critical or hard to tune, but vernier dials must be used. If trouble is experienced with the oscillator dial tuning broadly, or if it appears critical, the probability is there is too much capacity in the XL condenser. If there is still too much capacity with screw all out, try a small midget plate condenser in its place.

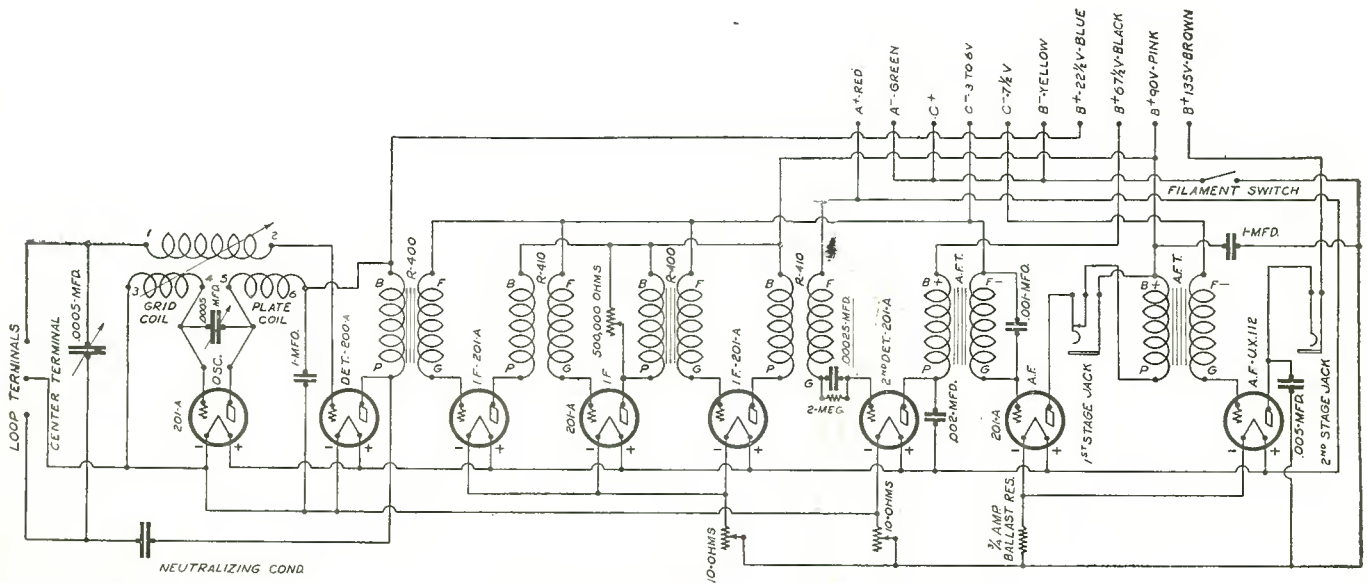
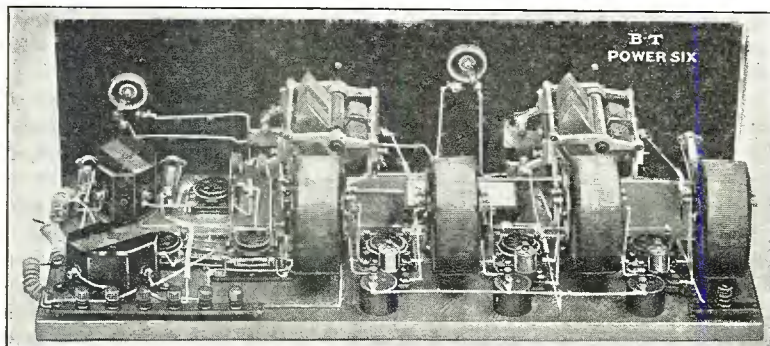


Fig. 4. Schematic wiring diagram

# "—by far the best B-T receiver yet developed"

Says a Technical Leader.

Which is only another way of saying the best Receiver yet developed—the B-T Counterphase Power Six.



## THE BREMER-TULLY POWER-SIX

Success is a Bremer-Tully habit. Anyone in radio will tell you that. And one success begets another—

Why? Why, because the B-T reputation is too valuable to chance anything that isn't successful.

Look over the past history of B-T products and you'll find one success after another, year after year.

So it means something when in October, 1926, Gerald M. Best, Technical Editor of "Radio," and a superheterodyne expert, says:

*"The new Bremer-Tully Power-Six is by far the best Bremer-Tully receiver yet developed.*

*"Its remarkable selectivity and simplicity of*

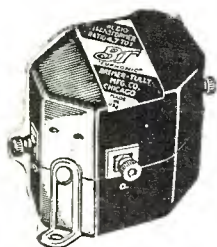
*operation leads me to believe it will be one of the season's most popular circuits.*

*"It is one of the easiest circuits to wire of any I have seen. Its engineering principle is sound.*

*"Congratulations to Bremer-Tully on this new development."*

Fans, by thousands, will endorse these statements in every detail. They know the superiority of the circuit—the absence of any element of "hocus-pocus" in B-T design and that B-T have not spent another year without bringing their product up to the latest standards of perfection.

You can't build a better set—in fact, you can't build one as good.



The world's best sets use Transformer Amplification—why? Because good transformers furnish better reproduction than any other method known.

B-T build only audio transformers for audio amplification. No one has ever produced sets with finer tone because B-T "Euphonic" Transformers are unsurpassed at any price.

Two ratios: 2.2 to 1.....\$5.00  
4.7 to 1.....5.75

The "Euphonic" Output Transformer is new. Use one with power-tube for pocketing your speaker and you'll find great tonal improvement. Price, \$5.50.



Two years ahead of its time—the longer this dial is in use the more you'll praise it. The first window dial—the best—the only one that reads 100-0-100 as well as in wavelengths or call letters; worth a dozen ordinary vernier dials. Black and gold striping, \$2.50; mahogany and gold striping, \$3.50.

The only socket of its kind—exclusively B-T in design. This socket absolutely absorbs shocks and vibrations. It will not continue to shake and vibrate after being jarred. It protects tubes and stops noises. For UX tubes, UXA Socket, \$0.75.



The UX "Silent" for the Detector is the only remedy for microphonic noises. It has additional double absorbers. UXD, \$1.00.

Louisville, Ky., Oct. 28, 1926.

After reading "Better Tuning," tenth edition, I revamped my six tube Counterphase with Power Tube and would like to report to you that unquestionably I am having the best radio reception I have ever heard, and incidentally, I believe better than any eight tube receiving set at the present time. The B-T Counterphase Circuit is beyond an equal.

G. C. M.

### Are You Missing Better Tuning?

If so you're missing one of the best things in Radio. It's straight from the shoulder talk that will save you money. Send 10c for a copy and read more about amplification, B-Eliminators, Kits, receivers, tuning fads, etc.

## BREMER-TULLY MFG. CO.

520 So. Canal St.  
Chicago, Illinois

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



# The B-T Power-Six

An Unusually Selective Tuned Radio Frequency Receiver Producing Excellent Results

This Receiver Completed and All Illustrations Prepared by the  
Citizens Radio Laboratory

OUR READERS will recall the publication of constructional details describing the Counterphase Six receiver in the CITIZENS RADIO CALL BOOK, about a year ago. The success of this receiver during the past year is evidenced by the great popularity enjoyed by it, and is, no doubt, the result of the circuit used. Many improvements in the design of transformers and modification of the fundamental circuit have been made during the past year,

stray radio frequency currents and preventing them from feeding through the "B" batteries and coupling the R. F. stages or feeding frequency amplifying circuits with attendant distortion in reproduction.

A resistance is inserted in the grid return of each of the radio frequency tubes. The function of this resistance is one of stabilization, and secures a smoother and more positive control over the entire wavelength range of the receiver.

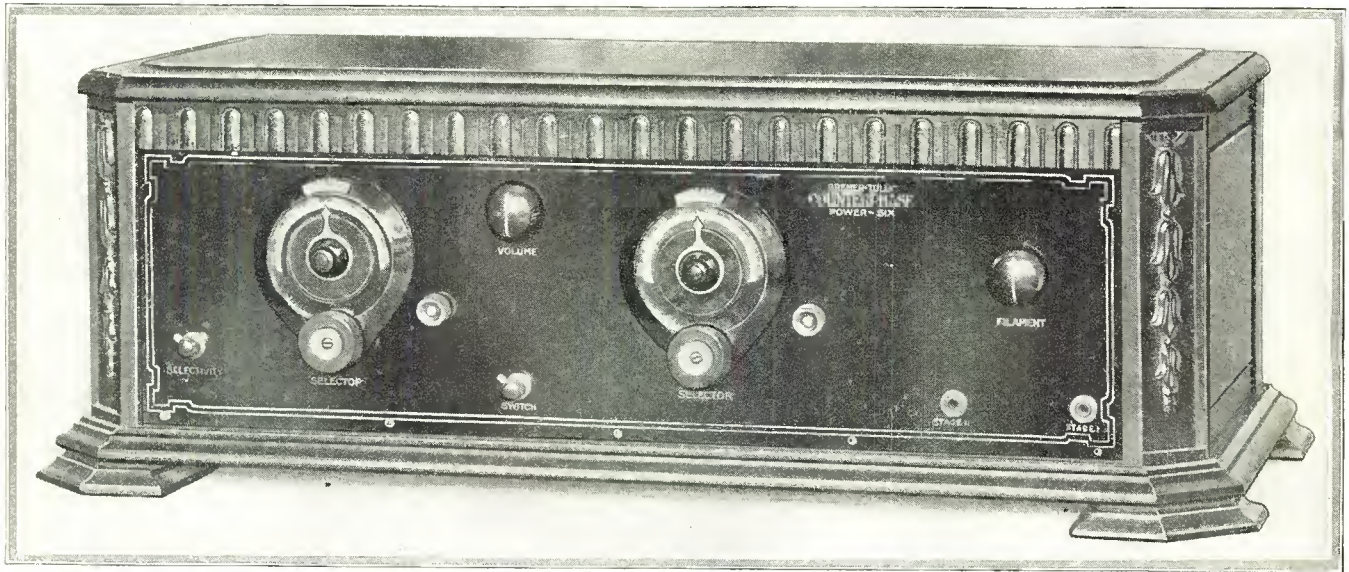


Photo A. Front view of completed receiver in cabinet

with the result that a new receiver is now offered our readers which, while very similar to the original Counterphase Six, incorporates these improvements in a slightly modified circuit.

Fundamentally, the circuit consists of three stages of balanced tuned radio frequency amplification, a detector and two stages of transformer coupled audio frequency amplification. A tapped antenna coil is provided by means of which best coupling may be obtained by panel control for either long or short wavelengths. The control of oscillation is accomplished by the use of an external circuit designed to feed back energy of opposite potential, in such manner and amount to overcome or neutralize the regenerative action of the tube. A peculiar and very fortunate result of this arrangement is that a surprising increase in energy transfer per stage with greater amplification is realized.

The "Counterphase Circuit" includes a bridge between output and input circuits. Counter potential is derived from a coil coupled inductively to the plate circuit and fed through an adjustable capacity (neutralizing condenser) to a coil inductively coupled to the grid circuit. Any connection made between plate and grid circuits must, to some extent, increase grid to plate capacity, which in turn tends to increase the tendency to oscillate. This tendency can be overcome with careful design so as to allow proper neutralization in any circuit at both the upper and lower end of the broadcast spectrum.

The method of balancing used in this circuit allows sufficient coupling at all frequencies without the mechanical and electrical weaknesses that prevail where attempts are made to vary the coupling between coils, and other expedients of that nature.

Radio frequency chokes are provided in the plate circuit of each radio frequency tube, thereby effectually choking out any

Two major tuning controls are used, each being a tandem condenser with the necessary trimming midgets to properly tune each stage. The use of these trimming condensers on each unit is to secure exact resonance of all tuned stages, so essential for tuning weak signals, as well as to compensate for any variations which are bound to occur in individual cases of wiring, and the variations which may occur between different coils and condensers.

The new circuit is more simple to construct and much easier to balance and operate, due to the improvements made through an added year of research and development in the circuit itself, in addition to the apparatus now available for use, such as fixed high resistances and the like, whose characteristics are more dependable and accurate than in the past.

UX 201A tubes are used throughout the receiver with the exception of the last stage of audio frequency amplification and the detector. The last stage of audio uses a UX 112 power tube, which allows excellent volume to be had on a cone speaker without pushing the receiver up to a point where distortion is caused. A UX 200A detector tube is recommended for the detector stage, since it is less critical in adjustment and delivers louder signals than the UX 201A type of tube. The necessary "C" battery bias is clearly shown on both the schematic wiring diagrams and the large graphic illustration. The radio frequency transformers have a bias of 3 volts, while the first and second stages of audio amplification have  $4\frac{1}{2}$  and 9 volts bias, respectively. Using the proper "C" battery bias allows greater voltage to be used without the possibility of overloading the tubes as well as insuring long life to the "B" batteries.

All batteries with the exception of the "C" battery are con-

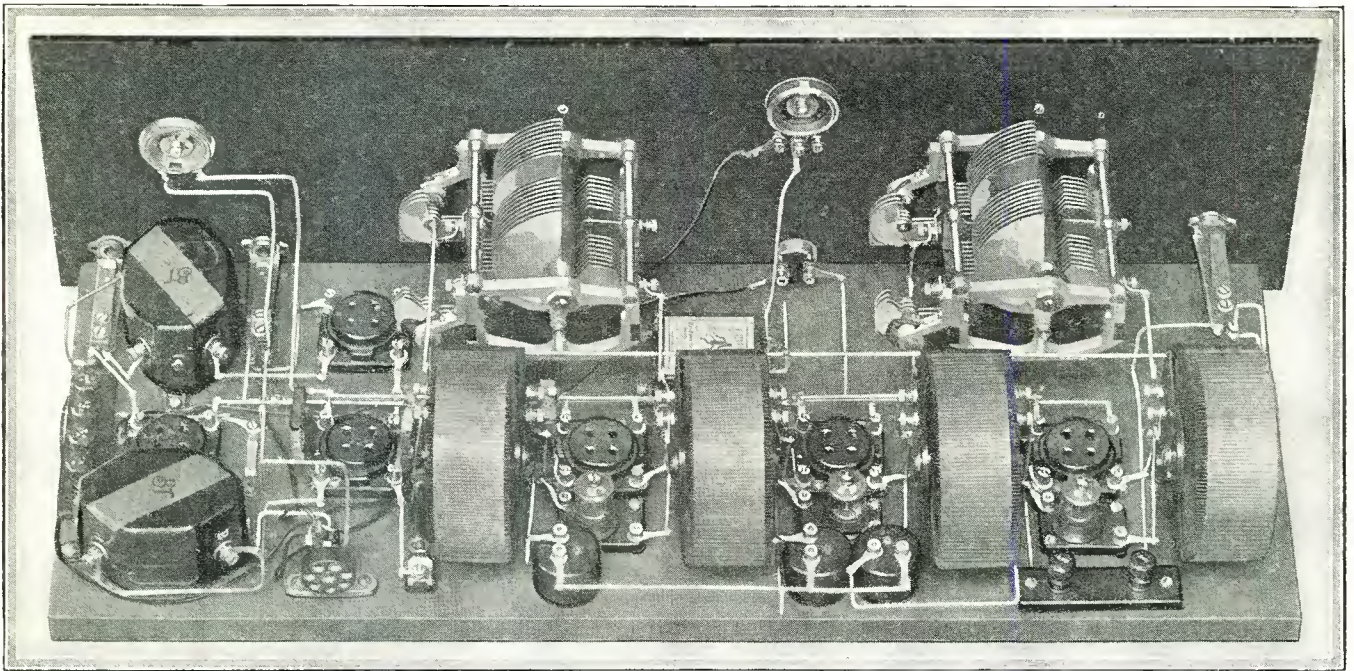


Photo B. Rear view of receiver completely wired

nected to the receiver by means of a Jones Multiplug and Cable. The regular color code supplied with the cable is utilized with the exception that the black is disregarded, and the brown, which is normally used for the antenna, supplies the receiver with 135 volts "B" potential. The "C" battery is connected to the receiver by separate binding posts along the left edge of the baseboard.

Fig. 1 is a layout of the front panel of the receiver. The correct location of all mounting holes is shown, as well as appropriate engraving. Fig. 2, the baseboard layout of the receiver, enables the constructor to easily place the apparatus in the proper position so as to allow short leads to be made wherever possible. The 1500-ohm fixed resistances are fastened to the "G" terminal of each of the radio frequency transformers and connection made to the free end. Fig. 3 is a complete wiring diagram of the set in schematic form. It is advisable that soldering lugs be placed under all terminals to facilitate soldering and assure a positive contact. While insulated wire may be used in hooking up the receiver, it is not essential. The constructor will have no difficulty in completely wiring the receiver and making a neat job of it, if he follows the various photographs and illustrations accompanying the article. It is best to first assemble all parts on the baseboard and complete all the wiring possible before the front panel is fastened into place.

After all wiring has been completed, carefully check all connections by referring to Fig. 4, the graphic illustration. Make those corrections which are necessary and then connect a 6-volt "A" battery to the proper terminals and insert the tubes in their

respective sockets. Test all tubes as to operation; observe whether they are controlled by the proper rheostat or resistance. Touch the "A" positive battery wire to each of the other terminals of the Jones Plug. If the tubes do not light up except when the "A" battery is applied to the proper terminals, it is safe to connect the "B" and "C" batteries. However, if any of the tubes light up it is an indication that something is wrong and a mistake has been made in the wiring. Carefully recheck all connections until the mistake is found. Repeat the "A" battery test and connect the other batteries, the antenna and ground and plug in the speaker.

The receiver should respond as soon as it is placed in operation. In tuning, rotate the dials together and continually "cross" one over the other until a signal is heard. Then proceed to adjust the trimmers as follows: Set the rear trimmer on the right hand condenser fully enmeshed and then rotate panel trimmer back and forth rapidly as the selector is moved slowly a few degrees to each side of the point of maximum signal intensity. Try to get the position of greatest volume on the front trimmer when it is near its central position. If the position of maximum signal strength does not occur at or near the center point, adjust the rear trimmer until this condition occurs. The front trimmer is especially helpful in tuning in weak signals, and therefore a full range of adjustments must be allowed.

Next balance out the stages of radio frequency amplification. Adjust volume control to greatest volume and disconnect either the positive "A" or negative "A" filament lead of the third radio

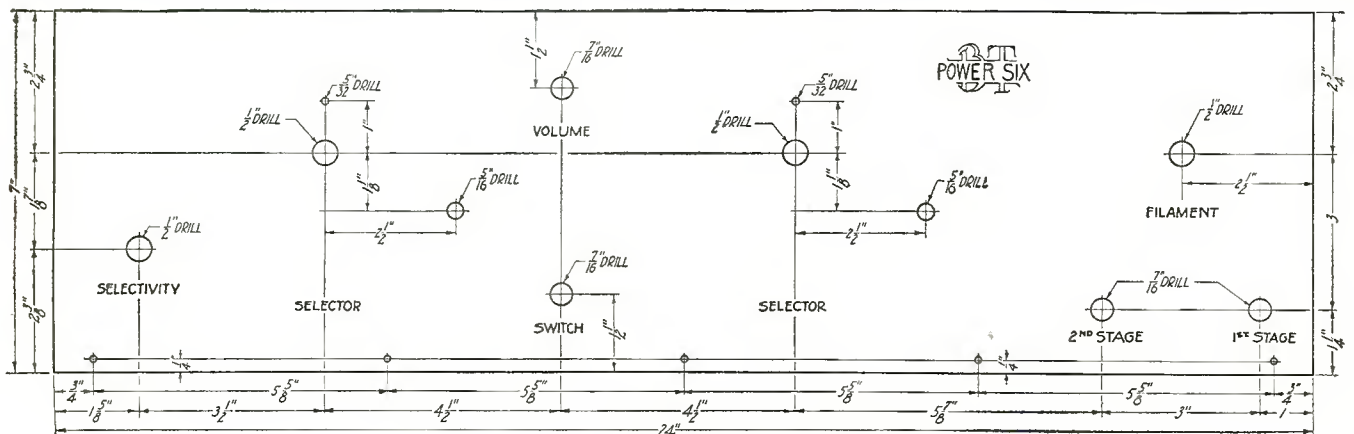


Fig. 1. Panel layout showing size and location of holes

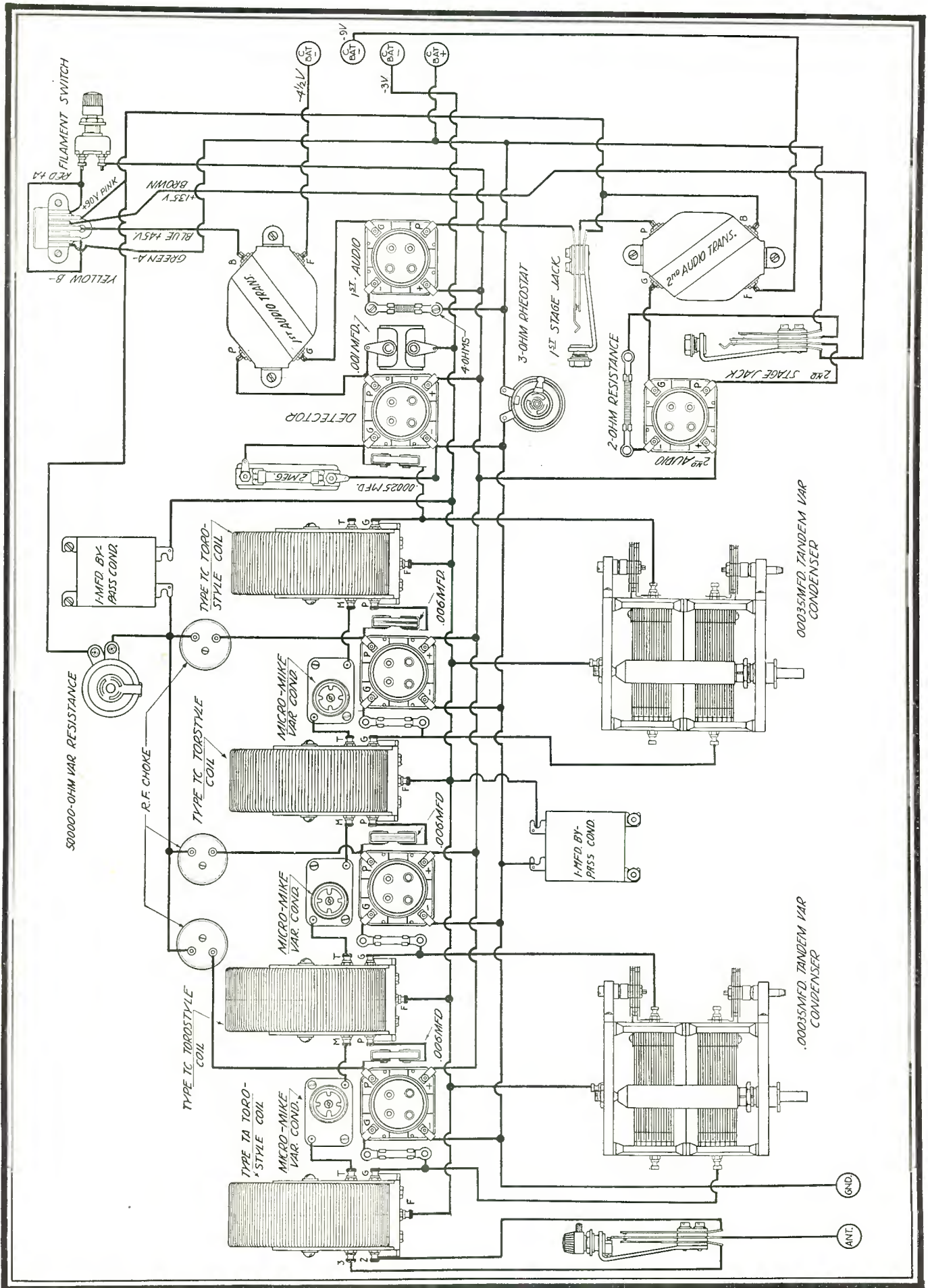


Fig. 4. Graphic illustration. Check this carefully after receiver has been completely wired up



# HOW IS THIS SET DIFFERENT?

The new COUNTERPHASE is different in many ways.

This ad briefly tells (\*) about two features of the Counterphase not found in any other receivers.



## Bremer-Tully Counterphase-Eight—Different and Better!

1. B-T did not offer a single control receiver until they could attain the same degree of selectivity as was possible with a well-designed multi-control set.

THE REJECTOR STAGE, exclusive to B-T Counterphase Sets makes possible selectivity never before equalled. The Rejector Stage rejects (grounds) all frequencies or signals except the one the operator desires to hear. It employs a principle long known to radio engineers but for the first time successfully applied to any receiver.

To gain this great selectivity so necessary to the up-to-date radio set, nothing else has been sacrificed. It's one of the easiest sets to tune that you will find.

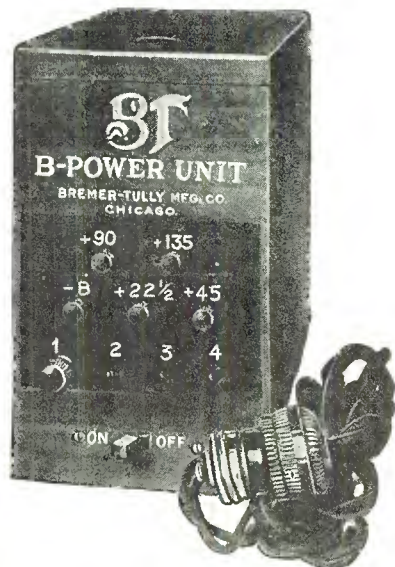
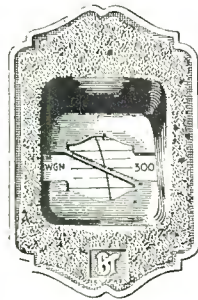
2. THE STATION INDICATOR, patented Sept. 28th, 1926, is another exclusive B-T feature.

No log book is necessary to find stations with the new Counterphase. You simply refer to the daily newspaper and decide which station you want to hear. Turn the dial until the red line on the tape crosses the diagonal bar at the desired wave length and the station will be there.

This is true not only on one section of the scale but on high or low wavelength stations because each Counterphase Set is calibrated at the factory. Think of it, each set calibrated, **accurately!**

The length of the aerial or ground makes no difference in the wavelength readings.

You owe it to yourself to know more about this superior set. Send today for full information.



### Why Is the B-T B-Power Unit Different?

B-T believe it is impossible for the user to know the voltage delivered by a B-Eliminator when variable resistances are used. Also it means that there is one or more knobs to turn. That is why B-T use fixed resistances, interchangeable for different size sets and a simple plug arrangement on the front panel. Adjustment is made once and there-

after the correct voltage is delivered without guess-work.

Capacity 150 volts at 60 milliamperes, sufficient for multitube sets using power tube. Originally designed to insure the satisfactory operation of the Counterphase-Eight. It is the best B-Power Unit that you can buy, one that will be good for years—a good investment.

### \* BETTER TUNING

The 10th Edition tells in detail about all the features of the New Counterphase. Many things you should know about B-Eliminators are covered as well as general radio subjects. Sent postpaid for 10c.

## BREMER-TULLY MFG. CO.

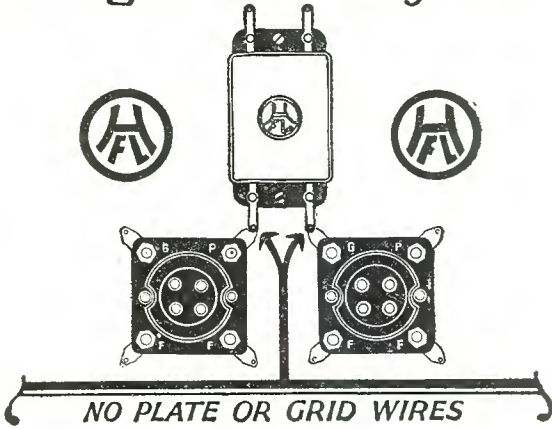
520 So. Canal St.

Chicago, Illinois

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

# H.F.L. Transformers

*The Highest Standard of Radio*



## Praised

Mr. Donn Piatt of Monticello, Ill., writes: "Must say that the 9-in-Line with your H. F. L. Units is the most selective and finest operating set I have ever seen or used. We get KFI and KPO on the loud speaker with as much volume as Chicago stations. Pull them in with plenty of volume anytime they're on the air."

## Endorsed—

H. F. L. Transformers have been endorsed and approved by Radio Authorities—Editors, Engineers and Set-Builders—for their supreme excellence and the improved quality of reception that they afford. H. F. L. Transformers represent the highest development of efficiency and the most advanced construction design. They make it possible to select radio programs at choice regardless of broadcast conditions. They combine tremendous power with an unexcelled purity of tone and amplify the weakest signals to full loud speaker volume. They operate with all types of standard tubes, and are altogether unsurpassed for quality, clarity and volume. Improve your new receiver with H. F. L. Transformers.

### HOLLIS DeNEEFE RADIO ENGINEERING SAYS:

"You are to be congratulated on your H. F. L. Units. Tested a set in Poughkeepsie, N. Y., last night using your transformers with most gratifying results. First station received was Chicago, second was Minneapolis and the third San Antonio. Set was operated in a steel building on a Quali-Tone loop without antenna or ground connections."

### THE CALL BOOK SAYS:

Using H. F. L. Units, we secured hair-line selectivity, tremendous power and highest quality of tone combined with simplicity of tuning and economical cost of operation.

### RADIO NEWS SAYS:

Using H. F. L. Units received 105 stations in United States, 7 Canadian, 1 Mexican, 1 Cuban, all logged while 23 local broadcast stations were on the air.

H. 210—Iron core transformers with an exceptionally high amplification factor. Each unit carries laboratory calibration. Range 32,000 to 42,000 cycles. Price ..... \$8.00

H. 215—Air core transformer, tuned stage, designed to amplify signals at a maximum efficiency of 37,000 cycles. Each unit carries the laboratory calibration. Price.....\$8.00

F. 320—Audio frequency transformer which will amplify signals to greatest volume with incomparable faithfulness of tone. These units are the result of an entirely new principle in transformer construction. Price.....\$8.00

L. 425—Radio Frequency Choke Unit. Price.....\$5.50  
L. 430—Tuned Radio Frequency Transformer. Price ..... \$5.50

DEALERS— WRITE FOR DISCOUNTS —JOBBER

# HIGH FREQUENCY LABORATORIES

131 N. WELLS STREET  
CHICAGO

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

# The Unicontrol Nine-in-Line Super

A Single Control Super-Heterodyne Which Is Free from the Inherent Drawbacks of a Single Dial Receiver

All illustrations of this receiver were prepared by The Citizens Radio Laboratory

THE September issue of the CITIZENS RADIO CALL BOOK contained complete constructional details on the Nine-In-Line Super-heterodyne Receiver. The circuit has proven highly efficient among those who have built the receiver, and the total results have been so excellent that considerable time has been spent in the laboratory in making improvements. In compliance with the insistent demand of the public for a minimum number of controls, a single major dial control was decided upon. Unlike the average attempts for simplicity of control, this receiver does not use the conventional tandem condenser. The inherent difficulty of properly tuning a number of circuits with the tuning instruments rigidly fastened together was recognized. After careful consideration an instrument of established merit, known as a Hanscom Capacity Element, was decided upon for use as the tuning device. It consists of two Remler variable condensers mounted side by side on a bakelite frame so constructed that the large bakelite gears in each of the condensers are mechanically connected together by a driving gear in such a manner that the two condensers tune as one. However, a very clever cam arrangement on one of the condensers permits a rocking motion to be imparted to one set of its plates so as to provide sufficient latitude in capacity variation on that condenser to fully compensate for any variations between the circuits. In order to electrically separate the two condensers, the end of the spring normally soldered to one of the binding posts on the right-hand condensers is removed and fastened under a screw passing through the frame just to the left of the post to which it was soldered. The results obtained with this single control unit compare favorably with the standard two dial control. Maximum selectivity is attained and actual tests have proven that this receiver is much sharper than any of the single control receivers known today.

As in the former model, appearance has been emphasized. A simple symmetrical layout of apparatus is used which allows extremely short plate and grid leads. In fact, the completed receiver is a proof that it is possible to build a high grade receiver

at home, of pleasing appearance, whose performance is more than satisfactory.

Fundamentally the circuit is identical in principle to the original Nine-In-Line Super. The .0005 mfd. fixed condenser across the secondary of the first audio transformer has been transferred to the second transformer, where it performs in the same manner. A 500,000-ohm C. R. L. modulator is shunted across the secondary of the first audio transformer, replacing the 200,000-ohm variable resistance. The outside terminals connect to both ends of the winding, while the center terminal is connected to the grid of the first audio tube. A 1 mfd. by-pass condenser has been omitted which was across the "C" battery. However, if a "B" battery eliminator is used this condenser should be placed in the circuit. In addition to the above changes the system of tube control has been slightly modified.

It is a well known fact that the use of more than three stages of intermediate frequency amplification has rarely been successfully accomplished because of the great difficulties associated with the use of multistage amplifiers. The average super-heterodyne receiver consists of a combination of one filter and three untuned intermediate frequency transformers. If the highly amplified intermediate frequency signal is passed through a second tuned stage a considerable increase in selectivity will result. This also may be accomplished if two untuned stages are used which are very closely peaked, possibly within 1 per cent. The untuned stages in this case act merely as intermediate frequency amplifiers and should have a very flat resonance curve. By using a coil of high capacity and a heavy closed iron core with a large surface, a large number of very fine high silicon content steel laminations, a transformer of these characteristics is possible. An untuned intermediate frequency transformer of this design will have a uniform ampli-

fication factor within a range of 6 to 8 kilocycles and will have a tendency to reduce or prevent oscillation or distortion. A signal passed through two transformers of this type will enter the first tuned stage on a very broad band, which, if passed through a filter, will sharpen it considerably. An additional stage of amplification with another filter will deliver a pure signal with maximum

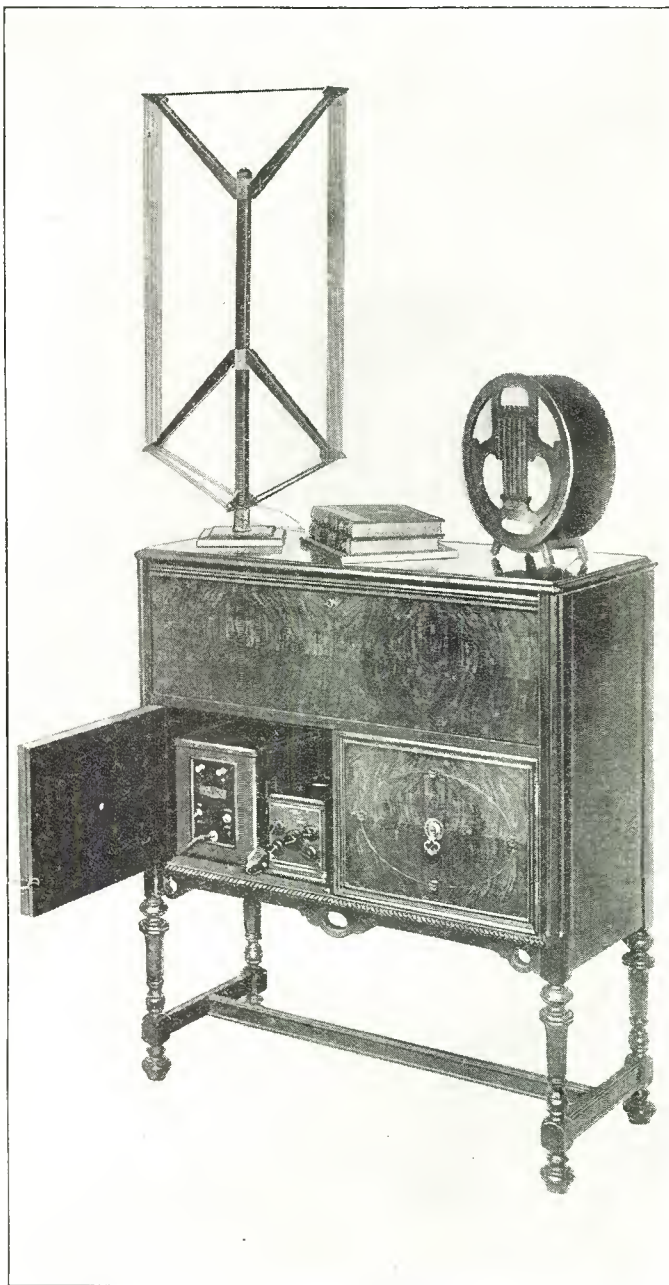


Photo A. View of receiver mounted in console, with suggested accessories

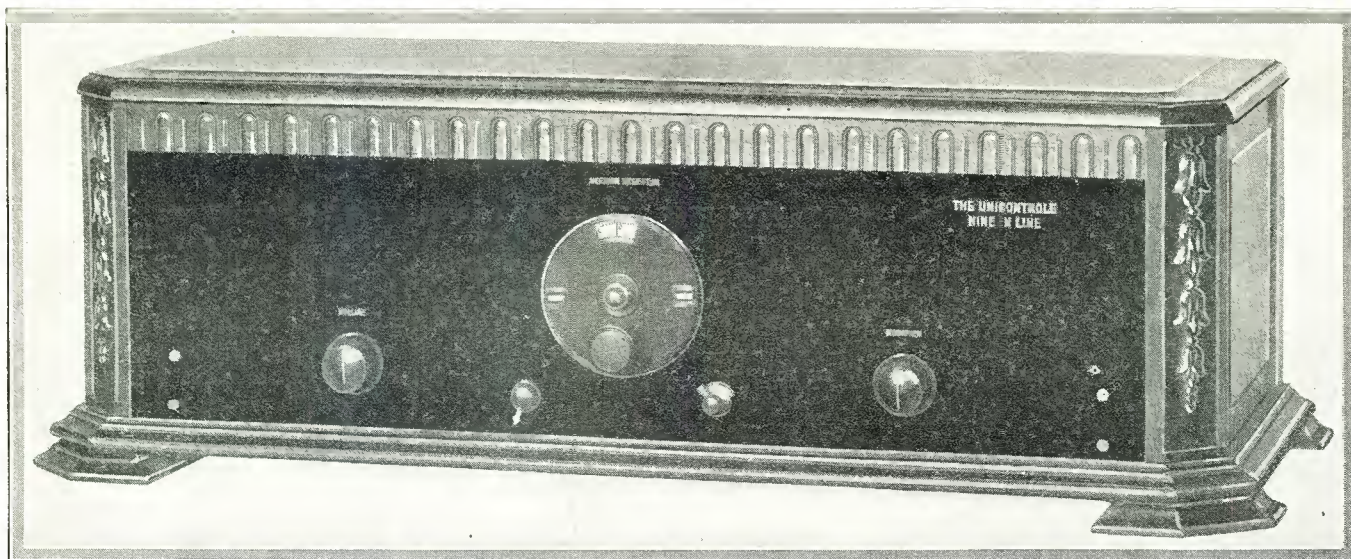


Photo B. Front view of receiver mounted in cabinet

intensity to the detector.

However, a highly amplified intermediate frequency signal of this character will have a tendency to feed into the audio frequency amplifying stages. For this reason it has been exceedingly difficult to incorporate impedance coupled or resistance coupled amplification in the audio frequency end of a super-heterodyne receiver. To obviate any possibility of this condition existing, transformer coupled audio frequency amplification is used in this receiver. Since a sensitive human ear will detect frequencies as high as 20,000 cycles per second, the audio transformers used in this receiver are designed to have very high impedance in the secondary winding, which, with its high capacity effect, will create a sharp decline on the amplification curve over 10,000 cycles and does not amplify the entering intermediate frequencies to the volume of audibility. In this way one of the greatest disadvantages of super-heterodyne receivers is eliminated.

Another factor which is given great consideration in this receiver is the design of the oscillator circuit so that the energy delivered will not be sufficient to unbalance the receiver. The range of the oscillator is within the broadcast wave band and its output energy matches that of the loop circuit so that overloading of the first detector grid is impossible. Therefore, the input circuit is of highest efficiency. This fully balanced system assures an extremely quiet operation and with no regeneration howls or oscillation. H. F. L. Transformer Units, originally

designed for high wave receivers, are used in this receiver.

The use of four stages of intermediate frequency amplification and two tuned stages are applied successfully in this receiver. Actual laboratory tests of this set have proven that extreme selectivity can be obtained as well as a comparative excellent reproduction on a loud speaker.

Fig. 4, a schematic wiring diagram, details the complete hook-up of the receiver. Fig. 3 is a graphic wiring diagram of the receiver and accurately shows the connections that are made to the various pieces of apparatus.

A completely drilled Celeron sub-panel, as well as a lithographed Celeron front panel may be obtained from the Diamond State Fibre Company or any good radio store. It is best to assemble the sub-panel first and mount all apparatus upon it on both the top and bottom side. The grid and plate terminals of the transformers are directly bridged to the respective terminals of the sockets by means of small lengths of wire passing through the sub-panel, with the exception of the sixth and seventh transformers. The grid terminals on the sixth and seventh transformers, as well as the battery and filament terminals of all other transformers, are bent up and No. 4  $32 \times \frac{5}{8}$ -inch screws placed through the eyelet holes and connected under the sub-panel to the respective leads.

The L-430 radio frequency transformer, used as an oscillator, is mounted on the bottom side of the sub-panel. The L-425 radio

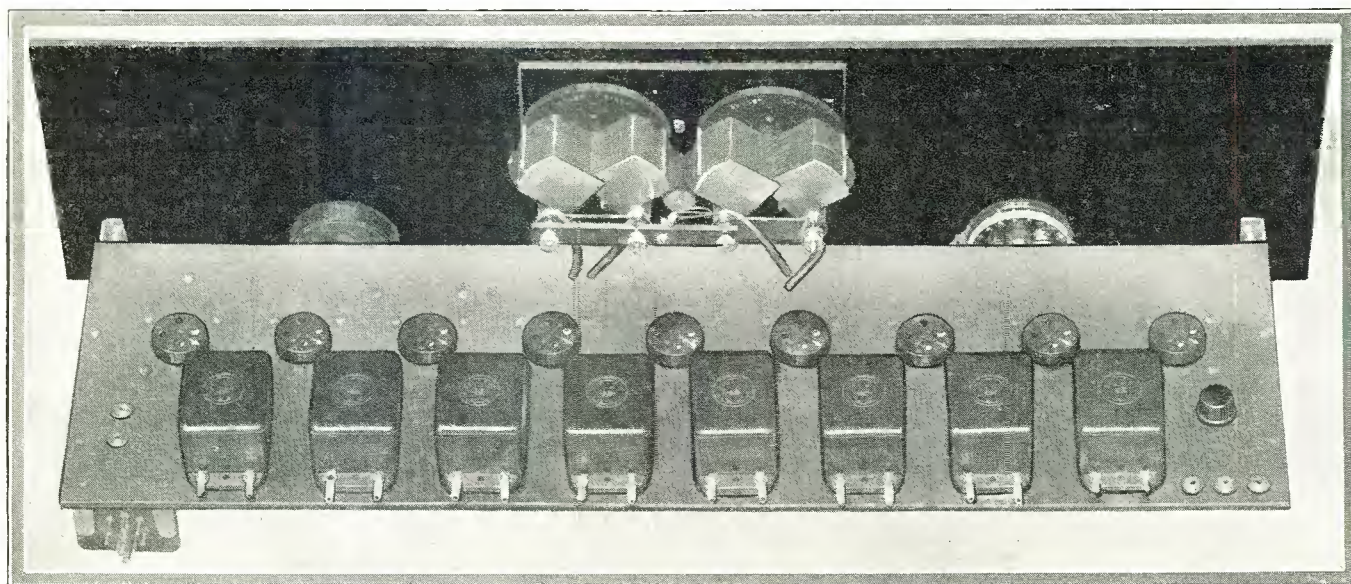


Photo C. Rear view of completed receiver. Notice absence of unsightly wiring



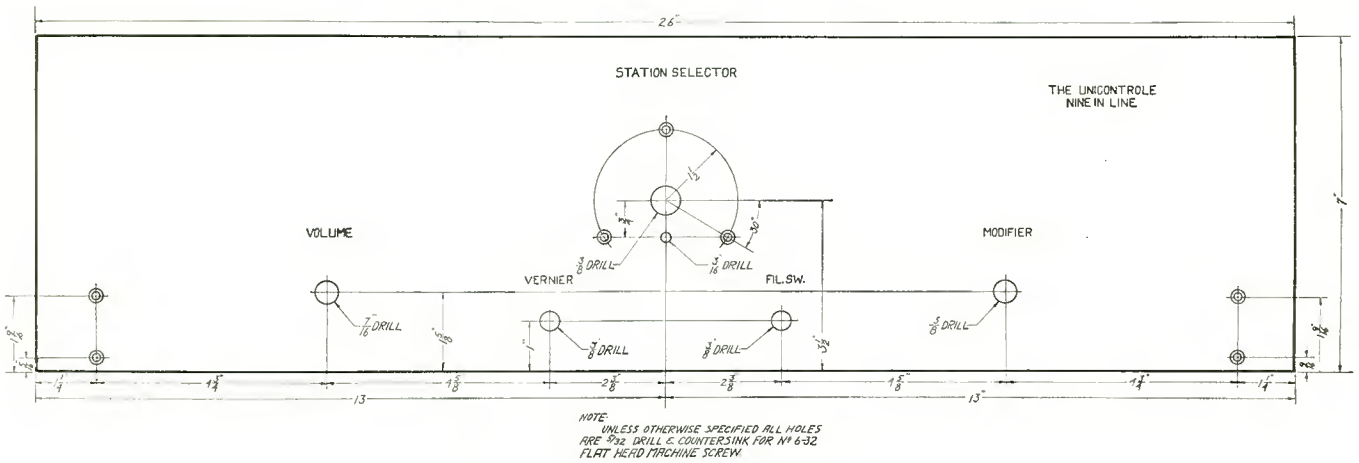


Fig. 1 Showing size and location of holes

frequency choke uses but three connections, the terminal "F" not being used. This choke consists of a combination of coil and by-pass condenser. The midget condenser, by-pass condensers, the Yaxley cable connector, the Elkey filament equalizers, and the pup jacks for loud speaker, and "C" battery connections, are all mounted on the under side of the sub-panel.

The entire wiring is done under the sub-panel. The rubber insulated flexible wire is quite suitable for this purpose, and if the leads are cabled a very neat job of wiring will result. The "B" battery leads of the transformers are run closely together into the prongs of the cable connector, and should be connected according to the color code shown in the graphic illustration.

The intermediate frequency amplifying tubes are controlled by a 25-ohm Yaxley rheostat mounted on the left end of the front panel, the two detectors and oscillator by a 3/4-ampere filament ballast, as well as the two audio tubes. On account of the separate adjustment, flexible leads are to be used for connecting the loop condenser. A common "C" battery is used for all grid returns, with a voltage of 4 1/2 to 6 volts recommended. It will be noted that this "C" battery provides the necessary bias also for the second detector tube so that rectification will be accomplished on the negative side of the characteristic curve of this tube. The types of tubes to be used are as follows: Oscillator, UX 201-A; first detector, UX 201-A; four intermediate frequency amplifiers, WX 12; second detector, UX 201-A; first audio, UX 201-A, and second audio, UX 112 power tube. It is emphatically advised that the very best material be used in this receiver, and that extreme care be exercised in connecting the various parts. Perfectly soldered joints will assure least resistance, and hence better reception.

**LIST OF PARTS**

These components or substitutes will give entirely satisfactory

results:

- 1—Celeron 7x26x3/16-inch Drilled and Engraved Front Panel
  - 1—Celeron 7x24x3/16-inch Drilled Sub-Panel
  - 3—No. H 210 H.F.L. Transformers
  - 2—No. H 215 H.F.L. Transformers
  - 2—No. F 320 H.F.L. Transformers
  - 1—No. L 425 H.F.L. R.F. Choke Unit
  - 1—No. L 430 H.F.L. R.F. Transformer
  - 9—Benjamin Sub-Panel Mounting UX Sockets
  - 1 Pair of Benjamin Sub-Panel Brackets
  - 1—Yaxley Cable Connector, complete
  - 1—Yaxley 25-ohm Air-Cooled Rheostat
  - 5—Yaxley Pup Jacks
  - 1—Yaxley Filament Switch
  - 1—C.R.L. 500,000-ohm Modulator
  - 1—Hanscom S-C Capacity Element, each Condenser .0005 mfd.
  - 1—Marco Vernier Dial
  - 1—Chelton .000045 mfd. Midget Condenser
  - 1—Sangamo 1 mfd. By-Pass Condenser
  - 2—Sangamo .0005 mfd. Fixed Condensers
  - 1—Sangamo .002 mfd. Fixed Condenser
  - 2—Elkey Type 4/3 Equalizers with mounting
  - 75—Kellogg Tinned Soldering Lugs
  - 24—4-32x3/8-inch Round Head Brass Machine Screws
  - 24—4-32 Hexagon Brass Nuts
  - 60—6-32x1/2-inch Round Head Brass Machine Screws
  - 60—6-32 Hexagon Brass Nuts
  - 50 Feet of Belden Flexible Rubber Insulated Stranded Hook-up Wire
  - 1 Package of Kester Solder
- Photo "A" shows how the Unicontrol Nine-In-Line Super-

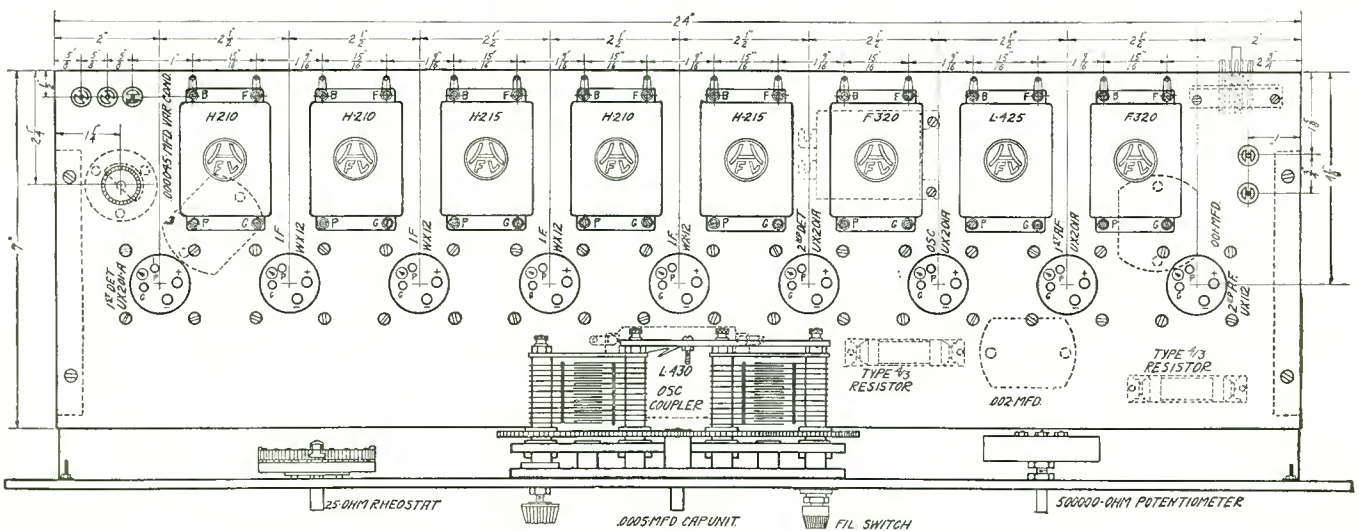


Fig. 2. Baseboard layout showing arrangement of apparatus on sub-panel

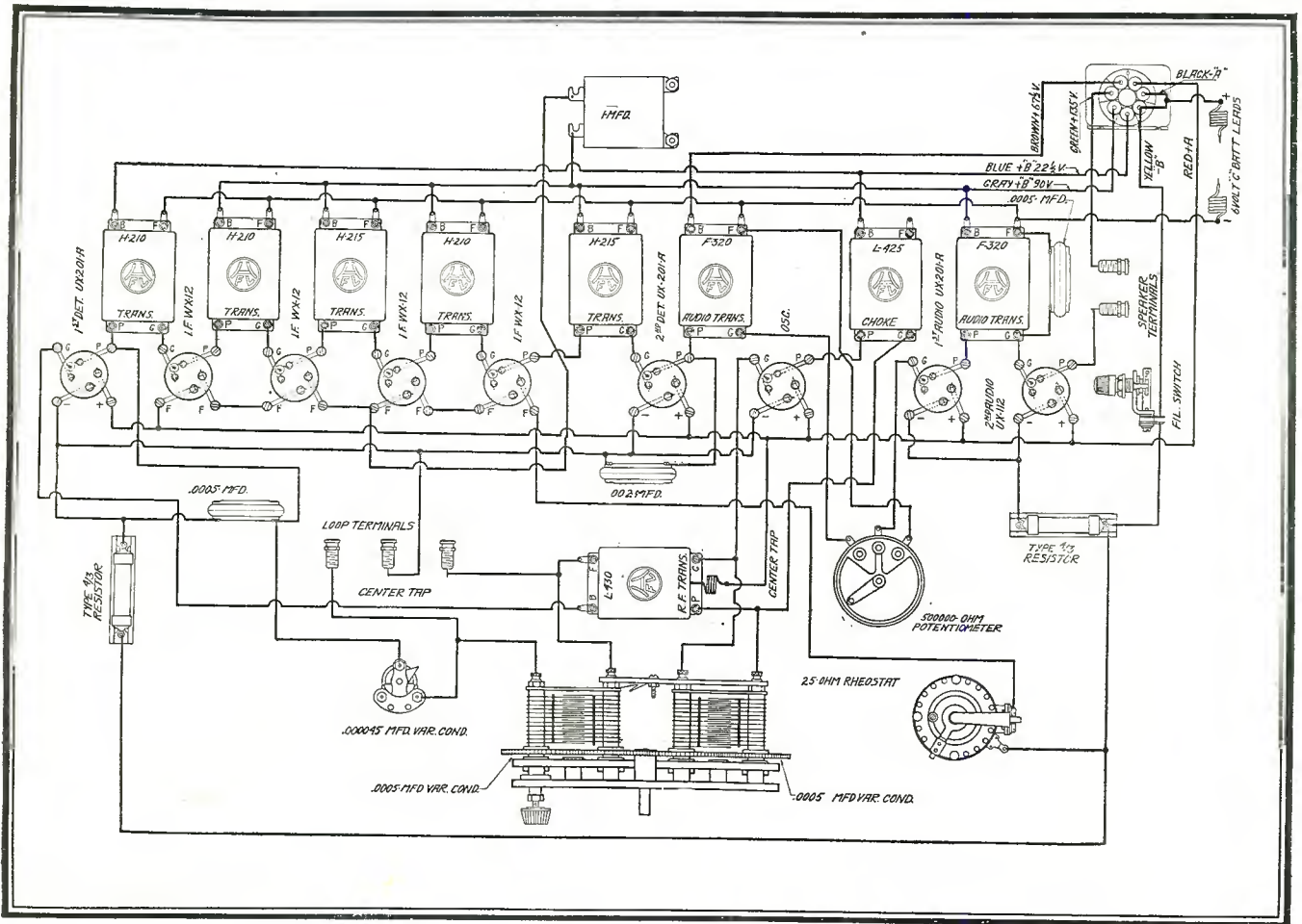


Fig. 3. A pictorial wiring diagram showing all connections

heterodyne appears when installed in a Charlotte Model 25 Console. This Console is manufactured by the Charlotte Furniture Company of Charlotte, Mich., and contains only genuine walnut lumber in its construction. The top and ends of the console are of plain walnut, while the doors at the front are of butt walnut. The console is highly finished in lacquer and carefully waxed.

A new type of combination charger and "A" battery is used to supply "A" potential for the receiver. Sufficient space is allowed within the unit for a Willard Glass Case Battery which is connected directly to the charger. A pair of toggle switches in the case of the instrument allows either a high or low rate of charging to be used, as well as turning the charger on or off. This unit is manufactured by the Interstate Electric Company of St. Louis, Missouri.

"B" potential is derived from the Webster "Little Giant" "B" and "C" Eliminator, manufactured by the Webster Company of

Chicago. This device utilizes a Raytheon Tube and supplies, in addition to "B" potential, the necessary "C" biases for the proper operation of the circuit.

The Speaker shown is the product of the Victor Radio Corporation of Chicago, and is known as the Operetta. It is a drum-type speaker, using a free floating, free edge cone supported at its apex by a driving pin.

A Qualitone Loop is shown, which is manufactured by the Duro Metal Products Company of Chicago. It is entirely collapsible and capable of being stowed away in a very small space. A thumbscrew arrangement allows the device to be tightened sufficiently to keep the wires taut at all times.

The Cabinet shown in Photo "B" is one of the many manufactured by D. H. Fritts & Co. of Chicago.

(If any further information on these accessories is desired, full descriptive matter may be obtained by writing the manufacturers direct.)

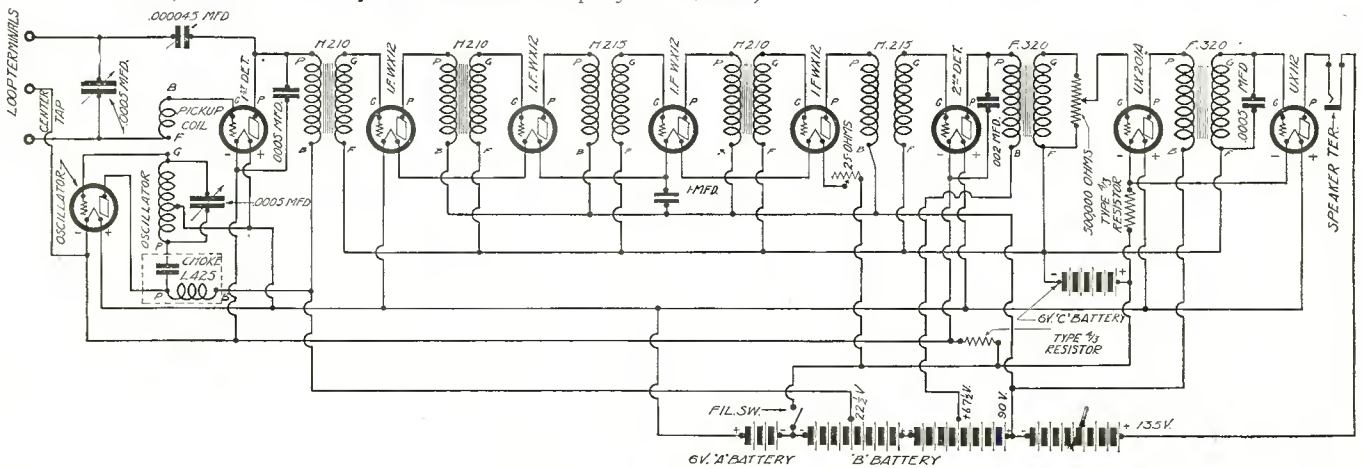


Fig. 4. Schematic wiring diagram

# The Wonderful Value in Radio Cabinets

Increase the value of your set with a beautiful, practical Charlotte Radio Cabinet

THE Charlotte Radio Cabinet makes of your set a handsome home furnishing, a practical, well-balanced decoration, as well as a more enjoyable source of entertainment. Every part of your set is conveniently and accessibly contained.

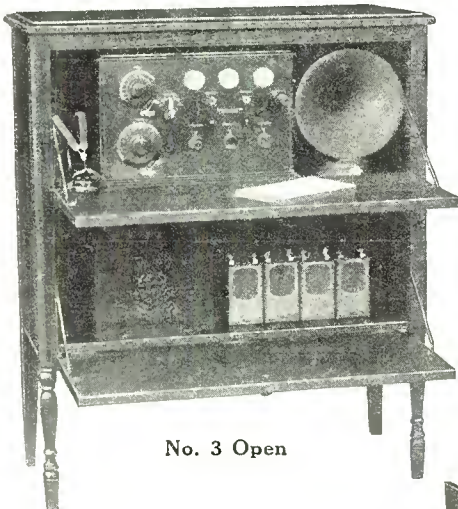


No. 10

## Number 10

Butt Walnut fronts, plain Walnut tops and ends. Balance Gum, finish Huguenot Walnut, lacquered and waxed. Dimensions in inches: Top  $36\frac{1}{4} \times 15\frac{1}{4}$ . Height 41. Upper Compartment  $32\frac{1}{4} \times 14 \times 8$  high. Lower Compartment  $32\frac{1}{4} \times 14 \times 12$ . Will take panel 8 high and leave  $12\frac{1}{2}$  behind panel. Will take panel 24 long or less and leave room at end for grille and loud speaker.

Cabinet only ..... \$ 96.00  
 Cabinet, with Loud Speaker Unit and Grille ..... 118.00  
 Shipping weight 138 lbs.

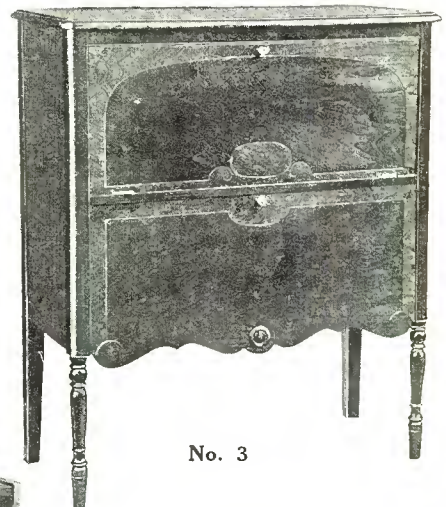


No. 3 Open

## Number 5

Fronts Mahogany. Balance Gum. Finish Brown Mahogany, lacquered and waxed. Dimensions in inches: Top  $38\frac{1}{2} \times 13\frac{1}{2}$ ; height 39; set compartment  $37 \times 12\frac{1}{2} \times 10$  high; battery compartment  $37 \times 9 \times 12$  high. Lock on front.

Cabinet only ..... \$30.00  
 Shipping weight 89 lbs.



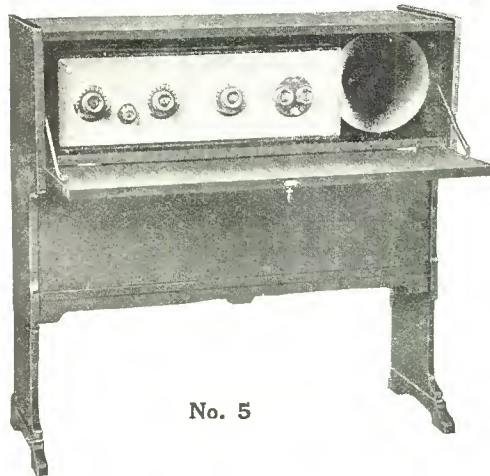
No. 3

## Number 3

Plain Mahogany or Walnut tops, fronts and ends. Balance gum. Finish Mahogany or Walnut, lacquered and waxed.

Dimensions in inches: Top  $36 \times 15$ ; height 42; upper compartment  $32\frac{1}{4} \times 12\frac{1}{2} \times 13\frac{3}{4}$  high; lower compartment  $32\frac{1}{4} \times 12\frac{1}{2} \times 11\frac{1}{2}$  high. Locks top and bottom.

Number 3 ..... \$39.00  
 Shipping weight 103 lbs.



No. 5

One of these models should enclose every table set for the convenient and practical accessibility of a console are nowhere better arranged than in the Charlotte. The Charlotte is the supreme value in Radio Cabinets.

Address

CHARLOTTE FURNITURE COMPANY

CHARLOTTE, MICHIGAN, U. S. A.

RADIO CABINETS OF **C** BEAUTIFUL UTILITY  
 CHARLOTTE

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

# Genuine Keystone Parts as Specified in

## Article on following pages of Citizens Radio Call Book



**\$1.48**  
each

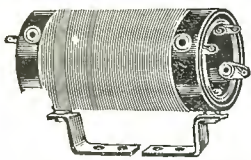
Keystone .00035 mfd.  
S.L.F. Variable Condenser



**30c**  
each

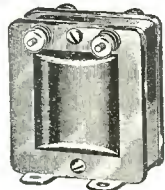
Keystone  
Grid Leak

**\$1.97**  
each



**\$3.48**  
Set of 3

Keystone Coils, 1 Tapped Auto-transformer and 2 R.F. Transformers



Keystone National  
All-Frequency  
Audio  
Transformer

Here are the genuine Keystone parts as specified in the article on the Call Book's *Inexpensive 5-Tube T.R.F. Receiver* explained and illustrated on the following pages. You'll be surprised what an efficient, first-rate set you can make for very little money from these parts.

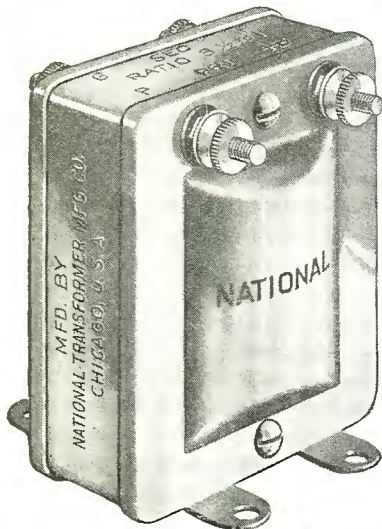
The cost of the genuine Keystone laboratory-made parts specified in this article total only \$12.16 complete. Think of it!

Here is a real opportunity for set builders, fans and those who do not have a good 5-tube set, to get a receiver that performs admirably, with a tone volume and clarity most unusual.

Take advantage of our special offer to get these parts now, and add to your order the famous Keystone National Audio Transformers while the supply is available. Please use the handy coupon below when sending in your order.

# AMAZING MONEY SAVING OFFER!

The wonderful Keystone National All-Frequency Audio Transformers specified by Radio Call Book offered special at less than half regular price. But—you must act NOW—supply is limited!



**BASS  
NOTE  
AMPLI-  
FICA-  
TION  
ONLY**

**\$1.97**

### Why "NATIONALS" Are BETTER

The secret of National's Supremacy is in its extra large, especially shaped, high grade silicon steel core, and its oversize special-wound core. No other transformer, regardless of price, can boast of the same combination of ideal features. Hence, no other transformer, regardless of price, can out-perform the National—in amplification, in fidelity of reproduction. Then think, too, of the improvement these wonder transformers will make in the appearance of your set. They are heavily nickel plated, all over, and polished so they are just like mirrors. To make a neat looking job of any set they can't be beaten.

### INSTANTLY—You'll Notice a Tremendous Improvement in Volume and Tone

Rip out your old audio transformers—no matter what they are, or how good you think them. Put these oversize, nickel-plated giants of amplification in place and prepare yourself for a distinct revelation. An orchestra will sound like an orchestra. You'll hear every instrument, round, full, clear, natural. No more jumbled mess, no more flat, tin-pan noise when the musical program happens to be at the lower end of the musical scale. National All-Frequency Transformers cover the whole scale, perfectly. And instead of paying \$7, \$8, or \$9 for this kind of amplification, you can NOW, for a limited time, get it for only \$1.97.

Seldom comes an opportunity like this. Certainly—you should take instant advantage of it—because never again will such a startling offer be made. Just think! National Transformers, the new type all-frequency units that amplify the lowest bass and the highest soprano with equal volume and clarity. And instead of paying their regular price of \$4.50, you can buy them for only \$1.97 each. Truly, the very money-saving opportunity you have been watching for.

### YOU CAN SAVE MONEY!

Hundreds of thousands of National Transformers have modernized radio sets everywhere in the land. Thousands upon thousands of fans have found them to be the final answer to perfect tone reproduction of voice and music. And everyone else who has ever bought Nationals has paid the full, regular price of \$4.50 each. They are a bargain at that price. They are a super-bargain at our price of \$1.97 each. Think! You save \$2.53 on each transformer, or more than \$5.00 on a pair. Money talks! Order now.

### USE COUPON BEFORE IT IS TOO LATE

Only a few thousand National All-Frequency Audio Transformers are in our present stocks. The special, low price of \$1.97 will hold only so long as this stock lasts. The thousands of set building fans who have used Nationals will order as many transformers from this stock as they can—because they know there is no better transformer at any price. This will take most of our present supply. If you want to make sure of obtaining a pair of Nationals for your own set, order at once. Use the coupon below, being careful to write your name and address plainly. Save money. Order TODAY!

**Keystone Radio Laboratories, Inc.,  
154 Whiting St., Dept. CR, Chicago, Ill.**

KEYSTONE RADIO LABORATORIES, Inc.  
154 Whiting St., Dept. CR, Chicago, Ill.

You may send me the following, which I have checked:

- .....Keystone National All-Frequency Audio Transformers at \$1.97 each.
  - Ratio 6 to 1     Ratio 3½ to 1
  - (Indicate ratio desired)
- .....Sets of 3 coils (1 Keystone tapped Auto-transformer and 2 Keystone R. F. transformers at \$3.48 set.  
(Any one coil separately \$1.20 each)
- .....Keystone .00035 Mfd. Variable Condensers (S.L.F.) at \$1.48 each.
- .....Keystone 2 meg. Grid Leak, at \$0.30 ea.

I agree to pay postman \$.....plus  
(add total amt. of order)  
few cents postage. We pay postage if you send cash with order.

Name.....  
Street.....  
City.....State.....

# An Inexpensive Five Tube Tuned Radio Frequency Receiver

Here Is a Very Moderately Priced Receiver  
Easily Constructed, Which Is Capable of  
Giving Excellent Results

This Receiver Was Designed and All Illustrations Prepared  
by the Citizens Radio Laboratory

ONE of the assumptions that seem to be taken for granted in radio today is that good results cannot be obtained with a receiver unless the parts entering into its construction are of the very latest design and more or less expensive in price. This fact is well borne out when the cost of the average kit of apparatus for constructing a good four or five tube receiver is taken into consideration. While the usual price of a complete set of parts is in the neighborhood of \$65.00, many kits are being sold for considerably more. The receivers constructed from these parts will invariably give excellent results. It is true that many factory-made receivers perform in a manner equal to that of the best of home constructed sets, yet the cost of the commercially made set is considerably lower than that of the receiver made in the "kitchen laboratory." An examination of the facts surrounding this condition will disclose that it is quite logical and practical, as illustrated by the following actual case. A manufacturer of high quality apparatus regularly supplied a number of receiver factories with his merchandise. These parts are of excellent quality, being designed with certain electrical effects in view and constructed according to established engineering principles. However, the apparatus consists primarily of only the essential parts and is so designed and constructed that the lowest cost of production is maintained without sacrificing the quality of the finished product.

The manufacturer knew that his parts were of such merit as to successfully compete with other products, so he placed them upon the market. He found that it was impossible to sell his apparatus entirely on its merit alone. Applying a little psychology, he discovered that by improving the physical appearance of his products they

sold more easily. He accordingly enclosed some parts in enameled cases, added a bit of nickel plate here and there, replaced soldering lugs by clamping screws, and added various mechanical niceties which highly enhanced the appearance of the product but did not add to its electrical efficiency. Naturally the cost of production increased, necessitating a proportional increase in the retail selling price. Thus it may be plainly seen that while a purchaser of a piece of apparatus in a radio store will get a product of pleasing appearance, the performance of that piece of apparatus will be in no way any better than that of its uglier brother in a factory-made set, although there is a considerable difference in price between the two.

The purpose of this article is to describe a very inexpensive five-tube receiver, the parts of which are of very good quality and capable of performing in a very capable manner. This receiver will particularly appeal to those who appreciate good reproduction and are not in a position to spend a large sum of money.

The circuit used in this receiver is an ordinary tuned radio frequency hook-up consisting of two stages of tuned radio frequency amplification, detector, and two stages of transformer coupled audio frequency amplification. A tuned auto-transformer is used to couple the antenna and ground to the first tube. The auto-transformer tap is so proportioned as to be approximately correct for the average antenna of from 60 to 100 feet in length.

A volume control consisting of a combination rheostat and battery switch controls the filament temperatures of the radio frequency tubes. The switch is so arranged that when the volume of reproduction is reduced to a very minimum point the "A" battery circuit is automatically opened. A separate rheostat is used for the detector

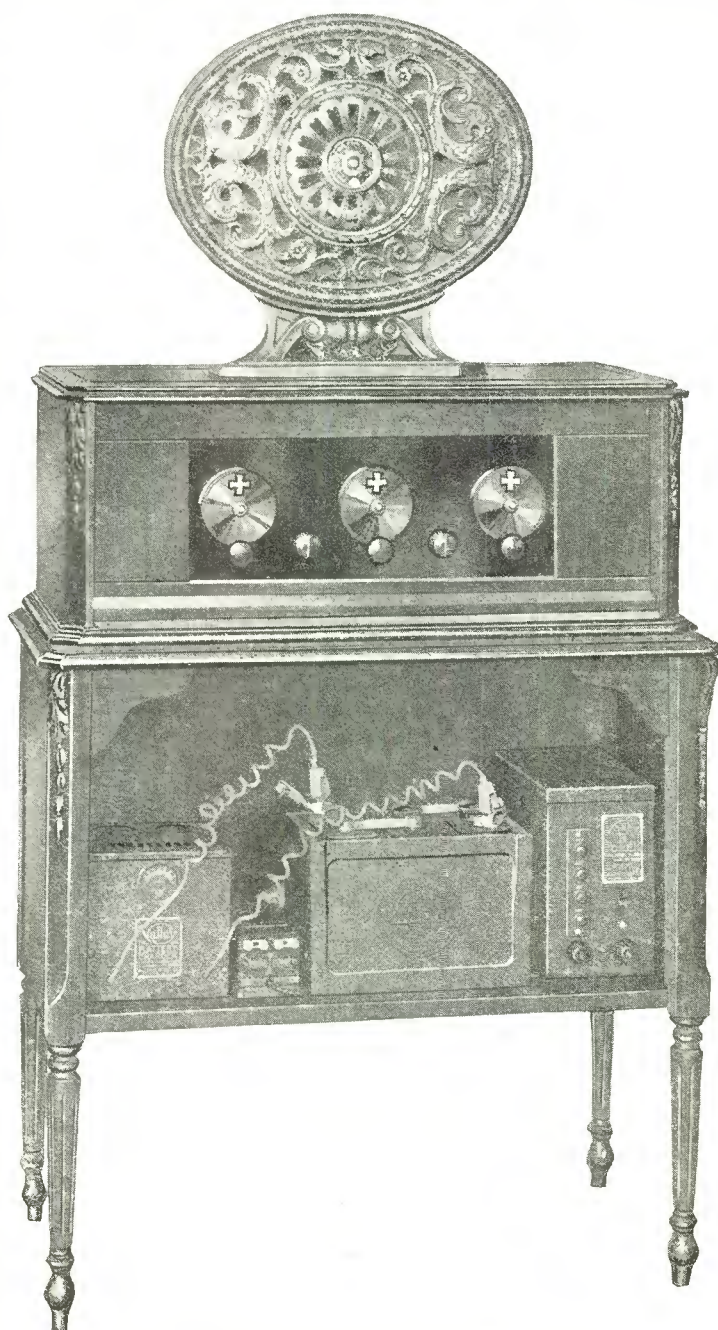


Photo A. Front view of receiver mounted on console with suggested accessories

tube, while the two audio tubes have fixed resistances in their filament leads to reduce the 6 volts delivered from the battery to the normal tube operating voltage of 5 volts.

Careful engineering consideration has been given the design of the radio frequency transformers. The inductances are of such physical dimensions that the undesirable large magnetic and electrical fields are not present, yet the size is large enough to provide an optimum electrical efficiency. Each primary winding is wound on a small bakelite tube and mounted inside of the tube holding the secondary and is concentric with it. The secondary, or outer winding, is carefully wound by machine so that a pure inductance is maintained with a high degree of consistency. This allows the various tuning circuits to be carefully matched. High coefficient of coupling as well as a tendency to reduce the possibility of uncontrollable oscillations are provided by this method of construction.

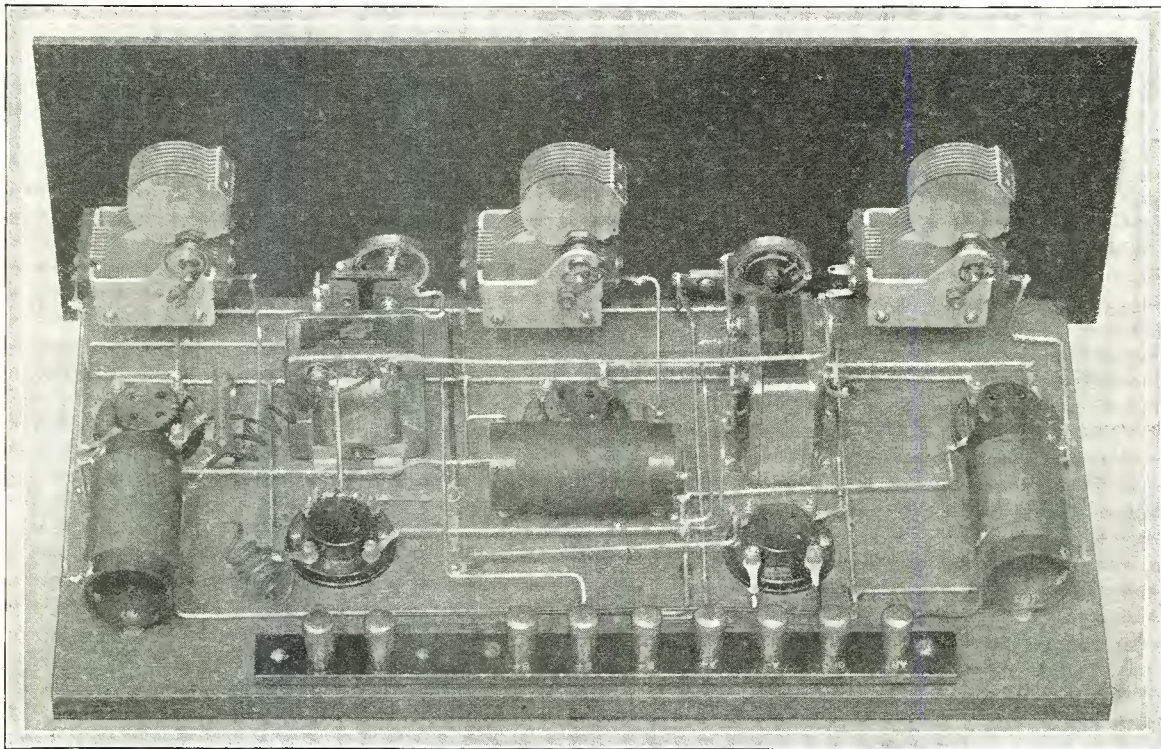
Three major tuning controls are used in this receiver, each

the fixed condenser this effect will be greatly reduced and rendered negligible.

#### LIST OF PARTS

These parts, or their equivalent, will give satisfactory results:

- 1—7x18x3/16-inch Radion Panel
- 1—9x17x1/2-inch Wooden Baseboard
- 1—1 1/4x3x3/16-inch Radion Terminal Strip
- 1—XL Terminal Strip with Posts
- 2—Push Type XL Binding Posts
- 1—Keystone Tapper Auto-transformer
- 2—Keystone Radio Frequency Transformers
- 3—Keystone .00035 mfd. Variable Condensers
- 2—Keystone 3 1/2 to 1 Audio Frequency Transformers
- 1—Keystone 2-meg. Grid Leak



*Photo B. Rear view of completely wired receiver. Notice neat arrangement of parts*

being a variable condenser of .00035 mfd. capacity. The plates are so shaped that the usual crowding at the lower end of the broadcast band is rendered negligible. Being matched to each other in a manner similar to the radio frequency transformer, the condensers make uniform dial settings possible.

The two audio transformers are each of 3 1/2 to 1 ratio. Their electrical characteristics are such that uniform amplification is possible over the entire broadcast musical scale. Considerable emphasis is laid upon the use of a .002 mfd. fixed condenser across the primary of the first audio transformer. Due to the load effect in the plate circuit of the detector tube imposed by the primary, there is a tendency to reduce the input impedance of the detector tube. The result is a decided broadening or damping of the tuning circuit, preceding the detector. By using

- 5—Alden UX Sockets
- 1—Carter 25-ohm Midget Rheostat
- 1—Carter 10-ohm Midget Rheostat and Switch
- 2—Carter 4-ohm Fixed Resistances
- 1—Dubilier Type 601 .002-mfd. Fixed Condenser
- 1—Dubilier Type 642 .00025-mfd. Grid Condenser
- 3—Loughman Whitecross Dials
- 1 Package Kester Solder
- 50 Feet Belden No. 12 Copper Tinned Wire
- Miscellaneous Screws, Lugs, Wire, etc.

The accessories shown are:

One Blandin Versailles Model Console, a beautifully carved

piece of radio furniture having ample room for all necessary accessories. Photo shows accessory compartment with panel removed. Made by Blandin Phonograph Company, Racine, Wis.

will supply all necessary voltages to operate detector and amplifier circuits, manufactured by Valley Electric Company, St. Louis, Mo. The same company makes the charger shown in left of com-

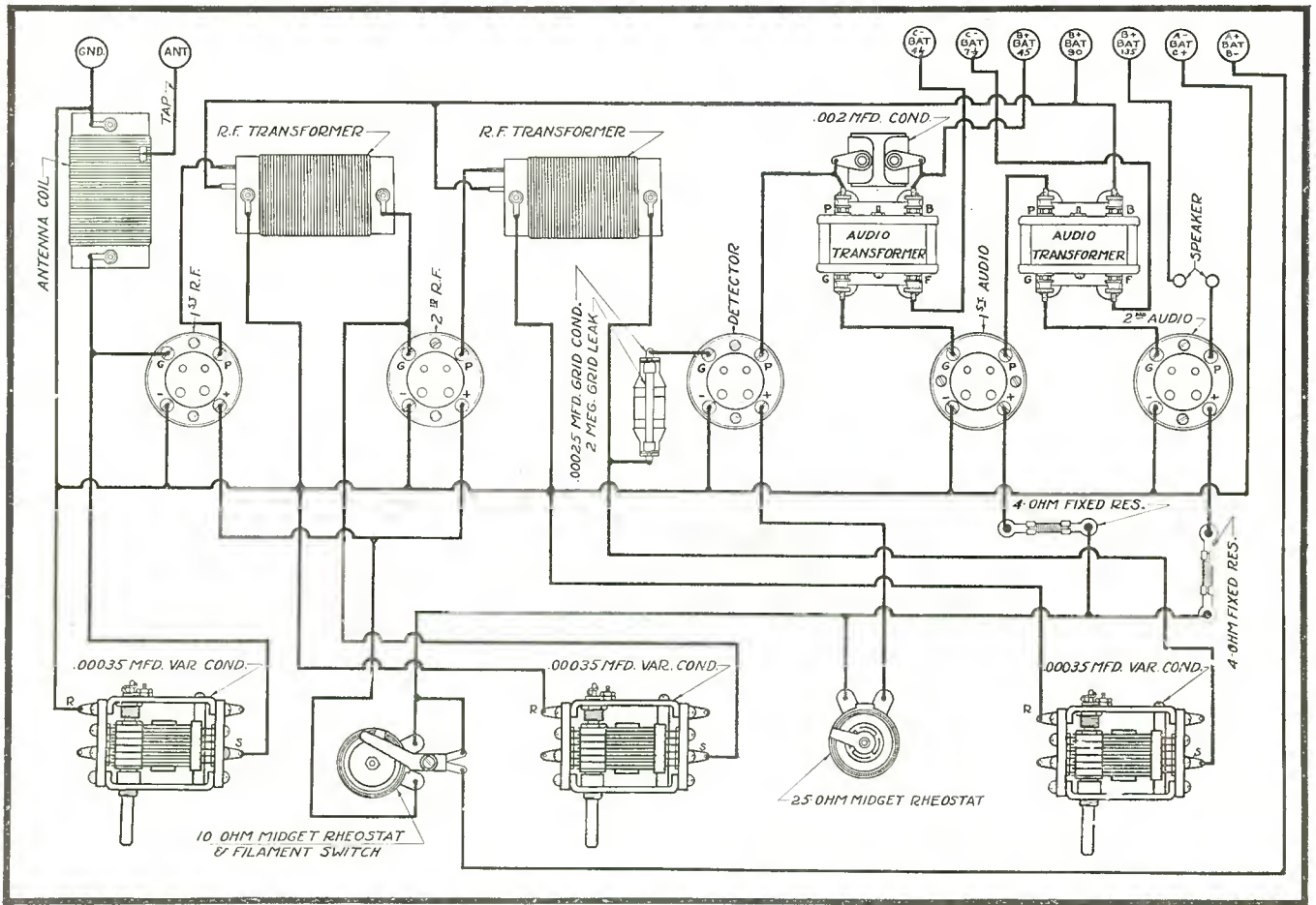


Fig. 1. Graphic illustration showing all connections in entire receiver

The Speaker is manufactured by Radio Foundation Company, New York City.

A 6-volt Willard Radio "A" battery is shown, made by the Willard Storage Battery Company, Cleveland, Ohio.

The "B" current is supplied by a Valley "B" Eliminator which

partment, which has ample capacity to keep "A" battery fully charged.

(If any further information is desired regarding these accessories, kindly address manufacturer direct.)

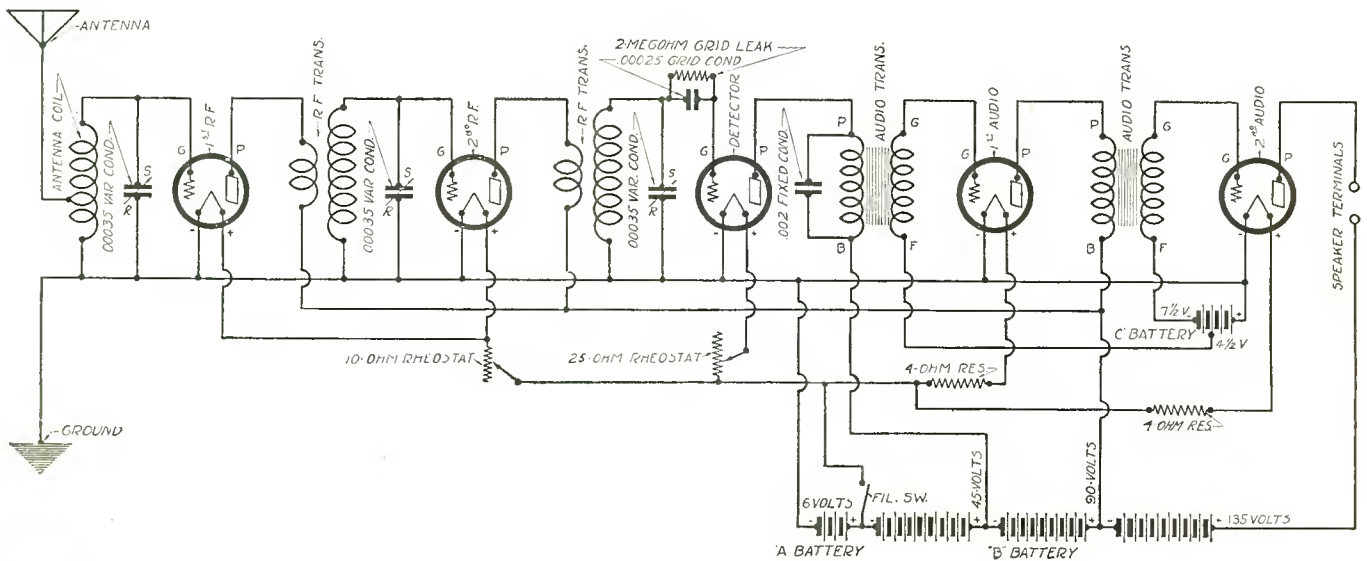


Fig. 2. Schematic wiring diagram

*The House of*



*Standard Parts*

## Build The Outstanding Circuit of the Year

HENRY-LYFORD is the new 1927 circuit that everybody at the New York Radio Exposition talked about and is endorsed by all the leading radio magazines; read about it in this magazine. This NEW circuit with a wide wave length range of from 37 to 550 meters (with interchangeable plug-in University Coils which you may obtain) permits you to tune in where the ordinary receiver NEVER GETS.

# HENRY-LYFORD RECEIVER

**It's a New Plug-in Coil Receiver With a Deliberately Unbalanced Circuit**

This new unbalanced feature gives a tremendous increase in sensitivity without losing selectivity, and its simplicity of construction is such that any one can build the Henry-Lyford and everyone should, for it is really a wonderful and beautiful receiver. Its high and low wave length range permits you to hear the North Pole expeditions, government stations and amateurs, a tuning feature not obtainable with the average set.

**Build This Simple Yet Powerful and Selective Circuit  
and Have the Pleasure and Satisfaction of Owning**

## a Better Set Than You Can Buy

Simple instructions are furnished with each complete set of parts and all you need is a screw driver, soldering iron and a pair of pliers.

### COMPLETE LIST OF STANDARD PARTS Including University Plug-in broadcast coils with 185 to 550 meters Range

1 Bakelite Panel, 7x24, drilled and engraved.....	\$ 5.25	2 Thordarson audio transformers, type R-200.....	16.00
1 Bakelite sub-panel, drilled, with 5 Benjamin sockets mtd.....	5.75	5 Tobe Deutschmann 1 mfd. fixed condensers.....	4.50
2 Precise 350 mmfd. variable condensers, type 845.....	9.00	1 Micamold .002 mfd. permanent condenser.....	.40
1 Precise 55 mmfd. variable condenser, type 940.....	1.50	1 Micamold .001 mfd. permanent condenser.....	.40
1 Centralab modulator, type 500M.....	2.00	3 Amperites, type 112.....	3.30
1 Carter or Yaxley "Imp" filament switch.....	.65	10 Coil mounting jacks.....	1.25
1 Carter or Yaxley No. 102a jack.....	.70	1 Pair of Benjamin brackets, type S629.....	1.70
1 Carter or Yaxley No. 103 jack.....	.80	1 Sub-panel supporting post.....	.20
1 University antenna coupling transformer, type B-1.....	4.50	2 Eby binding posts marked ANT., GND.....	.30
1 University radio frequency transformer, type B-2.....	3.50	2 4-in. Kurz Kasch dials, 100 to 0.....	1.50
1 University tuned radio frequency transformer, type B-3.....	3.50	1 8-wire battery cable.....	1.10
		1 Coil of Belden hook-up wire.....	.40
		1 Complete set of hardware.....	.30

Complete parts as specified  
carefully packed and fully **\$69.50**  
guaranteed .....

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**50 Park Place New York**



# The Henry-Lyford Receiver

Here Is a Receiver So Designed That It Will Never Become Obsolete  
Due to Changes in the Wavelengths of Broadcasting Stations

**P**ROGRESS in the Radio art, as in everything else, comes through gradual development and refinement. Once in a decade may come a revolutionary idea, but in general the advance is in the form of refinements in the individual parts of a radio receiver, and in refinements of old ideas, with new and better applications of them to present-day needs.

The receiver here described employs five tubes. The first two are radio frequency amplifiers, and the third is a detector, and the last two are audio amplifiers. The first stage of radio frequency amplification is tuned, and the second is untuned, with oscillation in both, controlled by the application of a system of reversed c.m.f. to the grid of the first tube. The detector is tuned and is non-regenerative, and the two audio stages are transformer coupled.

Five 1 mfd. by-pass condensers are used in the audio amplifier, also, to by-pass every grid and plate circuit return directly back to filament. This point, incidentally, has been quite generally overlooked by set designers, but too much importance cannot be laid upon it. These by-pass condensers are essential to perfect reproduction.

Sensitivity and selectivity go hand in hand, though one is usually gained at a sacrifice of the other. Both have been secured to an equally high degree in the Henry-Lyford by the method of oscillation control mentioned before. It is common knowledge that "losser" systems, using a resistance somewhere in the circuit to "kill" the oscillations, are inefficient, and regulation of the plate or filament voltage of a radio frequency tube is not much better. The ideal way is not to "kill" these oscillations by forceful methods, but to compensate for them and counterbalance them—in other words, to strike at the cause of the trouble rather than the effect.

The cause of these troublesome oscillations in the radio frequency amplifier is the ability of the plate-grid capacity of the tube to pass back energy—to "regenerate," and consequently to oscillate. In this circuit, enough energy is passed back, reversed, to just compensate for that which is causing the trouble and to balance it out. Thus the oscillation is scientifically controlled without recourse to any resistances, and the result is of course much greater sensitivity. A feedback coil and a small condenser on the panel are used for this balanc-

ing. With the balancing condenser on the panel, the amount of compensation may be varied at will, and the receiver made as sensitive as desired.

The grids or both of the radio frequency tubes are biased negatively with  $1\frac{1}{2}$  volts of "C" battery. This is the condition of maximum amplification and sensitivity, with the plate voltage 90. The detector tube is also biased with  $1\frac{1}{2}$  volts of "C" and  $22\frac{1}{2}$  volts of "B" used on this tube. This method of detection is much better than the usual grid-leak and condenser method, for it is quieter. Ninety volts is supplied to the plate of the first audio frequency tube from the same supply as that for the radio frequency tubes.

Selectivity has been assured by correct design of the two tuned circuits—the first radio frequency stage and the detector. The coils and condensers are of approved low-loss construction and the selectivity is all that could be desired. Control of the degree of selectivity is provided for by an adjustable coupling to the antenna. This coupling may be close, when selectivity will be as great as with the average receiver, or it may be loose, when selectivity will be much increased. This adjustable feature is quite necessary to enable the receiver to be used under varying conditions in different localities. By adjusting this coupling coil once to the position where maximum results are obtained, it is set for good, and need not be adjusted any further.

## LIST OF PARTS

These parts or their equivalent will give satisfactory results:

1—Formica panel, drilled and engraved, 7x24

1—Formica subpanel, drilled with 5 Benjamin cushion sockets mounted

2—Precise 350 mmfd. variable condensers, type 845

1—Precise 55 mmfd. variable condenser, type 940

1—Centralab modulator, 500,000 ohms

1—Carter Imp. filament switch

1—Carter No. 102A jack

1—Carter No. 103 jack

1—University antenna coupling transformer, type B-1

1—University radio frequency transformer, type B-2

1—University tuned radio frequency transformer, type B-3

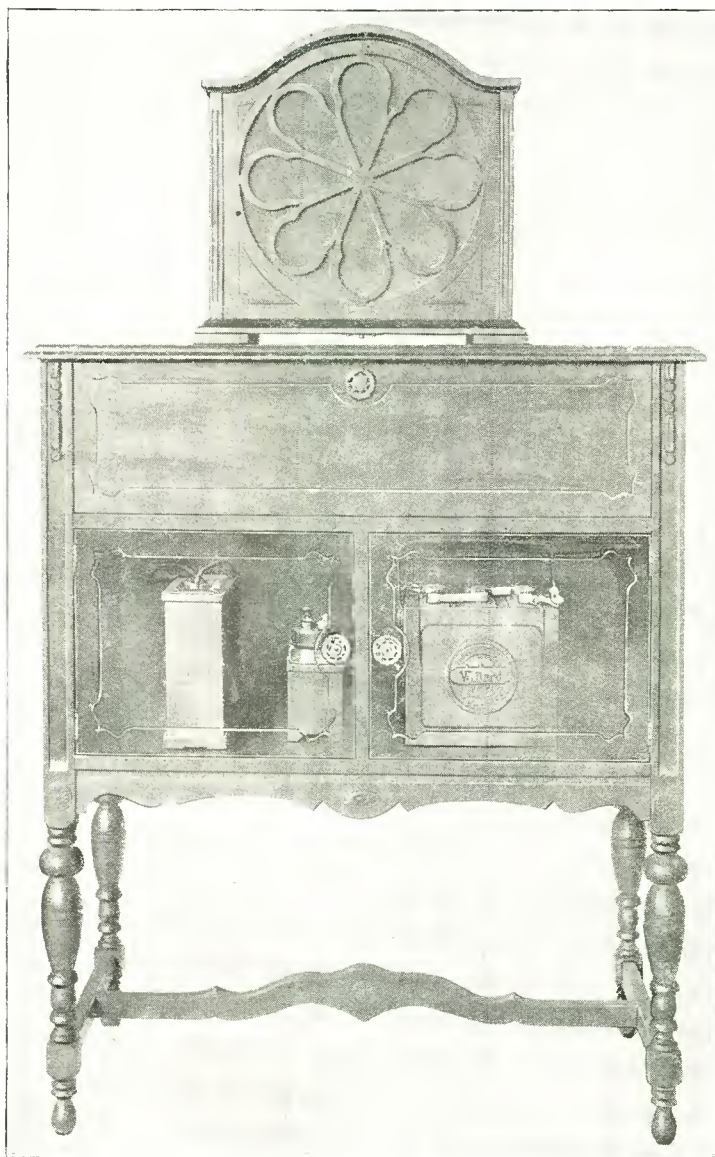


Photo A. View showing how receiver can be placed in a console with suggested accessories

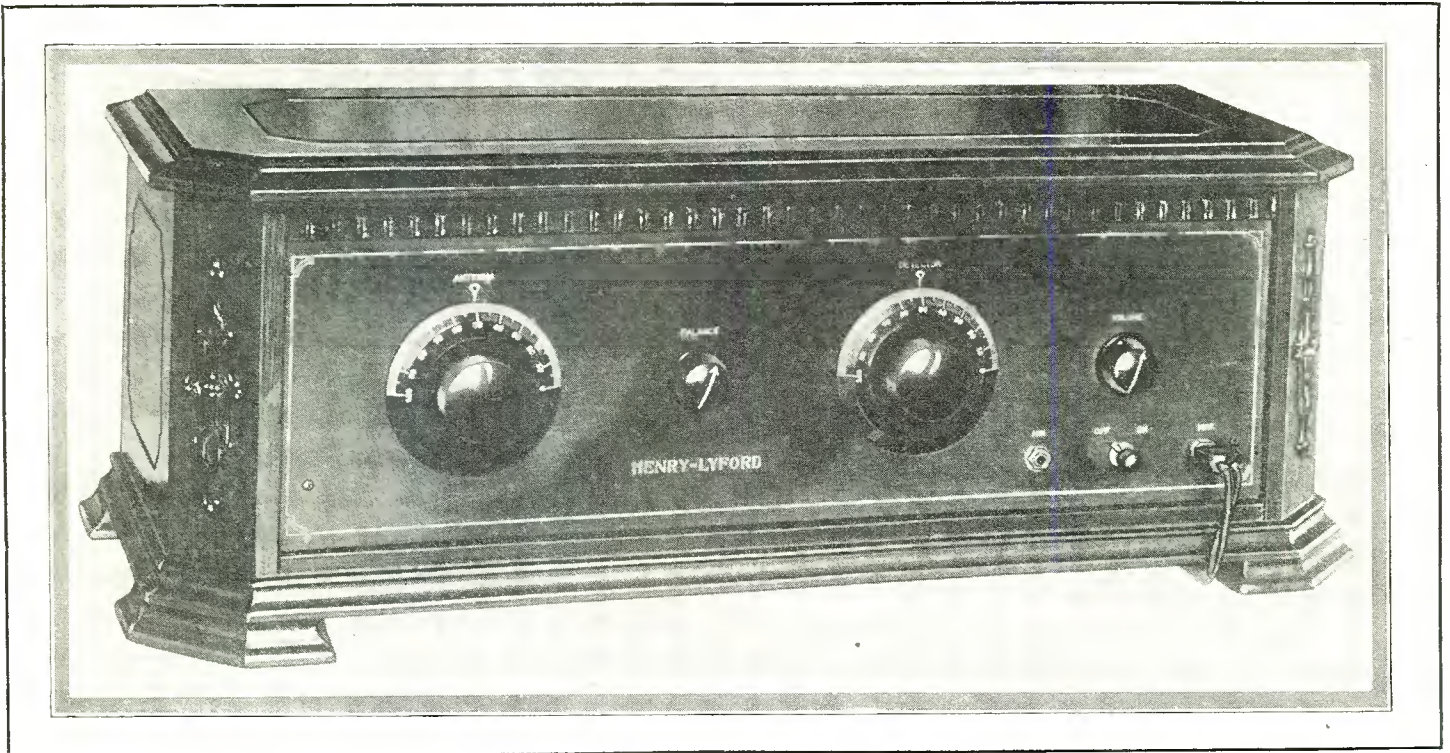


Photo B. Front view of receiver mounted in cabinet

- 2—Thordarson audio frequency transformers, type R-200
- 5—Tobe Deutschmann 1 mfd. fixed condensers, No. 201
- 1—Micamold .002 mfd. fixed condenser
- 1—Micamold .001 mfd. fixed condenser
- 3—Amperites, No. 112
- 10—Coil mounting jacks
- 1—Pair of Benjamin brackets, type 8629
- 1—Bakelite post
- 2—Eby binding posts, Ant. Gnd.
- 2—4-inch Kurz Kasch dials
- 1—8-wire battery cable
- 1—Coil of Belden hook-up wire
- 1—Complete set of hardware

The accompanying illustrations show that the receiver is simply laid out and very easy to build. By making use of a bakelite sub-panel, as is done here, the work of assembling and wiring is greatly facilitated, and the appearance of the finished receiver is greatly improved. It does not have the crude "home-made" look of the average set which is assembled by the average home constructor or novice. All of the wiring is hidden beneath the subpanel and there is nothing unsightly in view.

There are only two tuning controls, and these run together over the whole range of the receiver. The only other controls are two small knobs on the panel. One of them, marked "Balance," controls oscillation in the radio frequency amplifier—it is the balancing or compensating condenser mentioned before. The other knob, marked

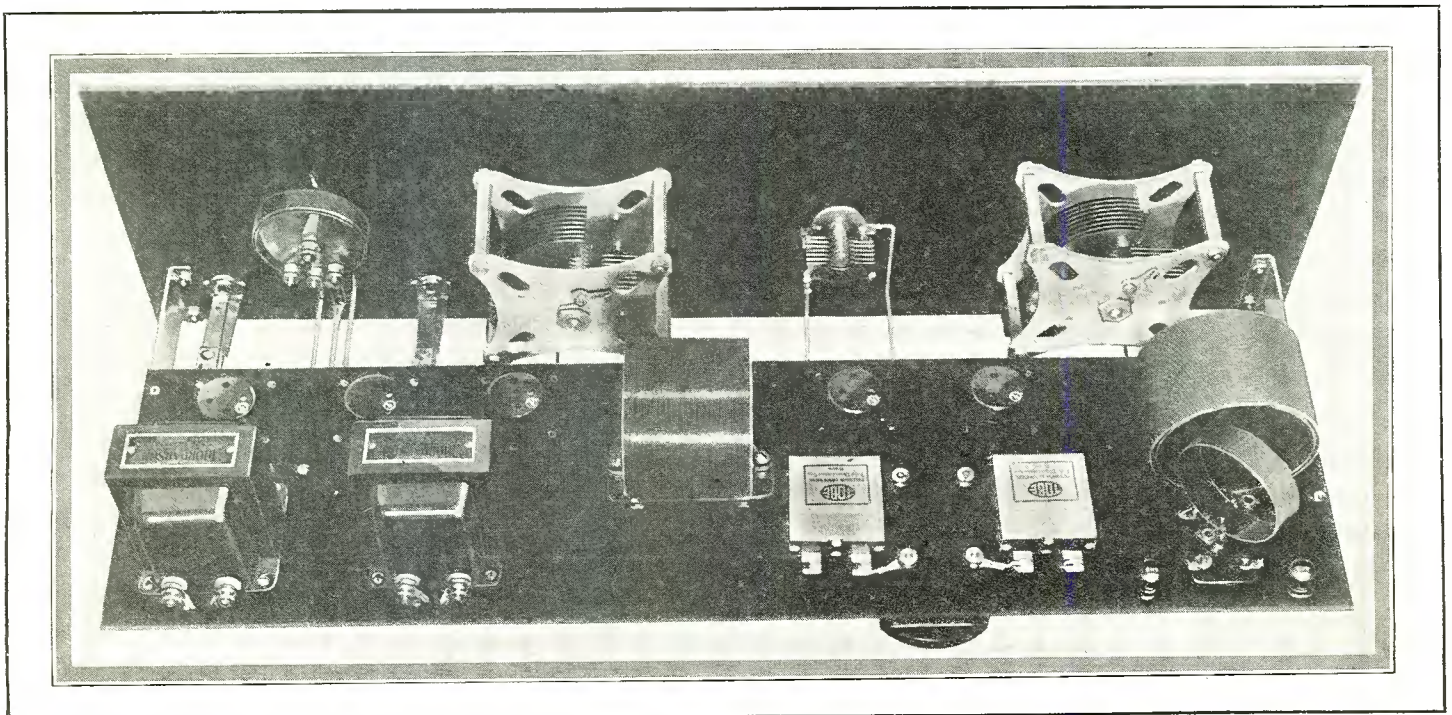


Photo C. Rear view, showing arrangement of parts mounted on subpanel

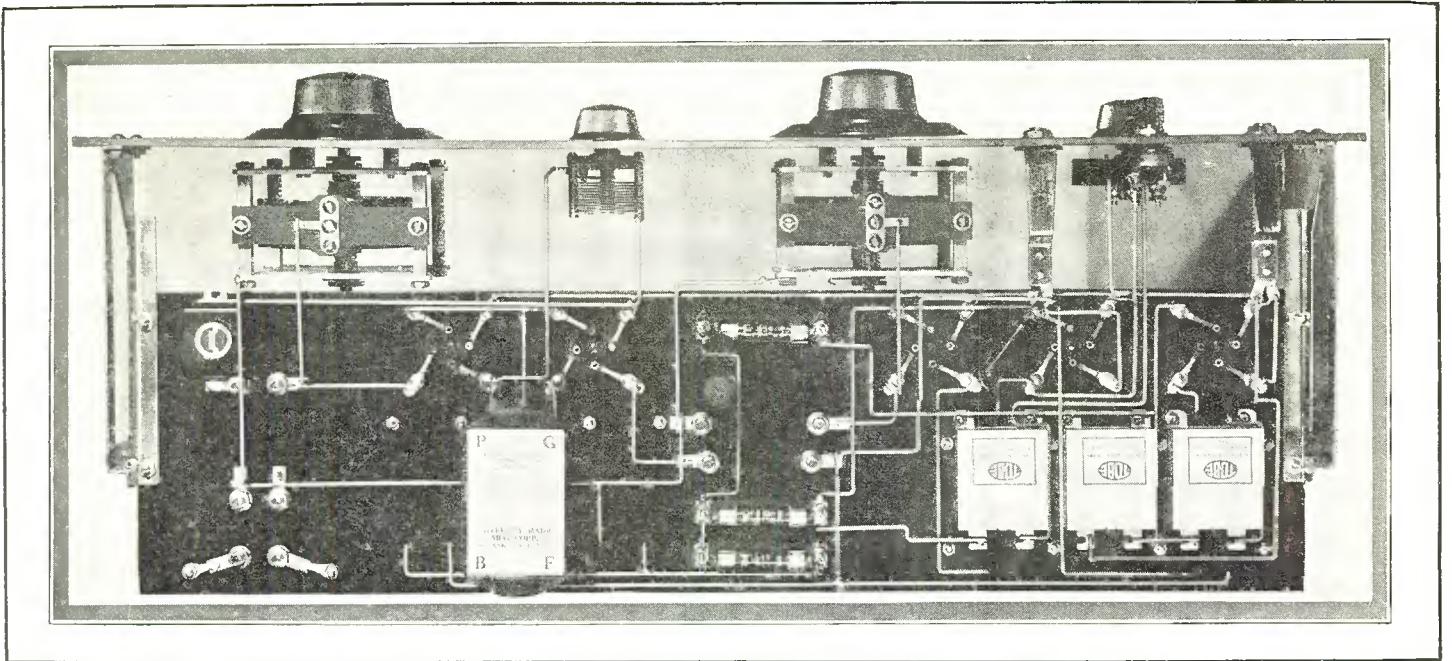


Photo D. Bottom view, showing apparatus supported by subpanel

"Volume," is a volume control, and nothing else. It is a variable resistance placed across the secondary of the first audio frequency transformer, and it gives a very smooth and uniform control of the output of the receiver.

The coils used in the tuned circuits are plug-in type, which gives this receiver a much greater tuning range than the average. With the three sets of coils (two to a set) which are available, this receiver will tune to all wavelengths between 37 and 550 meters. The set of coils for the broadcast wavelengths tune from 550 down to 185 meters. The next lowest set of coils cover the band from 125 down to 37 meters. This provides a generous overlapping of ranges, so that there is no wavelengths between 37 and 550 meters which cannot be tuned in.

This circuit has been designed to employ standard storage battery tubes. Four of the 201A type should be used, but the last one—the second audio tube—should be larger. The 112 type is recommended, though any other suitable "power tube" may be used. The C-leads of the last two tubes and the plate supply of the last one are brought out on separate leads in the battery cable, enabling any suitable tubes to be used as audio amplifiers without any changes in the wiring of the receiver. A "C" battery is recommended in connection with this circuit having a 1½-volt tap.

In testing out a receiver of this type, it is always advisable to try the A battery circuit first. This is generally done by taking one tube only, inserting it in each tube socket to check the filament wiring. The last socket is tested by first inserting a plug in the maximum jack to close this circuit. In making these tests, see that the prong in the side of the tube is pointing in the direction of the arrow in the tube socket. If, by these tests, the filament circuit has been checked O.K. the B and C batteries are connected. Using but one tube, again insert this tube in each individual socket, and of course it should light up as before. This is an indication that all battery circuits are properly wired.

Insert all of the tubes in their proper sockets, taking care that the 112-tube or other similar power tube is placed in the fifth socket. Hook up the antenna and ground, putting the plug-in coils and connect a good cone speaker in the maximum jack. Turn the volume control half way on, set the Balance so that arrow points at the letter E, and rotate the tuning dials slowly, keeping them together within 10 degrees in reading.

When the desired station is tuned in, adjust the Balance for clarity, which might mean a very slight movement of the knob. For general purposes the Balance works best pointing at the letter E of the word Balance. The antenna rotor coil for greatest volume and distance

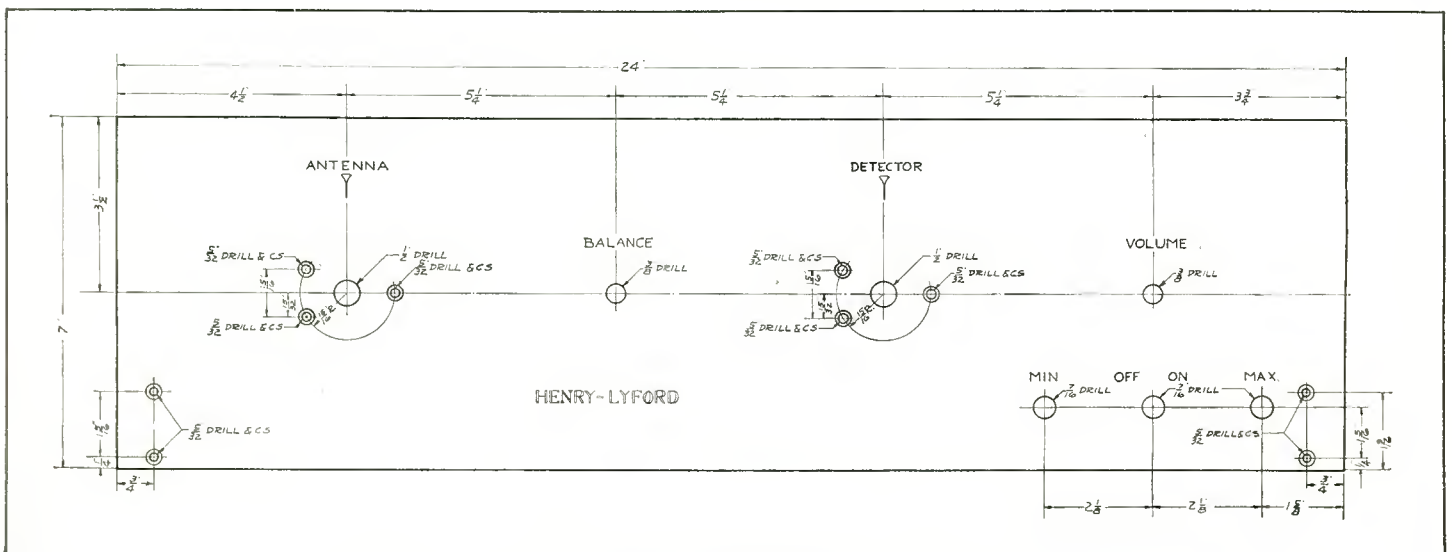


Fig. 1. Panel layout

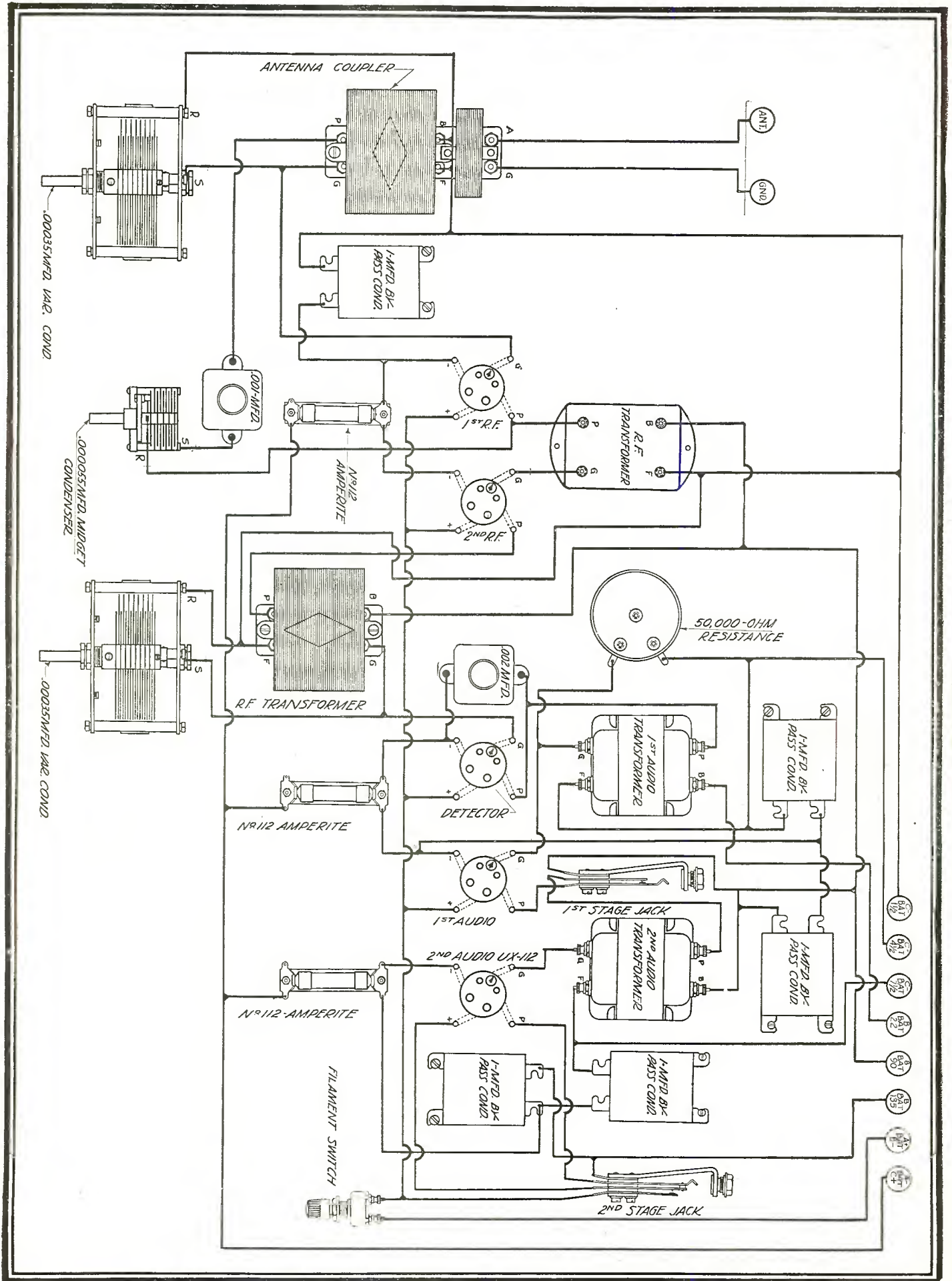


Fig. 2. Graphic illustration showing each connection in entire receiver

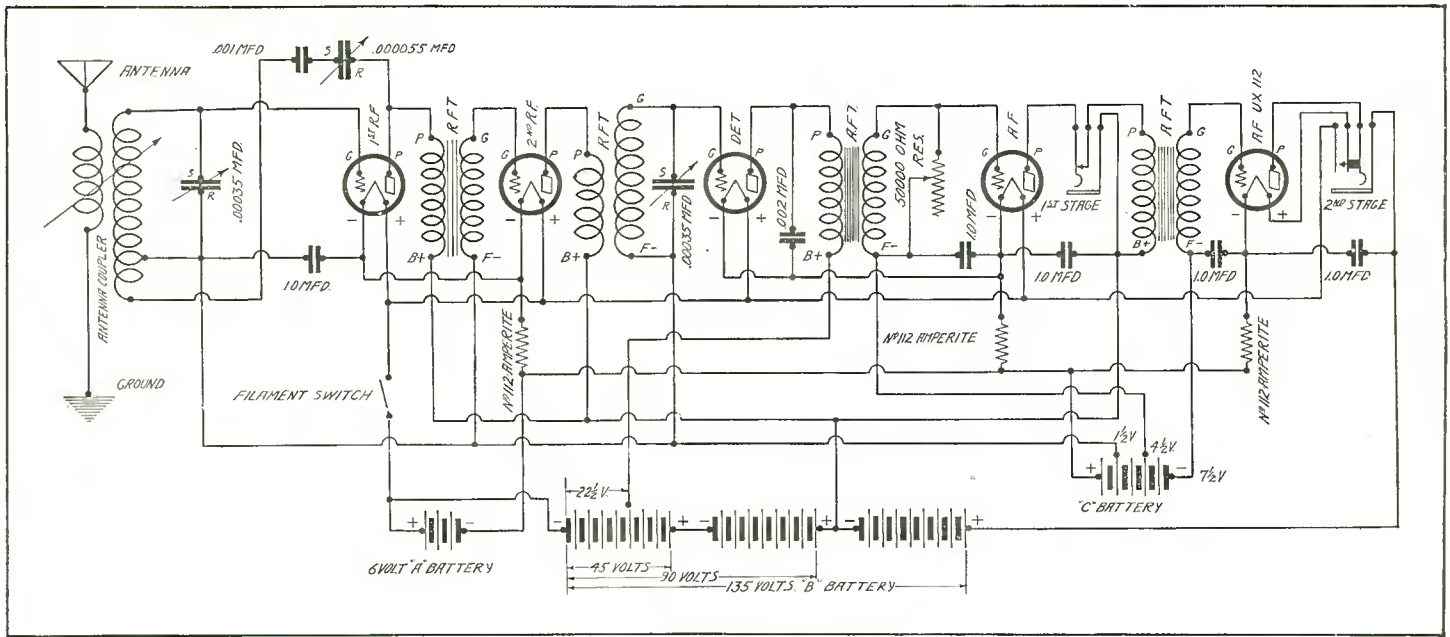


Fig. 3. Schematic wiring diagram

should be set parallel to the fixed coil. If greater selectivity is desired, moving the coil toward a right angle position will give the desired effect.

The Acme "B" eliminator shown in the Console has a switch for high or low voltage and a variable resistance for obtaining the correct voltage on the intermediate frequency tubes and detectors.

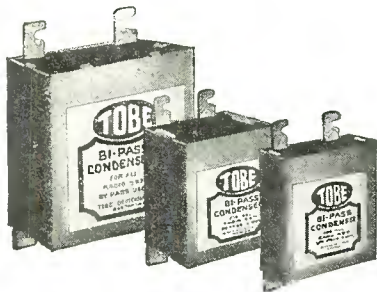
A Kodol trickler charger, manufactured by the Kodol Radio Corp., Cincinnati, Ohio, is shown connected to a standard 6-volt radio battery made by the Willard Storage Battery Co., Cleveland, Ohio.

The new Acme Double Disc, Type K-2, cone speaker, is shown. This is shown in a finished walnut cabinet also manufactured by Acme Apparatus Co., Cambridge, Mass.

The Console shown is manufactured by the Charlotte Furniture Co., Charlotte, Mich.

The Super Cabinet shown in Photo B is made by D. H. Fritts & Co., Hearst Square, Chicago.

(Any information regarding these suggested accessories can be obtained by writing direct to the manufacturers.)



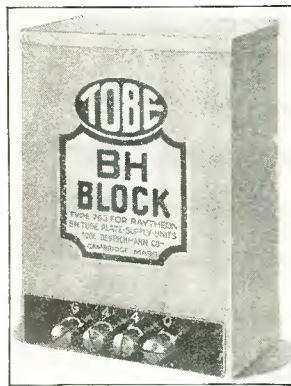
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**Hi-Voltage Power Pack Type Condensers for Amer Tran Sets**

A complete line of Fixed Condensers for set by-passing, for use in filters of Raytheon and Rectron B-Eliminators, and the new TOBE High-Voltage Power Pack Type Condensers, especially designed for use in the AmerTran Power Amplifier.

One quality only.—the best we can make.

In the characteristic silvered metal cases.



Always in the forefront in the development of Radio, Tobe Deutschmann Company presents the TOBE BH BLOCK, containing one 6 and two 4 Mfd. TOBE Filter Condensers, especially designed for use with the new Raytheon BH Tube.

Price \$11.00



**Vacuum TIPON Loewe-Leak**



**VERITAS Hi-Current Resistor**

The TOBE VACUUM TIPON LOEWE-LEAKS, and the TOBE VERITAS High-Current Resistors, cover the entire Radio requirements for fixed resistances. The vacuum leaks are sealed in a high vacuum and are changeless and noiseless. Adaptable for resistance and impedance-coupled amplifiers and for all grid-leak use in receiving sets. Carry up to 1/10 watt current.

The "VERITAS" Resistors are for use in B-Eliminators and for transmitting grid-leaks and can carry 5 watts continuously. Both types can be soldered into the wiring without damage.

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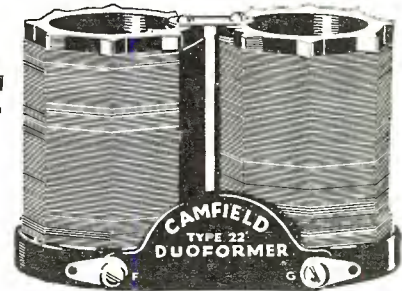
Tell 'Em You Saw It in the Citizens Radio Call Book

# Stop Disturbing Oscillations!

By Using

# CAMFIELD DUOFORMERS

## The Finest Radio Frequency Transformer Ever Made



The Camfield Duoformers use a new and highly efficient system of preventing oscillations, as described in the article on the opposite page. Circuits using this radio frequency transformer have good sensitivity, good selectivity, and are extremely simple to construct and operate.

In the receiver described on the opposite page, the use of the new Camfield Equaltune condenser (see page 113) gives the same efficiency with two controls as has heretofore been obtainable in three control sets.

### Stop Oscillations and Improve Your Present Radio Frequency Receiver

Camfield Duoformers may be used to replace the radio frequency transformer in any tuned radio frequency receiver using three condensers of .00035 MF capacity. By making this change and following our instructions for lay-out, wiring, etc., disturbing oscillations will be stopped and reception improved generally.

### How to Buy Camfield Parts

Camfield parts may be bought through any radio dealer or you may order direct from us. Send a money order direct to our Chicago office for the exact amount of the parts wanted, and they will be sent post paid, by return mail.

### Use This Coupon Today!

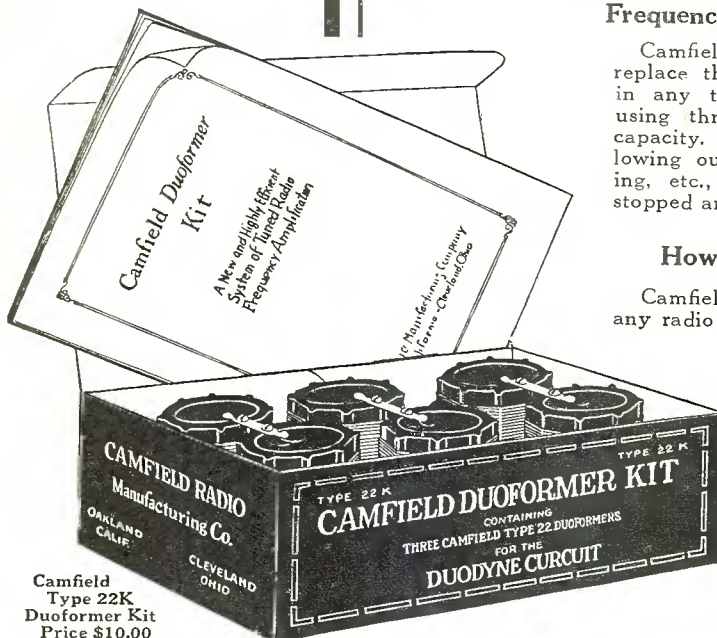
It Will Receive Our Immediate Attention

Camfield Radio Mfg. Co.  
57 East Wacker Drive  
Chicago, Illinois

Check one or more of the following:

- ( ) Inclosed find \$10.00 for one Type 22K Kit of Three Camfield Duoformers
- ( ) Inclosed find \$3.30 for one Camfield Type 620 Coupling Unit
- ( ) Inclosed find 10c. in coin or stamps, for a copy of "Radio Frequency Amplification Without Disturbing Oscillations," and descriptive literature of your complete line.

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



Camfield Type 22K Duoformer Kit Price \$10.00

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

# The Camfield Duoformer Five Receiver

## A New Non-Oscillating Two-Control Radio Frequency Receiver

This Receiver Was Built and All Illustrations Made in  
The Citizens Radio Laboratory

**I**T SEEMS as though the general tendency of home builders' construction is, more or less, towards the tuned radio frequency type of receiver. The cause of this popularity is, probably, due to the simplicity of construction, ease of operation, and general efficiency of this type of receiver. Various manufacturers have spent a great deal of time and experimentation in an effort to make the home builders' problems less, and to increase the general efficiency of this type of receiver. The receiver herewith described contains many features of advance design and general improvement that will be of value and interest to home builders.

The principal objection to the tuned radio frequency receiver, of the past, has been due to the condition known as oscillation, which is a very undesirable feature in any type of receiver. This is strikingly absent in this receiver. The absence of oscillation in this receiver is due to the special design of the Camfield Duoformer Radio Frequency Transformer.

In order to understand the method used for the suppression of oscillation in the Camfield Duoformer "Five," a brief explanation of the causes of oscillation in a tuned radio frequency amplifier is necessary.

Oscillation in a tuned radio frequency amplifier is due to the coupling between the input and the output circuits of the tube. There are three major causes of coupling that are always to some degree inherent in all radio frequency amplifiers:

1. Inductive coupling between the windings of the radio frequency transformers.
2. Capacity and conductive coupling in the wiring of the set itself.
3. Capacity coupling between the input and output of the tube due to the capacity between the grid and the plate elements of the tube itself.

The first and second causes of coupling are not difficult to eliminate by careful arrangement of parts and wiring. This receiver has been very carefully laid out in this respect, and it is suggested that the constructor follow instructions to the most minute detail, otherwise satisfactory operation and reception may be difficult to obtain.

The third cause of coupling is more or less difficult to eliminate, in most of the usual types of receivers. The actual capacity of the tube itself cannot be altered.

Several methods for the compensating of energy, fed back from the plate circuit to the grid circuit, have been developed and worked out to a very exacting degree. The summary of

these methods is feeding back energy from the plate circuit to the grid circuit in such a manner that the energy fed back is out of phase with the energy feeding back through the tube in itself, at an equal potential and a capacity equal to that of the internal grid to plate capacity of the tube. By the use of precision construction of circuits and radio frequency transformers, and very accurate neutralizing adjustments, the tendency of the tube to break into self-oscillation is entirely eliminated. In the majority of compensating methods, this operation of neutralizing is very critical and difficult for the average layman with a limited amount of apparatus to adjust, with great enough accuracy to permit maximum efficiency from the receiver.

There are several other ways in use for the suppression of oscillation, such as inserting a resistance in the grid circuit of the tube, which will prevent oscillation but decreases the selectivity and broadens the tuning to a very noticeable extent. Another method is to make the primary inductance of the radio frequency transformer sufficiently small and the coupling so loose that oscillation is prevented. In this method the transfer of energy is so low and the amplification per stage so small, that the total efficiency of the amplifier is not great enough to be, in the least, desirable.

The usual conditions that exist in a tuned radio frequency amplifier are such that the current fed back from the plate circuit to the grid circuit is of such phase that will add to the already existing current between the grid and the plate of the tube and, therefore, causes it to break into self-oscillation. It is, therefore, self-evident that if the correct phase relation between the current fed back through the tube and the existing current in the grid circuit is obtained, that oscillation will not be present.

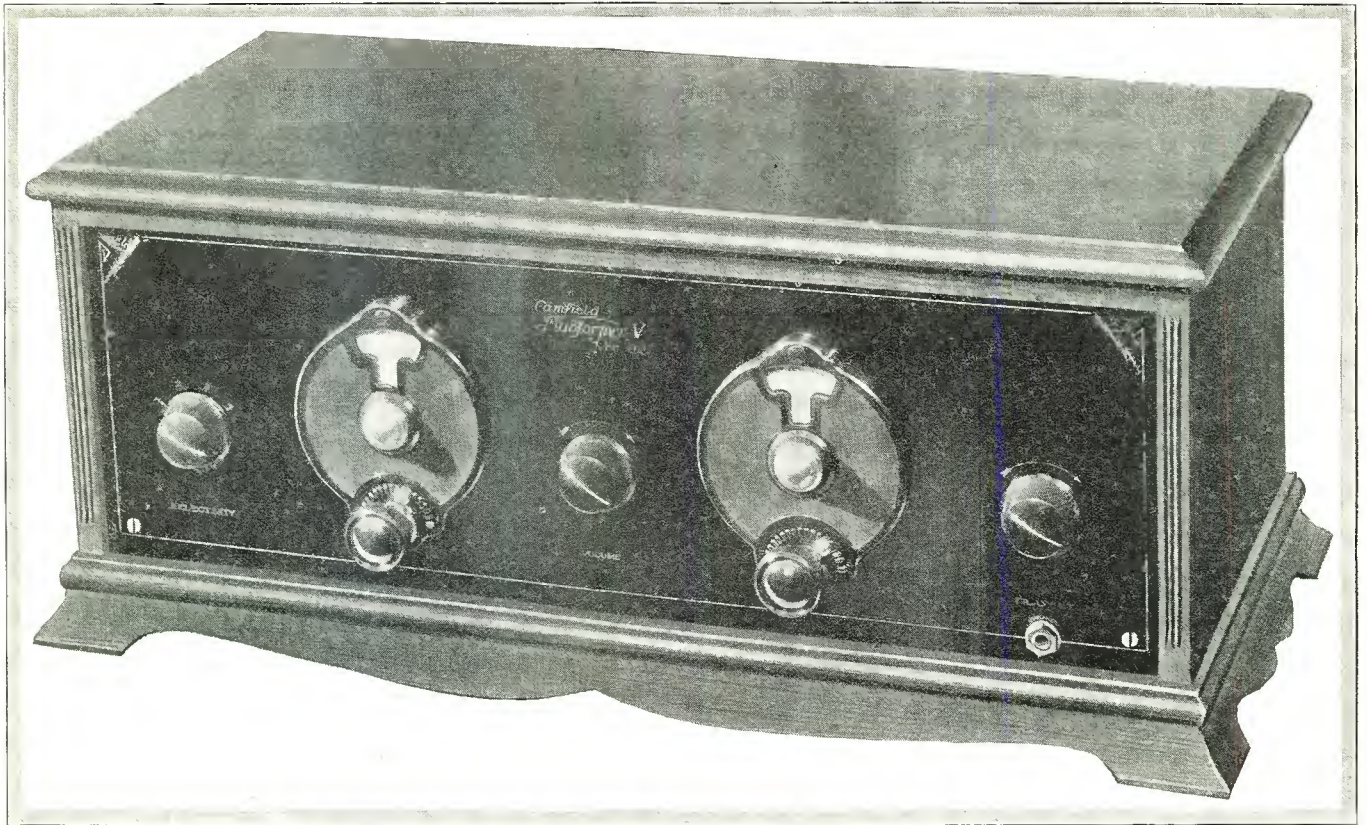
It is known that phase relation between current and voltage in any circuit or combination of circuits depends entirely upon the impedance of the circuit, which consists of inductance, resistance and capacity.

In the design of the Camfield Duoformer, the relative proportion of all the impedance constants have been arranged in such a manner as to cause the current fed back from the plate circuit, to the grid circuit, to be in proper phase relation with the already existing current between grid and plate, to suppress any oscillation that may have the tendency to arise.

Combined with this phase relation feature of the Camfield Duoformer, certain physical features have also been incorporated



Photo A. View of receiver mounted in console, with suggested accessories

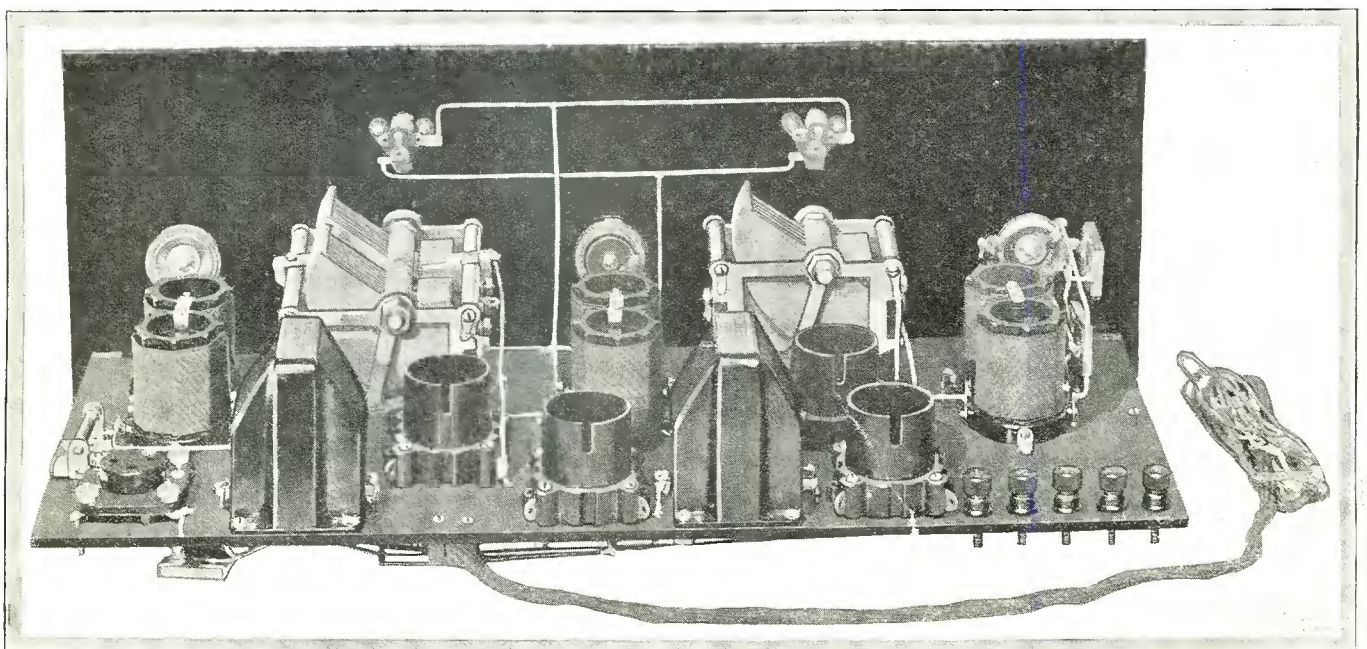


*Photo B. Front view of receiver mounted in cabinet*

in the design of the transformer in such a way that all electromagnetic coupling between successive stages is practically eliminated. With the correct use of by-pass condensers, it is possible to build this Five Tube Non-oscillating Radio Frequency Receiver in an extremely simple way and yet retain a very high and uniform efficiency over the entire broadcast wave band.

The circuit used is the usual tuned radio frequency type, but incorporates many refinements in the apparatus used. The circuit consists of two stages of tuned radio frequency, detector, and two stages of audio frequency. The two-control feature is accomplished by a dual gang condenser, tuning the second stage of radio frequency and detector. These condensers are of the straight frequency line, grounded rotor type. The method of

balancing the gang condenser is of rather unique design and insures perfect resonance at all dial settings, thus eliminating the necessity of trimming or compensating condensers. The balancing is accomplished by the moving of the stator plates to or from the rotor plates. After being balanced, the adjustment is locked, which insures constant adjustment. The condensers used in tuning the first stage of radio frequency or the antenna coupler is of the same type and design as the gang condensers. These condensers have a maximum capacity of 350 mmf. and are made by the Camfield Manufacturing Company especially for use with the Camfield radio frequency transformers. The radio frequency transformers are the Camfield Duoformers, Type 22, which incorporate the unique field control, as previously explained, and are



*Photo C. Rear view of completely wired receiver*



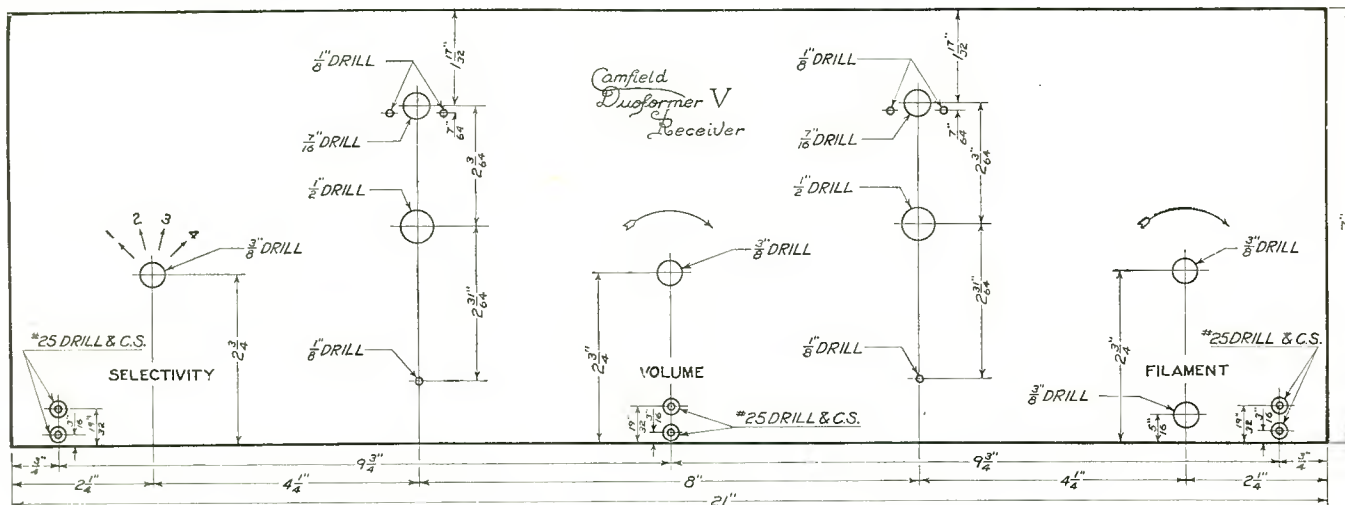


Fig. 1. Panel layout showing size and location of holes

unusually uniform in their characteristic. Camfield "Bull Dog Grip" sockets are used throughout the receiver, with the exception of the detector, which is a Benjamin spring cushion socket, which eliminates the microphonic noises which are characteristic in most detectors. The audio frequency transformers are of a very high grade and produce a wonderful tone quality. The amplification curve of these transformers is surprisingly flat between 200 and 5000 cycles. Due to this fact, equal clarity and volume may be had from the lowest bass to the highest treble.

A UX 200-A is used for the detector tube and a UX 112 in the second stage of audio frequency. The other three tubes are the standard UX 201-A.

**LIST OF PARTS**

These parts or their equivalent will give satisfactory results.

- 1—7x21x3/16-inch Drilled and Engraved Formica Panel
- 1—7x20x3/16-inch Drilled Formica Sub-Panel
- 1—Camfield Type 22K Duoformer Kit
- 1—Camfield Type 352 (two-gang) Equaltune Condenser
- 1—Camfield Type 351 (single) Equaltune Condenser
- 4—Camfield Type 11 UX Sockets
- 1—Benjamin UX Cushion Socket
- 1—Dubilier .00025 mfd. Fixed Condenser
- 1—Dubilier .002 mfd. Fixed Condenser
- 2—Dubilier .0025 Fixed Condensers
- 1—Dubilier 2-ohm Grid Leak
- 1—Dubilier 1/2 mfd. By-Pass Condenser
- 1—Carter Imp. Inductance Switch

- 1—Carter 10-ohm Midget Rheostat
- 1—Carter 6-ohm Midget Rheostat Filament Switch
- 1—Samson Type HW-A3, 2-1 Audio Transformer
- 1—Samson Type HW-A3, 3-1 Audio Transformer
- 2—National Illuminated Dials
- 1—Carter Open Circuit "Short" Jack
- 1—Jones Cable and Cable Lug
- 1—Pair of Karas Sub-Panel Brackets
- 5—Engraved Eby Binding Posts
- 30 Feet of Belden No. 12 Gauge Tinned Copper Wire
- 60 Kellogg Tinned Soldering Lugs
- 1 Package Kester Solder

The Camfield Duoformer Five is shown in Photo "A" installed in a Model 22 Excello Console. This console is manufactured by the Excello Products Corporation of Chicago and is exceptionally well made. The console is finished in a two-tone effect, with matched wood door panels of butt walnut. Ample space is provided in the lower compartment for the storage of accessories. Any size panel may be accommodated between 7x18-inch and 10 1/2 x 32-inch. A sliding leaf is provided by which it is possible to withdraw the apparatus placed upon it from the cabinet.

A complete Willard "A" unit is shown. It consists of a Glass Case, Willard Storage Battery combined with a Charger which is capable of either 1/2-ampere or 2-ampere charging rate. In addition to this, it is capable of recharging up to 96 volts of "B" battery.

A Sterling "B" Power Unit manufactured by the Sterling

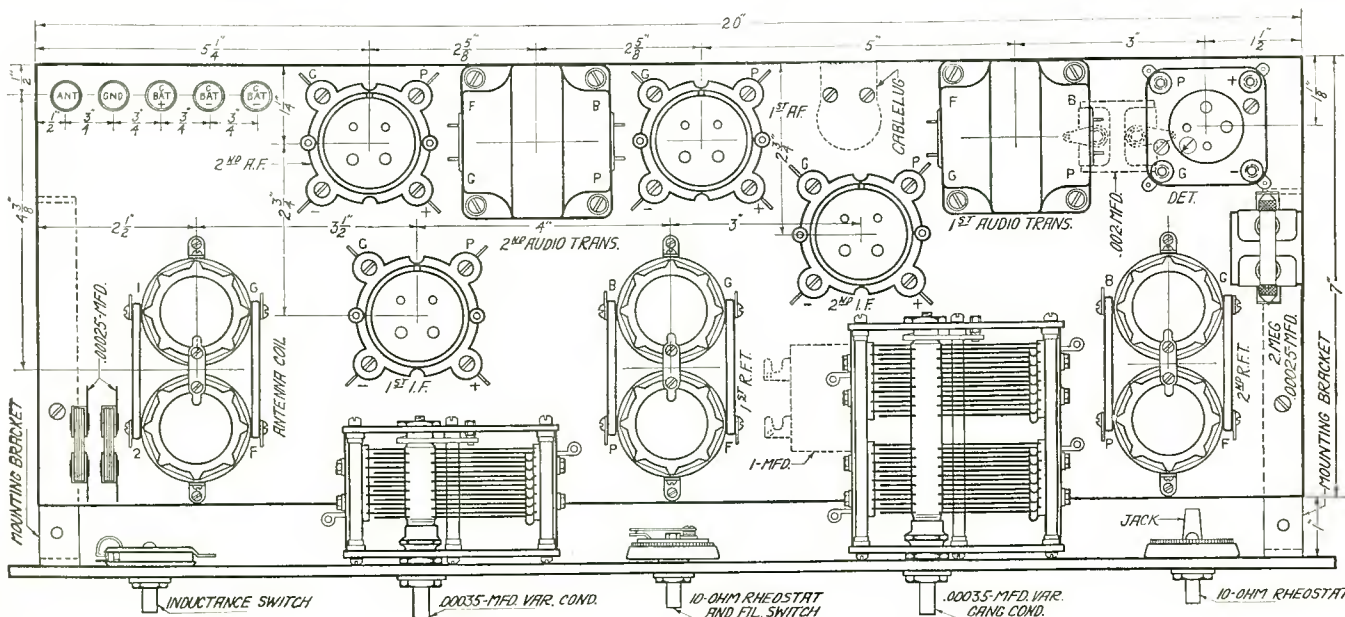


Fig. 2. Baseboard layout showing arrangement of parts

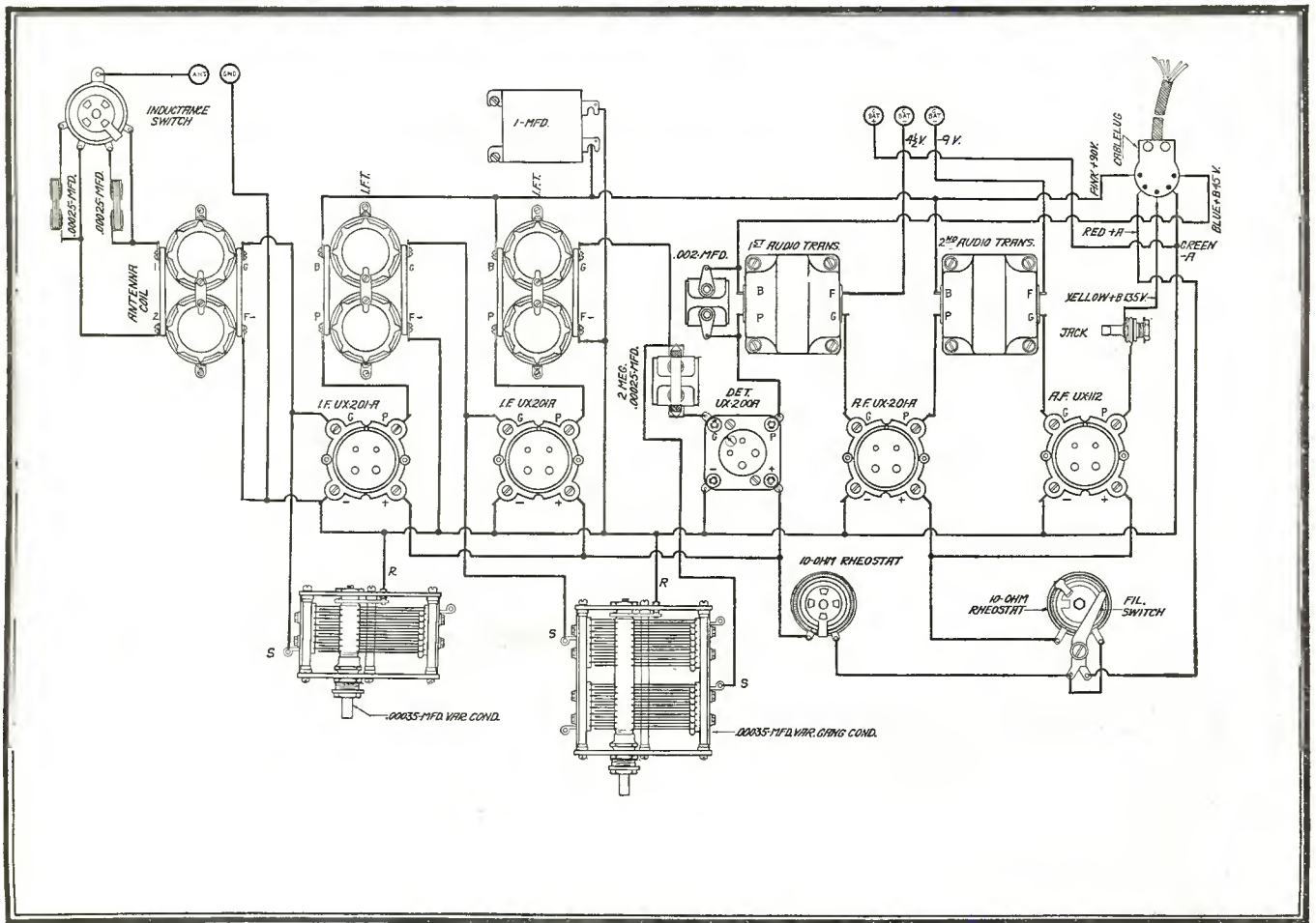


Fig. 3. Graphic illustration showing all connections

Manufacturing Company of Cleveland, Ohio, supplies the necessary "B" potential. This device uses a Raytheon rectifying tube and is capable of delivering up to 60 milliamperes without overloading.

The Speaker is one of the models manufactured by the Tower Manufacturing Corporation of Boston, Mass. This speaker is one

of the free-edge type and will give very excellent reproduction. The cabinet shown in Photo "B" is a product of the Signal Electric Company of Menominee, Mich.

(If any further information on these accessories is desired, full descriptive matter may be obtained by writing the manufacturers direct.)

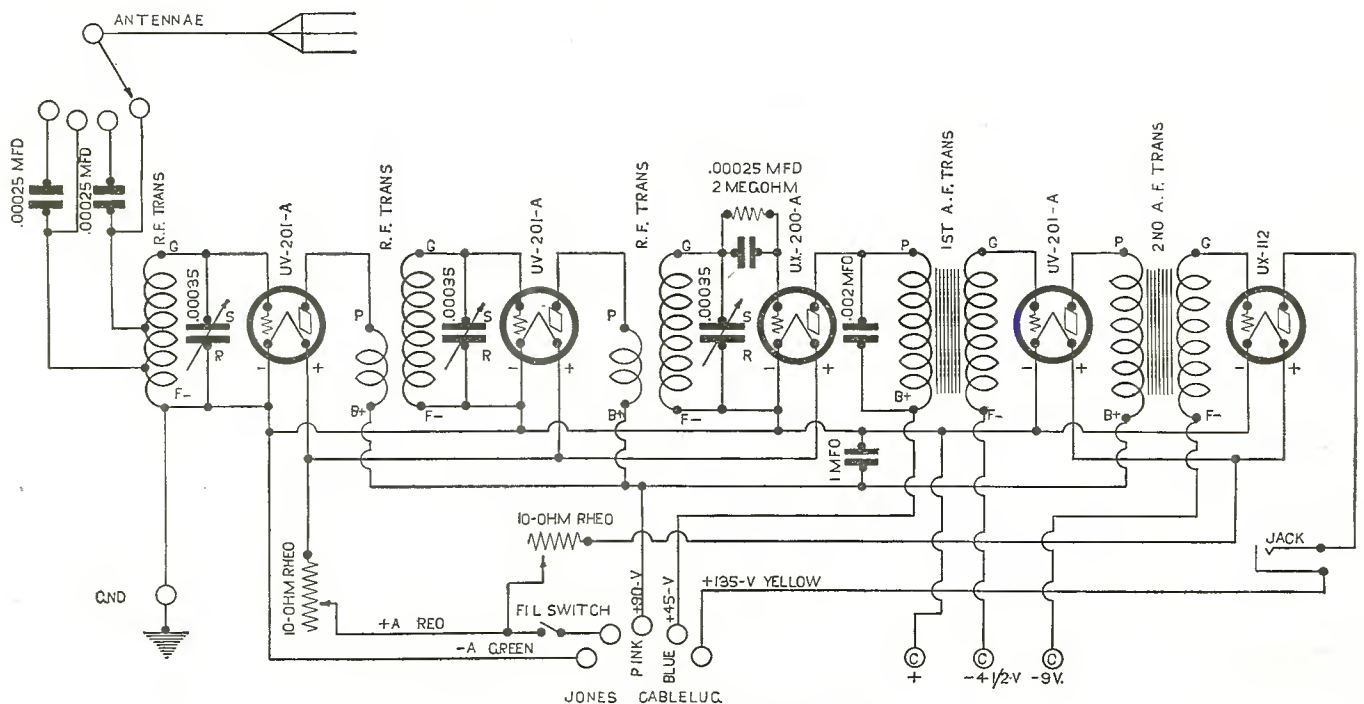
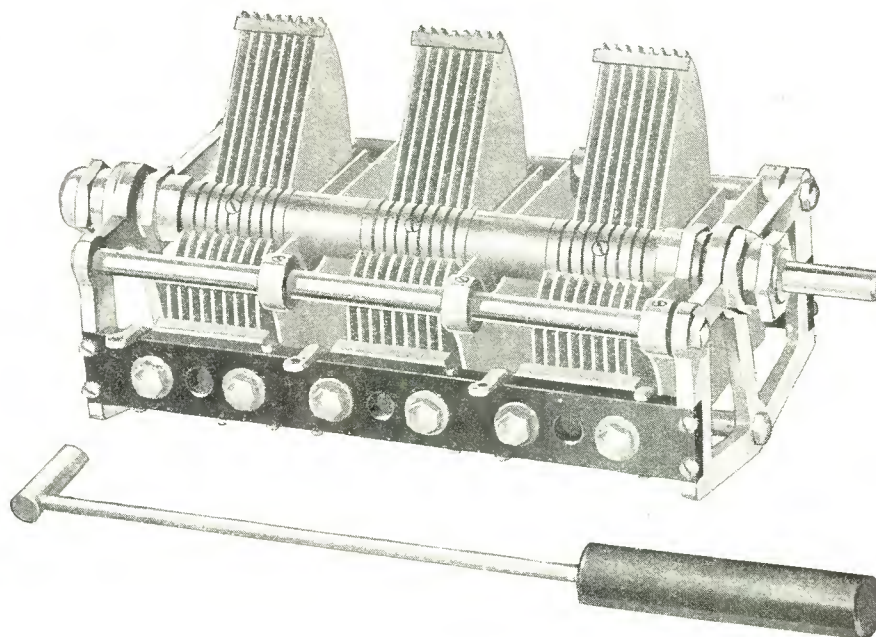


Fig. 4. Schematic wiring diagram

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4. The shaft may be shortened or lengthened or entirely removed without effecting the adjustment of the rotor plates. This provides a simple means for connecting several units together with a single shaft and anywhere from one to six condenser units may be operated with one dial.
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502 (Two Gang)	.0005 Mfd.	11.00
503 (Three Gang)	.0005 Mfd.	16.00

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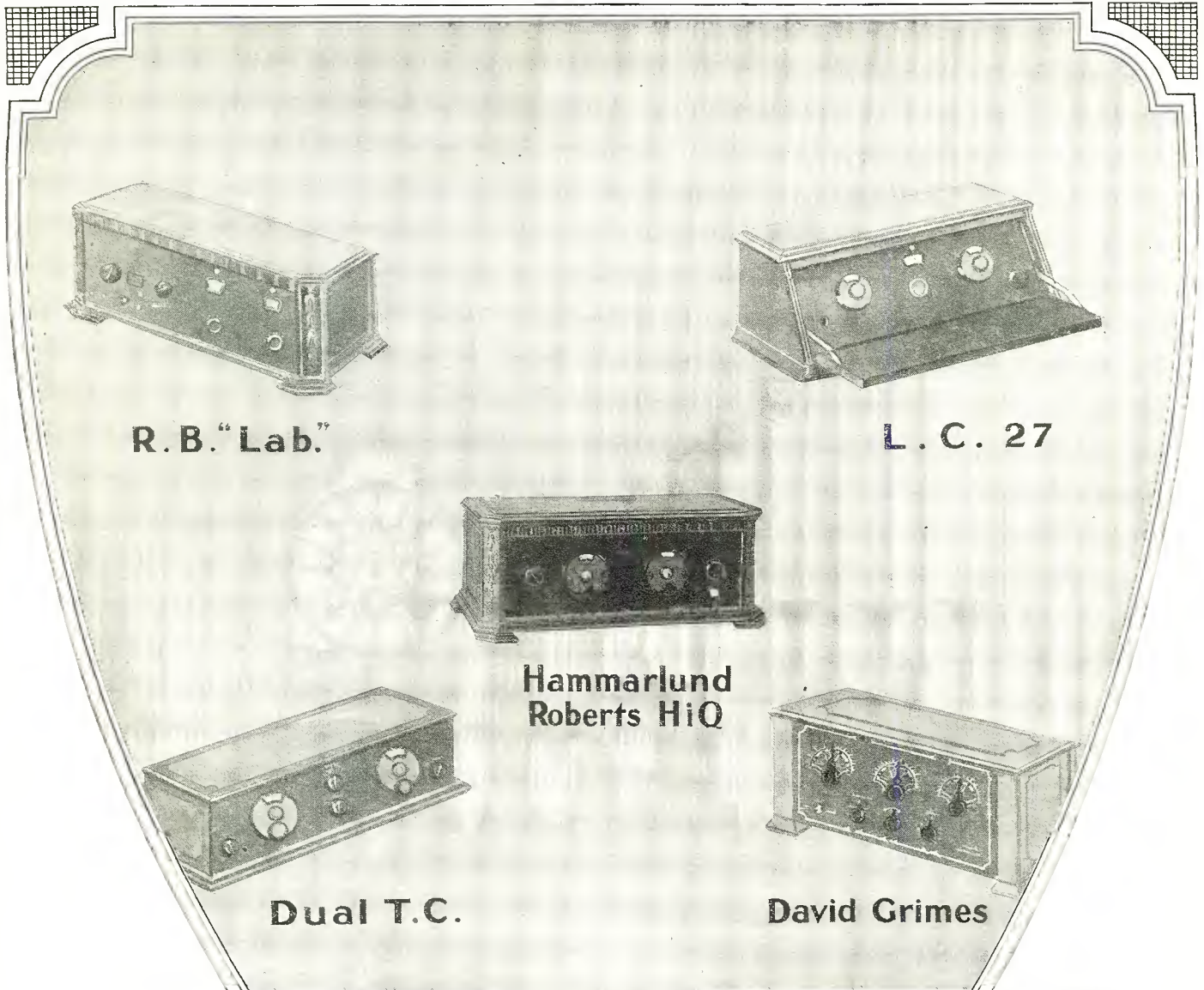
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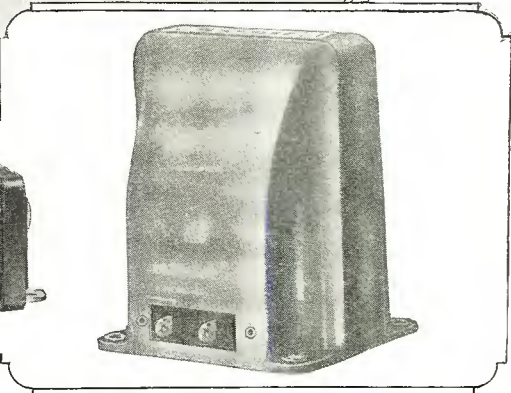
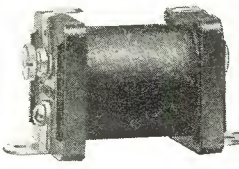
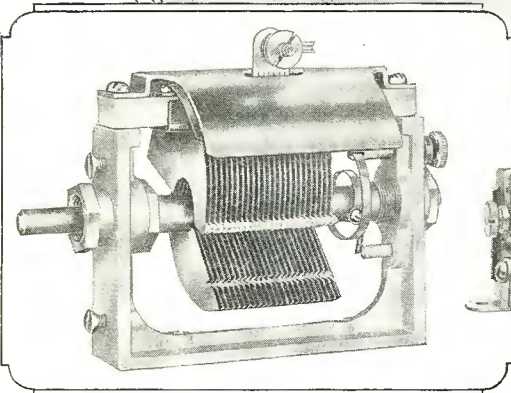
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# The Special T-C Receiver

An Efficient Neutralizing Tuned R.F. Receiver Using a New Type of High-Grade Audio Amplifier

**T**HE following article does not describe an entirely new development in a circuit or a receiver, but is simply about the application of an audio amplifier of surpassing merit to a well known receiving system which has given entire satisfaction in the past to those who have used it. The audio amplifier consists of an entirely new development in impedance coupled amplification. Fundamentally, the circuit used in the amplifier is the same as that which is used in all impedance coupled amplifiers, but various changes have been made, such as substituting an impedance for a grid leak in place of a resistance, and various other refinements in the apparatus used in the circuit.

As compared to other radio frequency receivers, the difference in this receiver is largely in the neutralizing of the radio frequency tube. This is accomplished by a method somewhat different than that ordinarily employed. A neutralizing condenser, capable of very precise adjustment, is placed between the grid return and the plate of the radio frequency tube. A radio frequency choke coil, whose inductance is 85 millihenrys, is inserted between the grid return of the radio frequency tube and a three-volt bias. A .0001-mfd. fixed condenser is inserted between one side of the radio frequency choke and the negative filament of the radio frequency tube. This, in effect, is the same as shunting the condenser directly across the radio frequency choke.

The question naturally arises as to why a condenser, which allows radio frequency currents to pass, is shunted across the choke coil, designed especially to stop radio frequency currents. Inasmuch as the choke coil used in this circuit has an exceptionally small distributed capacity, sufficient current does pass to permit the proper operation of the circuit. The condenser acts as a gate or valve, and permits a sufficient amount of radio frequency to pass through.

The connection of the "C" battery to the grid circuit without the use of the radio frequency choke would permit the radio frequency currents to pass around that condenser to the filament, thus rendering the condenser impotent. The insertion of the choke prevents the radio frequency currents from passing through this path for the direct current, and forces them through the path intended for them, i.e., through the .0001-mfd. fixed condenser.

A radio frequency choke is also inserted in the plate circuit of the radio frequency tube, and the "tickler" lead going to the input of the audio amplifier. The object of these two chokes is to prevent radio frequency currents from entering either the audio amplifier directly or feeding through the "B" battery into the

amplifier, where distortion will be caused in reproduction.

The circuit itself consists primarily of one stage of neutralized tuned radio frequency and a regenerative detector and three stages of high grade impedance coupled amplification. Unlike the ordinary tuned radio frequency receiver using regeneration, this set makes use of a double rotor coupler. One rotor is the "tickler" or regeneration control, the other the primary of the radio frequency transformer, which is used for a selectivity control. In metropolitan areas where air congestion is severe, the selectivity may be increased so interference will be reduced to a minimum. On the other hand, in suburban districts, where interference is negligible, the receiver may be tuned broadly

without sacrificing volume or distance. With the primary rotor in a vertical position, maximum selectivity is obtained, and vice versa. The selectivity control need not be varied after it has once been set according to the degree of selectivity desired by the operator.

Audio frequency chokes are inserted in the plate circuit of each of the amplifying tubes. They are designed primarily for a stabilizing effect and a suppression of distortion, as well as the isolation of the different stages of the audio amplifier.

In conjunction with these audio frequency chokes are used large by-pass condensers of 4 mfd. capacity each. These condensers are placed across the output of each of the plate impedances and the positive "A" battery line. These effectively prevent, when properly used with "B" lead chokes, any tendency of the amplifier to howl and distort, caused by the passage of currents through the common "B" battery with attendant disturbing coupling effect between stages. Properly constructed, the amplifier will give excellent reproduction; but conditions may be present in a home constructed receiver which will make distortion possible.

Therefore the use of the chokes and condensers precludes any possibility of such an occurrence. Owing to its construction, the choke has a self-capacitance of only 5 mmfds. with an inductance of  $3\frac{1}{2}$  henrys. Its direct current resistance of 640 ohms is low enough so that when the choke is used in series with the "B" battery it does not drop the plate voltage. In other words, its use in no way affects the battery consumption or the power output of the set.

Special attention is called to the use of large fixed condensers in the audio frequency end of the set. The coupling condensers used between the plate and grid circuits are of unusually large size, 1, 2 and 4 mfd. respectively. The result is that the lowest

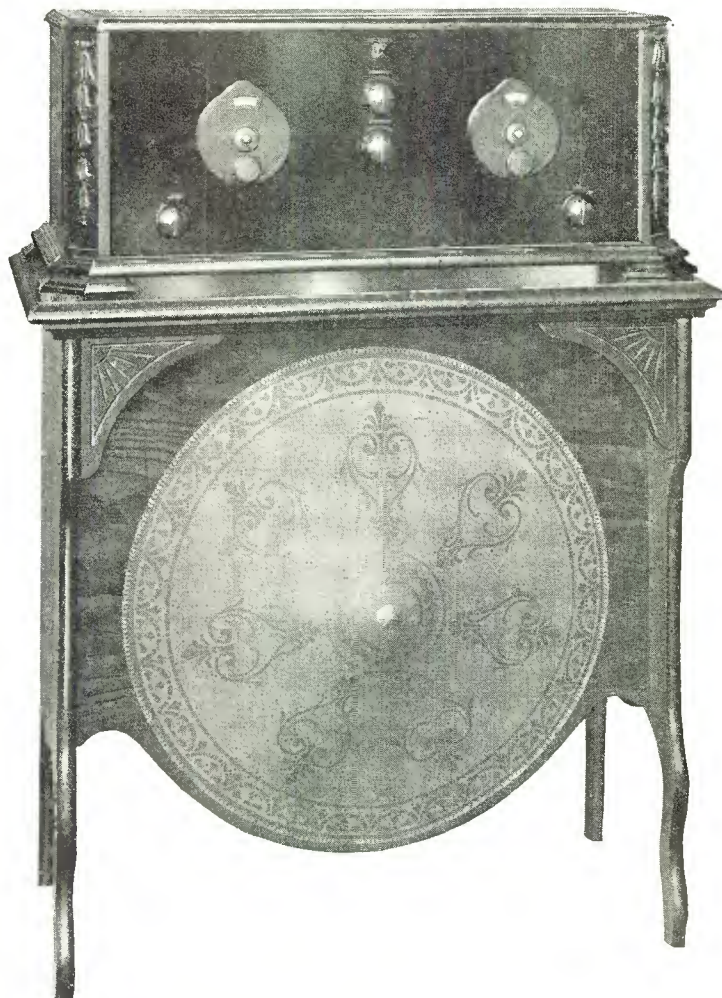


Photo A. Front view of receiver in cabinet with Windsor console cone loud speaker

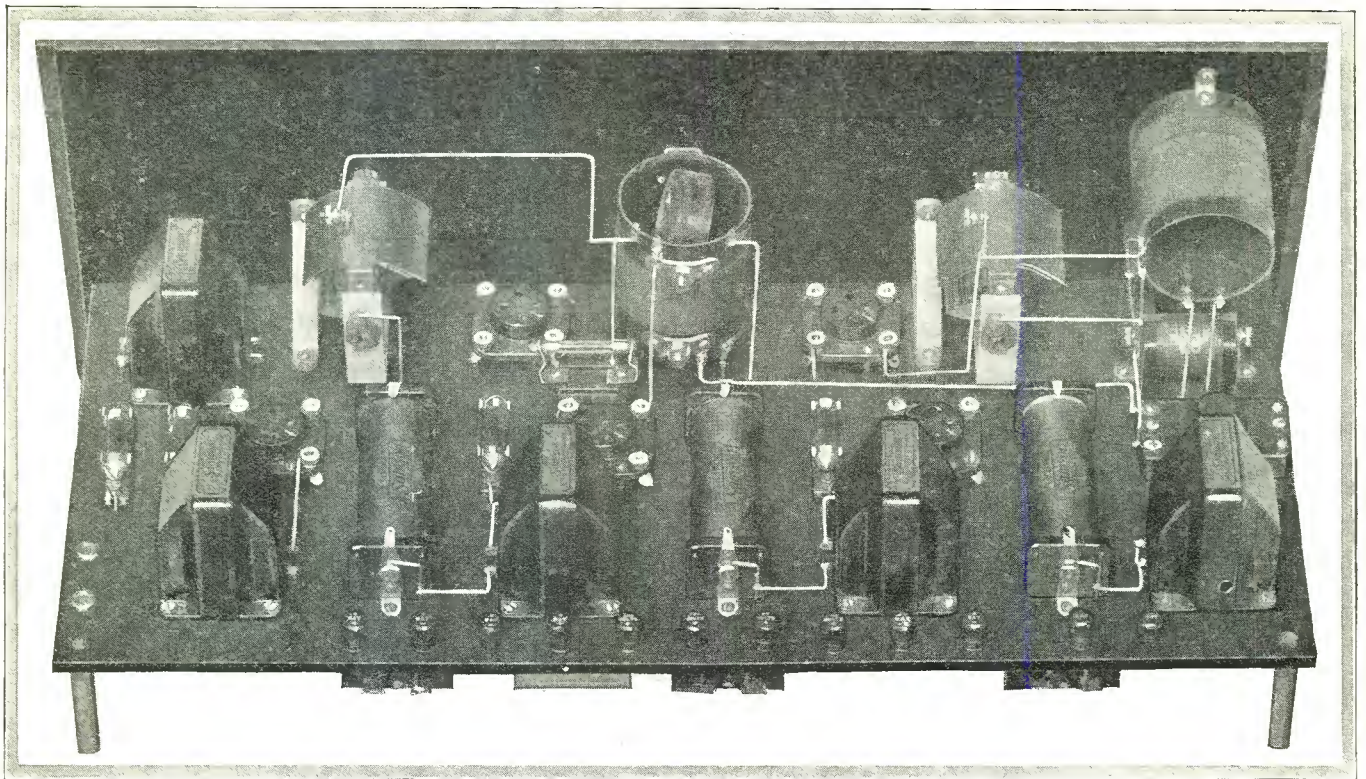


Photo B. Rear view of completely wired receiver

notes are passed by them, and the music which issues from the speaker retains all that background of double bass, drums, and low wood notes which is absolutely essential for perfect reproduction. The usual receiver loses these notes almost entirely. The condensers used for this purpose must be of highest quality. Their construction must be such so as to avoid slight leaks with corresponding noisiness and waste of current.

In place of the usual grid leak in the grid return of the last audio tube, an impedance is substituted for the resistance. Such an impedance leak is of value, particularly in this case, since the impressed signal is quite large. A leak of this type helps considerably to suppress blocking in the amplifier due to overloading the tubes. While this overloading is most likely to occur in the last stage of an amplifier, it may occur in other stages to a certain extent. Through the use of plenty of copper and iron in its construction, the grid impedance has ample inductance to prevent it from suppressing amplification of the low frequencies.

Unlike the average amplifier, an output impedance is used in this receiver. Its purpose is primarily to supply a path to the filament for the direct grid currents as well as to keep the high potential "B" current out of the speaker. This impedance obviates the necessity for an output transformer with its sacrificing of efficiency, especially in the amplification of low notes. The impedance is so designed that a tap is provided by which a speaker of incorrect impedance may be coupled to the last amplifier tube efficiently. The inductance of the unit is sufficiently high so that its efficiency is not impaired. Its use does not, in any way, decrease the efficiency of an amplifier as a transformer would in the same position.

Photo A shows receiver installed in a Fritts Super Cabinet made by D. H. Fritts Co., Hearst Square, Chicago. The console contains a very practical arrangement for the 22-inch type of cone type speaker and is finished in walnut and there is ample room in rear compartment to arrange all necessary accessories to operate the set. Made by the Windsor Furniture Company, Chicago, Ill.

(If any further information is desired regarding these accessories, kindly address the manufacturers direct.)

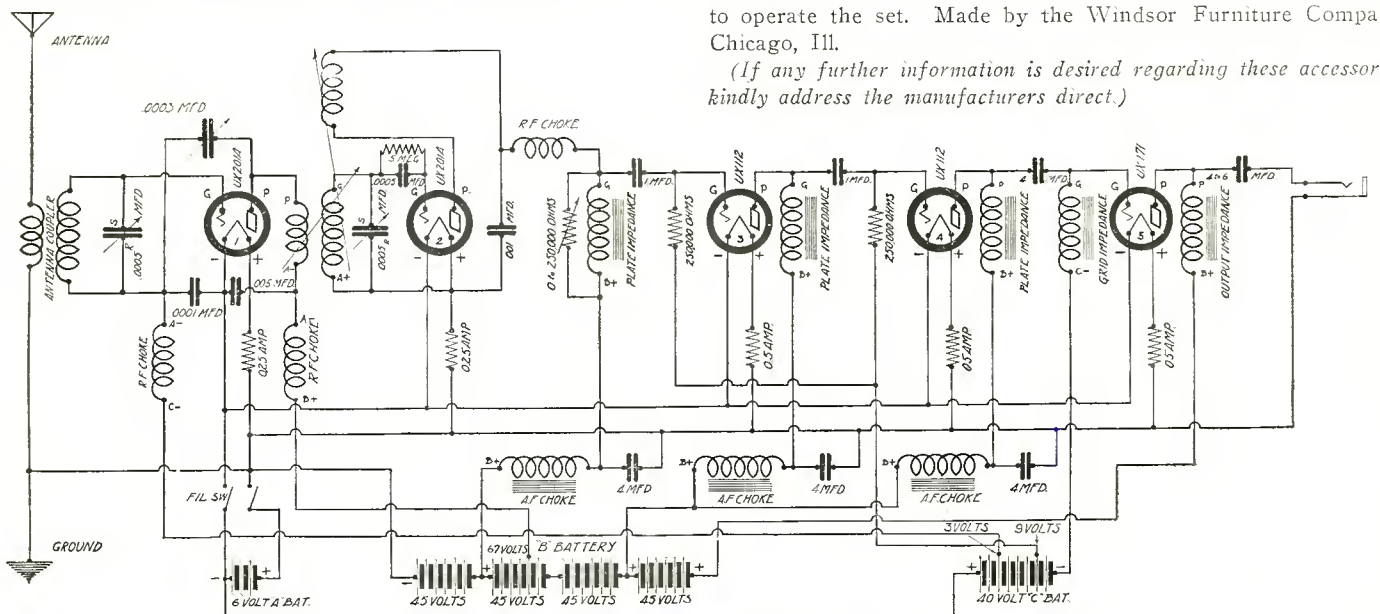


Fig. 2. Schematic wiring diagram

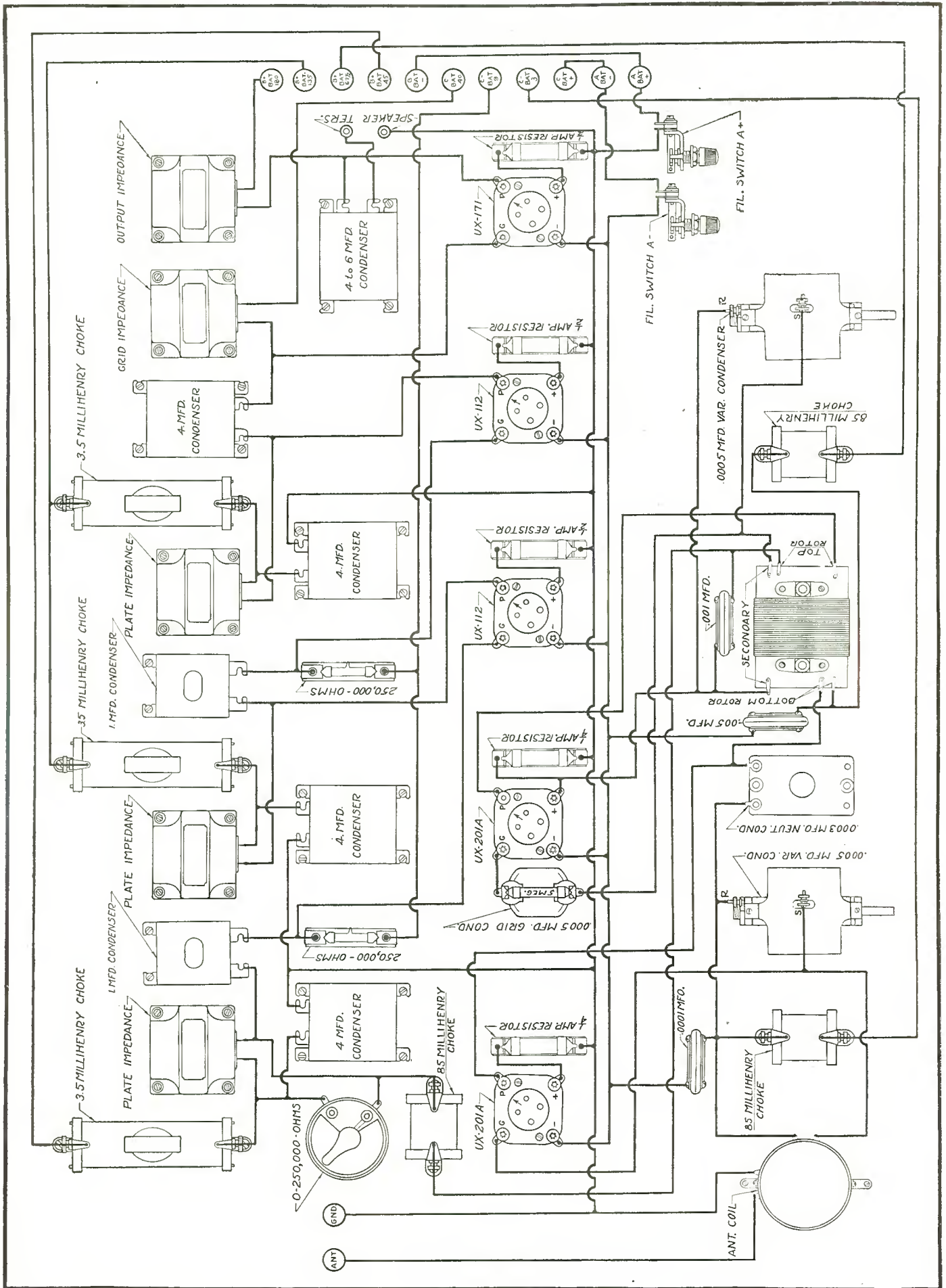


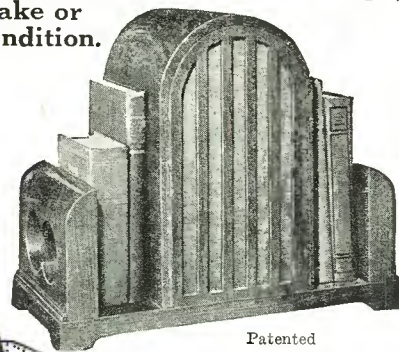
Fig. 1. Graphic illustration showing all connections

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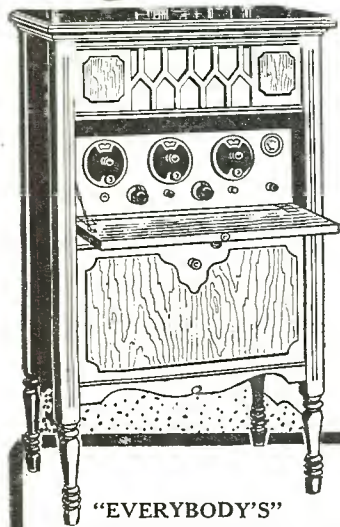
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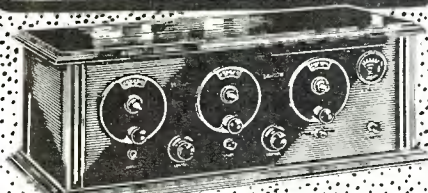
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Tell 'Em You Saw It in the Citizens Radio Call Book



# A Six-Tube Receiver Using Three Stages of Tuned Radio Frequency

This Receiver Is Extremely Selective and Has an Abundance of Available Power

Construction and all illustrations made in The Citizens Radio Laboratory

**I**N BUILDING a receiver the home constructor usually has a desire to incorporate three major desirable features, namely, selectivity, volume, and simplicity of construction. The herewith described receiver has these three most desirable features incorporated in its design and, if properly constructed, should give results sufficient to satisfy the most discriminating fan.

In considering the first of the foregoing mentioned desirable features, which is selectivity, a brief discussion on "What makes a set selective" will be made. First, the ability of the tuning condensers to give a frequency separation of operating stations sufficient to prohibit any jamming or heterodyning of the sta-

frequency transformer and interstage coupling, is reduced to the minimum, full 10 kilocycle separation may be obtained.

The essentials of a good radio frequency transformer depend upon the distributive capacity, resistance, and the amount of coupling in the transformer. The ideal transformer would have a very low distributive capacity and resistance and a very close coupling, but as ideals cannot always be realized, the constants must be proportioned relative to their merits. When the distributive capacity is high, the capacity reactance will probably be greater than the inductive reactance and the transformer will cease to be an inductance and have a condenser effect in the circuit. When the resistance is high, the signal is so impeded

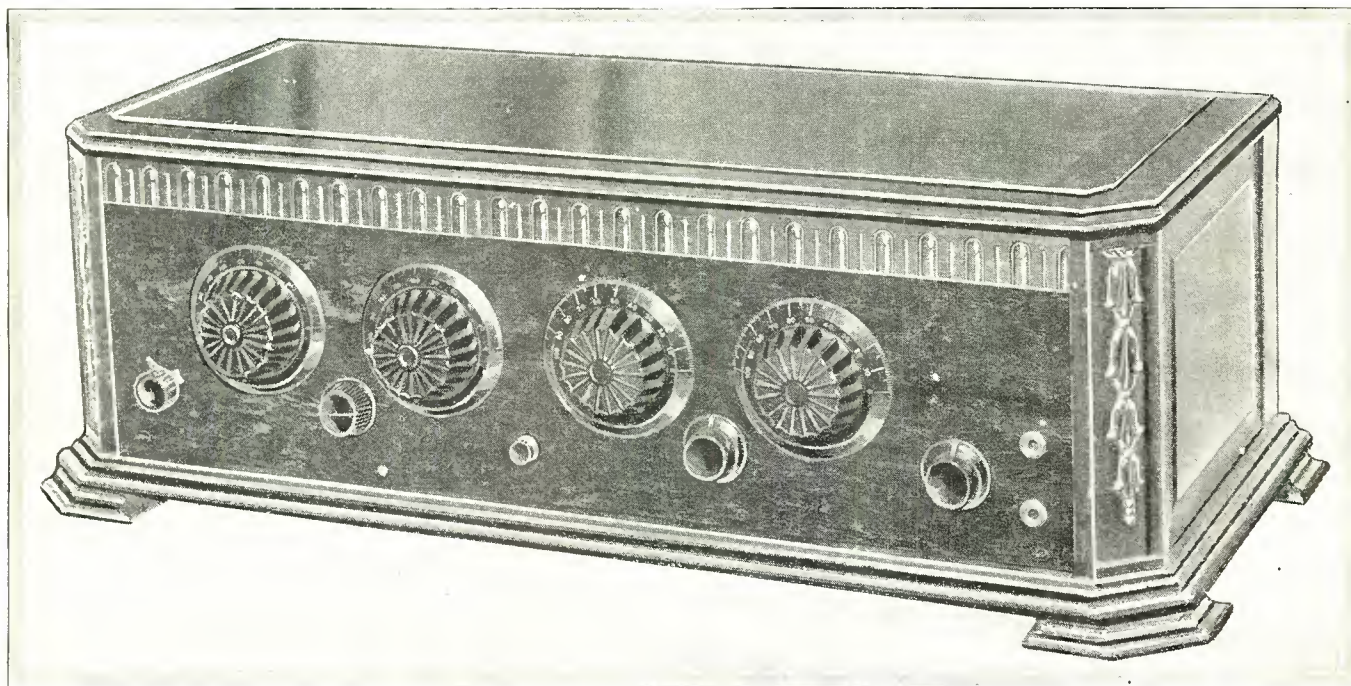


Photo A. Front view of receiver mounted in cabinet

tion's carrier wave within the tuned circuits of the receiver. Second, in addition to the tuning condensers' virtue of frequency separation, the design of the radio frequency transformers must be such that the losses be minute enough to permit the tuning condensers to retain their point of electrical efficiency. Third, that the interstage electro-magnetic coupling be sufficiently loose to permit a high gain factor per stage, to be used without danger of oscillation.

In considering the requisites of an efficient tuning condenser, several factors in the design must be considered: a mechanical construction that will insure continuancy of capacitance accuracy over a long period of time; electrical construction such that the frequency curve will be straight, or nearly so, in respect to the dial setting, and of low loss to permit of great enough efficiency for satisfactory operation. Condensers incorporating these features are generally known as the straight frequency line, grounded rotor type. This type condenser, when used with a good radio

that the amplification factor is undesirably low. Low resistance may be had by using a large diameter wire, but which increases the distributive capacity. By the use of adjacent winding, distributive capacity will be reduced, but the radio frequency resistance will be increased. The efficiency of a radio frequency transformer may be increased by the use of bare or enameled wire. As this method requires intricate and expensive methods of construction, the usual practice is to select a satisfactory medium of resistance and distributive capacity.

The question of coupling in radio frequency transformers is of great importance. If coupling is very tight, the receiver will tune very broadly and have a tendency to oscillate due to plate feed-back, and if the coupling is very loose, the transfer of energy is very small. The correct percentage of coupling is of a very critical nature and requires considerable experimentation to determine the correct values. The most satisfactory factors are selected and an efficient transformer may be produced.

The third essential of selectivity is that of interstage coupling. The regulation or elimination of interstage coupling is a very broad subject and requires considerable attention in a great many different ways. There are three ways in which coupling may be regulated or eliminated. One of the usual methods is in setting the radio frequency transformer at one angle or various angles in respect to the baseboard in such a way as to give zero

Volume, the second of the desirable features, may be accomplished by one of two methods, or both. Several stages of radio frequency amplification may be used, but when more than two or three stages are used, difficulty in control arises and is unadvisable. Three or more stages of audio frequency may be used, but suffers from distortion. The usual method is of selecting a moderate number of stages of radio frequency and audio fre-

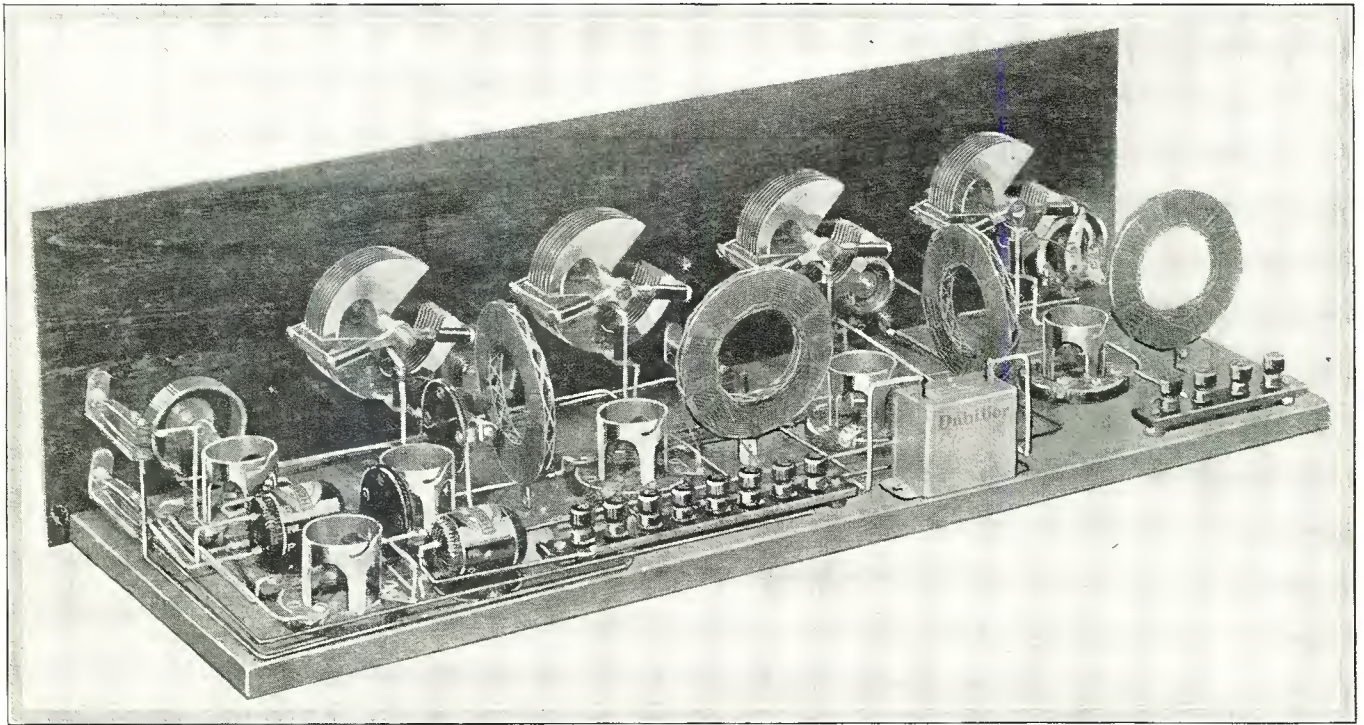


Photo B. Rear view of completely wired receiver

coupling. The objection to this method is that the angle of magnetic coupling changes with the tuned frequency. This will cause oscillation at various frequency settings. Another method is to place the transformer in a complete shield. This method is most desirable and very satisfactory results are obtainable, but it is not extensively used, due to the expense of construction. The most widely used method of regulating interstage coupling is to construct a transformer with a completely, or nearly so, enclosed field. This type of transformer is built in many different shapes and forms and the desired effect is obtained.

quency, whereby ease of control is obtained and distortion is absent.

The average constructor does not possess apparatus sufficient for intricate and expensive construction. Thus, the receiver which can be constructed in a simple and efficient manner finds favor in the home construction field.

The herein described receiver has been designed with the foregoing features in mind. This receiver consists of three stages of tuned radio frequency, detector, and two stages of audio frequency. The condensers used in tuning the three stages of radio

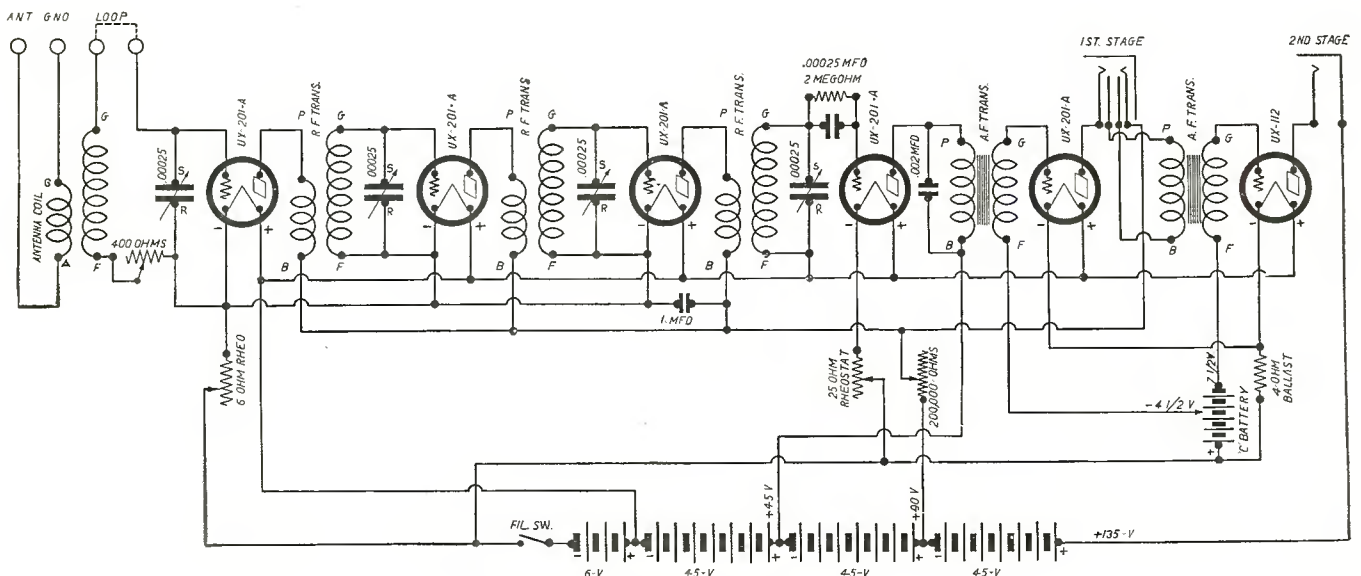


Figure 1. Schematic wiring diagram

frequency and the detector contain the desirable features as mentioned in the foregoing discussion on condenser design, and are made by the Premier Electric Company. These condensers have a maximum capacity of 250 mfd. The radio frequency transformers are of the confined field type, being wound in the self-supporting spiderweb form, and reduces the interstage magnetic coupling to a minimum. Premier sockets are used throughout. These sockets will accommodate tubes with either the old type base or the new UX type base. Hedgehog audio frequency transformers are used. Both transformers have a four to one ratio and are completely shielded, which reduces distortion to a minimum, yet retains sufficient volume for general use. A .0005 mfd. Premier fixed condenser is connected across the primary of the first audio frequency transformer, which will by-pass any stray radio frequency currents which may come through the

binding posts are provided whereby a loop antenna may be placed in the secondary circuit of the first stage of radio frequency, thus making the receiver either loop or antenna operated.

For details of circuit connections, reference is made to the schematic wiring diagram illustrated in Fig. 1. Fig. 2 is a graphic illustration of all connections to the actual parts in use.

LIST OF PARTS

- 1—7x26x3/16-inch Radion Drilled and Engraved Front Panel
- 1—9x25x3/4-inch Wood Baseboard
- 4—Premier .00025 Crofoot SLF Condensers
- 4—Premier "Tran" Radio Frequency Transformers
- 4—Radion 4-inch Dials
- 2—Premier 4-1 Hedgehog Audio Frequency Transformers

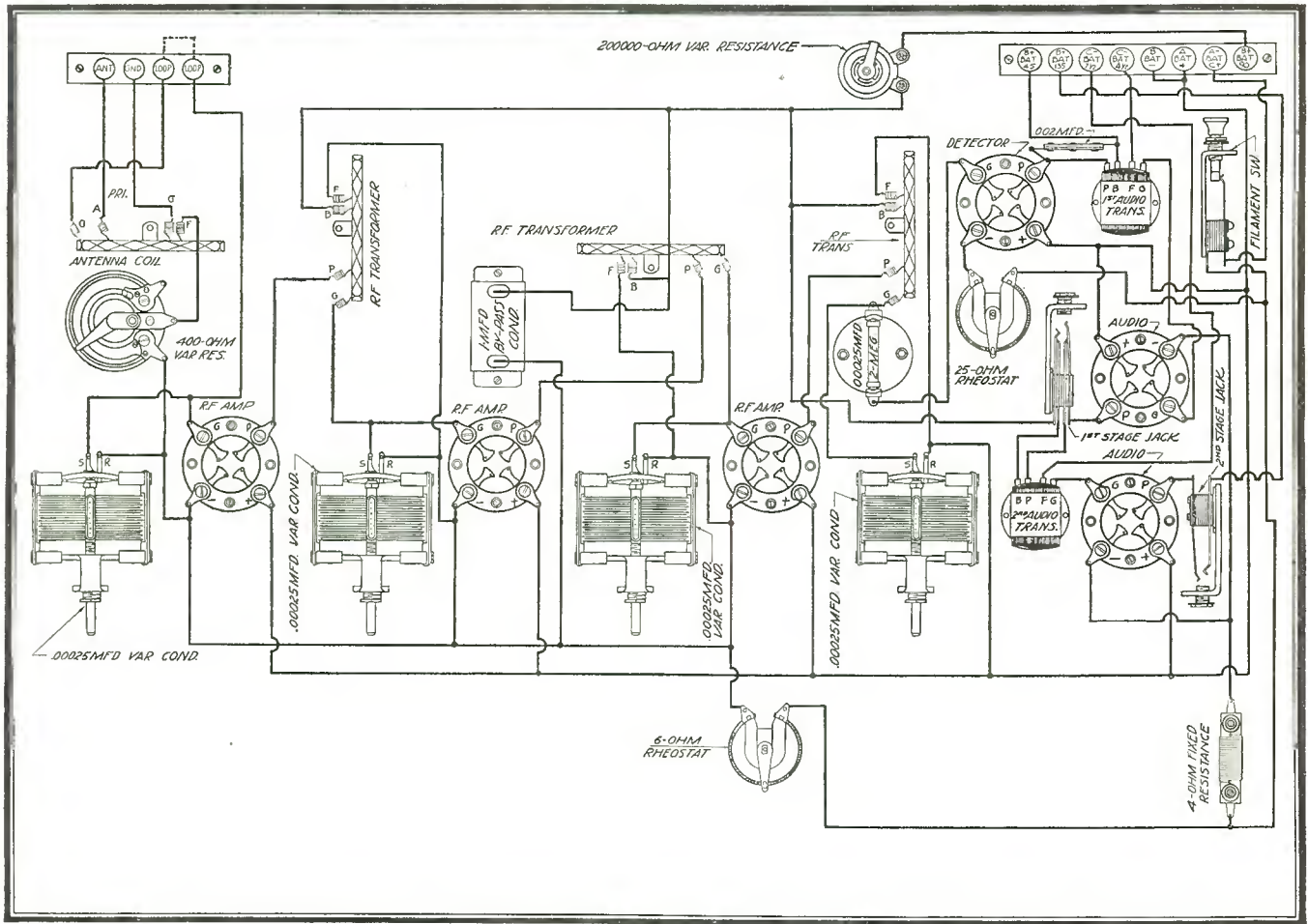


Figure 2. Graphic illustration

detector tube. A Dubilier 1 mfd. by-pass transformer is shunted across the "B" battery for the purpose of keeping radio frequency currents out of the batteries, which would have a tendency to cause the set to oscillate. Two Premier jacks, one a closed circuit jack in the output of the first stage of audio frequency and the other an open circuit jack in the output of the second stage of audio frequency, are used. The filament switch is a Premier jack type switch. A Premier 25-ohm "Arctic" rheostat is used in the negative filament lead of the detector. A Premier 6-ohm "Arctic" rheostat is used in controlling the filaments of the three stages of radio frequency. A 400-ohm Premier potentiometer is used in the grid return of the first stage of radio frequency. A 4-ohm fixed resistance is used to control the filament voltage of the two audio frequency tubes. A Carter 200,000-ohm Variable Resistance is used in the plate circuit supply of the three radio frequency tubes and first stage of audio frequency amplification as a volume control. Two

- 1—Premier Type No. 5 .00025 Grid Condenser with Prongs
- 1—Premier Type No. 4 .0005 Fixed Condenser
- 1—Dubilier Type No. 908 1-mfd. By-Pass Condenser
- 1—Premier "Arctic" 25-ohm Rheostat
- 1—Premier "Arctic" 6-ohm Rheostat
- 1—Premier Type No. 2 1/2-ampere Filament Resistor
- 1—Premier Universal Type No. 131 Jack
- 1—Premier Universal Type No. 133 Jack
- 1—Premier Cam Switch
- 1—Premier No. 30 400-ohm Potentiometer
- 1—Carter 200,000-ohm Variable Resistance
- 1—Dubilier 3-megohm Grid Leak
- 12—Engraved Eby Binding Posts
- 2—Bakelite Strips for mounting binding posts
- 3—Rheostat Knobs
- 4—4-inch Bakelite Dials
- Miscellaneous Screws and Wire

# The Improved Infradyne Receiver

Here Is a Revised Infradyne Incorporating Extensive Developments,  
Greatly Adding to the Efficiency of This Receiver

This Receiver Was Constructed and All Illustrations Made  
in the Citizens Radio Laboratory

**T**HERE appeared in the last issue of the CITIZENS RADIO CALL BOOK complete construction details of the Infradyne Receiver. Considerable time was spent before publication in developing a set which was easy to build, balance and operate. However, certain difficulties have been experienced by constructors in assembling the receiver and placing it in operation. These difficulties have been carefully examined, and the means of overcoming them found by careful experimentation in our laboratory. We now offer an Improved Infradyne Receiver which incorporates the following changes:

For tuning the two stages of radio frequency and the first detector, a Cardwell, balanced rotor, triple gang, condenser of the straight frequency line type is used. In conjunction with this gang condenser, there are two trimming or compensating con-

socket, and the oscillator socket has been placed in back of the oscillator tuning condensers. In other words, the oscillator socket and the oscillator coil have been reversed in their respective positions. The resonate frequency of the Infradyne amplifier has been changed from that of 95 meters or 3,200,000 cycles to 86 meters or 3,490,000 cycles. A Jones Multiple Plug has been placed on top of the sub-panel.

When an incoming signal, or frequency, is combined with a locally generated frequency, there are two resultant frequencies generated in the circuit. The two frequencies are, namely, "the difference of the frequencies" and "the sum of the frequencies."

Heretofore, "the difference of the frequencies" has been the only one that has been put into practical use, which has been due largely to the supposition that a low frequency could be

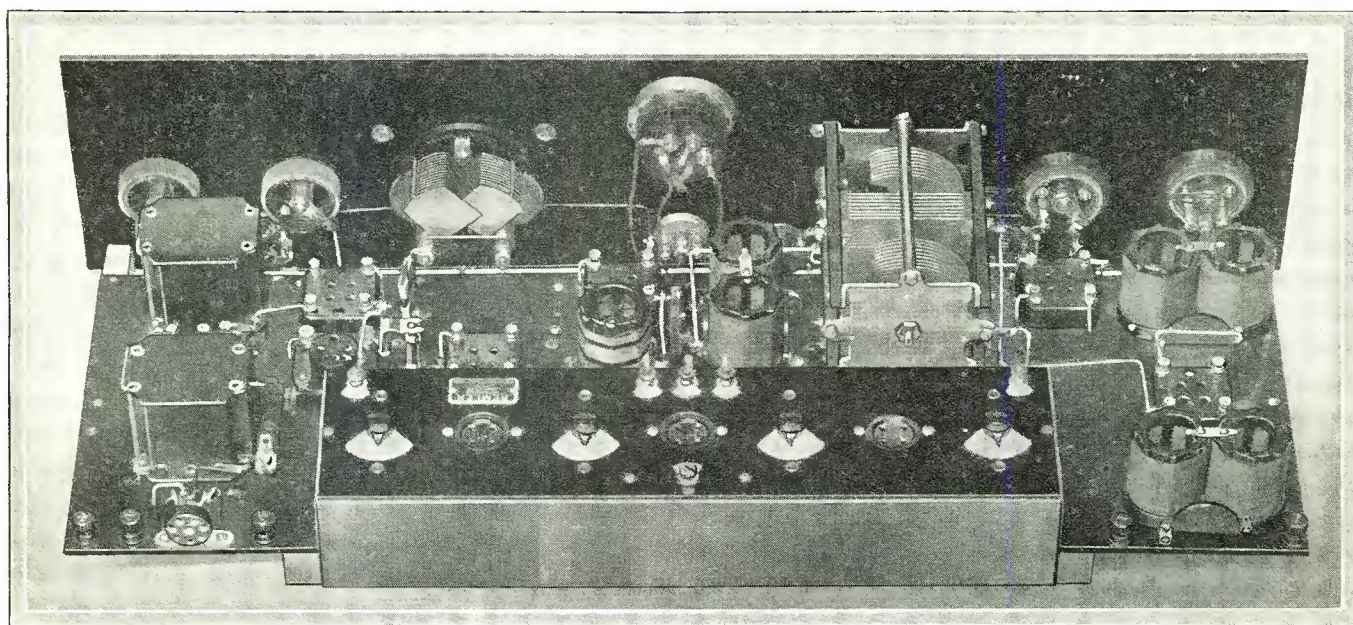


Photo A. Rear view of receiver removed from cabinet. Note simplicity of arrangement of parts and absence of unsightly wiring

densers used on the two stages of tuned radio frequency. By the use of these trimming condensers, it is possible to compensate for any discrepancy in the three gang condensers, at any dial setting. Also on a very sharp signal absolute resonance may be obtained by the use of these condensers. These trimming condensers are of precise make, three plate, .00001 mfd. capacity, and mounted directly on the front panel on either side of the wavelength dial. Electrad rheostats are now used throughout, and are of the Bakelite shell type and have a very high heat-dissipating factor. Electrad and Sangamo by-pass and blocking condensers are also used throughout the Receiver.

The test jack in the plate circuit of the first detector has been discontinued. This jack was formerly used in the balancing of the gang condenser, but due to the advent of the two trimming condensers, it has been found unnecessary. Amertran De Luxe Audio Frequency transformers are used. The Yaxley pup jacks are used on the first and second stages of the Audio Frequency. A slight change has also been made in the sub-panel layout. The oscillator coil has been moved directly in back of the first detector

much more easily controlled than a high frequency. For this reason the exact value of "the sum of the frequencies" method had never been realized or exploited to any great extent.

The greatest objection to "the difference of the frequencies" method is very probably due to the characteristic action of the method which causes the oscillator to be subjected to harmonics, which causes the reception of long wave code stations on the harmonics of their fundamental wavelengths, "arc mush," and the commonly called repeater action, or the reception of one station on more than one setting of the oscillator dial.

In the Infradyne circuit "the sum of the frequencies" method is used to many advantages over "the difference of the frequencies" method. Actual tests in our laboratory have shown that only one dial setting of the oscillator is used for each station of the same wavelength, which avoids the usual undesirable repeater actions so common to receivers of this type. When properly balanced the method employed in the Infradyne amplifier has the faculty of eliminating harmonics of double or treble the wavelength of the station being received. The Infradyne amplifier

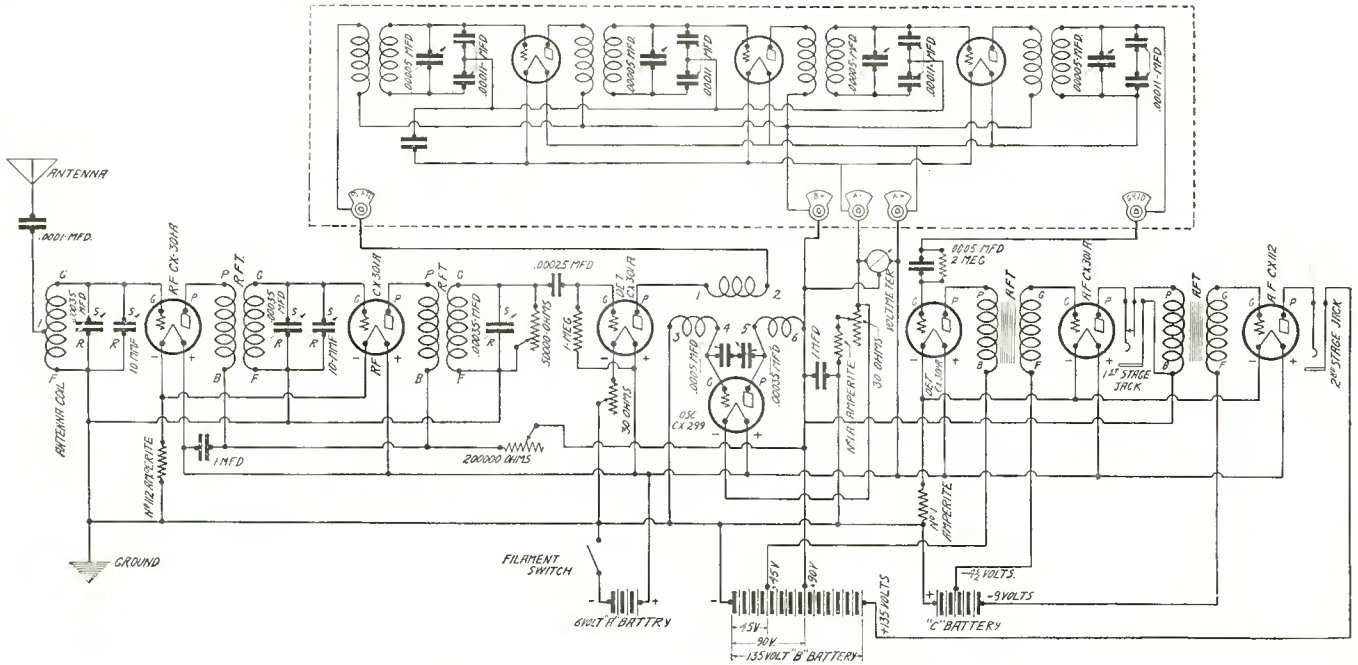


Fig. 1. Schematic wiring diagram of completed receiver

is very sharply resonated at 86 meters. From this fact it is obvious that the amplification of any other frequency is very low, which means that tube noises, etc., being of much lower frequency, or higher wavelength, will be amplified very little, if any at all.

There are ten tubes used in the, herewith described, Infradyne Receiver, two stages of Tuned Radio Frequency, first

detector, oscillator, three stages of Infradyne intermediate amplification, second detector, and two stages of Audio Frequency amplification. It is self-evident that with the incoming signal passing through two sharply tuned stages of radio frequency, that it is in a high state of amplification before reaching the Infradyne intermediate amplifier and the audio frequency amplifier. (Continued on Page 184)

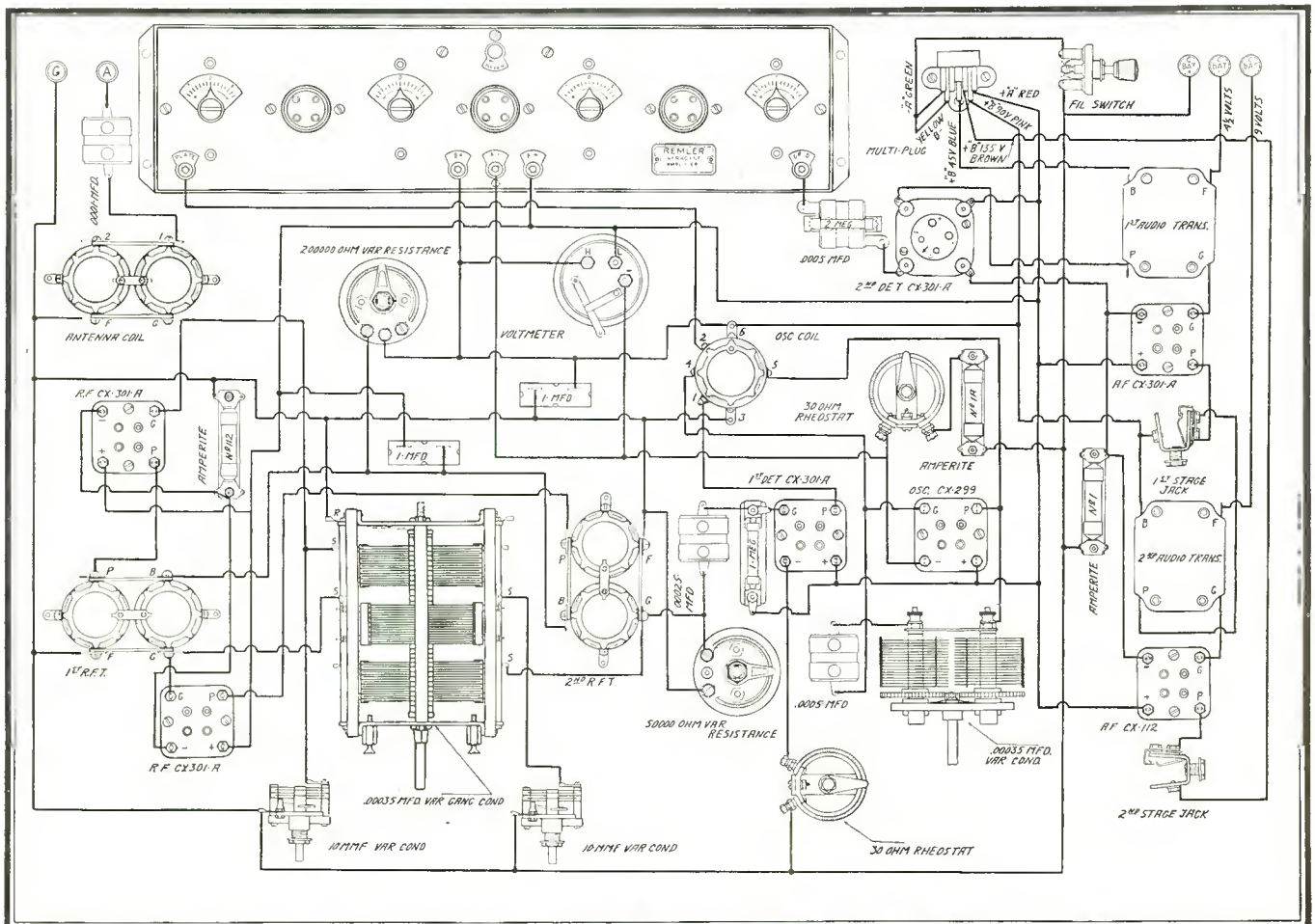


Fig. 2. Graphic illustration showing in a pictorial manner all the necessary connections for properly wiring receiver

# SM

# Build YOUR Infradyne Right.

The S-M parts illustrated on this page have been selected by the inventors of the "Infradyne" as the only ones ideally suited to the "Infradyne." In building *your* Infradyne take advantage of the months of experimenting and research work of the inventors and insure success by using the parts they have endorsed above all others.

Prices 10% higher west of the Rockies

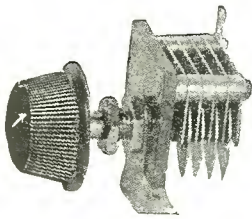
**Silver-Marshall, Inc.**

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CHICAGO, U. S. A.

Do you know the secret of quality reproduction?

Have you your copy of "The Secret of Quality"? It tells how to get the most out of your audio amplifier—how to get real quality. It contains laboratory data never before available even to many manufacturers. It is one of the few authoritative treatises on all types of audio amplification written in non-technical language ever published.

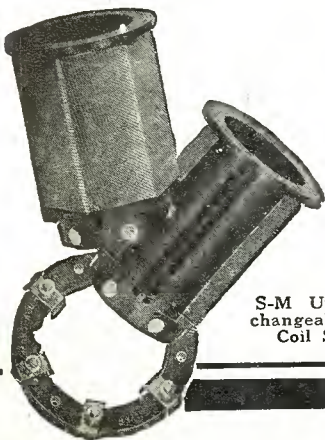
It's free! Ask your dealer for a copy.



S-M Compensating Condenser, \$1.50



S-M 220 Audio and 221 Output Transformers, \$6.00 Each



S-M Uniformly Interchangeable Coils, \$2.50  
Coil Socket, \$1.00



## A STATEMENT FROM THE INVENTORS

THE Infradyne circuit, as originated by us, was first described in August, 1926, "RADIO" While we have no connection with this magazine, Mr Sargent has agreed to write exclusively for it under his own name concerning the circuit. Otherwise our co-operation is freely given to anyone interested in its development and sale. We alone are responsible for the selection of the Infradyne principle. This recommendation is based upon our personal experience and will be adhered to without change for at least six months. Consequently the parts specified herewith may be safely used in building the set. As the art progresses there may be new recommendations of parts perhaps better adapted to the peculiar needs of this circuit.

(Signed) E. M. SARGENT,  
L. C. RAYMENT.

### HERE IS THE LIST OF SPECIFIED PARTS

- 1 Remler Infradyne Amplifier
- 1 Central 31/2CL Tenth Condenser
- 1 Remler No. 500 0005 Fixed Condenser
- 1 Silver-Marshall Vernier Condenser, No. 110
- 1 Silver-Marshall 110 R. Inductance Coil
- 1 Silver-Marshall 110 R. Audio Transformer
- 1 Front No. 110 50,000 ohm Variable Resistance
- 1 Centralab 200 000 ohm Variable Resistor (see text)
- 1 set (31) Centfield Transformers
- 2 National Type R. CCW Dial
- 1 Front 30 ohm Baseband Rheostat
- 1 Front 30 ohm Fixed Mount Rheostat
- 1 Front Single Plug Jack
- 1 Front Single Open Jack
- 1 Bureau LK Type Cushion Sockets
- 2 Ampette, No. 112
- 1 Ampette, No. 1A
- 1 Howell Voltmeter, Pattern 135. 05
- 1 Durham 1 meg. Grid Leak
- 1 Durham 2 meg. Grid Leak
- 1 Durham Grid Leak Mounting
- 1 Eddy Element Switch
- 1 Tube 60075 Fixed Condenser
- 1 Tube 60075 Fixed Condenser
- 2 Tube 1 mid. Fixed Condenser
- 2 Eby Binding Posts
- 1 Jansz Plug and Cable
- 1 Panel, 3/16" x 2 1/2"
- 1 Baseboard, 3/4" x 1 3/4"
- 1 Cabinet
- 1 Set Official Blueprints by L. C. Rayment



E. M. SARGENT and L. C. RAYMENT, 721 MCKINLEY AVE., Oakland, Calif.

# A Completely Shielded Single Control Receiver

Here Is a Modern Shielded Receiver Which Is Remarkably Sensitive and Stable in Operation

**T**HE complete shielding of a receiver, in the past, has been strictly confined to only those receivers which were manufactured commercially in plants where production methods were employed. Home constructors found it exceedingly difficult, if not impossible, to shield receivers, due to the lack of exact information on the proper application of electrostatic and electromagnetic shielding as well as the great difficulty in properly forming the metal and assembling it.

The amazing increase in sensitivity of receiver designed during the past year, coupled with the introduction of high power in broadcast stations has made it imperative that a great amount of attention be given to the question of proper shielding. It is a well known fact that enough energy may be picked up by the radio frequency coils in a receiver to broaden the tuning and cause interference with stations operating on adjacent wavelengths. In addition to this, a trouble inherent with tuned radio frequency receivers is the inter-stage coupling between transformers. Placing the coil at certain angles sometimes relieved the interaction, but usually the angle was one of precision and difficult to maintain. Hand capacity and audio frequency feedback were also encountered.

These objectionable features are readily eliminated by the use of proper shielding. It is not sufficient to simply place sheets of metal in a haphazard manner around the instruments in order to obtain beneficial results. The problems at hand must be carefully considered and the best method of arriving at a solution determined from an engineering standpoint.

With the use of proper shielding, the construction of three- or four-stage tuned radio frequency amplifiers is possible, due to the removal of stray capacity and inductive coupling, perfect neutralization is obtainable and the number of major tuning controls easily reduced to two.

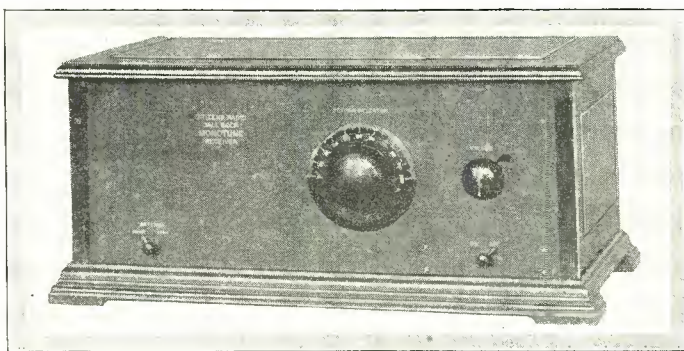
The receiver described herewith is probably the first type of

thoroughly shielded five tube radio frequency receiver ever made available to the home constructor that might be easily built in the home workshop. The general design and aspect of the receiver in itself is not new, since many of the finest radio sets of today, as produced by the leading manufacturers in this country, incorporate the major features of this particular outfit, which is known as the Monotune Receiver.

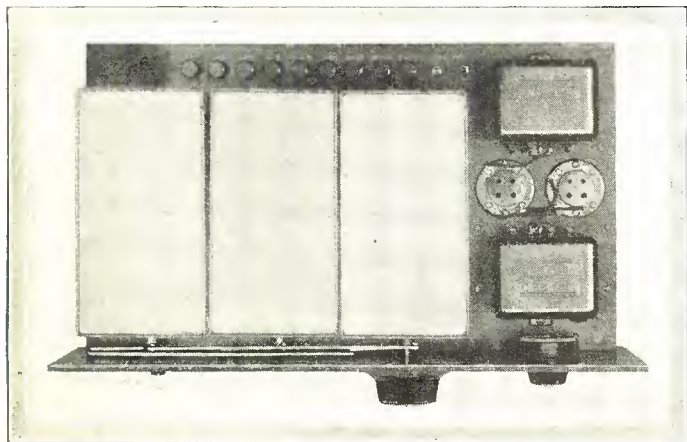
The Monotune Receiver contains five tubes, the circuit consisting of two stages of tuned radio frequency, a detector and two stages of transformer coupled audio frequency amplification. Only one major tuning control is used. This consists of the mechanical coupling, by means of a link motion, of the tuning condensers in such a manner that they operate as one. An antenna switch is provided so that either a long or short aerial may be used or the relative degree of selectivity of the receiver coarsely regulated. A twenty-ohm rheostat in the filament lead of the first radio frequency tube serves as a very efficient volume control.

Unlike the average set which may be built by the home constructor, this receiver is mounted on a 10x17½-inch Formica sub-panel that is supported on brackets fastened to the front panel. Along the rear edge of the sub-panel are located nine binding posts. All external connections, batteries, antenna and ground, are made to these posts, while the speaker is connected to the receiver by a pair of pin jacks located beside the binding posts. Thus, no wires appear upon the front panel; even the loud speaker connections are taken from the rear.

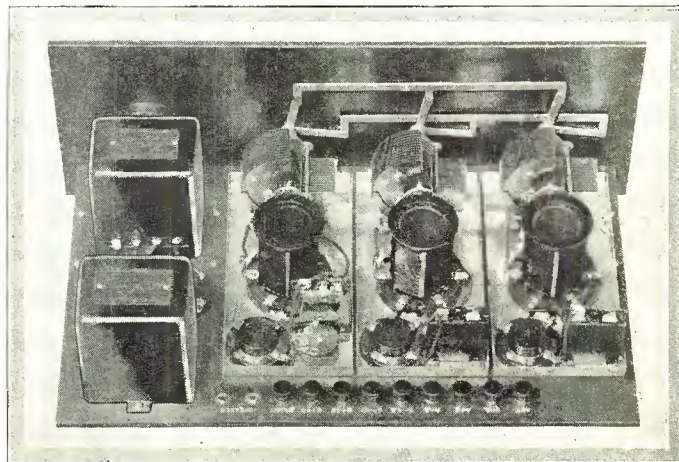
At the front of this sub-base are three aluminum stage shields, each containing one of the three radio frequency circuits of the receiver. This type of shielding is particularly advantageous, for not only does it prevent coupling of the various circuits housed in the separate shields, as well as eliminate entirely the pick-up



Front view of receiver mounted in cabinet



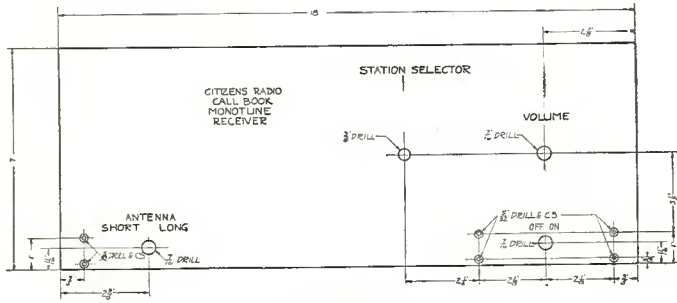
Top view, showing shields in place



Rear view of receiver with shields removed

of outside disturbances, but it does this in a much more effective way than ordinary shielding. This is because, where two circuits are isolated only by a single thickness of metal, circulating currents are frequently set up in the metal shielding by one circuit and transmitted to the second circuit. In the case of the Monotune Receiver, due to the use of two separate walls between each circuit the possibilities of circulating currents in one shield being communicated through another shield to the other circuits is very effectively obviated.

In each one of these stage shields is contained a specially constructed type of condenser which gives practically straight line frequency tuning over the upper range of the dial or on



Panel layout

the lower wavelengths and gradually verges into straight line wavelength tuning on the lower dial readings, or the higher wavelengths. The use of this type of tuning allows of maximum ease of adjustment, both in the hands of inexperienced and experienced users.

The condensers are very solidly fastened to the Formica sub-panel as well as to the bottom section of the stage shields in such a manner that their positions cannot alter and that their capacities may not change appreciably over long periods of time.

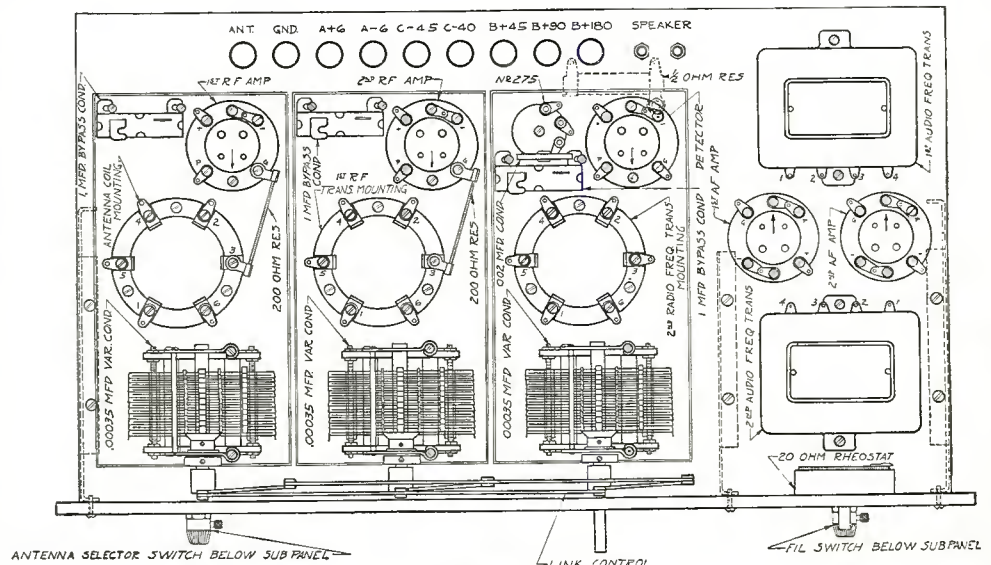
Particular attention has been given the designing of the inductance coils so that their uniformity will be constant at all times and that their inductance will not vary appreciably. These coils are interchangeable and are plugged into six contact sockets located in the respective stage shields. Thus, if a coil is damaged or in any way injured, it may be easily removed and a new one substituted. Further, the possibility for seasoned experimenters of constructing special coils, say, for the European wavelength ranges, is thus left open.

In each of the two left-hand R. F. amplifier shield compartments there are located, in addition to the tuning condensers and inductance coils, a tube socket, a by-pass condenser and a stabilizing resistance. In the detector compartment practically the same equipment is located except that instead of the stabilizing resistance there is a small choke coil which aids in isolating the radio frequency and audio frequency portions of the circuit.

All metal work in the receiver, as well as the shields themselves, are grounded and connected to negative "A." The antenna lead feeds in through the small antenna control switch to the primary of the modified antenna coupling coil, which is known as type No. 116-A. The coil used in this receiver differs from the regular type No. 116-A coil in that a different 1-2 winding is used. This new winding consists for 9½ turns of No. 24 double silk covered wire, wound in the same direction as the 3-6 wiring. The primary of the No. 116-A coil is tapped so that adjustment can be made for either a short or a long antenna. This also means that if only one size of antenna is used the selectivity of the receiver can be altered at will within certain limits by using one or the other of the two positions of the antenna switch in operation. The second-

ary winding of this antenna coupling coil is exactly similar to the secondary of all the other transformers and consists of a winding of enameled wire upon six supporting ridges of a bakelite coil form. These ridges are threaded and the turns of the winding spaced in a uniform manner. The shape of the coil is such that practically maximum advantage is taken of every possible factor contributing to efficiency. One very interesting feature is the location of this coil directly upon the bottom of the stage shield, separated from it only by the thickness of the coil socket. This spacing has been very carefully worked out and results in effective oscillation control at the lower end of the wavelength range and a pronounced increase in efficiency toward the higher end of the wavelength range; for the radio frequency resistance of the grid circuit actually is lower at 500 meters with the coil shielded than it is with the coil unshielded.

The function of the stabilizing resistance referred to above is to secure uniform amplification over the entire wavelength range of the receiver. This resistance combines two effects—one inductive and the other resistive. The theory of the operation is that in any tuned R. F. receiver as the wavelength at which it is operated decreases, the tendency to oscillate increases. This is obviously an undesirable condition, inasmuch as maximum amplification will be obtained only with a uniform amount of regeneration at all wavelengths, which is impossible without some means of compensation. The stabilizing resistance is placed in the grid circuit of the first and second radio frequency tubes and is of such electrical characteristics that the radio frequency resistance increases fairly rapidly as the wavelength at which the receiver is operated decreases. In this manner these resistances serve to even up the amplification over the entire wavelength range and to allow the receiver to be operated in an extremely sensitive condition both at the high and low ends of its range. The resistances alone are not depended upon for adequate oscillation control. A small tickler winding is used in each stage which serves to control regeneration in that stage, since each stage is individually so designed that without the resistance considered it would be in an oscillating condition. Careful experimentation has formed the combination of grid resistance, and the small tickler coil results in a receiver not only stable over its entire wavelength range, but one which operates at practically peak efficiency at all wavelengths. The audio frequency amplifier incorporates a pair of extremely heavy audio transformers designed with a rising low frequency characteristic. This means that they will provide maximum amplification and maximum power handling capacity at low frequencies in a neighborhood of 30 cycles and that the amplification will fall off gradually as the frequency increases. The use of these transformers overcomes the variations in broadcasting and other discrepancies in loud speaker design so that a surprisingly faithful reproduction is obtained from the receiver as



Baseboard layout



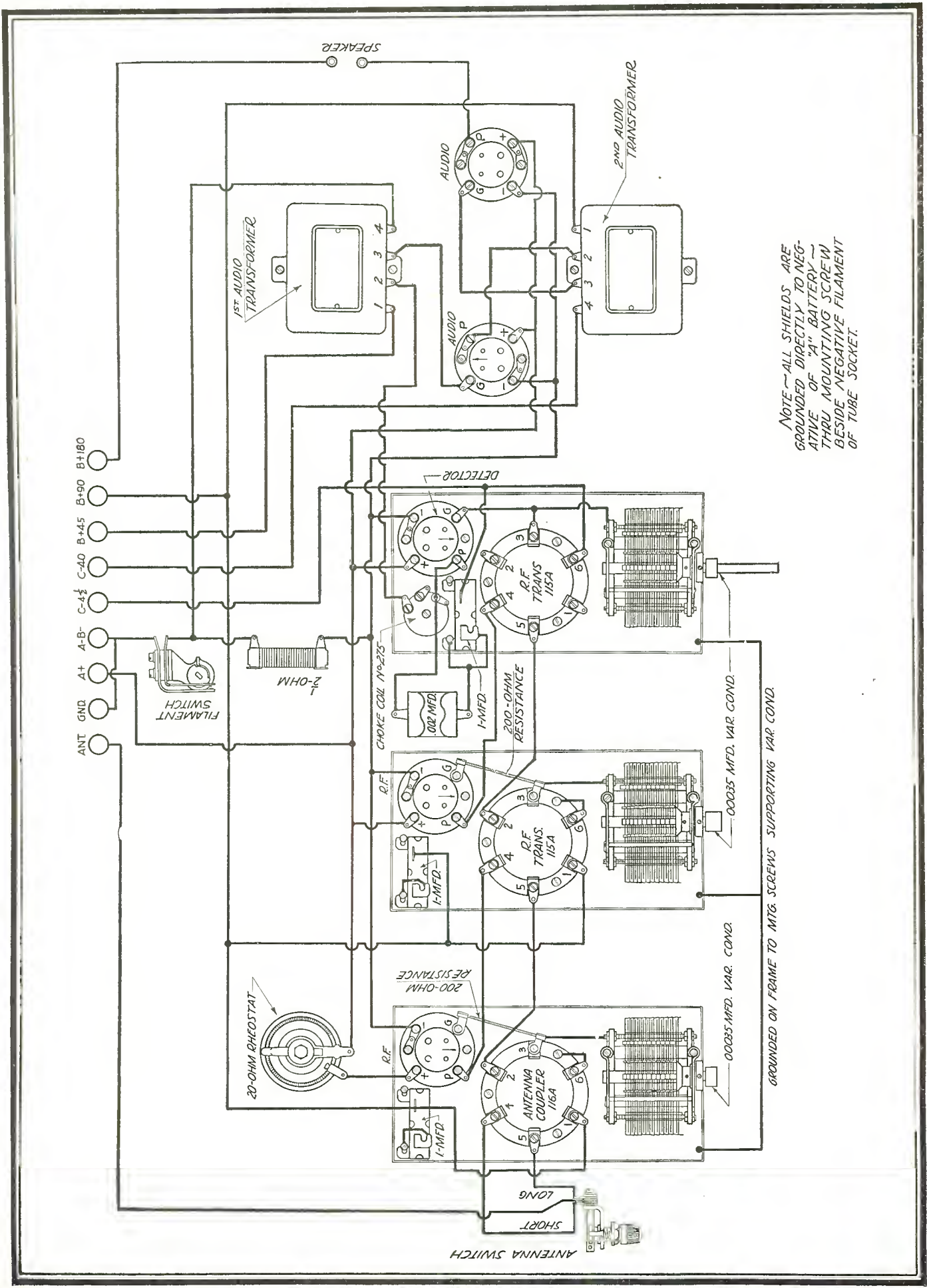


Fig. 3. Graphic illustration showing all connections

judged by the human ear.

UX 201-A tubes are used throughout the receiver up to and including the first audio frequency amplifier. The second stage of audio frequency amplifier uses a UX 171 power tube. It is advisable that as high a voltage be used on the output so as to insure that maximum quality of reproduction will be obtained.

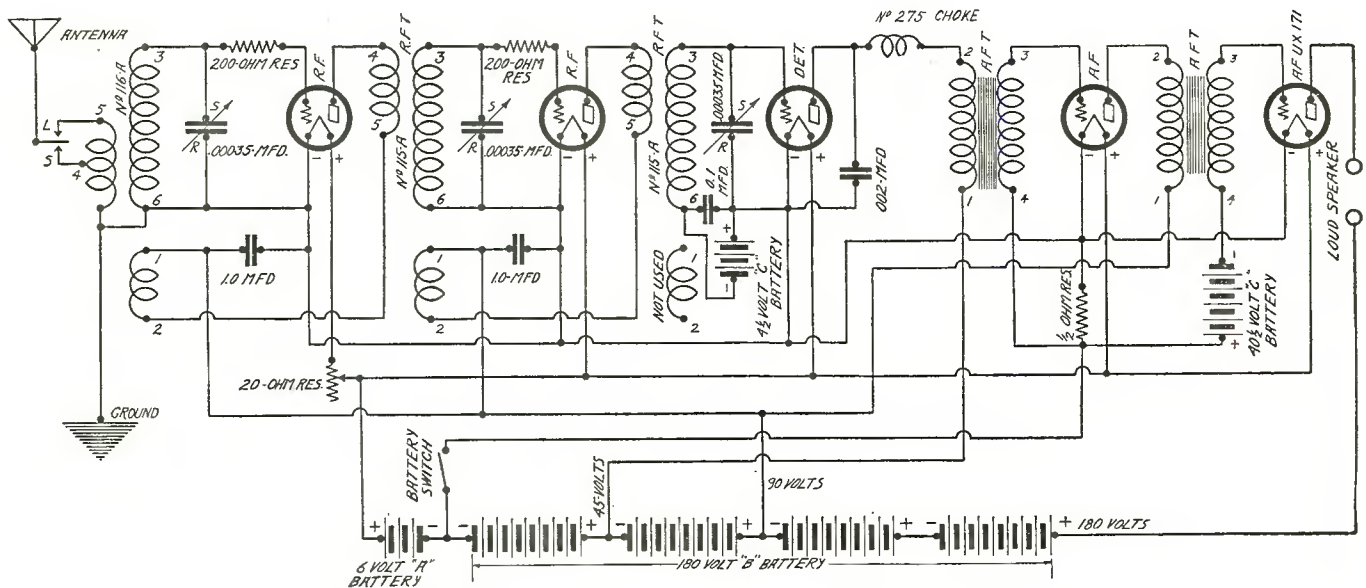
### LIST OF PARTS

These components or their equivalent may be used for satisfactory results:

- 1—7x18x3/16-inch Drilled Engraved Formica Panel
- 1—10x17½x3/16-inch Drilled Formica Sub-Panel
- 2—S-M Type 220 Audio Transformers
- 5—S-M Type 511 Sockets
- 3—S-M Type 631 Stage Shields

in mounting the parts—that is, in respect to the variable condensers. It is barely possible that after they have been mounted a strain may have occurred which will pull the plates slightly out of alignment. If it is noticed that as the rotary plates are rotated there is a tendency for them to come closer to one side of the stationary plate than the other, it will be necessary to adjust the positions of the stator plate sections so that each rotor plate will center up between its two adjacent stator plates, when viewed from above. The necessary adjustment of the position of the stator plate sections may be made by loosening the nuts to be found on either side of the bakelite supporting strips, these nuts being actually on the tie-bars of the stator plate. This will allow the shifting of the entire stator plate sections to any desired position, where they may be locked by means of these same nuts.

One precaution must be observed in wiring. The two wires



Schematic wiring diagram

- 3—S-M Type 515 Coil Sockets
- 2—S-M Type 115-A Coils
- 1—S-M Type 116-A (Modified)
- 2—S-M Type 316-A Condensers
- 1—S-M Type 316-B Condenser
- 1—S-M Type 275 Choke
- 3—S-M Type 540 Brackets
- 1—Yaxley 20-ohm Rheostat
- 2—Yaxley Tip Jacks
- 1—Yaxley ½-ohm Resistance
- 2—Yaxley 200-ohm Resistances
- 1—Yaxley Type 10 Switch
- 1—Yaxley Type 11 Switch
- 3—Polymet 1-mfd. By-Pass Condensers
- 1—Polymet .002 Fixed Condenser
- 9—Eby Binding Posts
- 1—Kurtz Kasch O-Left 4-inch Bakelite Dial
- 1 Package of Kester Solder
- 36—Kellogg Tin Soldering Lugs
- 40 Feet of Beldon Insulated Hook-up Wire
- Miscellaneous Screws, Nuts, Bolts, etc.

No trouble should be experienced in the proper assembling and wiring of this receiver. By carefully observing the various illustrations and photographs incorporated in this article, the correct location of parts, as well as the shortest leads for best results will be found. It will aid considerably if the constructor would first assemble all the apparatus upon a sub-base and complete all wiring possible before fastening the front panel into place.

There is only one caution that need be observed, particularly

which run from one shield to the next must be kept free and away from all other wiring of the set. Terminals are plainly marked on all wiring diagrams and it is comparatively simple to correctly wire the receiver. After all wiring has been done on the sub-base, the front panel may be attached after the three condensers have been ganged. The method of ganging them is to push the link motion over their shafts, as illustrated in the photographs, and then setting the condensers so that the rotor plates are just about to interleave with the stator plates, but so that to the eye there is a tiny gap between them. This gap should be set so that it is uniform on all three condensers and the link motion then locked into position in such a fashion that the condensers can be turned only about 1/16 inch further out in each case, but so that if the shaft of one is rotated the other three can be carried to the full interleaved position, due to the link connection.

Before placing the receiver into operation it is best to carefully check all connections against the large graphic illustration appearing in Fig. 3. Make those connections which are necessary and then connect a six-volt battery to the "A" terminals. Try a single 201-A tube in each of the sockets and observe whether it lights and is properly controlled by the resistance in series with its filament. If each socket appears to be correctly wired, insert the other tubes and connect the "A" battery to the remaining binding posts in such a manner that each battery circuit will be tested. If the tubes do not light except when the "A" battery is correctly connected, it is safe to plug in the speaker and connect the remaining batteries.

An antenna not exceeding 60 feet will give very excellent results with this receiver.

# Know Greater Enjoyment with these new radio conveniences



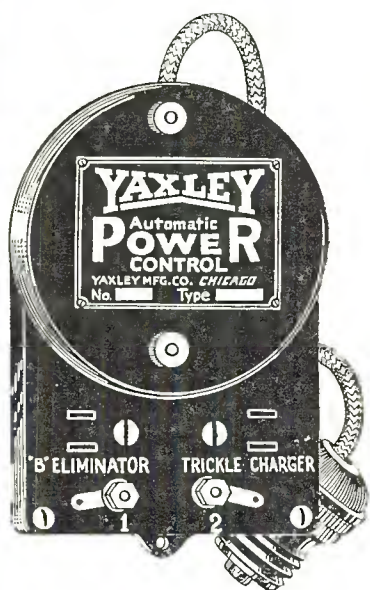
Your radio hours will be more enjoyable with these new radio conveniences. Yaxley Approved Radio Products have always meant a great deal to the enthusiast because they bring clearer reception and have a permanence that guarantees their ability to give service through years of use.

Study closely these new conveniences and start today on a course of greater radio pleasure.

### Automatic Power Control

No more plugging in sockets and turning several switches every time you use your set. No more pulling out plug from sockets and turning of switches when you turn off the set. No more needless burning of lamps which reduces their usefulness, and runs down your battery.

These are some of the things the Yaxley Automatic Power Control will take off your mind. It does all the extra switching for you. It takes care



of your B eliminator or trickle charger or both. You know that when you turn the switch on your set, the trickle charger is off, the B eliminator is on. You know that when you turn the set off, the Power Control is standing guard for you. It works automatically, surely and without fail to turn off the B eliminator and turn on the trickle charger.

No. 444—Automatic Power Control, Series type—for use with sets having tubes with a current draw equal to or greater than 6 U.V.-199 types of Tubes.....Each, \$5.00  
No. 445—Automatic Power Control, Multiple type—for use with any set, but especially for sets having tubes with a current draw lower than that of 6 U.V.-199 types of Tubes. Each .....\$6.00

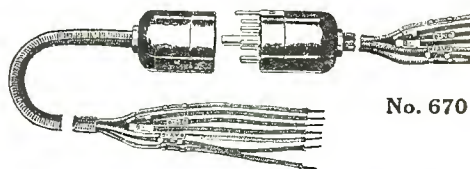
### Special Switches

Special Switches in a wide variety of spring combinations, ranging from single pole single throw to four pole double throw, are available. These switches are made in two or three positions as desired. Send a sketch of what is wanted. Prices on request.

At your Dealer's. If he cannot supply you, send his name with your order to

## Yaxley Manufacturing Co.

Dept. C, 9 South Clinton Street  
Chicago, Ill.



No. 670

### Cable Connector with Cable

Let the Yaxley Cable Connector Plug be the answer to your radio wiring problems. This Plug is one of the most practical accessories to a radio outfit as it does away with the old-fashioned unsightly mass of battery wires, simplifies your battery wiring and makes an instant and correct connection. The very appearance and sure positive action as you put it together will impress you immediately.

Bakelite construction, phosphor bronze double contact springs, convenient mounting plate with permanently attached color guide for wiring, are some of the features that show you the unusual merits of the Yaxley Cable Connector Plug.

No. 670—For the set with binding posts—no soldering. Just hook up the terminals to your set and batteries and the job is done.....Each, \$4.00

No. 660—With Connector Plate.....Each, \$3.50

—COUPON—

Yaxley Manufacturing Company,  
9 So. Clinton St., Dept. C.,  
Chicago, Ill.

Enclosed find \$..... Please send me  
(670) Cable Connector Plug  
(660)  
(444) Automatic Power Control  
(445)

Name.....  
Address.....  
City.....State.....  
Dealer's Name.....

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



# New

THE TRANSFORMER THAT INSURES RECEPTION AT ONE POINT ONLY ON THE DIAL. THIS HAS NEVER BEEN DONE BEFORE.

## THE MADISON-MOORE One-Spot TRANSFORMER JUST OUT!

In this new instrument, the intermediate frequency is of such high value that the reappearance of any station throughout the entire broadcast range is eliminated. Reception at more than one point on the dial, the feature that has annoyed every owner of a set, has been completely conquered by this latest radio engineering achievement.

This new MADISON-MOORE ONE-SPOT TRANSFORMER is even more wonderful than its predecessor, because it gives POSITIVE SELECTIVITY, HIGHER QUALITY, and GREATER DISTANCE. Yet, owing to increased production, the price for the new instrument is lower than for the former model.

Surpassing radio satisfaction is yours if you install MADISON-MOORE ONE-SPOT TRANSFORMERS. They are supreme in the realm of Radio.

**{Ask your dealer. If he can't supply you, write us.}**

MADISON-MOORE RADIO CORPORATION

2524 A Federal Boulevard

Denver, Colorado—U. S. A.

# MADISON-MOORE

*The Finest RADIO APPARATUS in the World!*

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

# The New Madison-Moore "One-Spot" Super-Heterodyne Receiver

This Receiver Incorporates the Latest Development in Super-Heterodyne Circuits Using a New Design of Precision Units

Design, construction and all illustrations of this receiver were prepared in The Citizens Radio Laboratory

**A**MONG a discriminating public, the Super-Heterodyne is generally conceded to be the ultimate in radio receivers. Considering its multiplicity of units, it is quite simple to operate and the results of reception due to its excellent selectivity and sensitivity, are very gratifying. However, the inherent difficulty experienced with this type of receiver has been the interference between the high beat of one station and the low beat of another. Many stations were not efficiently received due to this fact, in that the high beat of one local station interfered with another station whose wavelength corresponded to the setting of the local station's high beat. In addition to this, many Super-heterodyne receivers are of such design that the reappearance of any station throughout the broadcast range is quite possible. In congested areas where extreme selectivity is necessary, these phenomena are very annoying and very much detract from the value of the receiver.

It has been the aim of research engineers to design a Super-heterodyne receiver with which it is impossible to receive any station at more than one place over the tuning range of the receiver. Considerable success has been attained in this research, as can be noted from the excellent design of receivers which have appeared during the last year or so.

The receiver described herewith is the result of considerable development both in the circuit itself and the design of the transformers. It incorporates an entirely new circuit, which is capable of extreme selectivity and yet has the advantage of being incapable of duplicating any particular station within its tuning range, provided that the receiver is properly operated.

The feature in which this receiver differs from others is in the method of providing for heterodyne action, and the means of coupling the intermediate frequency to the amplifying system. The radio frequency current set up in the plate circuit of the first detector tube by the broadcast signal in the tuned loop passes through the primary of unit No. 2 as well as through the plate winding of the oscillator, or unit No. 1. When the current passes through the plate winding of the No. 1, a heterodyne action occurs, since a locally generated frequency is also built up in the plate inductance of the oscillator unit. The mixture of

the original signal frequency and the locally generated frequency in the plate inductance causes the generation of a third or intermediate frequency. By virtue of the inductive reaction of this intermediate frequency on the plate inductance of the oscillator unit,

the heterodyne frequency reacts through the primary of the No. 2 unit. Since the No. 2 unit is adjusted to be resonant only to this third or intermediate frequency, its presence, therefore, stimulates the amplifying action of the three stage intermediate frequency amplifier. This circuit arrangement makes possible a more simple and direct means of producing the intermediate frequency. A comparison of the new circuit to that which was previously used emphasizes this fact very forcibly.

The design of the oscillator unit has been so proportioned that the operating voltage is such that a power balance with maximum efficiency between the incoming signal and the locally generated energy is obtained. While the set is not regenerative, the ability to bring the first tube just under the point of oscillation gives infinitely more sensitivity to weak signals than is possible under any other method known today. The greatest care must be exercised in the manufacture of the units, as a slight deviation from the extremely high frequency at which the transformers are built to function at will result in an unbalanced receiver.

Fig. 4 is a schematic wiring diagram of the complete receiver. All tubes in the receiver are controlled by a filament equalizer which prevents the filament temperature from rising above the normal operating point, and assures the correct function of the tubes at all times. A 20-ohm rheostat is connected in series with a type 4 equalizer in the positive filament lead of the first tube. The correct use of this rheostat will assure satisfactory results

in reception, and should be kept at a position which allows just enough current to pass through the filament to prevent the tube from establishing a condition of self-oscillation. The second tube is automatically controlled by the use of a type 4 equalizer in the negative filament lead. The three intermediate tubes are controlled by both a type 4/3 equalizer and a 10-ohm rheostat. The 10-ohm rheostat is connected in series with the equalizer and is used as a volume control. The sixth tube, or second detector, is a UX-200-A and is controlled by a type 4 equalizer in

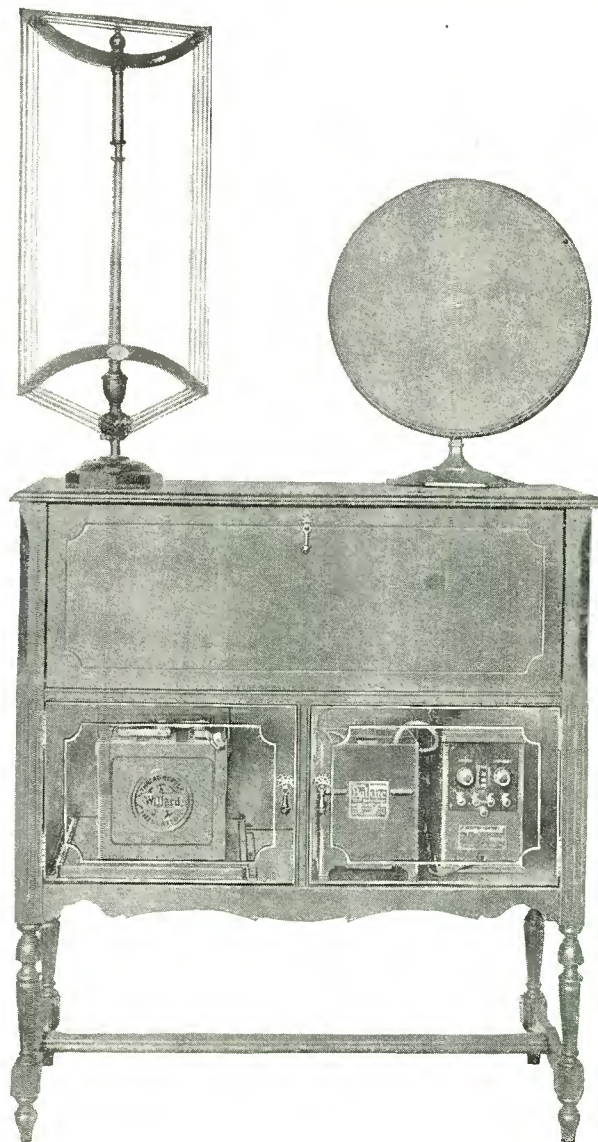


Photo A. Front view showing how receiver can be placed in a console, with suggested accessories

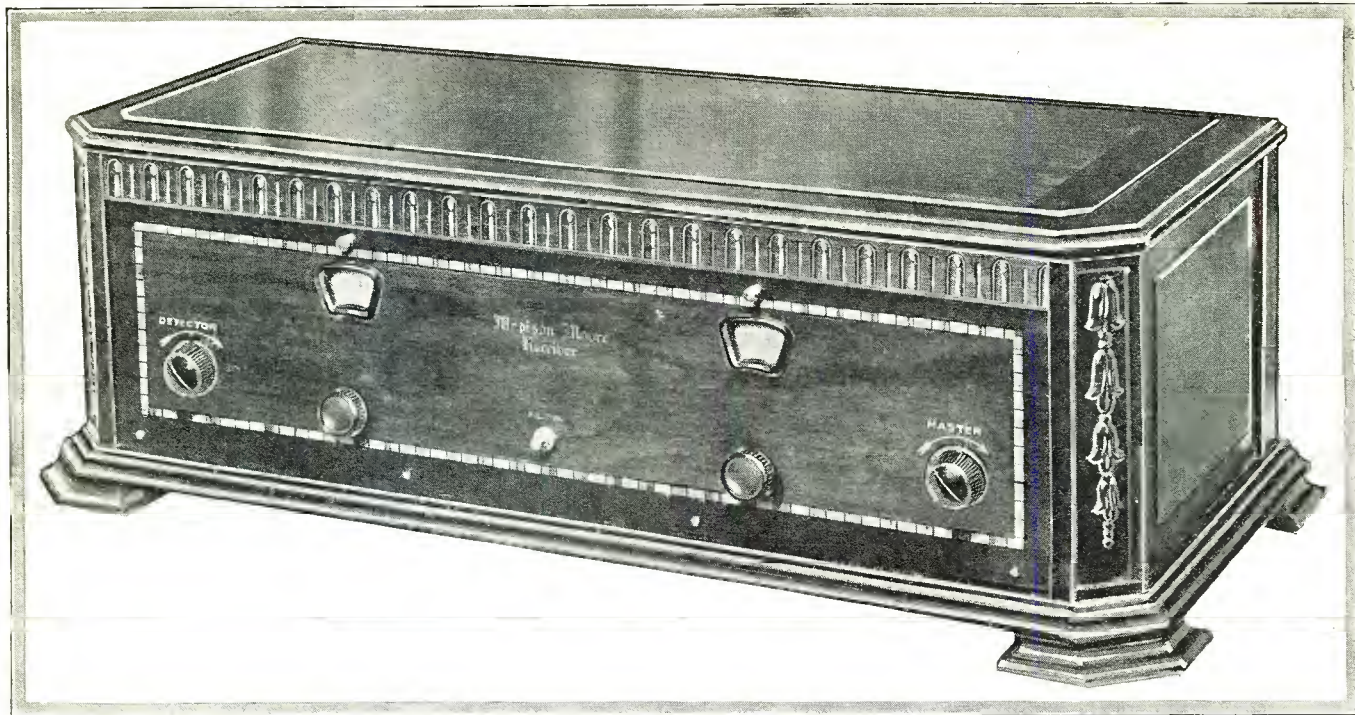


Photo B. Front view of receiver mounted in cabinet

the negative filament lead. The grid return of this tube is to the negative filament. Each of the two audio tubes are controlled by equalizers, the first being a type 4 and the second a type 2. The last stage of audio uses the UX 112 power tube. All other tubes are UX 201-A.

Fig. 1 is a layout of the front panel, which shows the necessary drilling for the proper mounting of apparatus, as well as appropriate engraving. In the event that the constructor does not have the facilities to properly drill the front panel and have it engraved, a completely drilled and engraved Lignole panel may be secured at any good radio store.

Fig. 2 is a baseboard layout of the completed receiver, and shows in detail the correct location of all parts mounted on the baseboard, as well as the proper position of the terminals in relation to other pieces of apparatus, so that short leads will be possible.

The new type of Marco illuminated dial is used in this receiver.

The mechanism of this dial is housed entirely behind the panel. A small aperture in the panel allows a view of the indicator, which is illuminated by a six-volt lamp. The Karas Orthometric condensers, used as tuning controls, are mounted directly on the mechanism forming the dial. A General Radio type 285-D transformer is used in the first stage of audio, while a General Radio type 285-L is used in the second stage. A Yaxley cable connector is used for connecting the battery to the receiver. The regular color code is used, which is supplied with the connector, with the exception that the "B" detector has  $22\frac{1}{2}$  volts connected to it, and the "B" Amp., 45 volts. One hundred and thirty-five volts is connected to the brown terminal, while 90 volts is connected to the green.

No difficulty should be experienced in correctly mounting the apparatus and wiring it, if the various illustrations and diagrams are carefully followed. The wiring may be considerably simplified if the apparatus mounted on the baseboard is first con-

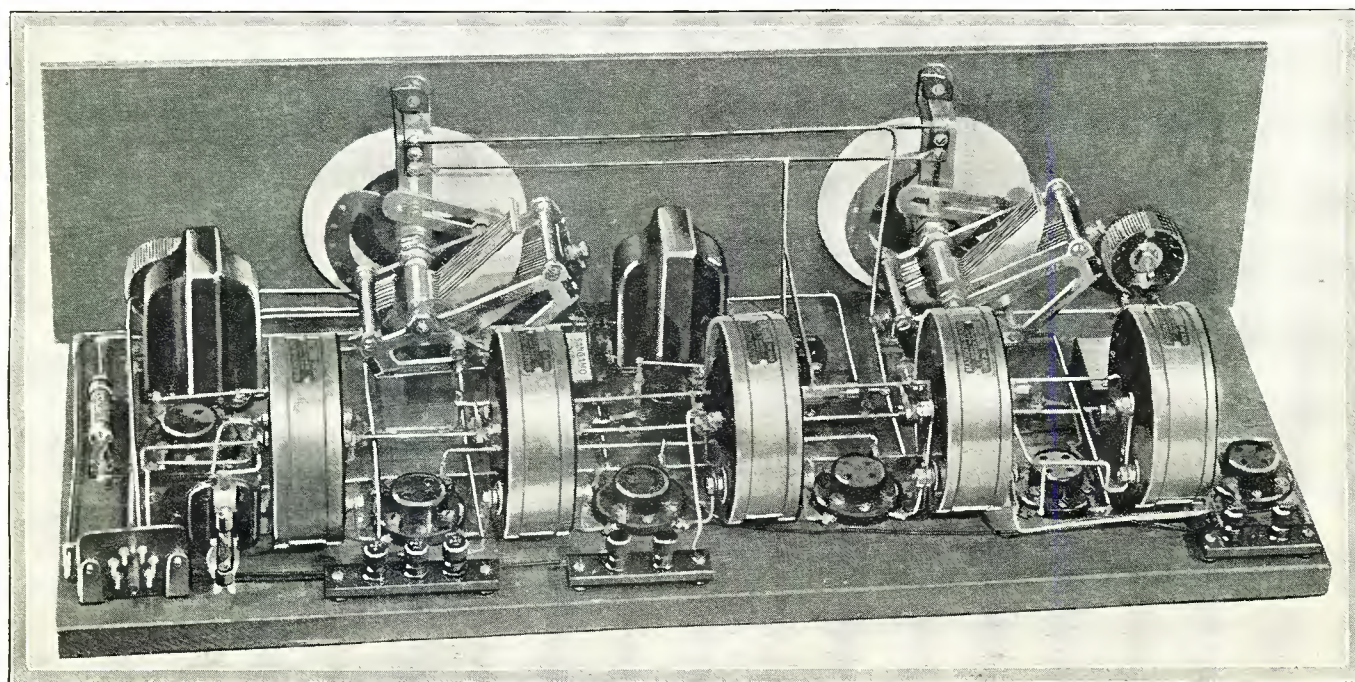


Photo C. Rear view of completed receiver

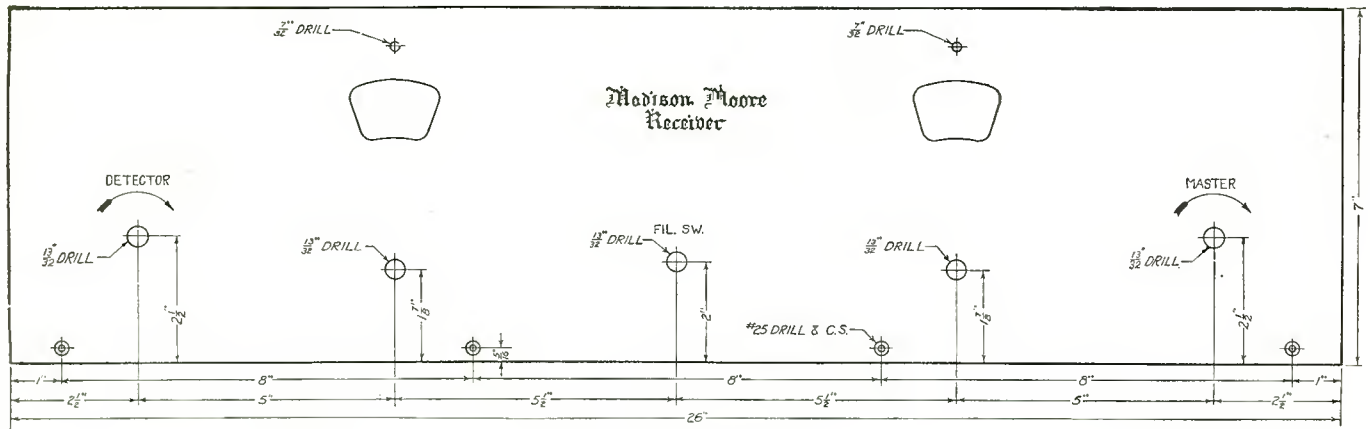


Fig. 1. Panel layout

nected up with the panel not in place. After the receiver is completely wired, carefully check it against the large graphic illustration shown in Fig. 3. If there are any incorrect connections, correct them, and then connect the "A" battery alone to the receiver. Insert the proper tube in each socket, test each tube one at a time, and observe whether it is controlled by the proper resistance, etc. Then disconnect one of the terminals of the "A" battery on the receiver and touch it in turn to the remaining terminals of the cable connector, and observe whether any of the tubes light. If there is no indication that the tubes light except when the "A" battery is properly connected, it is safe to connect the remaining batteries and insert all the tubes, and connect the speaker and loop.

This set is not as easy to operate as one where it is merely necessary to turn the dials. Due to its extreme selectivity and sensitivity, together with its wonderful tone quality, it will prove to be the latest thing in radio reception when its operating characteristics are thoroughly understood and patient tuning is observed. In its operation, however, some instruction and practice are necessary. For local stations, lower filament temperature is used on the intermediates than for distant ones. Properly constructed, this receiver will tune in a station at only one place on each dial. This is possible, however, only with the proper operation of the first tube. If the rheostat controlling the first tube is kept at a position which keeps the first tube just under the point of oscillation, the loop tuning dial will be extremely sharp and stations will not be heard unless both circuits—the loop and oscillator circuits—are kept in absolute resonance. It is absolutely essential that both circuits be in resonance, as otherwise even local stations will not be heard.

If the first tube is permitted to oscillate, a condition will be established by which a station will be received at more than one place on the dial.

It will be entirely unfair to expect this receiver to give phenomenal results as soon as it is placed on the air. Being an extremely sensitive receiver, considerable time should be spent in properly mastering its peculiarities before the best results can be obtained. If ordinary patience is observed in tuning, and proper consideration given to the fact that the operation of the receiver is more or less strange, a properly constructed receiver will, in time, perform in such a manner that the utmost satisfaction in reception will be obtained.

**LIST OF PARTS**

This material, or any reasonable substitute, will give satisfactory results:

- 1—7x26x3/16-inch Drilled and Engraved Lignole Front Panel
- 1—3/4x3 3/4x3/16-inch Drilled Formica Terminal Strips
- 2—3/4x2 1/2x3/16-inch Drilled Formica Terminal Strips
- 1—10 1/2x25x3/4-inch Wooden Baseboard
- 1 Set of 5 Type HW Madison-Moore Precision Units
- 1—Karas .0005 mfd. Orthometric Variable Condenser
- 1—Karas .00025 mfd. Orthometric Variable Condenser
- 2—Marco Illuminated Dials
- 8—Type 349 General Radio UX Sockets
- 1—Type 285D General Radio Audio Transformers
- 1—Type 285L General Radio Audio Transformers
- 1—Frost 10-ohm Rheostat
- 1—Frost 20-ohm Rheostat
- 1—Frost Filament Switch

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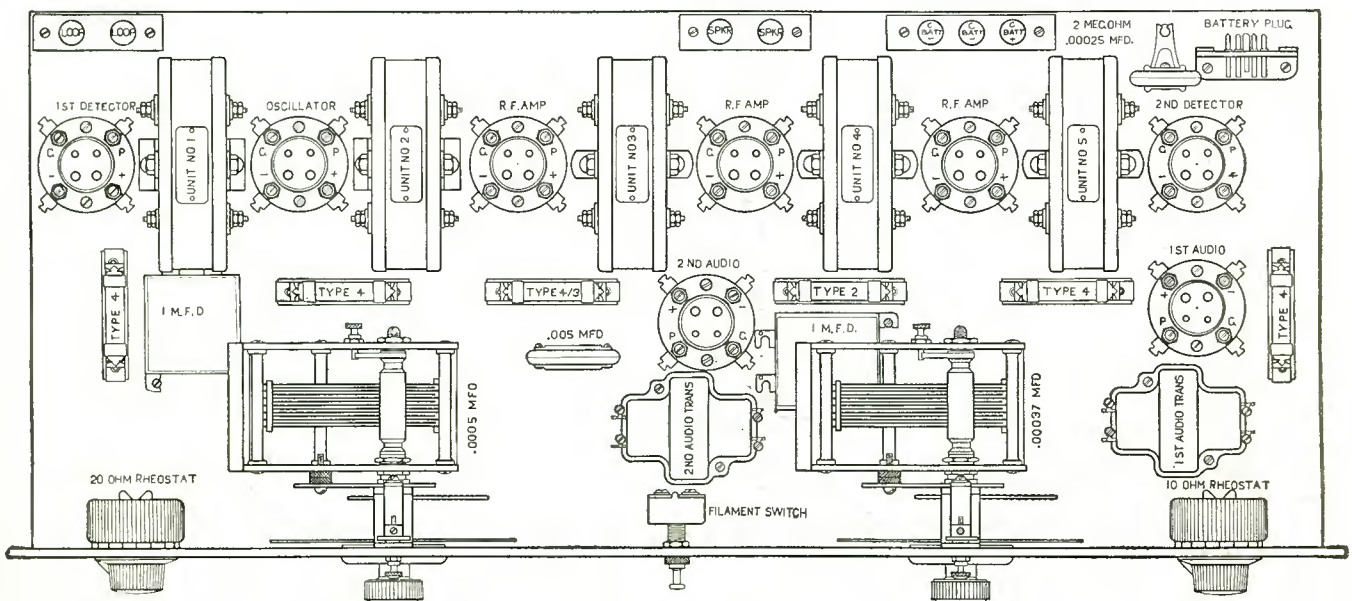


Fig. 2. Baseboard layout

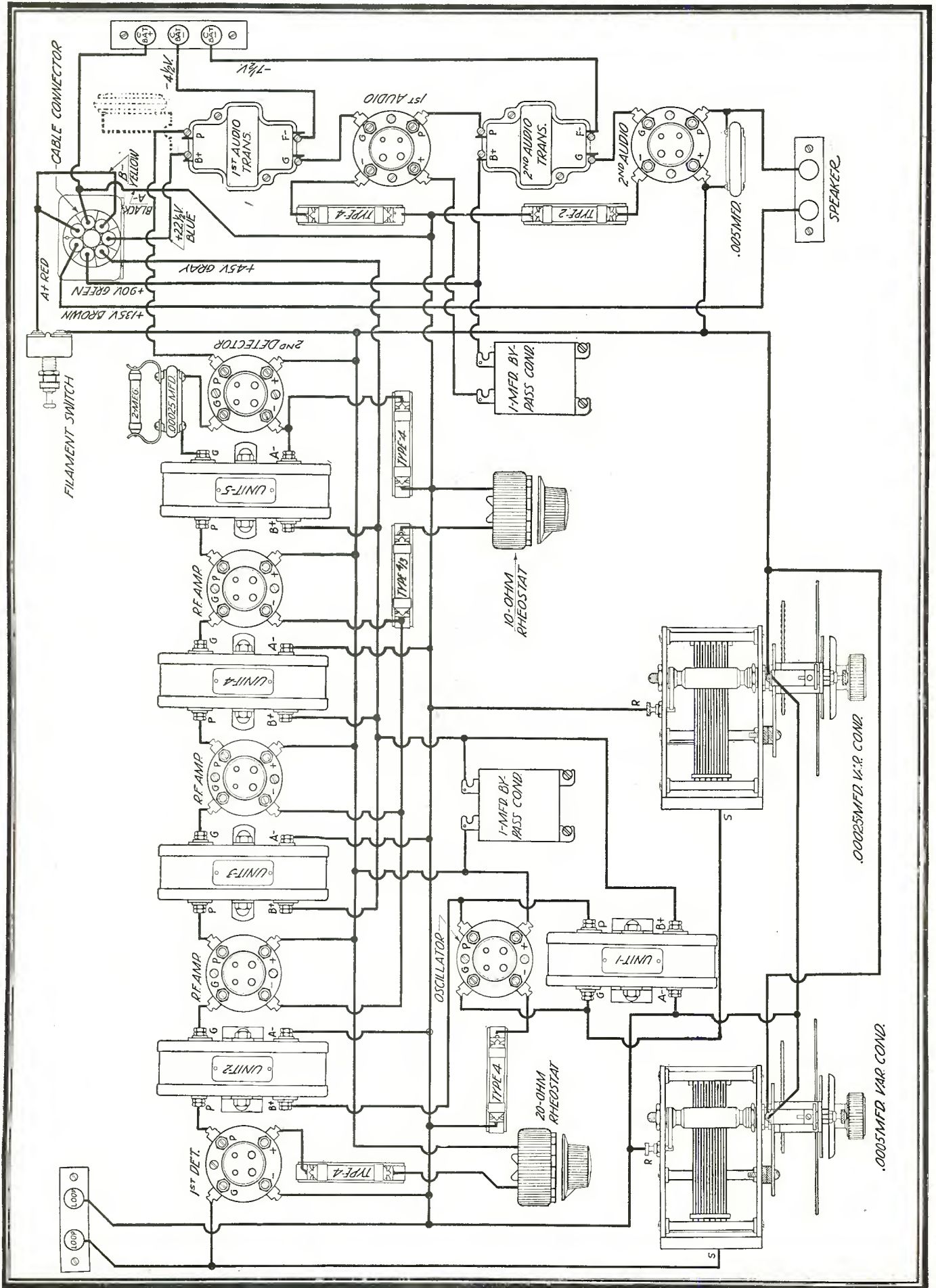
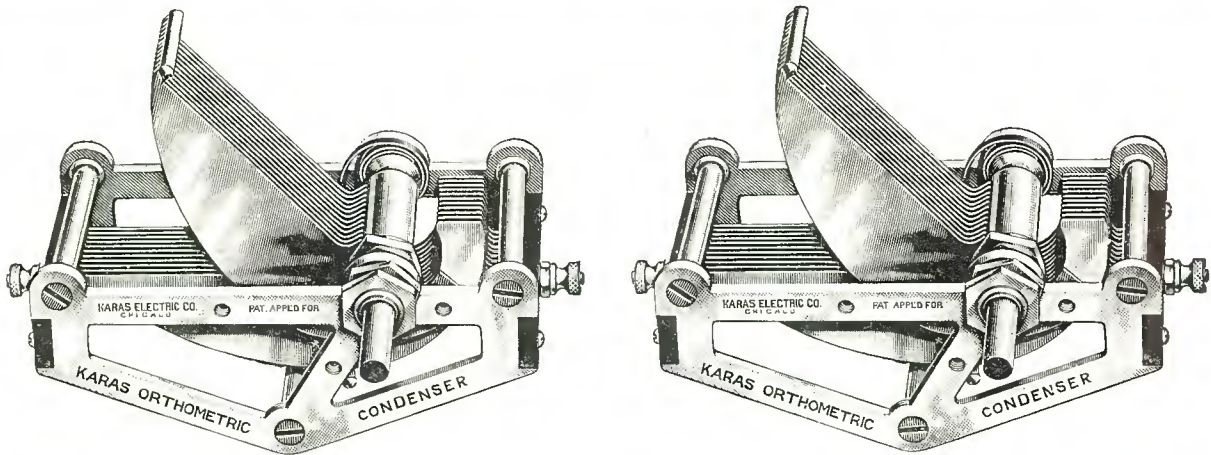


Fig. 3. Graphic illustration Check this carefully when wiring is completed





# Karas Orthometric Condensers are best for Superheterodynes

The recent developments in superheterodyne receivers, of which the improved Madison-Moore is an outstanding example, demand nothing less than the very best condensers that money can buy—Karas Orthometric Straight Frequency Line Variable Condensers. Two .0005 23-plate Karas Orthometrics are specified for the Madison-Moore Super.

The requirements of a superhet circuit such as the Madison-Moore call for Karas Condensers because these units must be of the very highest class—must be extremely low loss type—must be capable of absolutely straight frequency line tuning—and must have the precision necessary to tune the loop and oscillator circuits with absolute exactness. Due to the frequency used in such a super as the Madison-Moore (480 kc.) and the necessity of covering the entire broadcast waveband of 200-600 meters with an evenly balanced energy output at each wavelength, Karas Orthometrics are a positive assurance of satisfactory operation in this or any other superhet.

Builders of various other types of supers have found that Karas Condensers are the finest on the market. When a set builder once uses these condensers he will not thereafter be without them, although he may have hesitated about ordering a pair of Karas Orthometrics at the start, due to their slightly higher cost.

Karas Orthometrics are built with mathematical exactness by engineers who have made a special study of variable condenser requirements in all types of circuits. These remarkable condensers do several things extremely well. 1st—They distribute stations evenly over the dial, every point of a 100 division dial being equally separated from its adjoining point in both directions by 10 kc. This is due to the scientific eccentric form and the position of Karas rotor and stator plates. 2nd—Karas Orthometrics are absolutely free from absorption losses, because all dielectrics are outside of effective electrostatic fields and are made from highest quality hard rubber. 3rd—Karas Orthometrics are of lowest possible resistance, resulting in strong, powerful signals with full, rounded, natural tones. 4th—Karas Orthometrics are mechanically and electrically of the highest efficiency. They are constructed throughout of brass, with die-stamped solidly braced plates and frames. Rotor and stator plates are soldered at every contact point. Rotor plates and frame are grounded, eliminating body capacity

effect. Rotor is fitted with wide copper pigtail connection, soldered at both ends. Cone bearings make Karas Orthometrics wonderfully smooth-running.

Whether you build a Madison-Moore or any other type of receiver, select Karas Orthometrics. They are sold by good dealers everywhere. If your dealer is out of stock and you are in a hurry to get them for your superhet you may order direct from us by filling out and mailing the coupon below. SEND NO MONEY. Just hand the postman the price of the condensers (or dials) plus a few cents postage. Order from your dealer or from us TODAY.



**Karas Micrometric Dials Make Sharp Tuning Easy**  
Oscillatory circuits require Karas Micrometric Vernier Dials for best results in tuning. Micrometrics tune to within 1/1000th of an inch—have 63 to 1 gear ratio—never falter or slip—have large convenient knobs which do not tire the hand—are made of Bakelite—have gold inlay precision markings—smooth, velvety action—and are absolutely free from backlash. Order Micrometrics for your super today and listen to stations you never heard before.

Price \$3.50 each

**FOR SUPERHETERODYNES**

23 plate .0005 mfd. capacity, price.....\$7.00

**FOR TUNED RADIO FREQUENCY**

17 plate .00037 mfd. capacity, price..... 6.75

**FOR EQUAMATIC SYSTEM**

Special 17 plate with extended shaft..... 7.00

**FOR SHORT WAVE RECEIVERS**

11 plate .00025 mfd. capacity, price..... 6.50  
7 plate .00014 mfd. capacity, price..... 6.50  
5 plate .0001 mfd. capacity, price..... 6.50

**FOR ALL CIRCUITS, ESPECIALLY FOR SUPERHETERODYNES**

Karas Micrometric Vernier Dials, ea..... 3.50

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**KARAS ELECTRIC CO.**  
1009-M Association Bldg., Chicago.

Please send me.....Karas Orthometric Variable Condensers and  
.....Karas Micrometric Dials, for which I will pay postman  
\$.....upon delivery, plus mailing charge.  
( ) 23 plate ( ) 17 plate ( ) Special 17 plate  
( ) 11 plate ( ) 7 plate ( ) 5 plate  
(Check sizes desired when ordering.)

Name.....

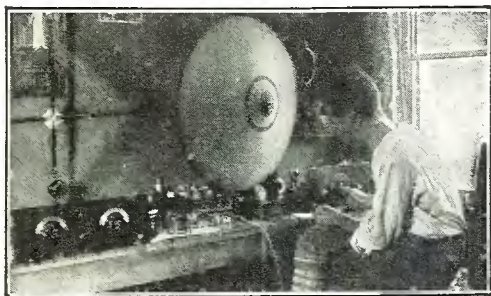
Address.....

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

(If cash accompanies order we ship postage paid.)

# 285 RADIO SETS

And then he built —



**T**HE ULTIMAX is the outstanding example of what perfection can be reached in radio after fifteen years of experimenting by such skilled experimenters as Ludwig Seigman. There are vital elements which go to make up every radio receiver. Mr. Seigman, in assembling the parts used to put together what he feels the perfect radio receiver, has specified Pacent Parts in nearly every case throughout the receiver, because his long experience and knowledge has shown him what Pacent Parts really can do.

## Pacent Superaudioformer

These Transformers can be relied on to give better tone quality.

Type 27A.....\$6.00    Shielded.....\$7.50

## Special Ultimax Unit

Upon the Ultimax Unit depend largely the sharp tuning and fine tone of the complete receiver.

Supplied in neat metal bronze case.

Price, \$5.00

## Special Ultimax Coils

The Ultimax Coils are wound exactly with the designer's specification and have just the right amount of wire for best results. From 190 to 570 meters.

Set of three, price, \$6.50

## Pacent Triple-Gang Condenser

(True Straight Line Frequency)

This condenser gives sharp, accurate

tuning and control, and operates as a one-dial tuning condenser. Its low loss features assure splendid efficiency in the Ultimax.

Price, \$12.50

## Pacent Jacks

Made of best possible materials with high percentage of German Silver spring member, sturdy nipples and extra washers to accommodate varying thickness of panels.

No. 61, price \$0.50

No. 63, price, \$0.60

## Pacent Rheostats

Simplifies installation and preserves accurate factory adjustment. Supplied with silver or gold finished dials and black or mahogany knobs.

95A— 6 ohm, \$1.00

95B—10 ohm, \$1.00

The

# Ultimax

his Latest and Best

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# PACENT PARTS

## Pacent Universal Cushion Sockets

A genuine Bakelite socket with real phosphor bronze spring suspension. Unique spring design insures positive, non-microphonic cushion effect. Push contacts seat tube prongs properly and effect positive, reliable contact.

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## Pacent Switch

Built for long, lasting service and will withstand rough usage. Its action is positive.

Price, \$0.40

A booklet on "How to Assemble the Ultimax" with full details on assembling these parts, and carefully laid out blueprints made up under the direction of skilled engineers will be furnished you for a nominal fee of \$1.00.

Ask any progressive dealer, or write today for full information on the Ultimax Circuit

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

# How to Build the Ultimax

This Popular Five-Tube Receiver Combines Fine Tone, One Control Tuning, and Uniform Selectivity from 200 to 570 Meters

**C**AN you imagine building 285 radio sets before you were finally satisfied that you had the tone quality that you wanted? Not only the tone quality, but selectivity, volume and high efficiency on the radio frequency side of the receiver: It sounds almost incredible, 286 radio sets, but it's true, and all of them built by one man. The Ultimax combines the experience and the fine points gained by actually building, operating and comparing 285 radio receivers in an attempt to concentrate the best and most efficient features in one set which can be easily constructed at a price well within the range of the average radio builder's purse.

The story of the development of The Ultimax is not only highly interesting, but valuable to the man who contemplates building this popular set. It shows that while certain features in the set, the R. F. system, for example, may appear quite new and untried, they have, as a matter of fact, been developed and perfected thoroughly before being offered to the radio public.

The man who designed The Ultimax has been actively interested in radio for more than fifteen years. As early as 1910, Ludwig Siegmann built his first receiving set, a loosely coupled crystal set. It was not beautiful, and far from efficient as we know radio sets today. But it worked—that was the important thing—and the designer received his first thrill from radio when he picked up weak code messages from a ship off Fire Island. Over a period of more than fifteen years his initial enthusiasm has never dwindled.

It is no exaggeration to say that Siegmann has built and operated 95 per cent of the sets and circuits presented to the public during the past six years. A trip to his laboratory and workshop would convince you of that. There you will find all types and kinds of receivers from one to twelve tubes, not to mention power amplifiers, B eliminators, and short wave sets. Over the fifteen-year period Siegmann has built with his own hands, operated and compared 285 radio sets!

The 286th is The Ultimax.

If you were to ask him why he calls it The Ultimax (as dozens of fans have asked him) he would reply: "Because to me it is the ultimate in fine tone quality."

The Ultimax is designed primarily to give fine quality and range of reproduction. But to this is added a uniformly high degree of selectivity from 200 to about 570 meters. You will find that The Ultimax has the same remarkable sharp tuning (without being critical) on high and low wavelengths alike. In

this day of congested broadcasting the value of this feature is at once apparent.

In the radio frequency high radio frequency amplification is achieved without self-oscillation. However, this condition is not gained by the ordinary method of cutting down the inductance in the plate circuits of the radio frequency tubes. The reason that most radio frequency sets on the market today do not squeal is that the transformer primaries rarely have more than eight or ten turns, and they are, therefore, tuned far below the broadcast band. Energy transfer to the succeeding stage is poor, particularly on the higher wavelengths.

In The Ultimax a new method is employed which not only prevents oscillation at the low waves, but also gives tremendous amplification at the longer wavelengths. The set has practically the same high degree of radio frequency amplification over its entire receiving range.

If the primary of the radio frequency transformers is tuned at or near the resonance point of the incoming signal, the circuit will approach oscillation. Therefore, the designer places the resonance point of the radio frequency plate circuits above the highest wavelength to which the grid circuit can be tuned, thereby achieving maximum impedance, and with that maximum energy transfer. The natural tendency of the vacuum tube to oscillate on the lower waves will produce efficiency at that point.

It should be understood that The Ultimax is not designed primarily for extreme long distance work. The designer makes no claims that it will bring in more distant stations than any other

receiver of the same number of tubes. The Ultimax is designed for fine quality of tone, that most desirable of all attributes of any radio set. And, after all, if one has fine quality and range of reproduction, plus true selectivity, he has just about all that is needed for a splendid radio receiver.

The Ultimax Unit is really the heart of the set. Funda-

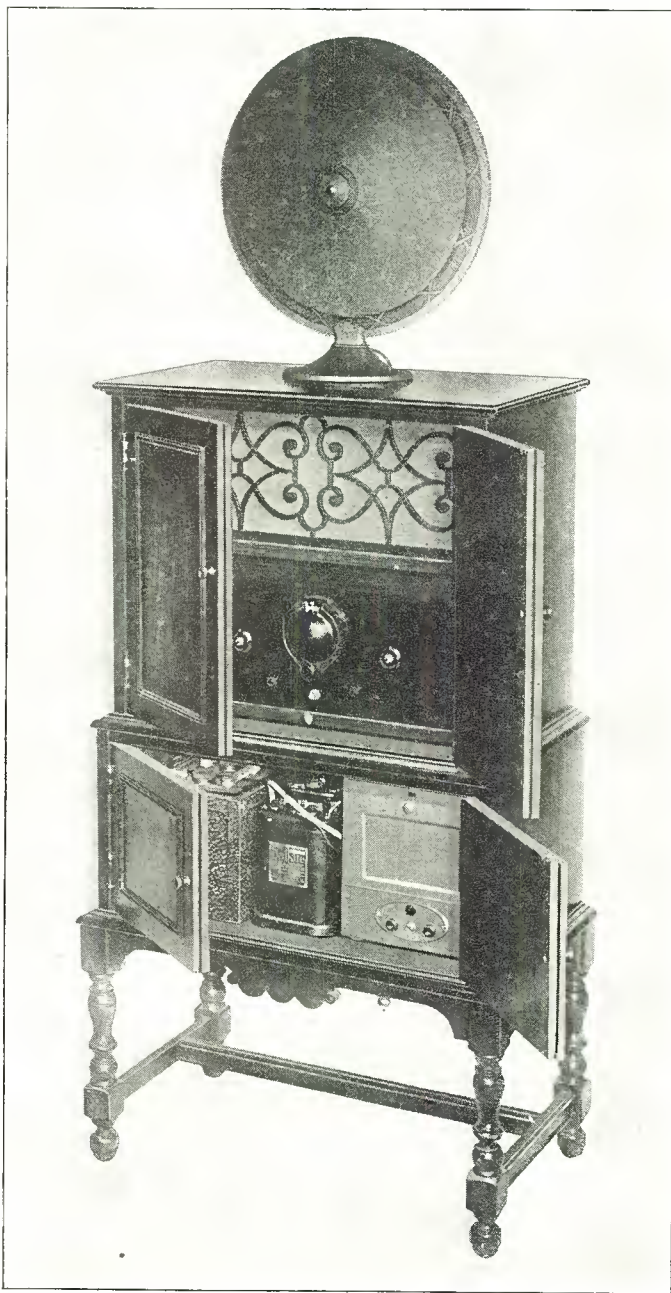


Photo A. View of receiver mounted in console, with suggested accessories

mentally, the success or failure of the completed receiver depends upon it. In designing this unit, extended experiments were conducted to determine just the right size wire, the right number of turns, and the best values of fixed condensers for use in it. The unit comes housed and sealed in a compact bronze finished case which fits handily into the complete assembly of the set.

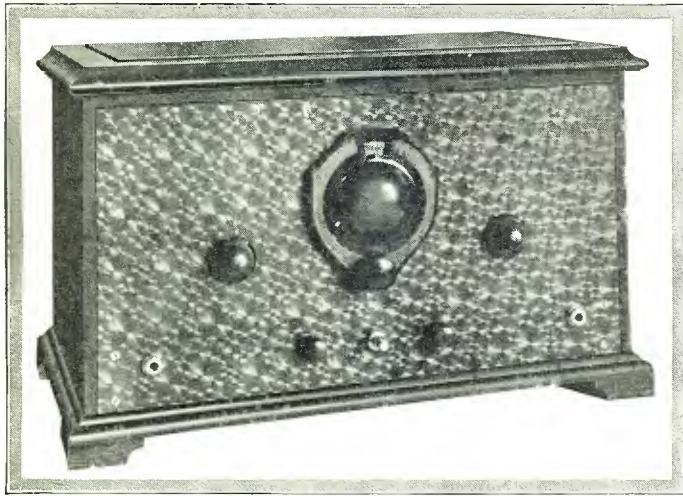


Photo B. Front view of receiver mounted in cabinet

#### LIST OF PARTS

These parts of their equivalent will give satisfactory results:

- 1—Ultimax Unit
- 1—Set of 3 Ultimax Coils
- 1—Pacent No. 3251B 3 Gang Straight Line Frequency Condenser
- 2—Hammarlund Junior Midget Condensers MC5, .00016 mfd.
- 5—Pacent No. 83 Universal Cushion Sockets
- 1—No. 62 Pacent Jack
- 1—No. 65 Pacent Jack
- 1—No. 95A Pacent 6-ohm Rheostat
- 1—No. 95B 10-ohm Pacent Rheostat
- 1—Kurz-Kasch Vernier Dial No. 592-0-100-1, port dial black
- 1—Pacent No. 16 Battery Switch
- 2—No. 27A Pacent Superaudioformers, shielded
- 1—4-ohm Special Resistance Strip
- 1—.002 Fixed Condenser, Dubilier No. 601
- 1—.00025 Fixed Condenser, Dubilier No. 601
- 1—2-megohm Resistance Electrad
- 8—Eby Binding Posts
- 1—Panel, Frieze Insuline, 8½x16x3/16-inch
- 1—Sub-Panel, 15x7x3/16-inch
- 2—Benjamin Sub-Panel Brackets
- 1—Special Pillar Post, for supporting center of sub-panel
- 1—No. 1 Electrad Grid Leak, Single Mount

Fig. 1 shows a complete schematic wiring diagram. Those who find it easy to work from this form of diagram will find that it meets their needs.

Fig. 2 shows a complete pictorial layout and wiring diagram of the receiver. This in combination with the photographs of the set shows exactly where each part goes and how to connect them.

The Ultimax works very well with either dry cell or storage battery tubes. Built according to the instructions and specifications, it may be used for either tubes.

Proper tube combinations are important, however. So are correct battery voltages. After trying many different combinations the designer of the set recommends the following:

#### For Dry Cell Operation

For 2 Radio Frequency Stages: UX 199 or CX 199.

For Detector: UX or CX 199.

For 2 Audio Stages: UX or CX 120, with 135 volts "B" battery and 22½ volts "C" battery on both.

#### For Storage Battery Tubes

Radio Frequency Stages: 2 UX 201-A or CX 301-A.

For Detector: UX 200-A or CX 300-A.

For Audio Stages: 2 UX or CX 112, with 135 volts "B" battery and 7½ volts "C" battery.

Use either of these tube combinations you prefer. You will not find any other combinations more satisfactory and economical.

#### Tuning The Ultimax

Referring to Photo B, front panel view of the set: The left-hand knob (rheostat) controls all five tubes. The first time you turn on the set the rheostat may be turned well up until you tune in a strong signal from a nearby station. Then turn down the filament current until there is a real loss in signal strength when you decrease it further. Then leave the rheostat set, turning the tubes off with the filament switch.

The right-hand knob controls the volume of the set, and by varying it you can have a whisper or maximum volume, as you wish.

The main dial tunes the set, and the little trimming condensers below it need not be touched for local or nearby reception.

Since the detector circuit is non-regenerative, there is no regeneration control to bother with.

Turn the volume control well up, then tune slowly and carefully with the middle dial controlling the 3 gang condenser. Bring in the signal as strongly as you can, then manipulate the little trimming condensers.

Start with either one and slowly adjust it until the volume is built up as desired. Then adjust the other in the same way and you will have the set at its most efficient point.

The Ultimax gives all the volume the average person will desire or require for ordinary home use. However, where there is a particularly large room, or for outdoor entertainment in summer, provision has been made for the addition of a power

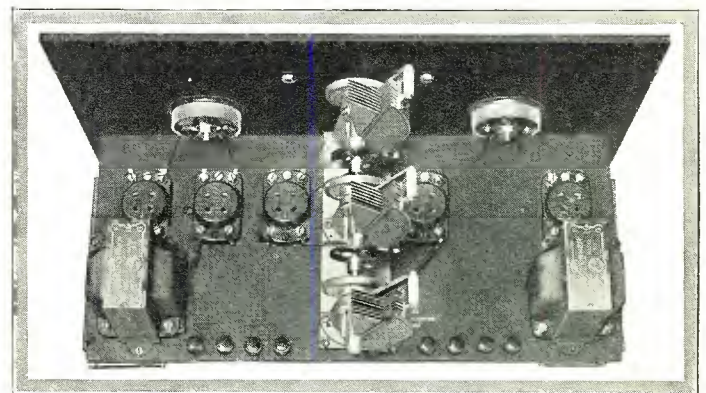


Photo C. Rear view of receiver with cabinet removed

amplifier or combination power amplifier and "B" eliminator.

The left-hand jack on the front panel is the first stage jack. Plug in the power amplifier here and you will get the additional volume wanted, with the splendid tone quality that has made The Ultimax one of the most talked of sets today.

#### Information on Accessories for The Ultimax Receiver

The accessories shown in Photo A are as follows: The Con-

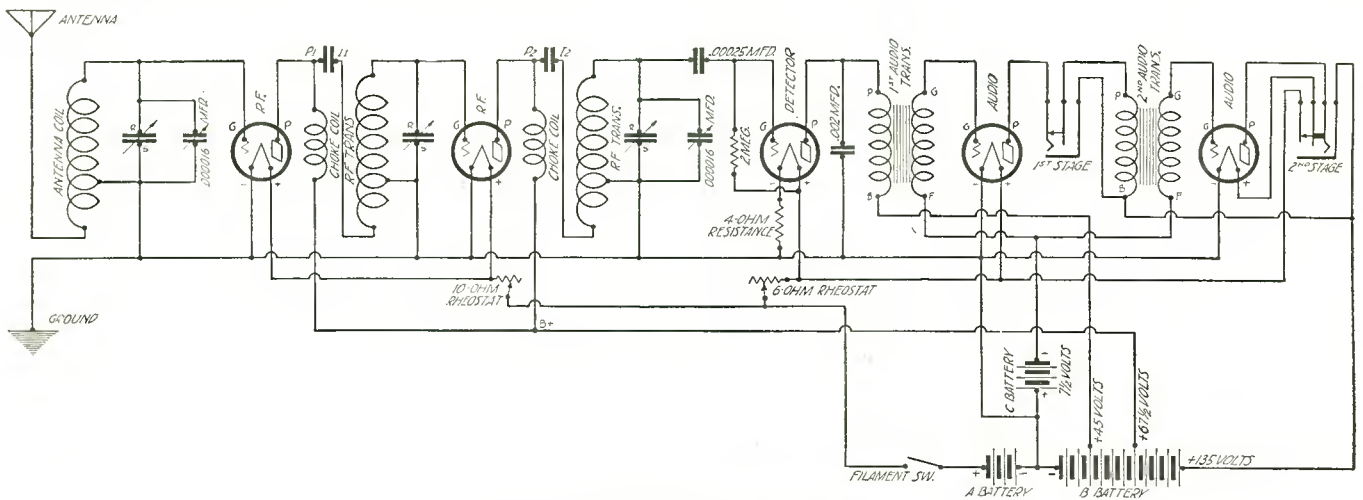


Fig. 1. Schematic wiring diagram

sole is a Model 10 and is manufactured by the Charlotte Furniture Company, Charlotte, Mich. Only genuine walnut is used in its construction. The front doors are of matched butt walnut, while the top and ends are of straight grain walnut. The highly polished finish consists of several coats of lacquer with a carefully waxed finishing coat.

A 100 Ampere Hour Willard Storage Battery is used to supply sufficient "A" potential to properly operate the receiver. The Battery is provided with a convenient carrying strip and Fahnestock Clips so that leads may be quickly attached or disconnected.

The new type of Balkite Charger will operate very satisfactorily in keeping the Willard Battery at full charge. This new type of charger is constructed along the same lines as the original Balkite

Trickle Charger, in that a glass jar is used for the electrolyte. This allows an instant visible check on the height of the solution in the jar. The Charger is a product of the Fansteel Products Company, North Chicago, Ill.

The Speaker used is the Type "A" Pacent Cone, which, when used in conjunction with the Pacent Powerformer, which is also illustrated, reproduces music and speech with exceptional tone quality, reproducing all audible frequencies broadcast. The Powerformer is primarily a combination "B" Eliminator and Power Amplifier. The two last mentioned devices are manufactured by the Pacent Radio Corporation of New York City.

(If any further information on these accessories is desired, full descriptive matter may be obtained by writing the manufacturers direct.)

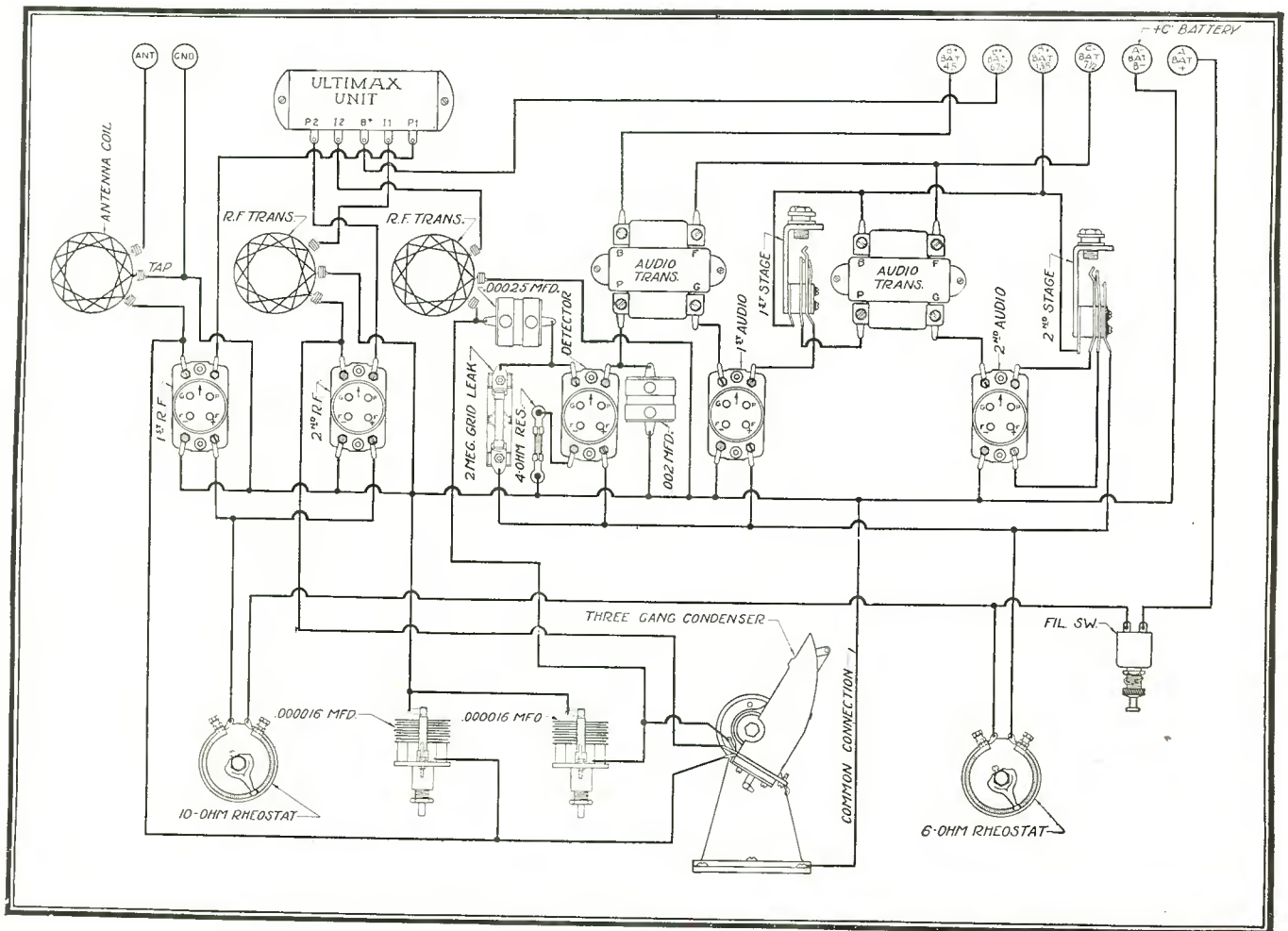
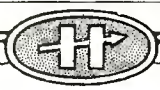
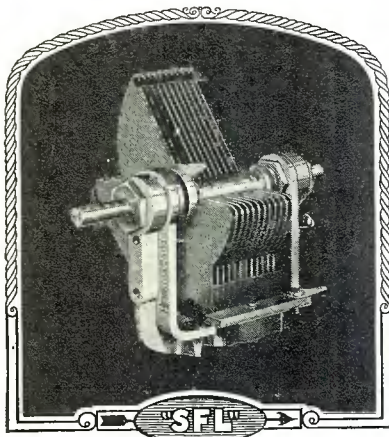


Fig. 2. Graphic illustration showing every lead in the entire receiver



# HAMMARLUND Precision PRODUCTS

Are Officially Specified  
In These New  
Featured Circuits



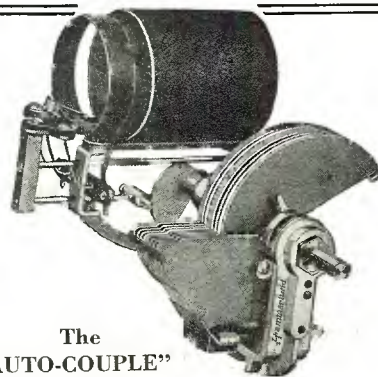
**The Improved "SFL" Condenser**

For the many enthusiasts who still prefer to use "Straight Frequency Line" Condensers, Hammarlund offers the best of its type, an improved model embodying all of the mechanical features found in the new Hammarlund "Midline" Condenser, described on this page. It is also made in the same standard sizes and sold at the same prices.



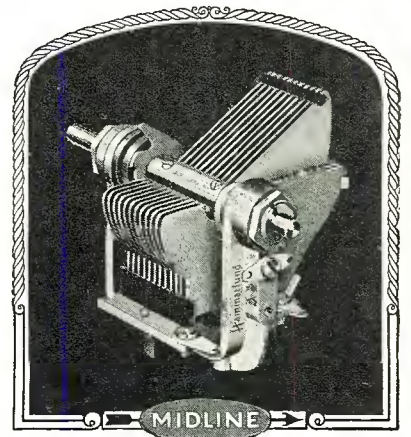
**Space-Wound Coils**

Hammarlund Coils are space-wound on a mere film of dielectric material, giving utmost efficiency with low losses. The "Auto-Couple" Coil provides automatic primary coupling for every broadcast wavelength. Actuated by a scientifically shaped cam attached to the extension shaft of the condenser, maximum transfer of energy is assured at every condenser setting, with control of undesirable oscillations. Coils, condensers and shields sold separately.



**The "AUTO-COUPLE"**

Used in the Hammarlund-Roberts "Hi-Q" Receiver



**The New "Midline" Condenser**

The most advanced condenser now before the radio public, the "Midline" includes all of the advantages of previous types without any of their disadvantages. It avoids crowding at any part of the broadcast wave band. The shaft of its full-floating rotor may be adjusted to any position or may be entirely removed and replaced by a longer shaft for tandem coupling to other condensers. It has ball and cone bearings and only one small piece of dielectric material. Strong, compact—measuring only four inches with plates fully open. One-hole mounting, with anchoring screw.



**"Hammarlund, Jr."**

A high ratio, shielded midget condenser with all the distinctive earmarks of Hammarlund design and workmanship. Used wherever small variable capacities and fine tuning are required. Baseboard or one-hole panel mounting. Knob included.

**HAMMARLUND MANUFACTURING CO.**  
424-438 W. 33rd Street, New York City

We shall be pleased to refer to the proper authorities any inquiries regarding the above-mentioned receivers.

For Better Radio  
**Hammarlund**  
PRECISION  
PRODUCTS

Write for Descriptive Literature of Hammarlund Products, used in the Popular 1927 Receivers.



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

# The Hammarlund-Roberts HI-Q Receiver

This Modern Receiver Incorporates Dual Tuning, Stage Shielding, Automatic Coupling Variation, High Detection Efficiency, and a High Power Output

**T**RIED and proven fundamentals have been adhered to in the design of this circuit, but they are applied in new and different ways that produce greater selectivity, clearer tone, simpler tuning. This new Hammarlund-Roberts is the united achievement of ten of the leading radio engineers in the country; all concentrating on producing the most advanced and efficient receiver, regardless of cost.

Here is a receiver of five tubes, which employs two highly efficient stages of tuned radio amplification, a non-regenerative detector and two stages of high quality transformer coupled audio amplification, the second stage of which is so arranged that the new power tubes may be used.

Tuning has been held down to two major controls. Scientific shielding of the radio frequency units produces a receiver of unusual selectivity, sensitivity, quality and volume.

In theory the Hammarlund-Roberts HI-Q Receiver is comparatively simple. It combines the sensitivity and selectivity of two stages of radio frequency amplification with the inherent stability and distortionless characteristics of a non-regenerative detector. While it is admitted that a regenerative detector provides a considerable degree of radio frequency amplification, it is well known that amplification secured in this manner has many drawbacks. Chief among these is the tendency to cut "side bands," a type of tone distortion which has a very disagreeable effect when passed on to the loud speaker. In order to avoid this and other types of "regenerative" troubles without sacrificing sensitivity, the two radio frequency stages have been designed to insure an extremely high degree of amplification.

After providing for a high quality audio output from the detector, a two stage transformer coupled audio amplifier is used to step up the signals to loud speaker intensity. The transformers used in the audio amplifier have a high primary impedance, insuring faithful reproduction of the lower musical and speech tones. The secondaries are wound by a special helical process which reduces distributed capacity to a minimum so that the higher audio frequencies and their harmonics are passed on to the loud speaker without loss. This results in the reproduction of the higher musical tones of such instruments as the violin with full "life" and "brilliance," and aids very materially in removing the "dull" and "muffled" effects so commonly associated with loud speaker reproduction.

Although the receiver has three radio frequency circuits, the tuning controls have been reduced to two by placing the second and third variable condensers on the same shaft. A small com-

pensating condenser in parallel with the third variable condenser has been provided to compensate for the small difference in circuit capacity of the third tuning circuit chiefly due to the detector grid condenser. This compensator needs no adjustment after its setting has once been determined.

A volume control has been provided which is exceptionally smooth and gradual, allowing the operator to adjust for a powerful local or a weak and distant station with equal facility. This volume control is a Carter 10-ohm rheostat regulating the filament brilliancy of the two radio frequency amplifier tubes. To eliminate the possibility of applying more than the rated voltage to

the filaments of these tubes, a 2-ohm resistance unit is used in series with the radio frequency tubes and rheostats. The filaments of the remaining tubes are held at their proper operating temperatures by separate amperites.

Since the second radio frequency stage and the detector stage are shielded, unwanted signals are weeded out due to the filtering action of the three sharply tuned circuits through which they would have to pass in order to reach the detector tube. This shielding also prevents direct pick-up by the second radio frequency and detector circuits.

The use of stage shielding also eliminates any interaction between circuits, thereby stabilizing the radio frequency amplifier and greatly increasing its overall efficiency.

No shield is necessary on the first radio frequency stage, although the receiver is designed so that a shield can also be used for this stage if desired.

The output of the second radio frequency stage, which is a highly amplified copy of

the original signal picked up by the antenna, is then fed to the non-regenerative detector, where it is demodulated or converted into audible frequencies. These audio currents, or electric sound waves, are then further increased in strength by the two stages of transformer coupled audio frequency amplification and passed on to the loud speaker.

The two stages of radio frequency amplification used present some rather new and novel features in the design of the antenna coupling coil and the interstage radio frequency transformers. The design of these coils is based on two fundamental laws of radio engineering that are as old as radio itself. The first of these laws is this: up to a certain point an increase in the coupling between two coils affords an increase in energy transfer and a decrease in selectivity. The second law is this: the energy transfer between two coils such as the primary and secondary of an ordinary radio frequency transformer increases rapidly as



Photo A. Front view of receiver in cabinet

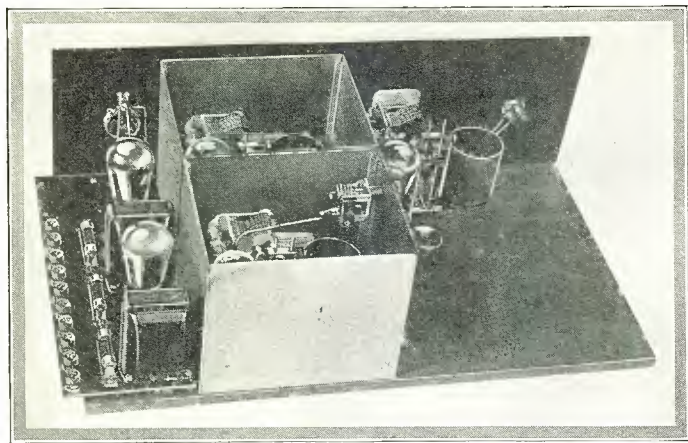


Photo B. Rear view showing parts assembled on baseboard

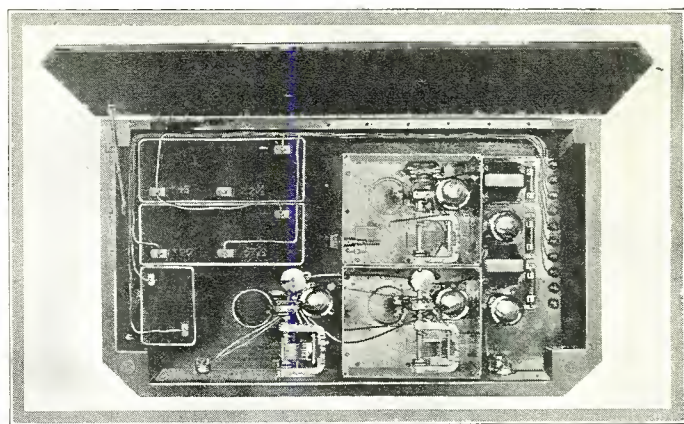


Photo C. Top view of receiver in cabinet with "B" batteries

the frequency increases. In other words, the energy transfer is much greater at high frequencies (short wavelengths) than at low frequencies (long wavelengths), and the relative selectivity is less at high frequencies and greater at low frequencies. Conversely, a constant transfer of energy and constant selectivity can be maintained by loosening the coupling as the frequency is increased.

A successful broadcast receiver must be capable of receiving wavelengths from 200 meters (1500 K. C.) up to 545 meters (550 K. C.). This represents two extremes in frequency corresponding to a range of about three to one. These requirements together with the two laws stated above make it evident that some means of variable coupling must be provided if we are to obtain equal energy transfer and selectivity throughout the broadcast spectrum. Since the trend in modern broadcast receivers is toward simplicity of tuning, the addition of variable coupling controls was not advisable. Therefore, designers have developed a radio frequency transformer in which the coupling between the primary and secondary coils is automatically varied by the rotation of its associated tuning condenser. This variation in coupling is smooth and continuous and is accomplished by means of a cam on the variable condenser shaft. At the setting of zero on the condenser dial (which tunes the transformer to a wavelength slightly below 200 meters) the coupling between primary and secondary is minimum. As the tuning dial is advanced toward

100 the coupling increases gradually until it reaches maximum, when the condenser dial reads 100, at which time the circuit is tuned to a wavelength of about 560 meters. The antenna coupler is designed to make use of this same efficient principle, and, in addition, the antenna coil itself is tapped and a switch provided in order to afford a further coupling variation to suit different length antennas and to provide extremely loose coupling in very congested areas.

This automatic variable coupling feature made it possible to use a comparatively large number of turns in the primaries of the radio frequency transformers. This large primary allows great energy transfer and consequent loud signals on the longer wavelengths where the coupling between primary and secondary is closest.

However, this large primary and close coupling would be totally unsuitable at the shorter wavelengths. This difficulty is overcome by automatically loosening the coupling as the receiver is tuned to the shorter wavelengths, thereby maintaining a high degree of selectivity without sacrificing signal strength. This is due to the fact that the same amount of energy transfer can be obtained with looser coupling at short wavelengths than at long wavelengths.

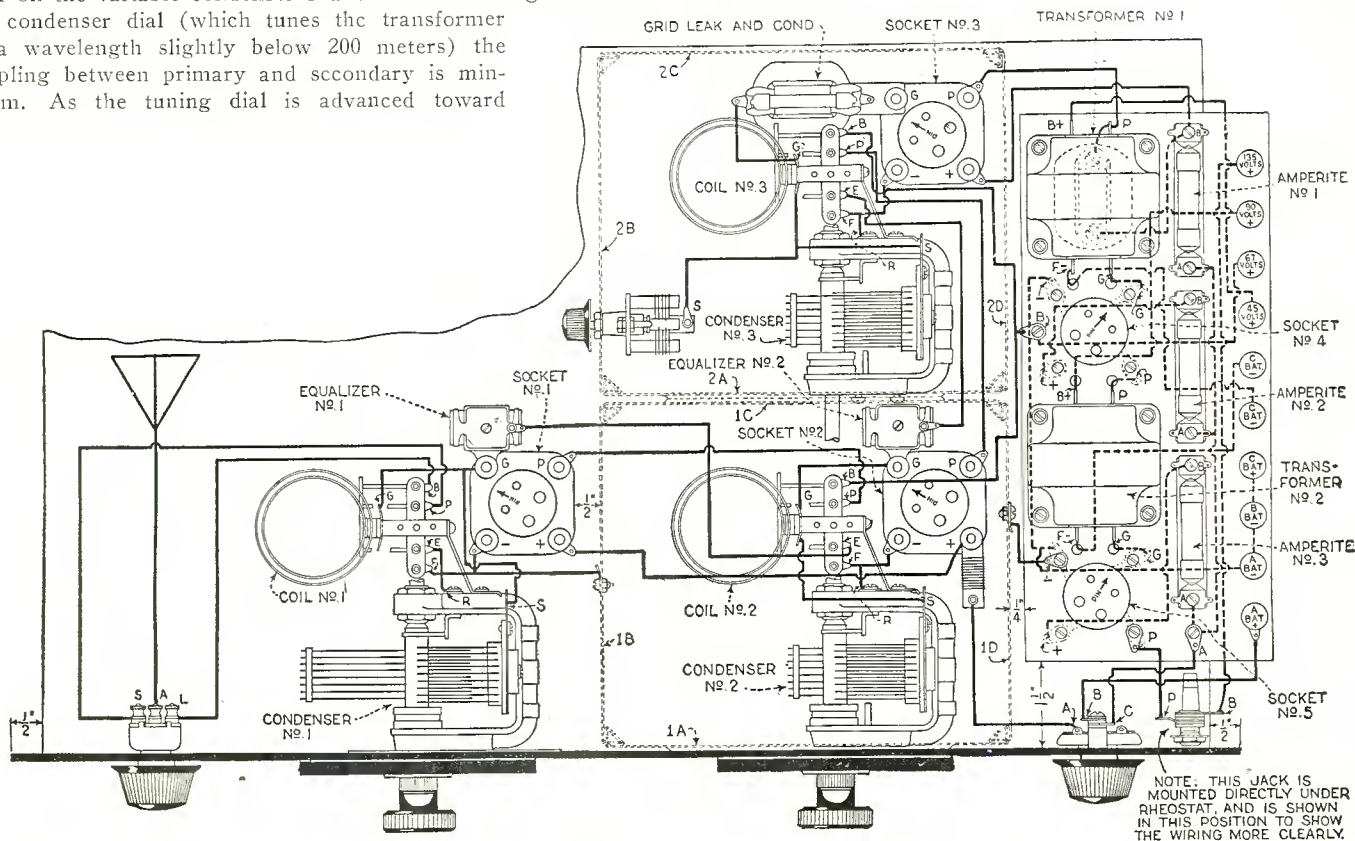


Fig. 1. Pictorial wiring diagram



In order to permit the use of more efficient stage coupling coils, equalization of disturbing potentials has been incorporated, thereby allowing a higher degree of amplification, with consequent louder signals and greater distance-getting ability, without the usual troubles caused by self-oscillation.

It will be well for the builder to observe closely the system employed in assembling and wiring. Usually it is the custom to assemble the entire receiver and then do all the wiring. Here the assembly is done jointly with the wiring. This tends toward ease of building because the hand is not hindered by the obstruction of parts not yet in place. The section method of building up the shield makes it possible to wire easily the parts which will later be completely enclosed by the shield.

The first step in the construction of the receiver is to attach the front panel to the baseboard and mount the panel instrument as shown in the picture diagram.

Now mount tuning condenser No. 1 with its small shield. The single hole mounting nuts on this and the other tuning condensers are not used and may be discarded.

After removing the mounting nuts and the short shafts from the remaining two condensers, mount one of them, first placing shield section No. 1A between the condenser and the panel.

Loosen the screws in the friction brakes of all condensers. Now slide the two aluminum strips of the foundation unit in place, taking care to place them in their correct positions. Then slide shield section 1E on top of these strips and under the lip of the panel shield section so that the holes in the lip of the panel shield, the bottom shield and the shield strips line up.

Socket No. 2 should then be screwed in place and socket No. 1 is fastened to the baseboard in line with socket No. 2.

Now loosen the two set screws in the rotor of the first tuning condenser, slide the shaft back so that  $\frac{3}{8}$  inch projects beyond the rear bearing, and then retighten the rotor set screws. Mount one of the Auto-Couple coil cams on the projecting shaft so that the set screw in the cam is exactly on top (looking down on the set) when the plates of the condensers are all the way in.

Before mounting the coils on their condensers remove the long adjusting screws in the square brass posts at the primary end of the coils, because they will be extremely difficult to remove when the assembly is completed.

After removing these screws mount the coils on the two condensers as shown, using the brackets and screws packed with the coils.

The cams on tuning condensers Nos. 2 and 3 are not yet to be

mounted, but the same mounting instructions given above will later apply to these two condensers.

The assembly is now ready for the first part of the wiring.

Use the special wire solder in the foundation unit and a light iron, which should first be cleaned and properly tinned.

Be extremely sparing with the amount of flux used and use just enough solder to run in the joint and make a firm connection. Large gobs of solder are entirely unnecessary and only serve to make an otherwise good job look unworkmanlike. If the iron is hot enough to cause the solder to flow freely, no trouble should be experienced in making neat and permanent joints.

In wiring, all leads should be run by the most direct routes, and no attempt should be made to secure square bends or other old-fashioned ideas in wiring. Care should be taken to see that none of the wires interfere with the full motion of the condenser rotor plate moving primary coils and their cams and flexible connectors.

**LIST OF PARTS**

These parts or their equivalent will give satisfactory results:

- 2—Samson Transformers, type HW-43 (3-1 ratio)
- 3—Hammarlund .00035-mfd. Midline Condensers
- 3—Hammarlund Auto-Couple Coils (set of 3 coils)
- 1—Hammarlund Jr. Condenser, 9 plates, 32 mmfd.
- 1—Hammarlund-Roberts "How to Build-It" Book
- 2—Mar-co No. 192 Vernier Dials
- 3—Benjamin No. 9040 Sockets (with bases)
- 2—Benjamin No. 9049 Sockets (without bases)
- 2—Amperites No. 1A
- 1—Amperite No. 112
- 1—Carter No. M-10-S Combined Rheostat and Filament Switch, 10-ohm
- 1—Carter No. 1 "Short" Jack
- 1—Carter No. 12 "Imp" Aerial Switch
- 1—Sangamo .00025-mfd. Fixed Condenser
- 1—Sangamo .001 mfd. Fixed Condenser
- 1 Pair Sangamo Grid-Leak Clips
- 1—Durham Metallized Resistor, 3 megohms
- 10—Eby Engraved Binding Posts
- 1—Hammarlund-Roberts Hi-Q Foundation Unit (containing drilled and engraved Westinghouse Bakelite Micarta panel, drilled Bakelite Micarta sub-panel, two complete shields, two equalizers, extension shaft, resistance unit, wire, screws, nuts and all special hardware required to complete receiver.

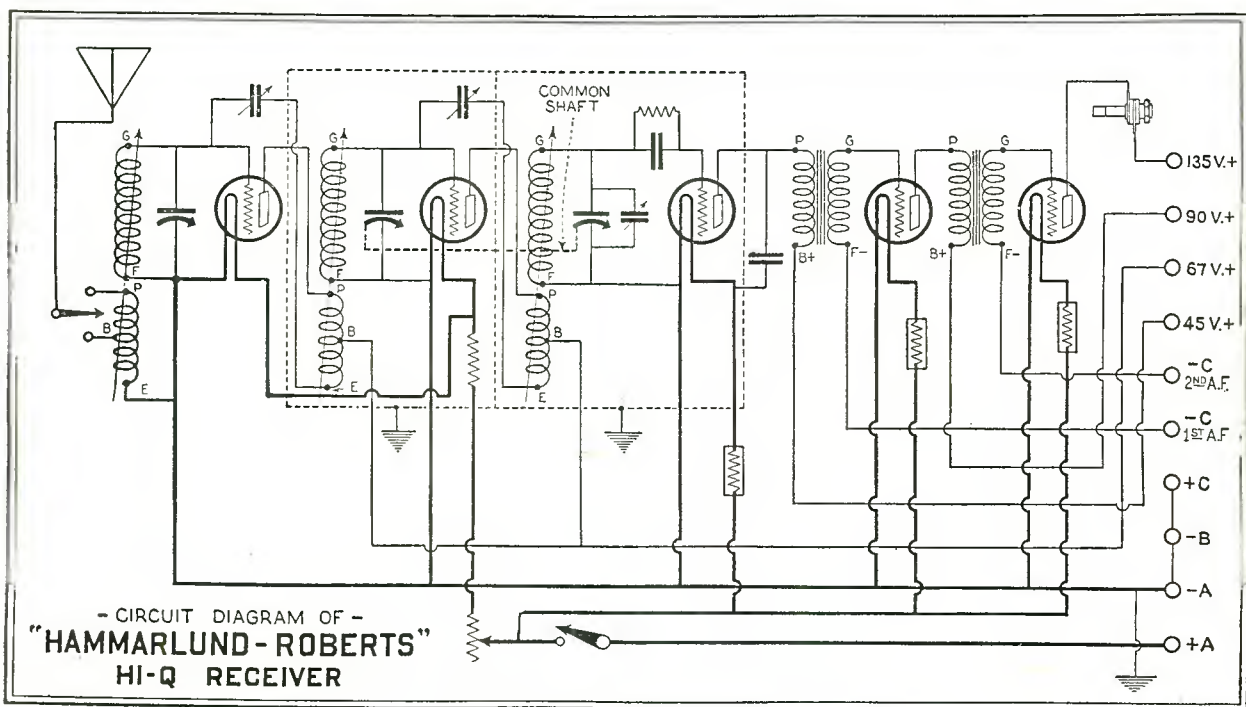
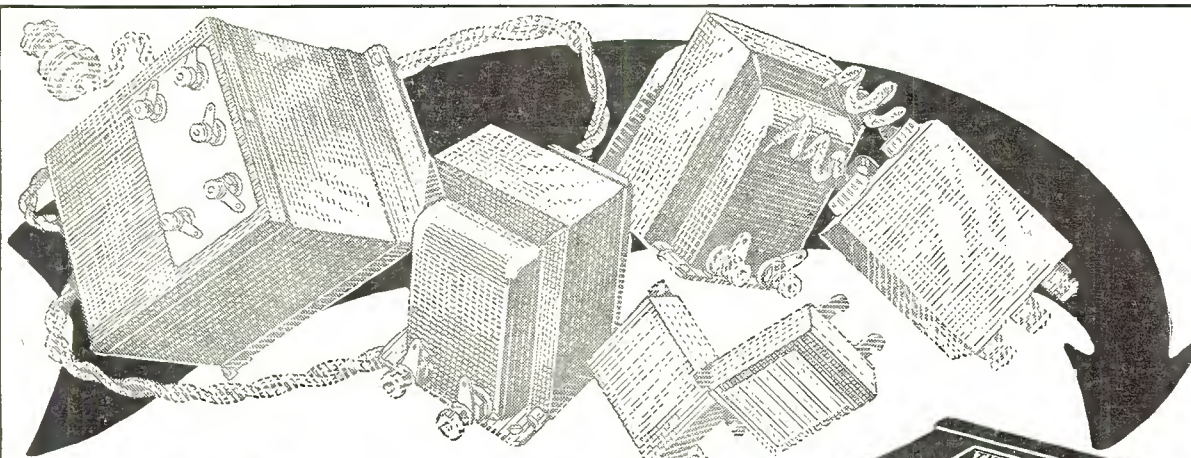


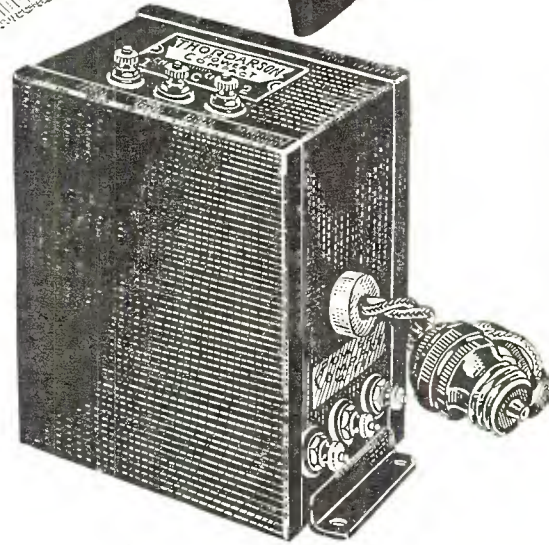
Fig. 2. Schematic wiring diagram





# All in One!

## THORDARSON POWER COMPACT



### TYPE R-171

Contains a power supply transformer for Raytheon BH rectifier, 2 filter chokes, 2 buffer condensers, and a filament supply for UX 171 power amplifying tube.

\$15.00

### TYPE R-210

Contains a power supply transformer for UX 216-B rectifier, 2 filter chokes, and a filament supply of 7½ volts for UX 210 power amplifying tube.

\$20.00

## The Complete Foundation Unit for power amplification and B supply

**Simplified Assembly.** The Power Compact contains within itself the greater part of the complete B supply unit. With the Type R-171, only 14 leads complete the Raytheon assembly. All terminals are carefully located for the greatest ease of assembly.

**Compactness.** The only additional apparatus required to build the B supply are the condenser block (Raytheon type), a Raytheon tube BH, and the resistance units. The complete eliminator occupies a space of but 6 in. x 9 in. without crowding.

**High Efficiency.** The power supply of either Power Compact furnishes the proper current for maximum efficiency of the rectifiers used; the chokes are of sufficient capacity to carry the maximum output. Conservatively rated, will not heat up in continuous service.

**High Voltage Output.** The R-171 Power Compact assembly will deliver a maximum plate voltage output of 300 volts at 30 milliamperes, or 275 volts at 40 milliamperes.

The R-210 type assembly will deliver 400 volts to the plate of the power tube, and in addition, will supply a constant 90 volts to the receiver at any current drain up to 40 milliamperes.

**Silent in Operation.** There is no traceable hum, either mechanical in the compact itself, or electrical through the loudspeaker.

**Complete Supply for Power Amplification.** The Power Compact not only supplies B voltage, but also provides for the filament current and grid bias of the stage of power amplification. *Makes it possible to use power amplification even on sets designed for dry battery operation.*

**Electrically Centered Filament Supply.** The power tube filament supply is tapped at the exact electrical center for grid return. The center tap is taken from the common lead of two perfectly balanced windings—completely obliterating the A. C. hum. (An exclusive Thordarson feature.)

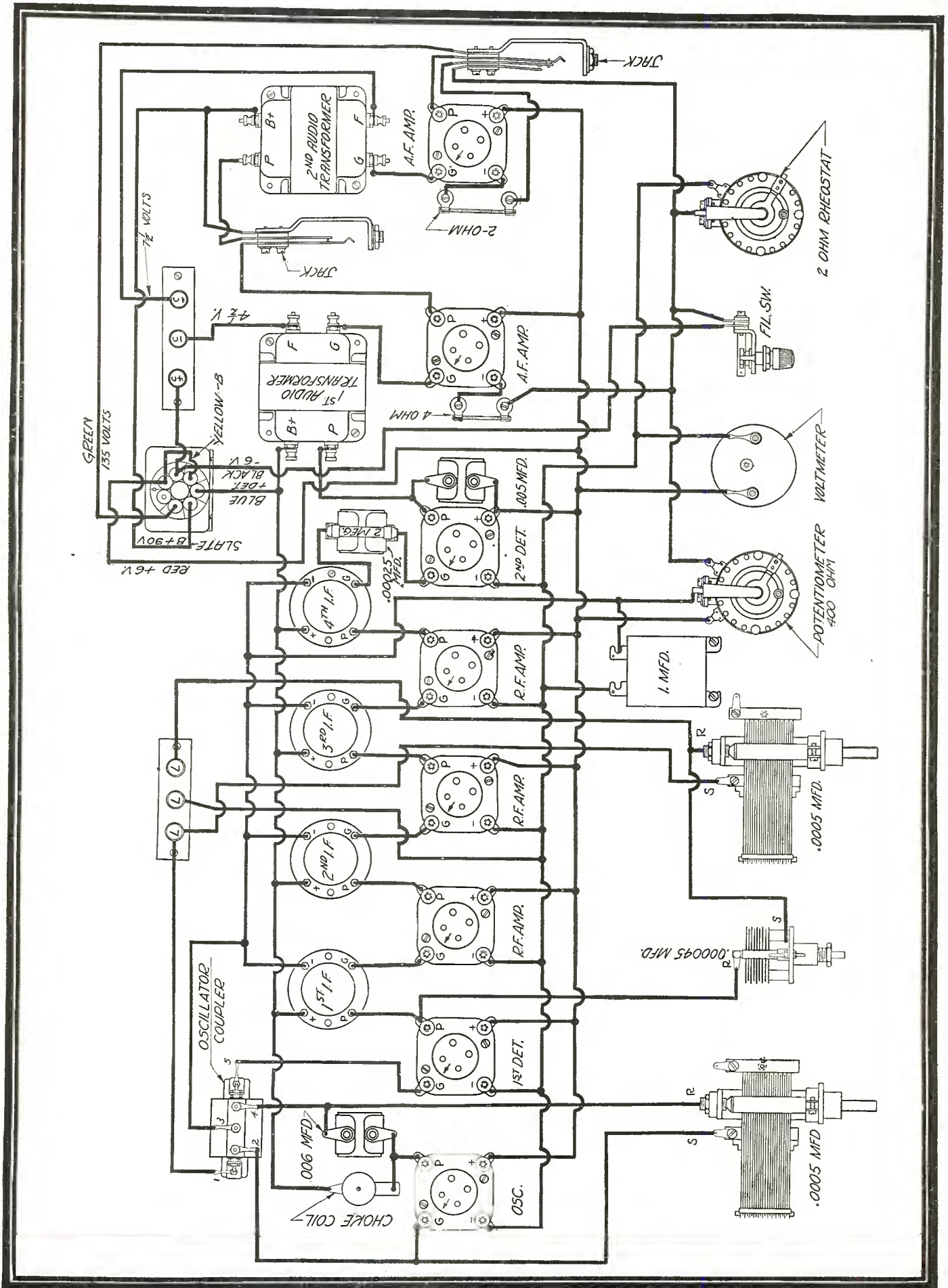
Write for instruction booklets SD-49 and SD-50.

If your dealer cannot supply, order direct from the factory.

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

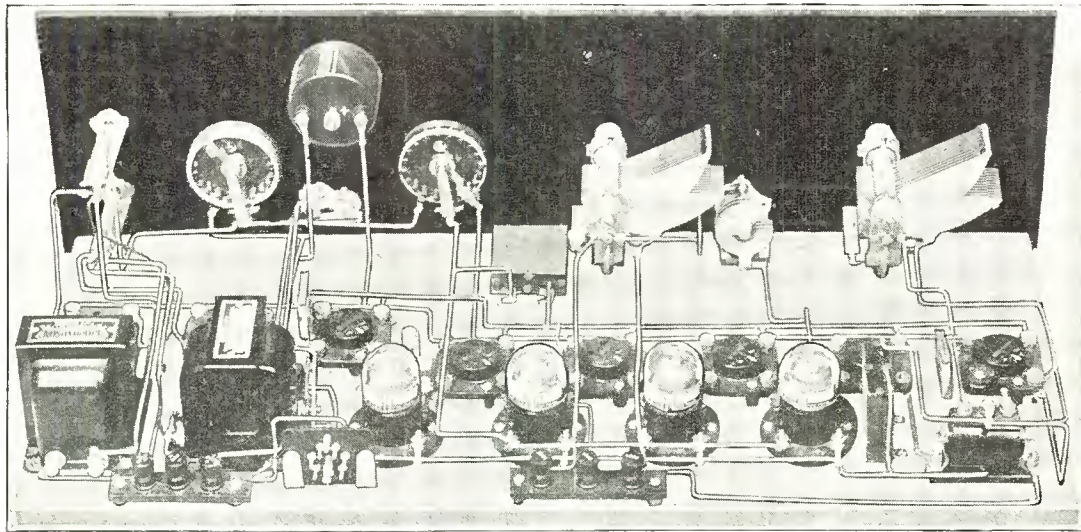
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Tell 'Em You Saw It in the Citizens Radio Call Book



The Improved St. James Superheterodyne

# The ST. JAMES Two Forty Receiver



## Radio's Outstanding Development of the Year

Using the vacuum treated, dehydrated air core transformer designed for highest efficiency. Operating at 240,000 cycles they are guaranteed to be matched within 50 cycles.

Note the simple wiring scheme as shown above, and the absence of large inductances — that means greater selectivity and less effects from extraneous or interfering causes, giving smooth powerful quality reception.

Hundreds of congratulatory letters, telegrams and personal calls have testified to the wonderful performance of the ST. JAMES TWO-FORTY, and invariably, special comment is made on the extraordinary tone quality and volume of the distant stations.

### The St. James Transformer

Especially wound air core inductances, exactly matched.

Bakelite base with terminals permitting very short leads.



Pat. Pend.

Full size illustration shows the small dimensions of coils.

Glass bulb enclosure with contents vacuum treated, then sealed from further effects of moisture.

YOU can build this set, as the full size working plans are very complete and easy to follow. **Absence of adjustments** insures immediate operation and consistent results. Our service department gives you prompt, courteous and intelligent assistance.

Folder B furnished on request, tells you more of the principles involved in the design of this receiver. Write today.

Special offer. If your dealer cannot or will not supply you with St. James Devices, we will on receipt of \$36.50 furnish you with the four specially matched transformers, Oscillator and choke coil, all shipping charges paid. The working plans will be included without charge.

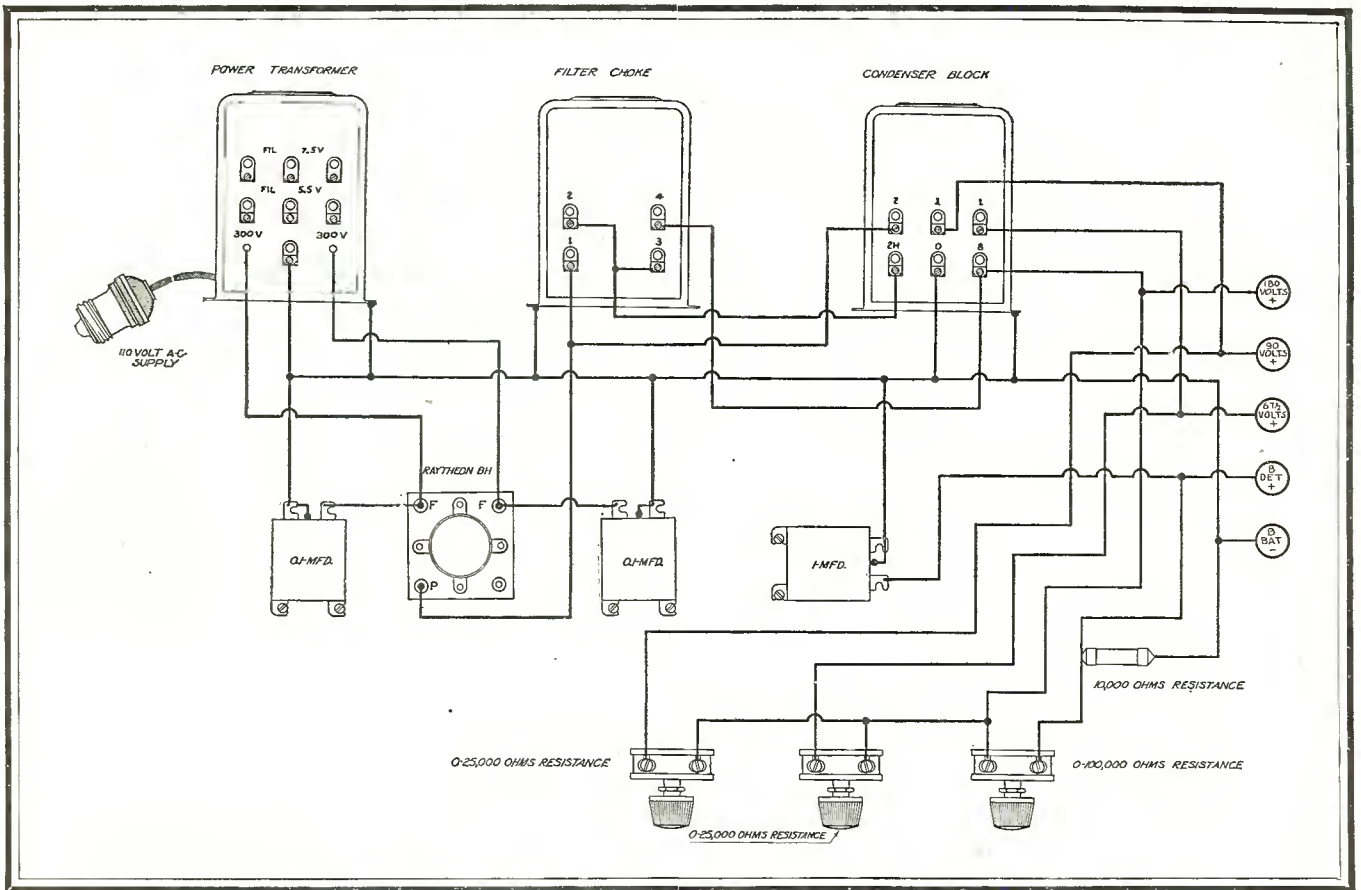
If, after a fair test, you are not satisfied with its performance, and you do not obtain finer reception than you ever have heard before, we will refund your money immediately they are returned to us in good condition.

## St. James Laboratories, Inc.

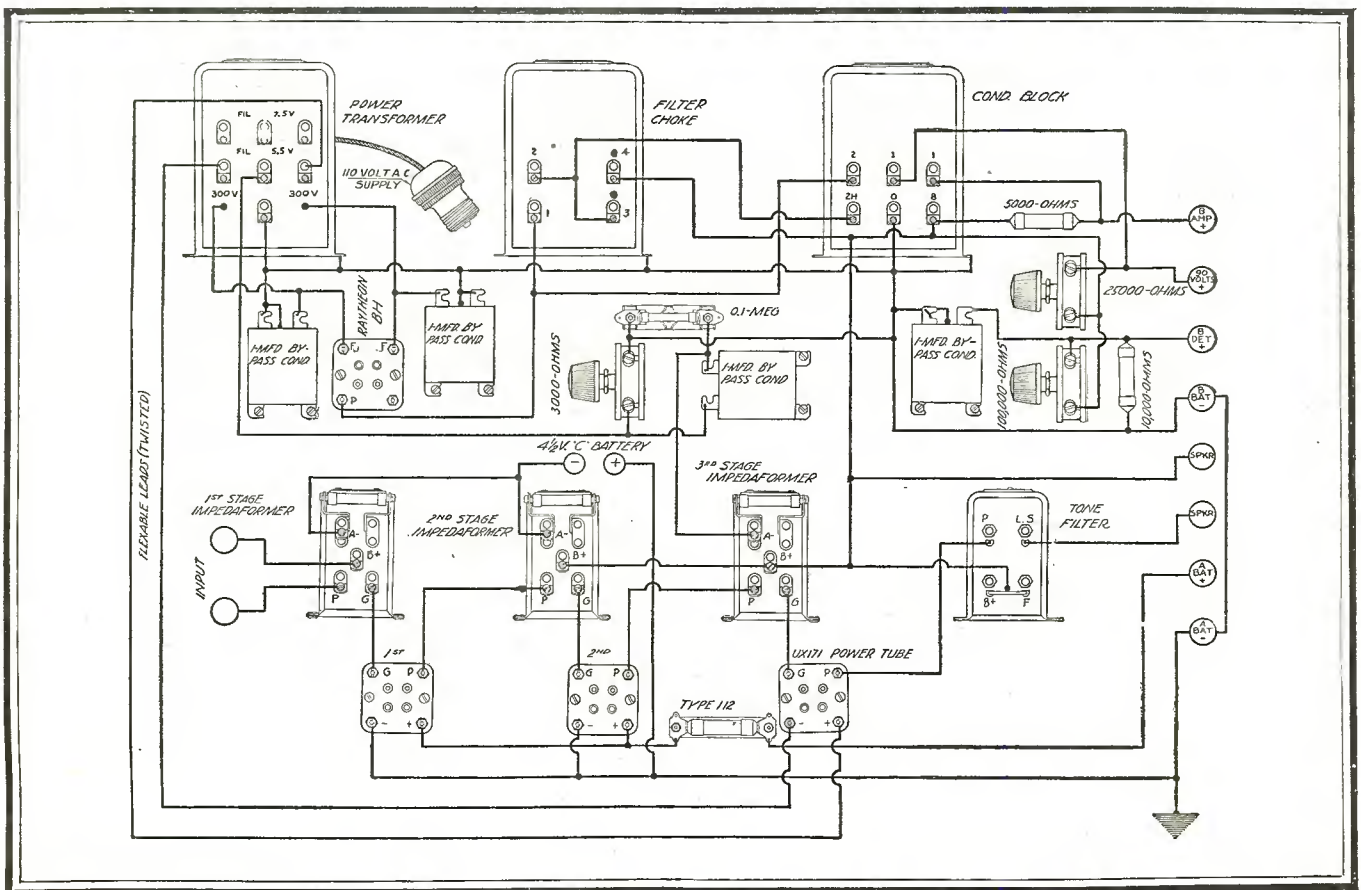
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Chicago, Ill.

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



National "B" Eliminator Using Type "BH" Raytheon Tube



National "B" Eliminator and Power Amplifier

NATIONAL B-POWER SUPPLY EQUIPMENT

# To MAKE GOOD

B-Power-Supply Units and Power Amplifiers, NATIONAL CO. INC. has now developed in collaboration with James Millen, these finer units;—adaptable to several best makes of rectifier tubes,—capable of carrying heavy loads continuously without heating or harm,—arranged for simplest and most direct wiring. Only the finest and most adequate materials we can buy are used. TOBE High-Voltage Condensers are employed in the TOBE SPECIAL B BLOCK.

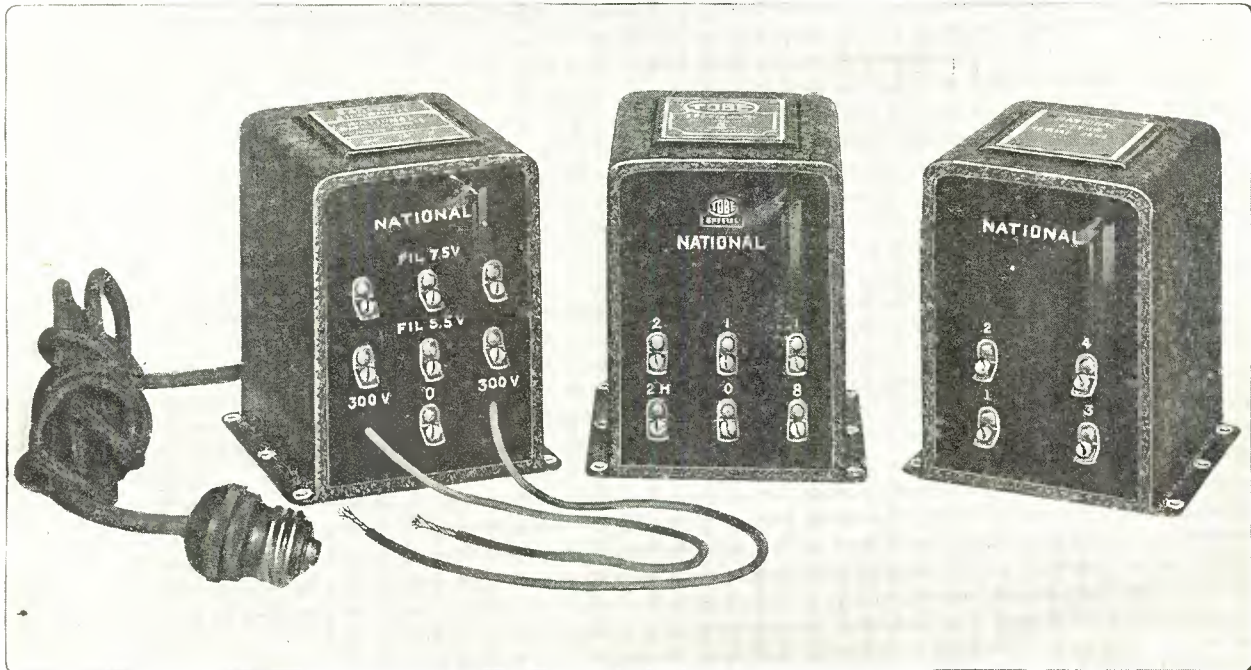
First, we made these units as well as we

could;—then and only then determined what they must sell for. The makers of the NATIONAL BROWNING-DRAKE Coils and R.F. Transformers have standards and a reputation to guard and maintain. And the fine appearance of these units reflects their sound engineering design.

## National Tone-Filter

An iron-core inductance of proper value and 2 Mfd. TOBE Filter Condenser, through which to pass power tube output, for improvement of quality and protection of speaker windings. Complete with 5 foot cord and tip jacks, for instant attachment.

Price \$8.00

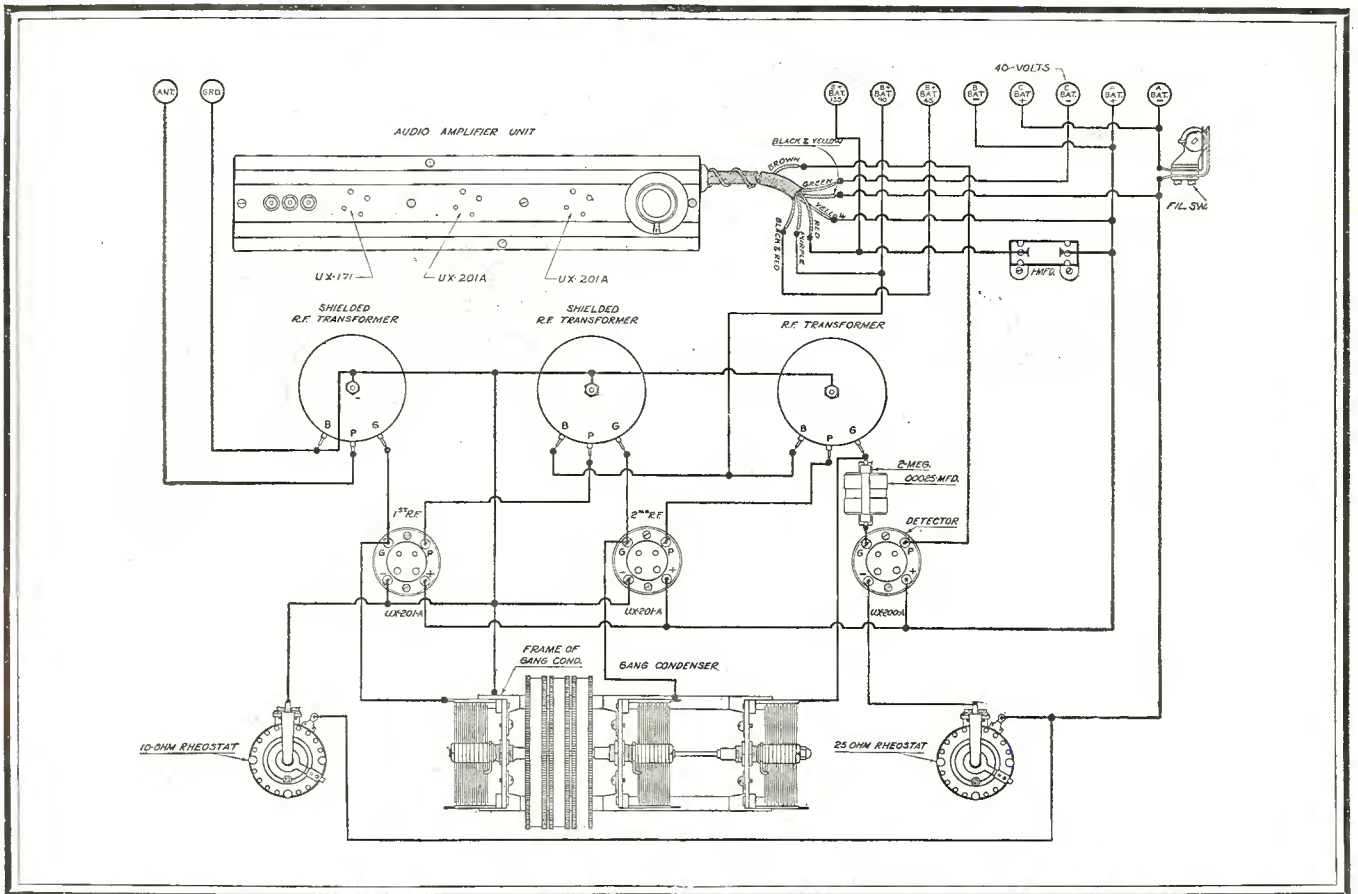


NATIONAL Power Transformer, \$16.50; TOBE SPECIAL B-BLOCK, \$17.50; Filter Choke Unit, Type 80, \$10.00.

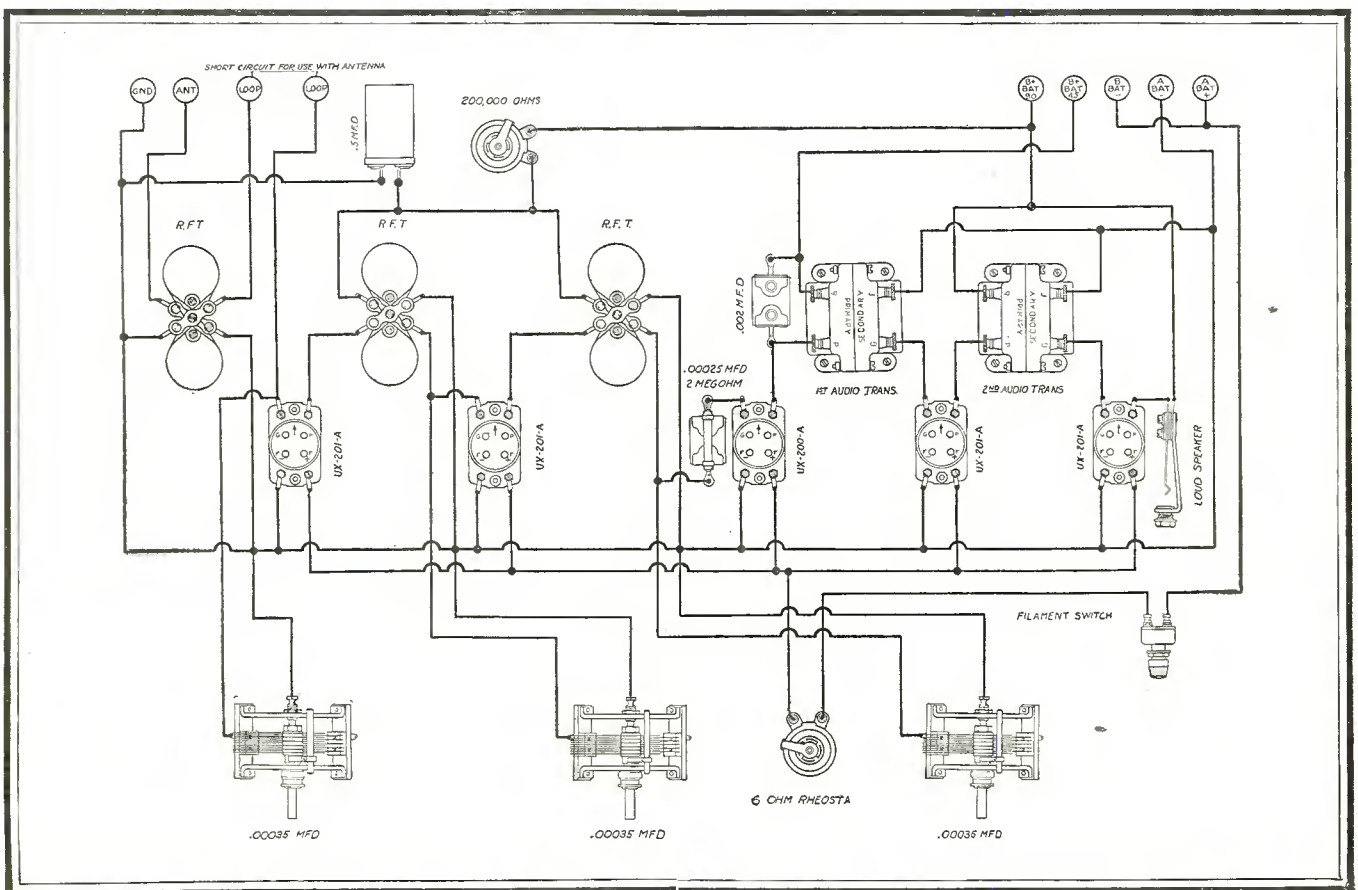
BE SURE YOU GET THE GENUINE  
**NATIONAL**  
 RADIO PRODUCTS

NATIONAL CO., Inc. makes BROWNING-DRAKE Coils and R. F. Transformers;—NATIONAL "EQUICYCLE" and "EQUIMETER" Variable Condensers, NATIONAL VELVET-VERNIER Dials, including the ILLUMINATED Type C Dial;—NATIONAL Impedaformers, for quality audio;—NATIONAL Transmitting Variable Condensers and other Radio products.—NATIONAL COMPANY, Inc., Cambridge, Mass.

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



Six-Tube Receiver Using Alden Localized Control and Truphonic Amplifier



Bodine "Twin Eight" Receiver



“—remarkably good!”



**ALL-AMERICAN**  
TRADE MARK  
**Reproducer**



**ALL-AMERICAN**  
TRADE MARK  
**Constant-B**  
Battery Eliminator

That is the judgment, without exception, of radio experts and enthusiasts who have examined and tested these two fine units.

They mean *better reception*. Both have a great deal to do with finer tone-quality. You owe it to your own enjoyment of radio, to know the facts about these fine-quality accessories.

**ALL-AMERICAN**  
**Reproducer**

For purity of tone this handsome product is outstanding among reproducers. It combines ingeniously all advantages of good cone-type reproducers—and the improved quality provided by a special sounding board and sounding chamber. A highly sensitive unit which reproduces voice and instruments naturally and clearly. Perfect uniformity is maintained over the entire musical range, whether amplifiers are turned to full volume, or down to a whisper. Absolute freedom from “inherent pitch” prevents low throaty tones or twangy nasal effects.

Price \$25.00

*Prices are slightly higher  
West of the Rockies*

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**Constant-B**

An attractive compact unit of silent efficiency—insures a dependable supply of uniform plate current. Five output taps; negative, +45, +67, +90, and a power tube tap adapt “Constant-B” to all requirements. A “Detector” control provides voltage variation between 10 to 60 volts. An “Amplifier” control allows a variation of 10 to 120 volts on the intermediate tap, without affecting the 90 volts supplied to first audio stage. A High-low switch adapts “Constant-B” to receivers of various current requirements.

Price \$37.50 Complete with Raytheon Tube

**New 1927 Radio Key Book**

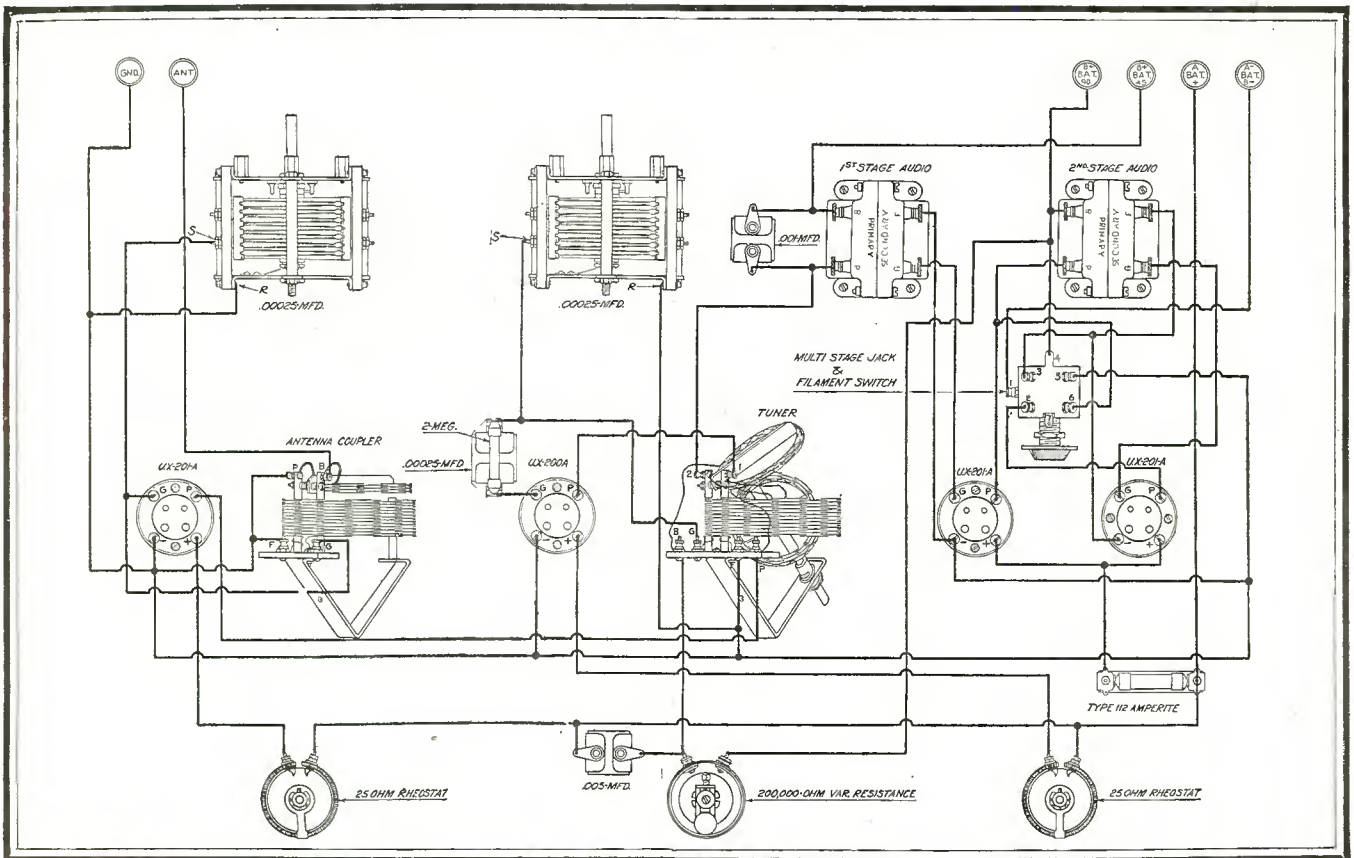
Learn more about the fundamentals of radio. This *new* 48-page book contains an interesting analysis of radio in language anyone can understand—also complete constructional details of the leading types of circuits. Sent for 10c (coin or stamps) to pay for postage and mailing.

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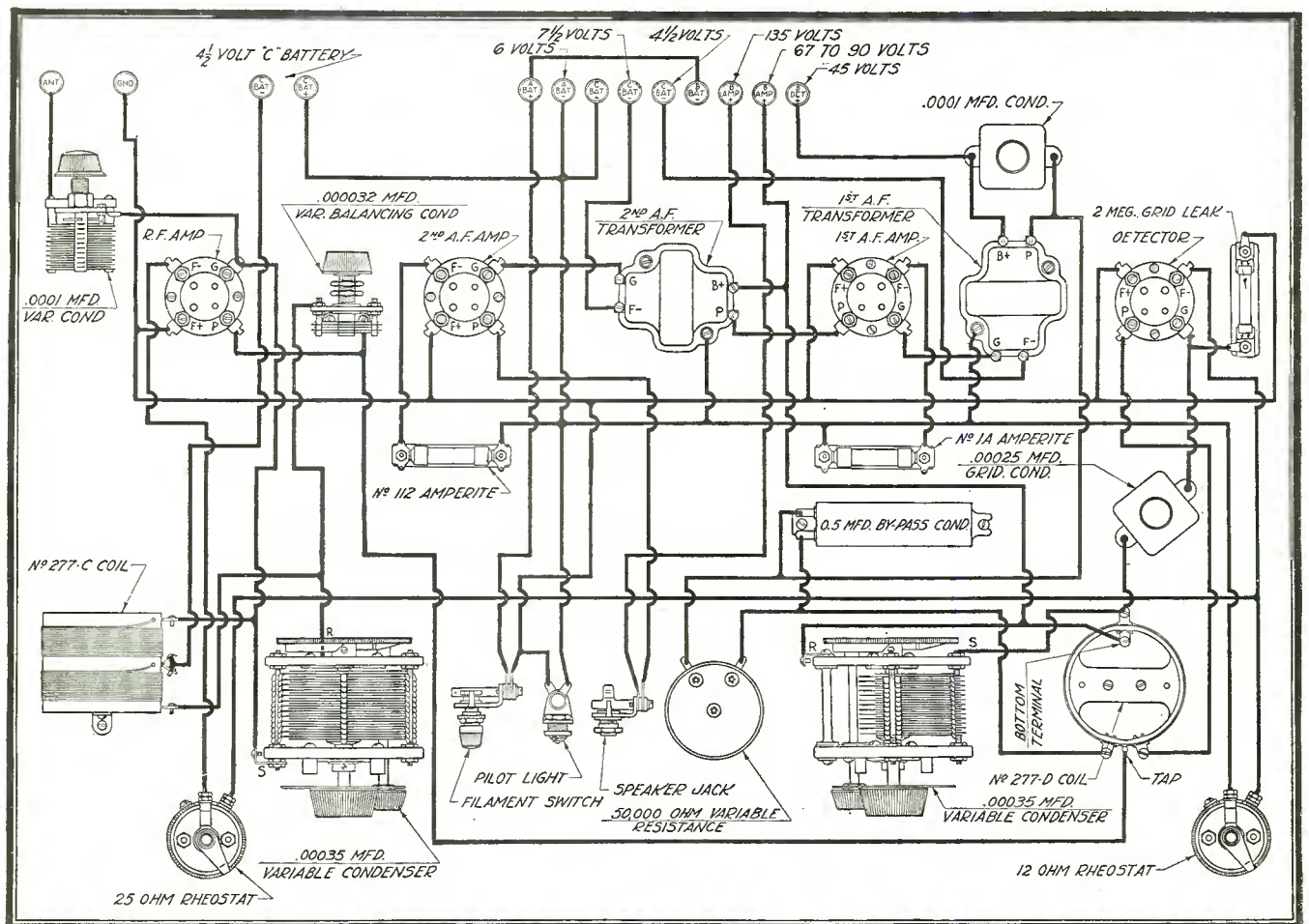
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OWNING AND OPERATING STATION WENR ~ 266 METERS

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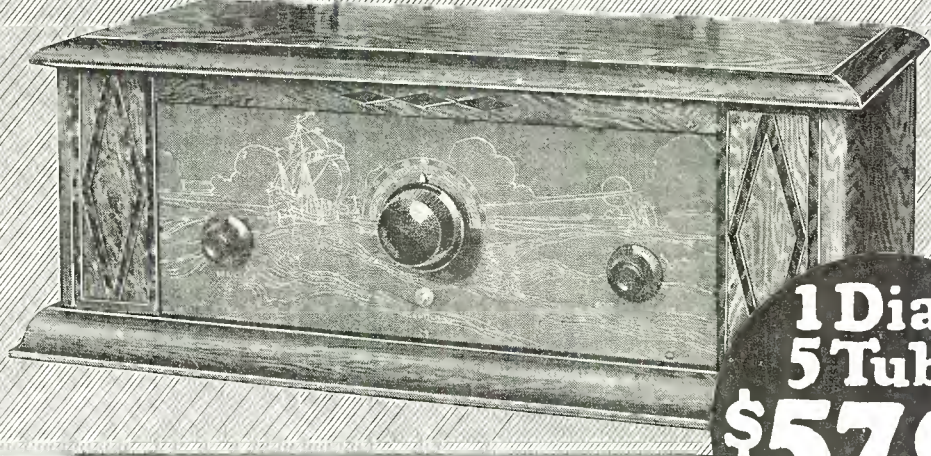
Four-Tube Non-Radiating Receiver



The Universal Receiver

# 30 Days Trial

Only **ONE** Dial to Tune



1 Dial  
5 Tube  
**\$57.00**  
RETAIL PRICE

## THE LAST WORD IN RADIO--- and the biggest values ever offered

Yes Sir!—you can put a NEW 1927 Model Westingale, 5-tube Radio in your own home and use it to your heart's content on 30 DAYS' TRIAL. Entertain your family and friends. Listen to the music, concerts, sports, news, market reports from stations all over the country. Compare it with other sets for beautiful appearance—wonderful performance and low price—and if you are not convinced that Westingale gives you the greatest measure of Radio satisfaction and the best value for the money—YOU DON'T HAVE TO KEEP IT.

Westingale Sets have been tested and approved by Popular Science Institute, Radio News and Popular Radio Laboratories,—also by the Radio Depts. of Farm Mechanics Magazine and Capper's Farm Publications.

### POWERFUL-- DEPENDABLE WESTINGALE 5-TUBE-- COAST TO COAST

Don't buy any Radio until you send the coupon below for our FREE Catalog which pictures and describes both the new 1-Dial and 2-Dial Models. Why pay more? Why not get the NEWEST Radio? Why take chances when all we ask is a 30-Day Trial at our risk to convince you that these NEW 1927 Westingale Models are years ahead in powerful reception—wonderful loud clear tone—handsome appearance—and EASY, simple control.

Look at these two distinctive Westingale Models—they're the last word in every way. Every late feature—every new worth while idea is embodied in their make up. Newest style period type cabinets. Two-tone, hand rubbed Walnut finish. The front panels enhanced with an artistic Spanish Galleon design embossed in dull gold, these new Westingale Models are unsurpassed in appearance—unbeatable in performance—and unbeatable in price.

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Right now we want to appoint an agent or dealer and place one demonstrating set in each locality because we know that each demonstration will sell more sets. This is your chance to get a Westingale Radio at a big discount and make it pay you big money. For a limited time we offer a big reduction, way be-

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2 Dial  
5 Tube  
**\$47.00**  
RETAIL PRICE

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Way Below Retail Prices  
To Agents and Dealers

Our FREE Catalog also explains a plan whereby you can put a Westingale Radio in your home on 30 Days' Trial—demonstrate it to your neighbors and friends in your spare time, and get your own set without cost before the trial period is up. Mail the coupon or a post card for our FREE Radio Catalog today. Be first in your locality to get special discount prices and our FREE Radio offer.

**Westingale Electric Co.**  
Dept. 126  
1751 Belmont Ave., Chicago

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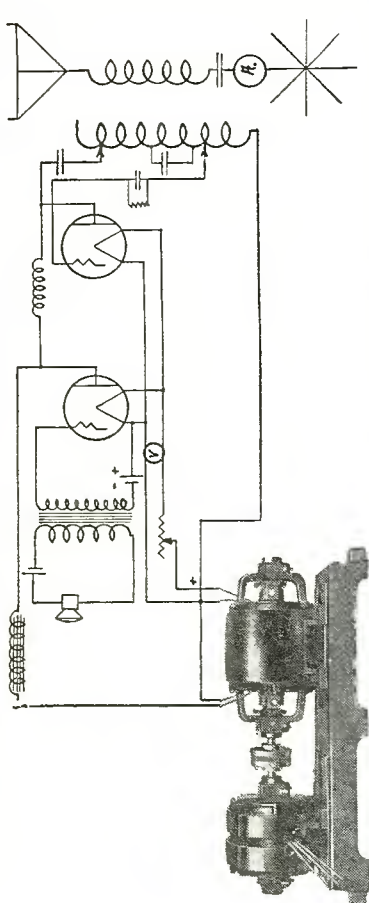
Westingale Electric Co.,  
Dept. 126—1751 Belmont Ave.,  
Chicago, Ill., U. S. A.

Please send your FREE Catalog on the New 1927 Westingale Radios. Also full particulars of your special Discount on the first outfit placed in each locality and your FREE Radio Offer.

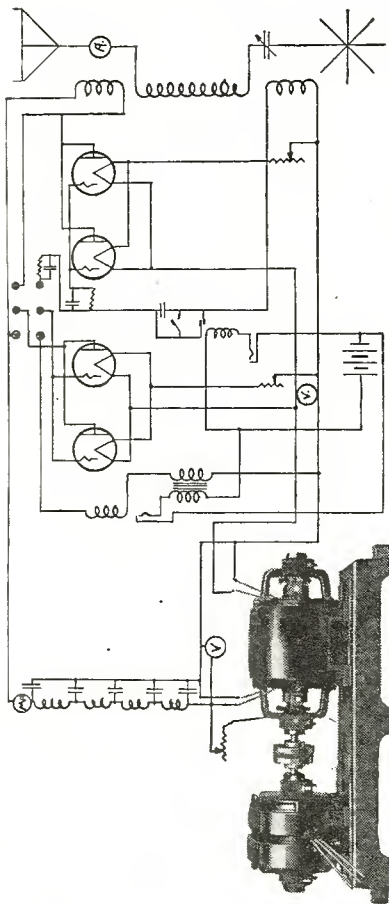
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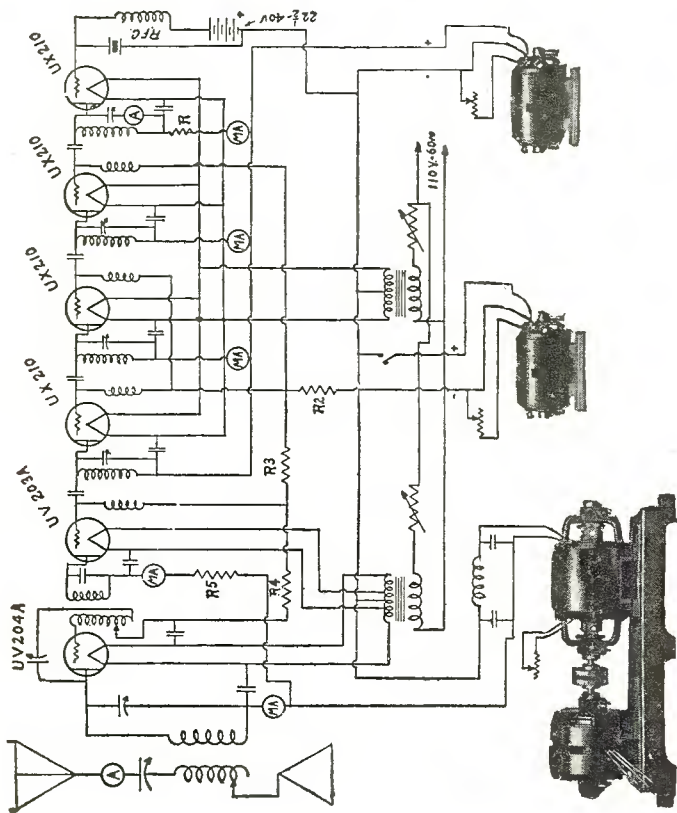


Item 35. Two unit four bearing set. Furnished with ring oiled or ball bearings. Motor to suit local supply. This "ESCO" set delivers 1000 volts, 300 watts for plate supply and 12 volts, 150 watts for filament supply. This set driving two 50 watters will make a good consistent station.



This is Item No. 8, furnishing Power Supply for 4/5 watters in the reversed feed back hook up.

Item 8 can be furnished with either AC or DC motors, or as a separate generator. The machine is two bearing, wick oil, and its output is conservatively rated at 500 volts, 150 watts. It's a real little maximum miles per watt DX getter.



This set requires a UX210 oscillator, three UX210 frequency doublers of the UX210 type, a 203-A power amplifier and a 204-A power amplifier. The crystal is a 320 meter one for 40 meter operation or a 160 for 20 meter work. Filament supply comes from two filament transformers, one for the 210s and another tapped for 11 and 13 volts for the 203-A and 204-A tubes. Plate supply for the 210s is obtained from Item 8, a resistance in the plate circuit of the oscillator tube producing the necessary IR drop to supply the tube with only 300 volts. Plate supply for the 203-A and 204-A tubes is obtained from Item 22, resistance R5 supplying the drop, allowing 1000 volts to be used on the 203-A. Grid bias for the tubes is obtained from Item 4 with IR drop resistances in those circuits requiring less than 400 volts. The grid bias for the oscillator tube comes from a block of B battery.

MOTORS—DYNAMOTORS—GENERATORS—MOTOR-GENERATORS

ELECTRIC SPECIALTY COMPANY

TRADE "ESCO" MARK

267 South Street, Stamford, Conn., U. S. A.

TRADE "ESCO" MARK

Pioneers in Developing and Perfecting High Voltage Wireless Apparatus

# Review of Circuits

## Our Question and Answer Department

We receive thousands of questions yearly from our readers on every phase of Radio maintenance, construction and design. In order to handle this on an economical basis we are going to make a slight charge for this service. Our engineers will answer your questions under the following conditions:

1. Make your questions brief and to the point.
2. No more than four questions allowed to one person.
3. Write on one side of the paper, in ink or on the typewriter.
3. Schematic wiring diagrams must be submitted on separate sheets.
5. We cannot answer questions free of charge. Send 25c in stamps or coin.
6. If your question requires considerable laboratory work or an unusual amount of time for research, an extra charge will be made, but you will be informed of that charge.
7. Do not send us checks.

*Avail yourself of this service. It is conducted to help You.*

### The Thordarson Power Amplifier

(See Diagram on Page 144.)

**W**ITH the passing of the novelty age in radio broadcast reception, and the acceptance of the receiver as a necessary luxury in the home, there has come a widespread demand for equipment that will faithfully reproduce the broadcast music or voices, as it may be.

Several methods have been attempted and worked out with a fair degree of success, in an endeavor to attain perfect reproduction by comparatively simple methods. Loud speakers have been improved by great strides recently, and have done much to improve the quality of reception. Power tubes have been substituted in the last stage of audio frequency in order that the input power of the last tube could be handled sufficiently fast enough to reduce distortion to a minimum by not working the tube at full rated capacity. Either of these, or a combination of these methods may be used with a fair amount of success.

The usual starting point of distortion is in the input of the first stage of audio frequency. The cause of distortion is closely confined to two points, transformer amplification and over-worked tubes. If these conditions are relieved, distortion will not be present.

In the described power amplifier, these difficulties have been eliminated and the output impedance of the amplifier has been matched with the internal impedance of the usual cone speaker, which will give as perfect reproduction as is possible at the present time.

The amplifier consists of three stages of impedance coupled amplification. This method does not have an amplification factor as high as that of a transformer coupled amplifier, but distortion, due to the transfer of energy, is eliminated. Two UX 201-A tubes are used and a UX171 is used in the last stage. A high voltage blocking condenser is placed in the loud speaker circuit, which prevents the high plate voltage of the last tube from causing any damage to the loud speaker windings. A 500,000 ohm potentiometer is placed in the grid circuit of the second tube, so that the proper grid bias may be easily obtained; 0.5 mfd. blocking condensers are placed in the grid circuits of all tubes to keep the high voltages of the autoformers from the grids.

The power amplifier method of amplification is highly recommended for those who desire the utmost in reproduction.

#### LIST OF PARTS

- 3—Thordarson R-190 Autoformer Impedance Units
- 1—Thordarson R-196 Output Choke Coil
- 1—Centralab 500,000 Ohm Potentiometer
- 1—Centralab 10 Ohm Rheostat
- 3—All American Sockets
- 1—Dubilier 1 mfd. By-Pass Condenser
- 3—Dubilier ½ mfd. By-Pass Condenser
- 1—Dubilier 2 mfd. High Voltage By-Pass Condenser
- 1—Dubilier .002 mfd. Fixed Condenser
- 1—Bradley 2000 Ohm Fixed Resistance and Mounting
- 1—1/10 Megohm Lynch Resistor and Mounting
- 1—½ Megohm Lynch Resistor and Mounting
- 12—Engraved Eby Binding Posts
- 1—Package Kester Solder
- 20 ft. Belden No. 12 ga. Copper Wire (Tinned)

### A Four-Tube Non-Radiating Receiver

See Page 152 for Diagram

**A** GREAT many of the home constructors are partial to the regenerative type of receiver, but, due to the effects of "blooming" and the limited range of "pick up" since the number of new stations has caused an air conges-

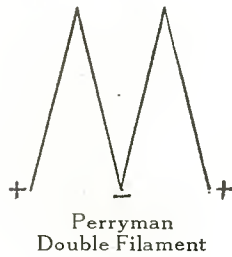


*View showing the completed receiver installed in a console with accessories*

## PERRYMAN RADIO TUBES

"Distance without Distortion"

# Double Filament! Extra Capacity!

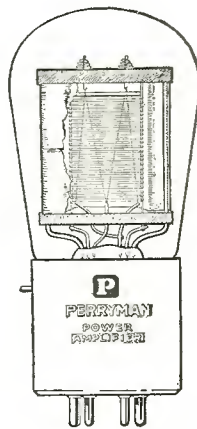


The filament of Perryman Radio Tubes with the patented Perryman Bridge is doubled to form a letter M. This twin construction not only exposes a greater area of filament surface, but it doubles the area of electron emission and increases the capacity of the tube. The real result is a tube that does its appointed work more easily, giving greater volume without distortion. Its longer life is a distinct economy.

Ask your dealer to show you the Perryman clear glass demonstrator. You can see at a glance why Perryman Tubes are superior.

The Perryman line consists of the latest types of amplifiers, detectors, super-sensitive detectors, power amplifiers, super-power amplifiers and rectifiers.

Here is the clear glass demonstrator tube showing the patented Perryman Bridge which holds the elements in place at the distance of greatest efficiency. Ordinary jars or jolts do not affect Perryman Tubes. Notice the double filament which distributes the electron emission over the full area of the plate, giving greater capacity without overloading. You get natural tone for the life of the tube and the life of the tube is exceptionally long.



(Patented June 22-26)

**PERRYMAN ELECTRIC CO., INC.**  
LABORATORIES AND PLANT  
NORTH BERGEN, N. J.  
SALES AND EXECUTIVE OFFICES  
33 W. 60th ST., N. Y. C.

tion, have had trouble in getting satisfactory results from this type of receiver.

Here is a receiver that has been designed to fulfill two of the desires of the user of a regenerative receiver: greater distance and a reduction of blooming interference. The method adopted to bring about these two features has been accomplished by adding a stage of tuned radio frequency before the detector. This will cause the signal to be amplified before reaching the detector and at the same time prevent any of the regenerated energy from passing into the antenna, and thus into the air to cause undue interference.

This receiver consists of a tuning arrangement of an antenna coupler with an adjustable primary, a three circuit tuner consisting of a radio frequency tube, secondary winding and a variable tickler coil used for regeneration in the plate circuit of the detector tube.

The secondaries of each coil are tuned with a .00025-mfd. variable condenser. A variable resistance of 200,000 ohms is used in the plate circuit of the radio frequency tube to control volume. The primary of the radio frequency coil is variable, and once adjusted for maximum selectivity and sensitivity, it needs no further adjustment.

The coils are of the self-supporting basket weave type, and are very efficient. The tuning condensers are of the S. F. L. variety, of rather odd design, the plates being wedge shape. A Rono switch is used as a combination control for filament, first and second stage of audio frequency.

### LIST OF PARTS

- 1—7x21x3/16-inch Formica Panel
- 1—General Radio Antenna Coupler
- 1—General Radio Tuner
- 2—National .00025-mfd. Variable Condensers
- 2—Ferantte Audio Frequency Transformers
- 4—Alden Sockets
- 1—Frost 200,000-ohm Variable Resistance
- 2—Frost 25-ohm Rheostats
- 1—Dubilier .005-mfd. Fixed Condenser
- 1—Dubilier .001-mfd. Fixed Condenser
- 1—Dubilier .00025-mfd. Grid Condenser
- 1—Dubilier 2-megohm Grid Leak
- 1—Type 112 Amperite and Mounting
- 1—Rono Multi-Stage Jack Filament Switch
- 6—Engraved Eby Binding Posts
- 1—Package Kester Solder
- 25 ft. No. 12 ga. Belden Tinned Copper Wire
- Miscellaneous Screws, etc.

This receiver is shown installed in a console in the photo reproduction appearing herewith. The console is a Model 10 manufactured by the Charlotte Furniture Company of Charlotte, Mich. In its construction only genuine walnut and high grade gumwood is used. All visible portions are made of walnut—the top and ends in straight grain walnut, while the front and doors are of carefully matched butt walnut.

A 100 ampere-hour six-volt Willard Storage Battery is used to supply the necessary "A" current. The battery is provided with a convenient carrying strap and Fahnestock Clips on terminals.

A Sterling "B" Power Unit capable of delivering up to 60 milliamperes without overloading is used to supply "B" potential. This unit uses the Raytheon Tube for rectification purposes and has two variable voltages.

The Sterling Charger is so constructed that it is capable of charging either "A" or "B" batteries. A switch is provided by which either the "A" or "B" charging rate is indicated. This charger uses a two-ampere Tungar bulb.

An automatic radio power control switch is used in this receiver to secure automatic control of eliminator and charger.

It plugs into the light socket and is connected in series with the receiver and the "A" battery. It has the facility of automatically cutting out the trickle charger and turning on the "A"

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

# A Brief Study of Audio Amplification



Type 285

### Audio Transformers

Under average conditions two stages of audio amplification are necessary to produce the desired loud-speaker volume.

Usually a combination of 1 to 2.7 and 1 to 6 ratio transformers proves most satisfactory, with the high ratio preferably in the last stage.

The new General Radio Type 285-D transformer has a ratio of 1 to 2.7 and has been designed specifically for use in the first stage of audio amplification following the new type 200-A detector tube. Because of its high input impedance, it produces very noticeably better tone quality than is possible with other transformers having a lower input impedance.

This transformer is particularly adapted, therefore, to use in the first stage of audio amplification and gives excellent results in the second stage as well.

	Price
Type 285 1 to 6	\$6.00
Type 285-D 1 to 2.7	6.00
Type 285-L 1 to 2	6.00

IN the design of any amplifying device for use at audio frequencies, it should be kept in mind that the curve of voltage amplification against frequency should approximate as closely as possible a horizontal line, if true tone quality is to be preserved in the process of intensifying the audible notes.

Since the purpose of amplification is to effect a considerable increase in volume, the curve representing the character of amplification should be as high as possible as well as a straight line running in a horizontal direction.

While it is a comparatively simple task to design a transformer to have a high and even amplification curve over any narrow frequency band, it is considerably more difficult to maintain the same degree of amplification at very low and very high frequencies as in the middle of the range.

In order that a transformer may function efficiently at low frequencies, its input impedance must be high—several times the plate impedance of the tube at 100 cycles. This is accomplished in the General Radio Type 285 transformers by means of a core of large cross-section of high permeability steel and a primary coil of many turns. Proper coil design, avoiding excessive coil capacity and magnetic leakage prevents loss of notes above the middle register.

Careful laboratory measurements of all General Radio Type 285 Audio Transformers show a high and comparatively flat curve over practically the entire section of the audio range covered by the human voice and musical instruments.

It will be remembered by radio experimenters whose interest in the science dates back to the early days of broadcasting, that in 1917 the General Radio Company brought out the first closed core transformer to be sold commercially. This instrument was the type 166. It established a new and higher standard of audio frequency transformer design. Since that time the subject of amplification has been exhaustively studied in the laboratories of the General Radio Company with the result that transformer design has been constantly improved and today the General Radio Company is universally recognized as an outstanding manufacturer of quality transformers.

*Ask your dealer or write for Catalog 925 containing full descriptions of all General Radio Parts*

GENERAL RADIO CO., Cambridge, Mass.



Type 369

### Coupling Impedance

While the greater amplification that is obtained by a transformer coupled amplifier has much in its favor, slightly better quality can sometimes be obtained by the use of impedance coupling, if one is willing to dispense with the greater amplification per stage of transformer coupled amplification.

The impedance method of coupling is considerably more efficient than the use of resistances because it allows a much larger proportion of the plate voltage to be impressed on the plate of the amplifier tube.

By using a choke of sufficiently high inductance a quality of reproduction may be obtained, which cannot be distinguished from that obtained by the use of resistances and a larger amplification per stage produced.

Type 369 Coupling Impedance. Price \$5.00 each

## GENERAL RADIO PARTS AND ACCESSORIES

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

# R. F. I.

## BALANCED

### OVAL CONE SPEAKER

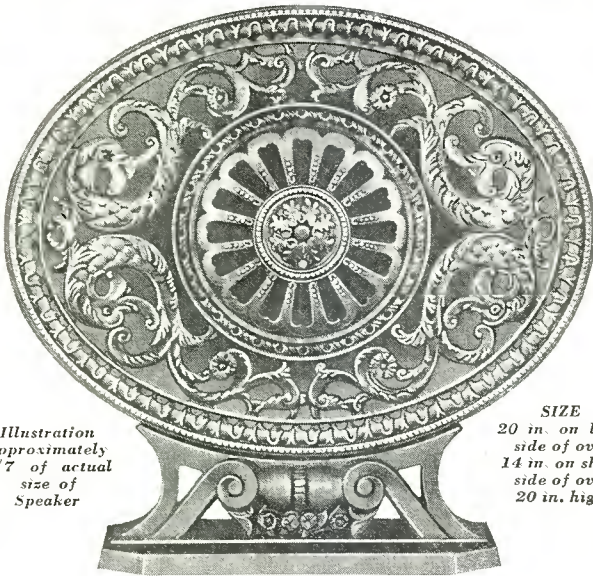


Illustration approximately 1/7 of actual size of Speaker

SIZE  
20 in. on long side of oval  
14 in. on short side of oval  
20 in. high

**A**T LAST all the high notes and all the low notes! A small cone gives high notes only. In a large cone, low notes predominate. In the R. F. I. *Balanced* Oval Cone Speaker the long side of the oval stresses the low notes and the short side stresses the high notes, and the two give a *complete balance*. Wonderful volume, clear tone, and all mechanical parts hidden. The insistent demand for more beauty in radio loud speakers is met by the R. F. I. Oval. It is a pure renaissance reproduction, designed by A. Kimball & Son, New York. Free of all patent infringements, licensed under all the Lektophone patents. Old Gold or Statuary Bronze.

Supplied on Approval by Your Dealer

**\$25.00**  
Price \$25.00  
West of Rockies \$26.50

Mr. JOBBER or Mr. DEALER  
Write or Wire for Agency

**RADIO FOUNDATION INCORPORATED**  
25 West Broadway New York

battery and "B" eliminator when the receiver is in operation, and cutting out the "B" eliminator and connecting the charger to the "A" battery when the receiver is not in operation. The last three mentioned items are products of the Sterling Manufacturing Company of Cleveland, Ohio.

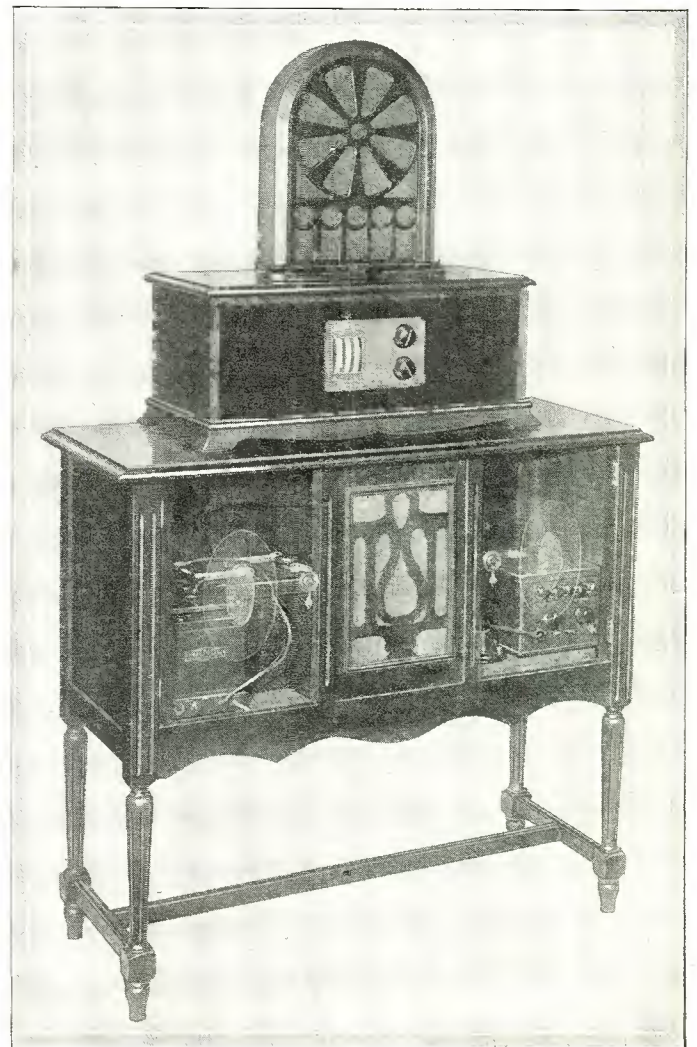
The speaker is known as the Orchestrion. It is a well-known horn, made entirely of wood and capable of excellent reproduction. This speaker is manufactured by the Radio Cabinet Company of Indianapolis, Ind.

(If any further information on these accessories is desired, full descriptive matter may be obtained by writing the manufacturers direct.)

### A Six-Tube Receiver Incorporating Localized Control and Tru- phonic Amplification

(See Page 150 for Diagram)

**W**ITH the continued advancement in the design of radio receivers, there has developed an era of simplicity of control and faithfulness in reproduction. Heretofore the home constructor has experienced some difficulty in building this type of receiver. The troublesome factor that has entered into the construction of a localized control system has been that when an attempt was made to "gang" several single tuning condensers, the discrepancy in the frequency curve at various dial settings was great enough, on a sharply tuned receiver, to cause part, or all, of the



View showing the completed receiver mounted on table, with accessories

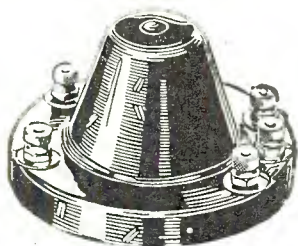


# These Automatic Switches

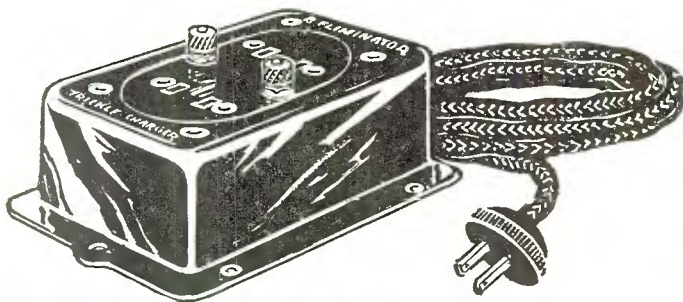
## \$2.00 to \$3.75

Owners of radio receiving sets may now have their choice of two types of the Reliable Automatic Power Control Switch at prices ranging from \$2.00 to \$3.75. It is no longer necessary to pay more for this new necessity of radio.

Either type of device will make the A Battery Switch on your receiving set, automatically turn on and off, either or both the Trickle Charger and B Eliminator as required. The charger is always off when the set is in operation, eliminating hum from the AC line. When the set is not in use, the charger will be on, insuring an adequate filament supply at all times without worry or bother. The B Eliminator will be on when the set is in operation and off when set is not in use.



**\$2.00**



**\$3.50**

### Convenience Types

*Model 23*—This model illustrated above, is complete with cord and plug and receptacles for connection with Trickle Charger and B Eliminator cords. This model is for receiving sets using 3 to 8 Type 201-A tubes or their equivalent in amperage drain. Retail at \$3.50.

*Model 24*—Same construction as Model 23 but is intended for use with sets using from 5 to 10 Type 199 tubes or their equivalent in amperage drain. Retail at \$3.75.

### Utility Types

*Model 13*—This model, illustrated at the left, is identical electrically with Model 23 but is without cord and plug or receptacles for Charger and Eliminator cords. Connections are easily made to binding posts. It is for use with sets using from 3 to 8 Type 201-A tubes or their equivalent in amperage drain. Retail at \$2.00.

*Model 14*—This switch is identical electrically with Model 24 except that it is without cord and plug and receptacles for Charger and Eliminator cords. Connections are easily made to binding posts. Intended for use with sets using from 5 to 10 Type 199 tubes or their equivalent in amperage drain. Retail at \$2.50.

*Ask the nearest radio dealer to show you these newest necessities of radio. If he cannot supply you, order direct, giving us the name of the dealer.*

THE RELIABLE PARTS MANUFACTURING COMPANY  
2829 Prospect Avenue, Cleveland, Ohio

# Reliable Automatic Power Control Switch

# There Is Always Something In The Air

Music, Sports, Opera, News, and a  
World of Other Good Things



Patented

Niles Console Charger

The Niles Console is a highly reliable charger, compact and neat in appearance. For charging 3 cell 6 volt or 2 cell 4 volt radio batteries from 110 volt 60 cycle alternating current. The charging rate is 2 amperes.

No fumes and very little heat is developed, permitting it to be placed inside radio cabinet or console if desired. The space occupied is 4x4x5.

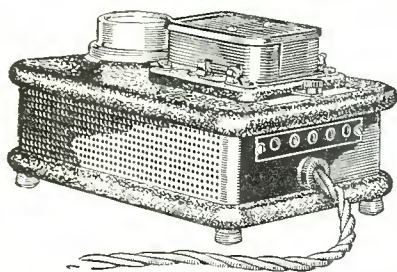
The operation is conveniently controlled by a small rotary switch. Radiation of interference while in operation is prevented by a unique absorption circuit.

Economy of operations is secured by the use of an especially quiet and efficient vibrator which requires no adjustment.

Equipment is complete with 6 ft. lamp cord and plug, 3 ft. rubber covered battery leads and clips and rubber pads to protect highly polished surfaces. The charger is finished in black crystalline lacquer which readily harmonizes with the most artistic home furnishings.

Shipping weight—4½ pounds. Size 4x4x6.  
List price—\$10.

Keep Your Batteries Fully Charged  
All the Time To Be Sure of  
the Best Reception



Patented

Model A—Niles Battery Charger

A heavy duty charger made for charging three cell six volt radio or automobile batteries from 110 volt 60 cycle alternating current.

The rate tapers from 10 amperes to 5, depending on the charge in the battery.

Seventy-two per cent efficiency is obtained by the use of a double vibrator which does not require adjustment.

Equipment consists of 8 feet lamp cord and plug, 6 ft. battery leads

and clips. A high grade ammeter, showing charging rate, is furnished as regular equipment. The base is equipped with soft rubber pads to protect highly polished surfaces. Finished in black crystalline lacquer, which harmonizes with the most artistic furnishings.

Highly reliable, compact and neat in appearance.  
Shipping weight 14 pounds. Size 8½ in. long, 6 in. wide, 5 in. high.

List price, \$19.

Write for Descriptive Literature

Niles Manufacturing Company  
River Road Ypsilanti, Michigan

received carrier wave to be cut off, due to the lack of resonance in one or more of the tuning circuits, to such an extent that the signal was weak or entirely inaudible. The usual method of remedying this condition was to insert, in parallel with the tuning condensers, small variable condensers to bring about a point of resonance. When this was done, the actual number of controls were increased to the same number as if individual control were in use.

In the design of this receiver an endeavor has been made to incorporate the desirable points of a single control and still retain the flexibility and sharpness of a multiple control receiver. The method adopted is the use of an Alden triple-gang, localized condenser. This unit consists of three .00035 mfd. condensers mounted on telescoping sleeve and rod shafts. Three edge reading dials are assembled between two of the condensers in such a manner that the dial readings are adjacent. By the use of this method the three condensers may be moved together, by one hand, and yet retain absolute resonance by varying each individual tuning condenser. This unit mounted in a receiver makes a very pleasing and attractive radio set.

The faithfulness of reproduction depends upon the quality of the audio frequency amplifier. The usual home constructed audio amplifier is given very little attention and often contains a maze of unmatched parts that cannot reproduce a true tone. In order to produce an audio frequency amplifier that will give a tonal quality which will resemble that of the original, great care must be exerted in the selection of parts and the exact position of them in the receiver. The method and placement of wiring of the amplifier is of much more importance than is usually supposed. The audio frequency amplifier specified in this receiver consists of three stages of dual impedance amplification. This method produces a tonal quality that is unsurpassed and is very easily and quickly installed in the receiver.

The circuit used in this receiver consists of two stages of radio frequency, detector and three stages of dual impedance coupled audio frequency amplification.

The radio frequency unit consists of three shielded radio frequency transformers. The coils are of solenoid construction and are housed in metal cases; thus any possible chance of electro-magnetic interstage coupling is eliminated, which permits a much higher gain factor per stage to be used than is the usual practice.

The two radio frequency tubes are controlled by a 10-ohm rheostat, the detector by a 25-ohm rheostat, and the three stages of audio frequency are controlled by a rheostat that is self-contained in the unit.

The low distributed capacity and negligible resistance of the parts used in this receiver make it very sharp in tuning. It cannot pick up undesirable signals, since the shielding of the coils nullifies any stray currents which may arise.

A battery cable is attached to the amplifier unit which may be connected to the binding posts of the set or directly to the batteries.

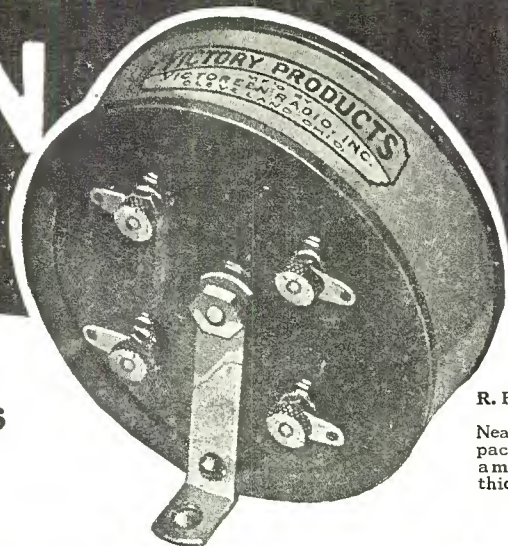
An example of how this receiver will appear when it is installed in an appropriate table and cabinet is shown herewith. The table is a product of the Standard Radio Cabinet Works of Chicago, and is made entirely of high grade material and finished in a dark mahogany. The front doors have a two-tone effect and allow access to the accessories. The cabinet shown is a product of the Signal Electric Company of Menominee, Mich., and is finished in a walnut which harmonizes very nicely with the finish of the table.

The speaker is the All-American Reproducer. Its construction is such that the unit is adjustable and will give excellent reproduction throughout the entire musical range.

A Constant "B" Eliminator is used in this receiver to supply the "B" potential. It uses a Raytheon rectifying tube, and has a switch by which either high or low voltage may be used. It is provided with five terminals by which any voltage from 10 to 180 volts may be had. It, as well as the speaker, is manufactured by

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

# VICTOREEN Radio Products



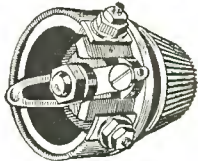
**R. F. Transformer  
No. 170**  
Neat and compact, 3 in. in diameter, 1 in. thick.

Use these Parts  
and

## BUILD A VICTOREEN SUPER!

A Victoreen Super will satisfy your craving for a set that has range, clarity, volume and selectivity. Victoreen Super sets are free from oscillations, howls or squeals—no matching of tubes is necessary.

Victoreen Air Core Transformers are not merely "matched" but are actually tuned to a guaranteed precision of 1/3 of 1 %—a Victoreen feature.



**Victoreen Rheostat**

Zero temperature coefficient resistance remains absolutely constant; double the number of turns of wire used on ordinary rheostats. Three terminals simplify wiring.  
Five resistances—2, 6, 10, 20, 30 ohms. \$1.20.  
Victoreen Potentiometers—200 and 400 ohms resistances. \$1.50.

### Victoreen Coils

**No. 170** This coil has a very sharp curve or peak. Interstage oscillation is prevented and amplification constants are uniform due to the adjustment which is made and then sealed at the factory. Use four of them in your Victoreen set. Price \$7.00 each.

**No. 150** Coupling Unit. This coil is especially designed for use with Victoreen Transformers. Carefully made. Price \$5.50.

**No. 160** Antenna Coupler for use in case outside aerial is desired. Otherwise this coil is not necessary. Price \$3.50.

### Read What One Victoreen Fan Says:—

"Cohoes, N. Y., Oct. 5, 1926."  
"I wish to state that I constructed a Victoreen, using Air Core Transformers and Manganin Rheostats and will say that it is a wonder set. I sure am delighted. Your parts are all that you claim them to be. Hoping for your continued success and that you sell a million transformers."

Yours very truly,

CHARLES ENGLISH.

P. S. From now on I am a Victoreen booster."

### Get a Victoreen Folder

A Victoreen folder gives you complete information about the Victoreen Super. It tells you the necessary parts and it answers all of your questions. Get one from your dealer or write us direct.

### Victoreen Master Control Unit

A completely assembled unit with one dial reading controlled by a compensator on the Vernier dial which compensates for any difference in the capacities of your condensers within 20 points on the dial. Used in circuits employing two or more condensers of the same capacity. Easy to mount—no change of wire necessary.  
Victoreen Master Control Unit 2 Condenser type, \$19.50. Extra condenser, \$4.50.

## The George W. Walker Co.

Merchandisers of Victoreen Radio Products

Cleveland, Ohio

Dept. A

BRANCH OFFICES:

6528 Carnegie Avenue

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443 So. San Pedro St.,  
Los Angeles, Calif.

2450 Third Ave. W.,  
Seattle, Wash.

615 East First South St.,  
Salt Lake City, Utah

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

# No matter what Panel is specified **RADION** will make the best set

Radion Panels are the choice of discriminating set builders because they are better insulation. All comparative electrical tests rate RADION ahead of all others in insulating characteristics.

You can easily cut and drill RADION with ordinary hand tools at home. No chipping.

They have fine polished surfaces and therefore make the best looking set.

RADION PANELS come in ready-cut sizes in black and mahoganite.

## RADION PANEL SIZES

1/16 In. Thick	Black	Mahoganite
7 x 10	\$1.25	\$1.55
7 x 12	1.50	1.85
7 x 14	1.75	2.20
7 x 18	2.25	2.75
7 x 21	2.65	3.25
7 x 24	3.00	3.70
7 x 26	3.25	4.00
7 x 30	3.80	4.65

from your Dealer or write to:  
**American Hard Rubber Co.**  
 11 Mercer Street, New York City

the All-American Radio Corporation of Chicago.

A 100 Ampere Hour Willard Storage Battery is used in this receiver. It is kept in full charge by Handy Charger, manufactured by the Interstate Electric Company of St. Louis, Mo. This charger is equipped with a rectifying tube, and has a switch by which either a high or low rate of charge may be used. A Reliable Switch, manufactured by the Reliable Parts Manufacturing Company of Cleveland, Ohio, is used in this installation for the purpose of automatically turning on and off both the Trickle Charger and "B" Eliminator, as required. The charger is always off when the set is in operation, and on when the set is not in use. On the other hand, the eliminator will be on when the set is in use and off when the battery is charging. This, therefore, allows a complete automatic control of all power supplies, which is, indeed, a very satisfactory arrangement.

(If any further information on these accessories is desired, full descriptive matter may be obtained by writing the Manufacturers direct.)

### LIST OF PARTS

These parts or their equivalent will give satisfactory results:

- 1—7x21x3/16-inch Radion Panel
- 1—Alden Localized Control Three-Gang Condenser
- 1—Alden Truphonic Audio Amplifier
- 1—Yaxley 25-ohm Rheostat
- 1—Yaxley 10-ohm Rheostat
- 1—Yaxley Filament Switch
- 10—Engraved Eby Binding Posts
- 3—Aalco Shielded R.F. Transformers
- 3—Alden Sockets
- 1—Electrad .00025 mfd. Grid Condenser
- 1—Electrad 2-megohm Grid Leak
- 1—Electrad 1/2-mfd. By-Pass Condenser
- 1 Package of Kester Solder
- 25 feet No. 12 ga. Tinned Copper Wire

## The New Orchestrion Console Model Speaker

**A** RECENT development in a combination Speaker and Console has been placed on the market by the Radio Cabinet Company of Indianapolis, Indiana. The over-all dimensions of this piece of furniture are 36 inches long, 30 inches high and 15 3/4 inches deep. This size allows ample space upon the top for large size receivers in cabinets. Ample space is provided within the table for the stor-



The Orchestrion Console Model Speaker

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

# So That Your Enjoyment

## Might Be Uninterrupted

Today you can be as sure of your B-power supply as you are of your electric lights. No longer need you worry whether your B batteries will run out at the most crucial moment of some national sporting event. No longer need you hesitate to invite the neighbors over to hear the opera for fear that your B-power unit will fail for lack of proper attention.

Raytheon has made possible absolutely reliable B-power that requires no attention. For years Raytheon Engineers studied the application of light socket power to the operation of radio in the home. Eventually the Raytheon rectifying tube was produced, giving an abundance of power, long life (no filament) and complete elimination of all service.

At this point the leading makers of radio equipment took up the task of incorporating the Raytheon rectifier in a complete B-power unit, ready for installation in the home. This has been accomplished with great success by the organizations represented on this page.

Their units, all tested and approved by the Raytheon Laboratories, represent a wide variety of styles and prices. Your dealer will be glad to recommend one best suited for your set. The fact that it is Raytheon-equipped means that un failing B-power is yours at the touch of a switch.

Raytheon is the heart of reliable radio power.

**Raytheon Manufacturing Co.**  
Cambridge, Mass.



Organizations Manufacturing B-Power Units  
**RAYTHEON-EQUIPPED**



ELECTRICAL RESEARCH LABORATORIES, INC.  
Chicago, Ill.

GENERAL RADIO COMPANY  
Cambridge, Mass.

MAYOLIAN RADIO CORP.  
Bronx, N.Y.

AMERICAN ELECTRIC CO.  
Chicago, Ill.

THE STERLING MFG. CO.  
Cleveland, Ohio.

PATHE PHONOGRAPH CO.  
Brooklyn, N.Y.

GRIGSBY-GRUNOW-HINDS CO.  
Chicago, Ill.

CORNELL ELECTRIC MFG. CO.  
Long Island City, N.Y.

THE WEBSTER COMPANY  
Chicago, Ill.

KING ELECTRIC MFG. CO.  
Buffalo, N.Y.

APCO MANUFACTURING CO.  
Providence, R.I.

SPARKS-WITHINGTON CO.  
Jackson, Michigan

J. S. TIMMONS INC.  
Germantown, Phila., Pa.

THE MODERN ELECTRIC CO.  
Toledo, Ohio

KOKOMO ELECTRIC CO.  
Kokomo, Indiana

ACME APPARATUS CO.  
Cambridge, Mass.

VALLEY ELECTRIC CO.  
St. Louis, Mo.

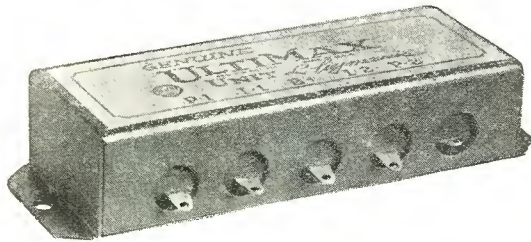
ZENITH RADIO CORP.  
Chicago, Ill.

BREMER-TULLY MFG. CO.  
Chicago, Ill.

STORAD MFG. CO.  
Cleveland, Ohio

ALL-AMERICAN RADIO CORP.  
Chicago, Ill.

*Morison's Has All Parts  
for The New Ultimax  
Including the  
GENUINE  
ULTIMAX  
UNIT* Endorsed by the designer,  
L. Siegmann



The Ultimax Unit is the heart of the Ultimax. You must have it to get maximum efficiency. Each unit is plainly marked for connections and bears the designer's signature.

Genuine Ultimax Unit, \$5.00

**GENUINE  
ULTIMAX COILS**

Wound exactly according to the designer's specifications, and with just the right amount of wire for best results. Complete directions are packed with each set of Genuine Ultimax Coils.

Set of 3 Ultimax Coils as specified..... **\$6.50**

**ULTIMAX CONSTRUCTION SHEETS  
AND ULTIMAX BOOKLET**

Show you just how to build the Ultimax and how to get the utmost from the set. Helpful hints on tuning. Invaluable to the man who wants to build the Ultimax.

Ultimax Construction Sheets and Booklet, "Helpful Pointers on The Ultimax"..... **\$1.00**

WHOLESALE—RETAIL

**MORISON**  
Electrical Supply Co. Inc.  
15 EAST 40<sup>TH</sup> STREET.  
NEW YORK CITY

MORISON ELECTRICAL SUPPLY CO. Inc.  
15 East 40th St., New York City.

Enclosed please find \$.....for which please send me following Ultimax Parts:

- Genuine Ultimax Unit, \$5.00
- Set of 3 Genuine Ultimax Coils, \$6.50
- Ultimax Construction Sheets and Booklet, \$1.00

Name.....

Address.....

CRCB—12-26

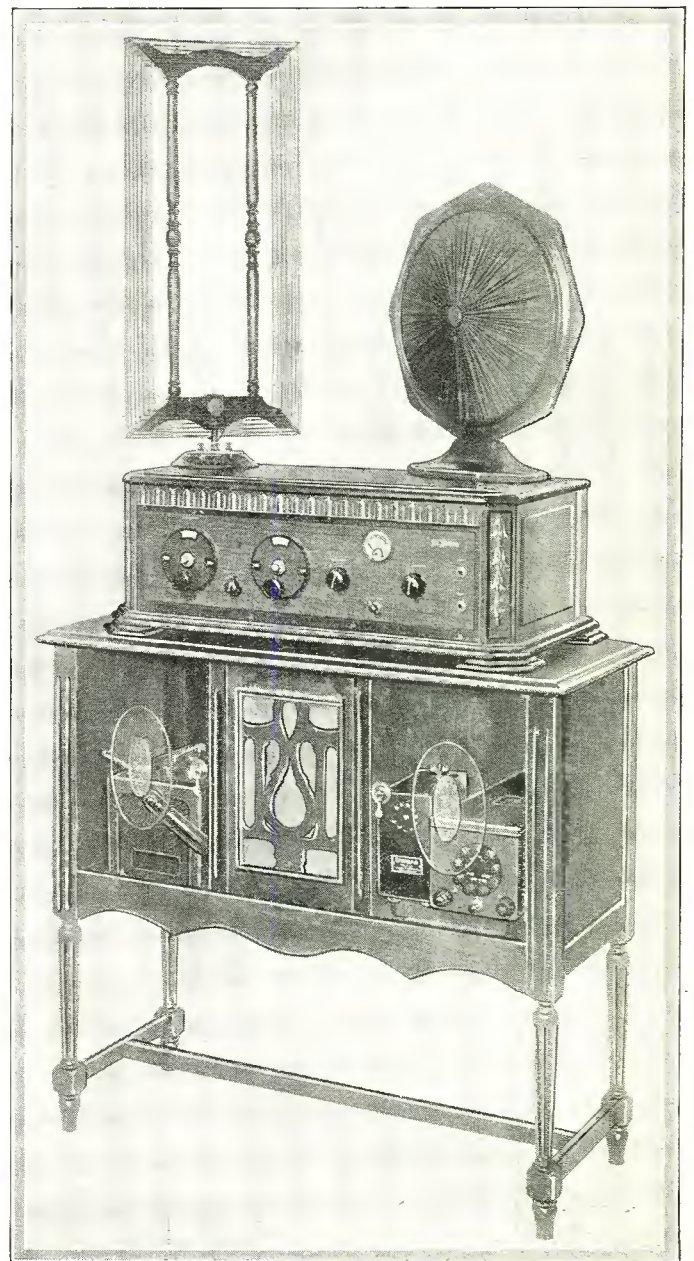
age of batteries, eliminators, chargers and the like. In addition to the storage room, an Orchestrion Tone Arm and Unit is incorporated in the table. This unit is capable of reproducing true tones with sweetness and clarity at full volume. The table is rigidly built of five-ply sliced walnut and beautifully finished.

(Any additional information will be gladly supplied by the Manufacturer direct.)

**The Revised St. James Super-Heterodyne**  
(See Page 146 for Diagram.)

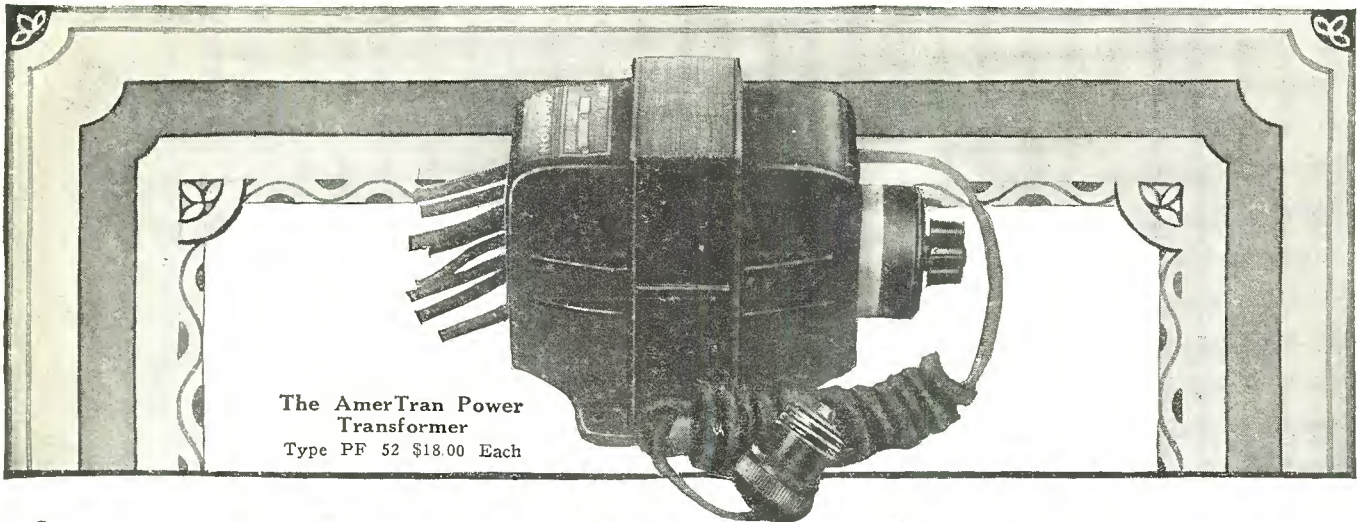
**R**EPORTS from various localities are substantiating the claims made of new St. James "Two-Forty" Super Heterodyne Receiver, which was first described in the Fall, 1926, issue of the CITIZENS RADIO CALL BOOK. Several changes have been made, which are to the advantage of the receiver. There have been no major changes made and no additional material is necessary, and very little time is required to make the changes.

The changes consist of returning the grids of the oscillator and second detector to the center terminal of the potentiometer. By this



The improved St. James Receiver installed in a cabinet and table with appropriate accessories

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



The AmerTran Power Transformer  
Type PF 52 \$18.00 Each

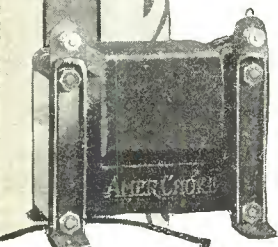
# AMERTRAN RADIO PRODUCTS

## A REAL POWER TRANSFORMER

Perfected on the firm foundation of twenty-five years successful experience in transformer building, AmerTran Radio Products enjoy a reputation second to none in their respective fields. Their continued selection by leading engineers and experimenters gives ample proof of their high efficiency and dependable performance.

Of particular interest is the AmerTran Power Transformer Type P. F. 52—the transformer for real “honest-to-goodness” power supply. This transformer is intended for use on the standard 110 volt, 60 cycle house-lighting circuit and can be depended on to give and maintain satisfaction.

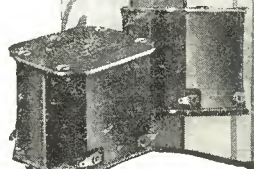
It has three separate windings—one for 525 volts and two 8-volt windings for the filament of the Rectifier and power tubes. The windings are enclosed in a strong metal case, provided with mounting feet. There are three primary taps for 110, 118 and 125 volts, connected to a three point snap switch, and a six-foot lamp cord and plug attached to the primary is standard equipment. The shipping weight is approximately 9 pounds and the price is \$18.00 each.



The AmerChoke type 854

This is a scientifically designed impedance or choke coil of general utility, designed primarily for use in filter circuits. As an output impedance for by-passing direct current from the loudspeaker it is both efficient and economical.

Price—\$6.00 each



The AmerTran De Luxe Audio Transformer

This new transformer sets an entirely new standard of Audio Amplification. It makes possible a transformer coupled amplifier that excels all other forms of amplifiers. Made in two types, for first and second stages.

Price—\$10.00 each

## AMERICAN TRANSFORMER COMPANY

178 Emmet Street, Newark, N. J.

“Transformer builders for over twenty-five years”

AmerTran Products are Sold only at Authorized AmerTran Dealers

### Other AmerTran Products:

- AmerTran Resistor Type 400—\$7.50.
- AmerTran Heater Transformer Type H-28 (for A. C. Tubes)—\$10.00.



We shall be very glad to send you upon request a copy of our booklet “Improving the Audio Amplifier,” together with other interesting and constructional data.

### AmerTran Types AF-7 and AF-6

AmerTran Audio Transformers, types AF-7 and AF-6, have been considered for years among the leaders in audio amplification. These popular and efficient models are made in two types — AF-7 (ratio 3½:1) — AF-6 (ratio 5:1) \$5.00 each.

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



Type GSX201A

Types GSX-201a  
The popular general purpose type, for amplifier or detector. Long life and high efficiency. Price \$2.00

# You Ought to Know GOLD SEAL Radio Tubes

They're so much better!!

Superior tone quality, volume and reliability are "built in"—and insured for you by exacting tests. You don't know what your set can do until you install a complete outfit of Gold Seal Radio Tubes.

Are you enjoying the advantages of the new special purpose tubes, for more volume, range and clarity?



Type GSX-112  
High power tubes for use in last stage of audio amplification give increased volume.  
Price \$4.50



Type GSX200A  
The new super-sensitive detector tube for distant reception and weak signals—not critical in adjustment.  
Price \$4.00



Type GSX20-Hy-Mu  
For use only in the popular resistance coupled amplification, highly efficient in this system.  
Price \$4.00

## Fill Every Socket with Gold Seals

All Standard Types

Type GSX201A.....	\$2.00	Type GSX200A.....	\$4.00
Type GSX199.....	2.25	Type GSX171.....	4.50
Type GS199.....	2.25	Type GSX216B.....	7.50
Type GSX120.....	2.50	Type GSX112.....	4.50
Type GSX20—Hy Mu.....		\$4.00	

Get them from your own dealer  
Insist on genuine Gold Seal Tubes—standard for all sets

GOLD SEAL ELECTRICAL CO., Inc.  
250 Park Ave., New York

# GOLD SEAL Radio Tubes

method full advantage of the characteristics of the transformers is taken. Due to this, the oscillatory point of the tubes may be kept at a balance, which will give a somewhat more stable operation.

The points commented upon, that are outstanding, are the tonal qualities, which, when reproduced on a good speaker, give all the instrumentation of orchestras, with an amount of volume limited only by the ear to tolerate. There is a very noticeable quietness of operation and absence of background noises.

Considering operation from an economical standpoint, the maintenance of this receiver is exceptionally low. With reception at normal volume the "B" battery consumption is ordinarily 10 milliamperes, and at full volume approximately 22 milliamperes. These figures are from 25 to 40 per cent lower than is usual upon using eight tubes including a power tube.

The principles underlying the operation of the Super-Heterodyne have previously been explained to such an extent that an extended explanation is unnecessary. The fundamentals of the circuit demand transformers that have the utmost point of efficiency in amplification. The St. James intermediate frequency transformer is of unusual and unique design and the only one of its type now manufactured.

The construction of the transformer consists of two air-core coils wound in a special way, which reduces the inter-turn capacity to a minimum. The coils are mounted on Bakelite tubing and placed in a high-lead content glass casing. The coils are then dehydrated by repeated addition and subtraction of dehydrated air. When the last trace of moisture is removed, the transformers are sealed.

It is evident that one of the major handicaps of the usual intermediate radio frequency transformers has been entirely eliminated by this method. The added efficiency, due to the complete absence of moisture, must be experienced to be appreciated.

The diameter of the coils in the St. James transformers is slightly less than 7/8 in. This unusually small size, together with the effect of the vacuum treatment and the shielding effect of the high-lead content glass, combine to produce a very concentrated field.

The manner of final checking of the intermediates insures limits of variation far below a 1 KC limit, and the final dehydrating of the coils and their sealing off from further moisture effects, precludes future changes in their electrical characteristics.

The large engraving appearing herewith shows the St. James Super-heterodyne receiver installed in a combination of table and cabinet. The table is a product of the Standard Radio Cabinet Works of Chicago, Illinois. Ample space is provided under the top for the storage of accessories, with two doors opening outward. The finish is in dark Mahogany, which harmonizes with the Fritts Super Cabinet, placed on top. Only genuine Walnut is used throughout the construction of the Fritts Cabinet, which is highly finished with Lacquer, and waxed. It is made by D. H. Fritts and Company of Chicago.

A new type Cone Speaker manufactured by the Boudette Manufacturing Company, Chelsea, Mass., is incorporated in the Sonochorde. The reproducing mechanism in this Speaker is adjustable so that it readily lends itself to any receiver.

An Electrolytic "B" Battery Eliminator is used to supply the necessary "B" and "C" potentials for the proper operation of the receiver. The various voltages may be accurately controlled by means of variable resistances. The Eliminator is made by the DeWitt-LaFrance Company, whose main offices are in Cambridge, Mass.

A Storad Manufacturing Company's Trickle Charger using tube rectification keeps the Willard Storage Battery at full charge at all times.

The Loop which is shown is a new design of the Bodine Electric Company of Chicago. It is equipped with a jack by which it may be mounted directly on top of the cabinet.

(If any further information on these accessories is desired, full descriptive matter may be obtained by writing the Manufacturers direct.)

### LIST OF PARTS

- These parts or their equivalent will give satisfactory results.  
1—Lignole Drilled and Engraved Panel 7x24x3/16 in.  
1—Jewel pattern No. 135 0 to 8 Volts Voltmeter  
1—9x23x1/2 in. Baseboard

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





**COMPLETE**  
Nothing else to buy. Replaces "B" Batteries. Operates direct from Electric Light Socket on 110-120 volt A. C. Lighting Circuit. Delivers up to 100 volts.

**\$17.50**

**New High Voltage Model  
Complete: Delivers  
up to 180 Volts**

**Not only  
the most reasonable—  
but proved by 40,000 users to be also the most convenient,  
unfailing and satisfactory "B" Eliminator**

**New High Voltage Model**

for extremely large sets, or sets using power tubes, now perfected. Delivers up to 180 volts. One control adjusts voltages on all taps.

*Equal to any "B" Eliminator regardless of price—not only in operation, but in workmanship, quality, durability and appearance*

**Money Back Guarantee**

Stop paying out money for costly, unreliable battery service and repairs. Permanent excellence can be built into economical "B" service. 40,000 users of the good Ferbend "B" Eliminator agree. That is why during the slack summer season we worked at full capacity to meet orders. That is why hundreds of unsolicited testimonials prove beyond the shadow of a doubt its splendid, enduring performance.

**Ask Your Dealer—or Send Direct**

Shipment made direct on receipt of price, or C. O. D. if preferred. Use for 10 days to convince yourself—if unsatisfactory write us within that time and purchase price will be refunded. Use Coupon NOW.

**FERBEND ELECTRIC COMPANY  
426 W. Superior St., Chicago, Ill.**



**They Want YOU to Know**

Montreal, Canada  
I am pleased to state that the Ferbend "B" Eliminator purchased from you is a wonder and is giving results far beyond my expectations. The tone and volume would satisfy the most critical.  
James Stroud,  
Electrical Engineer.

Youngstown, Ohio  
Your Eliminator is the best buy I have made in a long time. It has already more than paid for itself in saving on "B" batteries.  
R. L. Welsh.

Springville, N. Y.  
Having had perfect results with the seven Eliminators recently purchased you may send me six more by express at once.  
Leonard J. Cooper.

Burbank, Calif.  
I am more than pleased with your Eliminator. I am getting several Eastern stations through about 15 locals using the Eliminator.  
Jean Barnard.

St. Petersburg, Fla.  
I used your Eliminator all last winter, and it was as good, if not better than several I tried of much higher price. I am more than satisfied.  
Ben M. Pyatt.

Trenton, N. J.  
I have used your Eliminator for several months and unhesitatingly recommend it. It has added 25 per cent to the volume of my set and always has full voltage.  
J. M. Starger

New Orleans, La.  
The "B" Eliminator which I purchased from you some three or four months ago has given entire satisfaction and I am well pleased with its performance.  
C. J. Murphy

Wilmington, N. C.  
I am well pleased with the Eliminator I purchased some time ago. It is all you claim and more. It brings in signals louder and clearer than any set of dry batteries I ever used.  
T. E. Lyon.

Amsterdam, N. Y.  
I have compared your Eliminator with other makes and it cannot be beat. My reception has easily increased 50 per cent. It gives me much better results than I was ever able to get with dry batteries. William Davis.

Wheeling, W. Va.  
The Eliminator purchased some time ago is giving remarkable results.  
William A. Raper, Jr.

Des Moines, Ia.  
Your Eliminator is fine.  
Rev. F. A. Case.

Louisville, Ky.  
Your Eliminator is all you claim it to be. Am very much pleased with it.  
Alonzo G. Smith.

Oil City, La.  
Your Eliminator has given me good service for over a year.  
George May.

St. Louis, Mo.  
After giving your "B" Eliminator a thorough trial wish to state that I am thoroughly satisfied. It's performance is perfect—absolutely no hum whatever.  
Frank Kolar.

Mattapan, Mass.  
I have used your Eliminator for six months and am satisfied with it in every way. It has increased the volume of my 5-tube Neutrodyne fully 50 per cent and there is absolutely no hum from the 60-cycle line.  
John W. Fursell, Jr.

**Second Successful Year**

**FERBEND  
"B" ELIMINATOR**

*Approved and passed by the rigid Laboratory Tests  
of the two foremost Radio Laboratories in America  
—Radio News and Popular Radio*

FERBEND ELECTRIC CO.  
426 W. Superior St., Chicago, Ill.  
 Send \$12.50 model.  Send \$17.50 model.  
 Send at once. Payment enclosed.  
 Send C. O. D.  Send literature.

Name .....

Address .....

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

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

## The HANDY TRICKLE-BOOSTER CHARGER



**\$14.00**

complete with  
2 ampere  
bulb

\$15.00 west  
of Rockies

Combining Trickle Charger ( $\frac{1}{2}$  ampere) and a Fast Rate Charger (2 ampere) all in one small unit!



By merely flipping the small toggle switch, this Handy is instantly converted from a trickle charger to a fast rate charger or back again.

By hooking the Handy Trickle-Booster up to your "A" battery, it instantly provides an "A" Power Unit from your light socket. It is the ideal charging combination as it provides a smooth, quiet charging rate of  $\frac{1}{2}$ -ampere. If in time the battery ever weakens, the charger is instantly converted into a fast rate charger, giving a 2 to  $2\frac{1}{2}$  ampere charge, which quickly restores your battery. See your dealer for demonstration or send direct, on money back guarantee.

### THE NEW TWIN BULB HANDY CHARGER



**\$25.00**

complete  
\$27.00 west of Rockies

Charges both "A" and "B" batteries quietly and quickly. Before going to bed merely throw the switch and in the morning a fully charged battery awaits you. No danger of overcharging or discharging your battery as the rate of charge tapers off as the battery becomes charged. The oversize transformer prevents overheating and will stand tremendous overload. A special ammeter shows the rate of charge at all times so you can tell when your battery is fully charged. No disturbing noises or messy liquids. Absolutely quiet. Rich in appearance. Ask dealer for demonstration or send direct on money back guarantee.

# INTERSTATE

ELECTRIC COMPANY

4345 Duncan Ave.

St. Louis, U. S. A.

- 2—Marco Vernier Dials
- 1—Hammarlund .000045 mfd. Midget Condenser
- 2—Hammarlund .0005 mfd. Variable Condensers
- 1—Yaxley 2 Ohm Rheostat
- 1—Yaxley 400 Ohm Potentiometer
- 1—Yaxley No. 10 Battery Switch
- 1—Yaxley 2 Ohm Fixed Resistance
- 1—Yaxley 4 Ohm Fixed Resistance
- 1—Yaxley No. 2 Jack
- 1—Yaxley No. 3 Jack
- 1—Yaxley No. 660 Cable Connector and Plug
- 4—St. James Dehydrated Intermediate Frequency Transformers
- 1—St. James Oscillator
- 1—St. James Choke Coil
- 1—Electrad Single Grid Leak Mounting
- 8—Benjamin UX Cushion Sockets
- 2—Thordarson R-200 Audio Frequency Transformers
- 2—Dubilier 1 mfd. By-Pass Condensers
- 1—Dubilier No. 601 .00025 mfd. Grid Condenser with Prongs
- 1—Dubilier No. 601 .00025 mfd. Fixed Condenser
- 1—Dubilier 2-Megohm Grid Leak
- 2—Formica Terminal Strips 1x3x3/16 in.
- 6—Eby Engraved Binding Posts
- 1—Package Kester Radio Solder
- 4—Dozen Kellogg Tinned Soldering Lugs
- 5—Dozen 5x $\frac{1}{2}$  in. Round Head Wood Screws
- 50 ft. Belden No. 12 Tinned Copper Hook-up Wire

## The Bodine Twin Eight Receiver

(See Diagram on Page 150)

THE herewith described receiver has been designed with the point of view in mind of economy in cost and excellence in reproduction.

The described receiver uses two stages of tuned radio frequency, detector and two stages of transformer-coupled audio frequency. The radio frequency transformers in use are quite unusual and unique in design and construction. Construction is of the self-supporting type and is wound in the form of a figure eight. By this peculiar method of winding, two important factors in radio frequency transformer design are accomplished. First: Interstage magnetic coupling is reduced to a minimum, due to the fact that the transformers are wound in such a way as to have a "bucking field," which results in a very small local concentrated magnetic field. Second: Also due to this peculiar method of winding, the distributed capacity of the entire winding is materially reduced. By the virtue of these two factors, the point of oscillation, is materially reduced and, at the higher wavelengths, entirely absent.

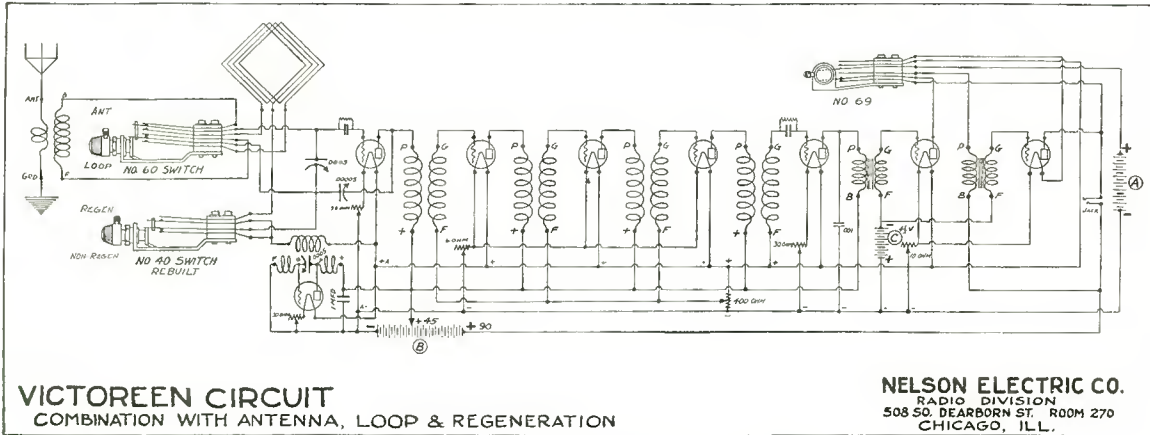
The three tuning condensers are of the straight frequency line, grounded rotor type, having a maximum capacity of 350 mmf. By the use of this type of tuning condenser, the usual condition of jamming on the lower wavelengths is greatly relieved, and will space the stations almost at evenly divided points on the dial.

The audio frequency transformers in use are of a very reliable make and very efficient in operation. The case is grounded, which passes off any eddy currents that may arise. There is a .002 mfd. fixed condenser shunted across the primary of the transformer. There is an open circuit jack in the output of the second stage of audio frequency for attachment of loud speaker or phones. A 200,000 ohm Variable Resistance is connected in the plate supply lead of the radio frequency transformers, which acts as an efficient volume control. A 6-ohm rheostat is placed in the positive "A" battery lead of all tubes for the controlling of filament voltage.

There are provided two binding posts in the secondary circuit of the first radio frequency transformer, whereby a loop antenna may be inserted. This method makes portability convenient, and aids very materially in separating a jammed condition of powerful local stations.

The photographic reproduction appearing herewith shows the

# VICTOREEN SUPREME



**VICTOREEN CIRCUIT**  
COMBINATION WITH ANTENNA, LOOP & REGENERATION

**NELSON ELECTRIC CO.**  
RADIO DIVISION  
508 SO. DEARBORN ST. ROOM 270  
CHICAGO, ILL.

THE above CIRCUIT, designed in our laboratory, is proving so popular with our trade that we wish to bring it before the public. We use SUB-PANEL wiring throughout, and have the panels and sub-panels, fully drilled and engraved, in stock at all times. The FAMOUS VICTOREEN is so well known now that no comments need be made here on its merits. You will note by referring to the above circuit diagram that the antenna, ground and the loop can be connected to the set, all at the same time, and the set can be changed from one to the other by simply throwing the required switch, and regeneration can be added to the loop when desired by throwing the special No. 40 switch shown on the diagram. We have given particular attention to the design, quality and the arrangement of the parts for the greatest possible efficiency.

WE have hundreds of these sets in actual operation in Chicago, the most congested RADIO DISTRICT in the world, giving results that far surpass any RADIO SET of any other make. Unlimited range, tone perfect, greatest possible selectivity, terrific power and unequalled flexibility.

Full Detail  
on the Sensational  
"Karas Equamatic Set"  
Furnished on Request

### List of parts required to complete this unequalled set, for the most satisfactory results, as follows:

- 1—No. 150 VICTOREEN Coupling Unit.
- 1—No. 160 VICTOREEN Antenna Compler.
- 3—No. 170 VICTOREEN Intermediate Transformers.
- 1—No. 170 VICTOREEN input Transformer.
- 1—7 in. x 26 in. LIGNOLE Front Panel, drilled and engraved.
- 1—7 in. x 25 in. LIGNOLE Sub-Panel, drilled and engraved.
- 1—2 in. x 25 in. LIGNOLE Back Panel Strip, drilled and engraved.
- 2—.00025 mfd. MICAMOLD Fixed Condensers with clips.
- 1—.001 MICAMOLD Fixed Condenser.
- 2—2 meg. MICAMOLD grid leaks.
- 1—1 mfd. MUTER By-Pass Condenser.
- 1—6 Ohm VICTOREEN Rheostat.
- 1—10 Ohm VICTOREEN Rheostat.
- 3—30 Ohm VICTOREEN Rheostats.
- 1—400 Ohm VICTOREEN Potentiometer.
- 1—No. 69 Yaxley Combination Jack Switch.
- 1—No. 60 Yaxley Combination Jack Switch.
- 1—No. 40 SPECIAL Combination Jack Switch.
- 1—No. 1 Yaxley Single Circuit Jack.
- 75—Assorted Lugs.
- 3—½ in. x ¼ in. No. 08602 Brass Angle Irons.
- 16—8/32 ½ in. Brass Machine Screws.
- 18—6/32 ½ in. Brass Machine Screws.
- 12—6/32 ¼ in. Brass Machine Screws.
- 30—6/32 in. Brass Hex Nuts.
- 1—8/32 Screw Tap.
- 1—No. 10 Yaxley "A" Battery Switch for Voltmeter.
- 1—R641 Sterling Voltmeter 0 to 8 v.
- 8—No. 9040 Benjamin, NEW STYLE Claratone Sockets.
- 2—0005 HAMMARLUND, MIDLINE Condensers Variable.
- 2—No. 592 Kurz Kasch, Port Type, UNIVERSAL Dials.
- 2—KARAS HARMONIC or THORDARSON R.200 Audio Transformers.
- 11—X. L. New Style, Binding Posts, ANT. GND. "A" Plus, "A" Minus, "C" Minus, "B" 45, "B" 90, "B" minus, 3 LOOP.
- 6—Lengths Black Celatiste.
- 25 ft. Black Flexible Celatiste.
- 1—Pr. 8629 Benjamin Brackets.
- 1—00005 Hammarlund Midget Condenser.
- 1—SET BLUE PRINTS, Templates, and INSTRUCTIONS.

Blueprints, Templates and Instruction Sheets, Postpaid, \$1.00

### We Are Wholesale Distributors for the Following Lines:

Amperites.  
Kurz-Kasch Co.  
Bodine Electric Mfg. Co.  
Flat Loops.  
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Bremer-Tully Mfg. Co.  
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Diamond "B" Batteries.  
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LIBERAL DISCOUNTS

## NELSON ELECTRIC CO.

IMMEDIATE DELIVERIES

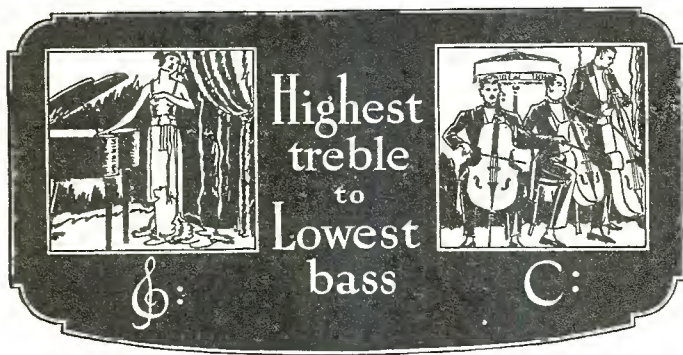
Telephone Wabash 8719

508 S. Dearborn St.,

CHICAGO, ILL.

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

THE NEARLY PERFECT TRANSFORMER



Every note...naturally...which the ear can hear!

Are you permitting your transformers to censor your reception? Are they cutting out those low bass notes of the bass viol or the kettle-drum? Are they giving proper amplification to the high notes of the piccolo and the human voice?

Here is an opportunity for you to get every note to which you are naturally entitled. Whether you are using a cone or a diaphragm type speaker, Ferranti Transformers are suitable. Ask your dealer about Ferranti. If he does not handle it, write us and we will let you know who does.

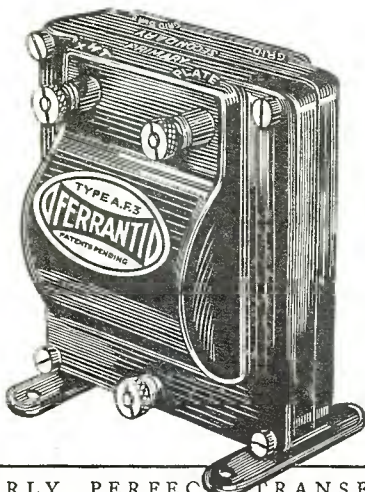
FERRANTI, Inc.  
130 W. 42nd St.  
New York, N. Y.

FERRANTI TRANSFORMER

:-: HIGHSPOTS :-:

High amplification ratio with flat curve. Ferranti brings out the fundamental frequency of low tones—none are heard merely by inference from higher harmonics. Every transformer tested ten times—all short-circuit turns eliminated. Built by an established manufacturing company with forty years' experience in the winding of coils of fine wire for electrical instruments and meters. Windings have high impedance. Primary shunted with built-in condenser of correct capacity. Tested to 1000 volts between primary and secondary and between primary and secondary and ground.

For the best available transformer results—Ferranti Audio Frequency Transformer A. F. 3—ratio 3½ to 1—\$12.

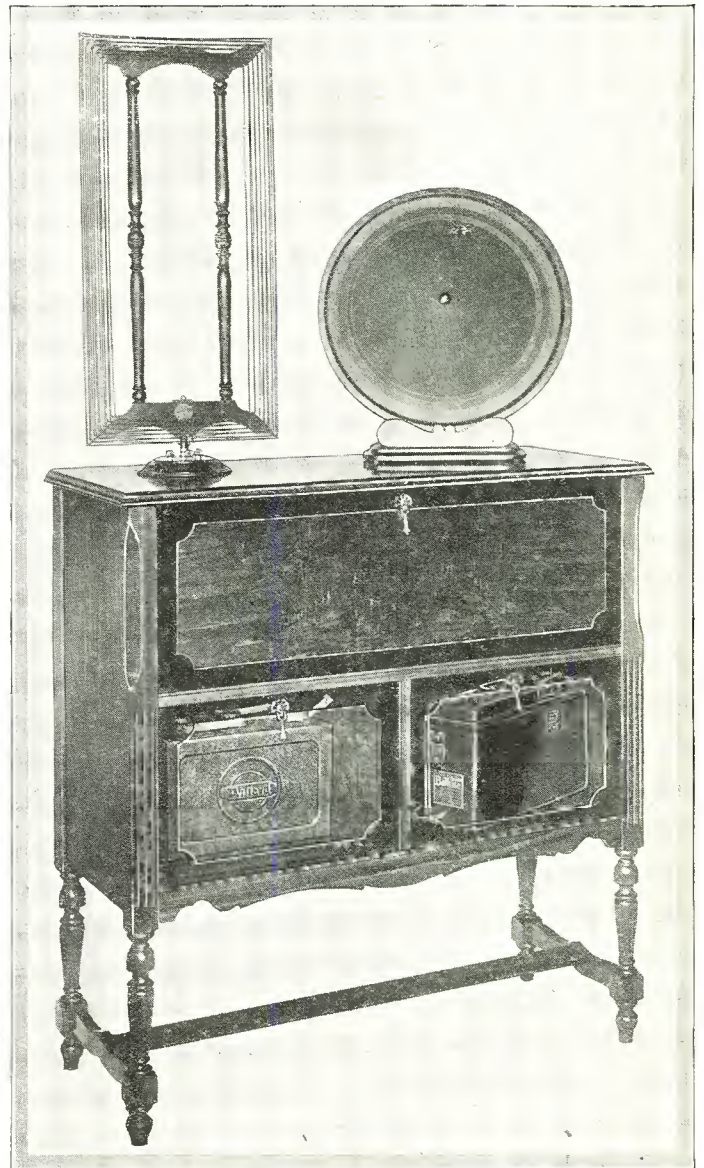


For a transformer far superior to the average, use Ferranti A. F. 4—ratio 3½ to 1—\$8.50

THE NEARLY PERFECT TRANSFORMER

Bodine Twin Eight Receiver installed in an Excello Model 22 Console, manufactured by the Excello Products Corporation of Chicago. This console is thoroughly constructed of walnut wood, and is finished in a two-tone effect. The front doors are carefully matched and are made of butt walnut. Ample space is provided in the lower compartment for the storage of accessories.

The Willard Storage Battery is one of the 100 ampere hour type, manufactured by the Willard Storage Battery Company of Cleveland, Ohio. It is equipped with a carrying strap as well as Fahnestock Clips on the positive and negative terminals.



Receiver installed in console with accessories

A new type Balkite Charger is connected to the Willard Battery and supplies automatic power to both "A" and "B" circuits. It is entirely automatic in operation, being controlled by the filament switch on the set. It is capable of supplying "B" potential to any receiver using not in excess of 30 milliamperes.

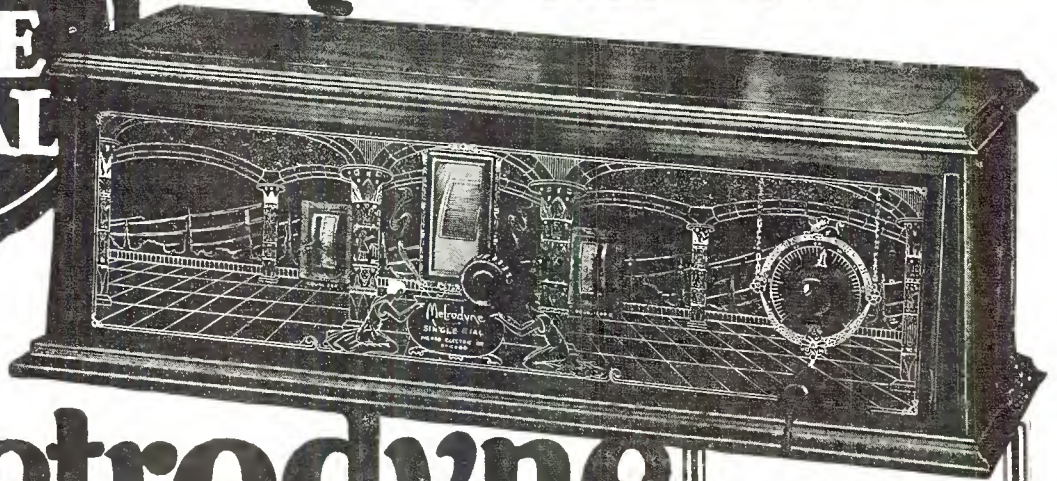
The Stevens Speaker is a product of the Stevens Company, Inc., of New York City. Two types of this speaker are available. One is provided with a silk cord by which the speaker may be hung from the wall, and the other has a base by which it may be set upon any flat surface. Either of the speakers are capable of giving very excellent reproduction over the entire musical range.

The Bodine Loop, which is shown with this receiver, is a product of the Bodine Electric Company of Chicago. It is ad-

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

**30  
DAYS  
FREE  
TRIAL**

# 7 Tube Set Single Dial Radio



## The Metrodyne

**ONLY ONE DIAL TO TUNE**

**Retail Price**  
**\$75**  
**Completely Assembled**  
**Big Discounts**  
**to Agents and Dealers**

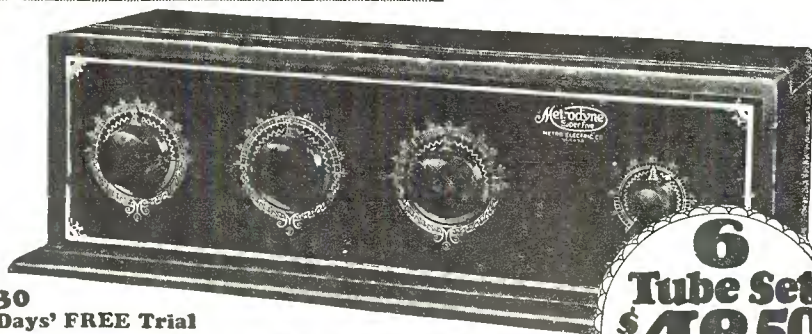
Wonderful offer direct from the factory! The world's greatest radio. A perfect working, single dial control, 7 tube receiver. And just to prove our claims, we will ship it to your home for **30 days' free trial**. Test it under all conditions. Test it for distance, volume and tonal quality — and if you are not convinced that it is the best single dial set you ever heard, return it to the factory. We don't want your money unless you are completely satisfied.

**BIG PROFITS  
TO AGENTS AND DEALERS**  
Our Agents and Dealers make big money selling Metrodyne Sets. You can work all or part time. Demonstrate the superiority of Metrodynes right in your home. Metrodyne Radios have no competition. Lowest wholesale prices. Demonstrating set on 30 days' free trial. Greatest money-making opportunity. Send coupon below—or a letter—for our agent's proposition.

## Metrodyne Super-Seven Radio

A single dial control, 7 tube, tuned radio frequency set. Approved by America's leading radio engineers. Designed and built by radio experts. Only the highest quality low loss parts are used. Magnificent, two-tone walnut cabinet. Artistically gilded genuine Bakelite panel, nickeled piano hinge and cover support. All exposed metal parts are beautifully finished in 24-k gold.

Easiest set to operate. Only one small knob tunes in all stations. The dial is electrically lighted so that you can log stations in the dark. The volume control regulates the reception from a faint whisper to thunderous volume, 1,000 to 3,000 miles on loud speaker! The Metrodyne Super-Seven is a beautiful and efficient receiver, and we are so sure that you will be delighted with it, that we make this liberal **30 days' free trial offer**. You to be the judge.



**30  
Days' FREE Trial**

## Metrodyne Super-Six

Another triumph in radio. Here's the new 1927 model Metrodyne 6 tube long distance tuned radio frequency receiving set. Approved by leading radio engineers of America. Highest grade low loss parts, completely assembled in a beautiful walnut cabinet. Easy to operate. Dials easily logged. Tune in your favorite station instantly on same dial readings every time. No guessing.

Mr. Howard, of Chicago, said: "While five Chicago broadcasting stations were on the air I tuned in seventeen out-of-town stations, including New York and San Francisco, on my loud speaker horn, very loud and clear, as though they were all in Chicago."

We are one of the pioneers of radio. The success of Metrodyne sets is due to our liberal **30 days' free trial offer**, which gives you the opportunity of trying before buying.

**6  
Tube Set**  
**\$48.50**  
**RETAIL PRICE**  
**Completely Assembled**

**MAIL THIS COUPON**  
or send a postal or letter. Get our proposition before buying a radio. Deal direct with manufacturer—**Save Money.**

## Mail COUPON Below!

**Let us send you proof of Metrodyne quality**

**F. L. Warnock, Greentown, Ind.,** writes: "I received the Metrodyne in good shape and am more than pleased with it. Got stations 2,000 miles away."

**C. J. Walker, Mariposa, Calif.,** writes: "Received my Metrodyne Single Dial set O. K. I believe that these one-dial sets are going to be excellent sellers. I had no trouble in tuning in stations enough to satisfy anyone, so you will please send me another set."

**Roy Bloch, San Francisco, Calif.,** writes: "Very often we travel from New York to the Hawaiian Islands quickly — from station to station — by means of the little tuning-knob which operates the electrically-lighted dial. The Metrodyne Single Dial Set is much easier to operate than any radio set I've ever seen."

We will send you hundreds of similar letters from owners who acclaim the Metrodyne as the greatest radio set in the world. A postal, letter or the coupon brings complete information, testimonials, wholesale prices, and our liberal **30 days' free trial offer**.

**METRO ELECTRIC COMPANY**  
2161-71 N. California Ave., Dept. 599  
Chicago, Illinois

Gentlemen:

Send me full particulars about Metrodyne 6 tube and 7 tube sets and your **30 days' free trial offer**

Name.....

Address.....

If you are interested in AGENT'S proposition, place an "X" in the square

**METRO ELECTRIC COMPANY**  
2161-71 N. California Ave. • Dept. 599 • Chicago, Illinois

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



# I.C.A. PANELS

For All Popular Circuits  
Sponsored by the Call Book  
and Other Leading Radio  
Publications, including the

**ST. JAMES SUPER HET  
NINE-IN-LINE SUPER HET  
INFRADYNE SUPER HET**

**T**HE finishing touch that puts your set on a plane of equality with the finest factory-built set—an I. C. A. Panel of Insuline or Bakelite!

These two standard insulating materials insure you the utmost in reception because of their high dielectric strength, which guards you against leakage losses. Furnished in Black and Wood finishes, with countersunk drill holes, ready to set up. Decoration by the famous ETCH-O-GRAVURE Method, the last word in artistic panel decoration.

**I.C.A. Panels are furnished for these and over 70 other popular circuits**

Citizens Call Book 45 Kilocycle Super—9 Tubes; Citizens Tuned Radio Frequency—5 Tubes; Radio Broadcast Universal—4 Tubes; B. T. Counterphase—6 Tubes; Hammarlund-Roberts—5 Tubes; Brown-ing-Drake—5 Tubes; B. T. Nameless—5 Tubes; Freshman Type T. R. F.—5 Tubes; Madison Moore Super-Het—8 Tubes; Fen-way Super-Het—9 Tubes; Best Super-Het—7 Tubes; Silver Six—6 Tubes; Cockaday L. C. 26—5 Tubes; Rasla Reflex—2 and 3 Tubes; Raytheon "B" Eliminator Panel.

*We also supply I. C. A. Sub-Panels for all of the above and many other circuits.*

**GET OUR NEW FREE CATALOG** Every set builder should have a copy of this new illustrated catalog, giving prices of all I. C. A. Insulating Parts, including: Panels, Sub-Panels, Binding Post Strips, Mounting Brackets, Aerial Insulators, New I. C. A. Non-Microphonic Socket, etc. Ask your dealer for a copy or write us direct.

*Don't take a substitute for the genuine I. C. A. Products. If your dealer can't supply you write us*



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**INSULATING COMPANY OF AMERICA INC.**

RADIO PANEL & PARTS DIVISION  
INSULINE BLDG. 59 WARREN STREET  
NEW YORK

mirably suited for this circuit inasmuch as both the loop and the circuit were designed to match.

*(If any further information on these accessories is desired, full descriptive matter may be obtained by writing the Manufacturers direct.)*

### LIST OF PARTS

- These parts or their equivalent will give satisfactory results:
- 1—7x24x3/16 Micarta Panel
  - 3—Bodine Twin Eight Radio Frequency Transformers
  - 3—.00035 mfd. Windham Condensers
  - 5—Pacnet Sockets
  - 2—Ferranti Audio Frequency Transformers
  - 1—Muter .00025 Grid Condenser
  - 1—Muter 2-megohm Grid Leak
  - 1—Muter .5 mfd. By-Pass Condenser
  - 1—Carter 200,000 ohm Variable Resistance
  - 1—Carter Open Circuit Jack
  - 1—Carter 6-ohm Rheostat
  - 10—Engraved Eby Binding Posts
  - 1—Carter Filament Switch
  - Miscellaneous Screws
  - 1 Package Kester Solder
  - 25 ft. No. 12 ga. Tinned Copper Wire

### The Universal Receiver

(See Page 152 for Diagram)

**O**UR readers are continually requesting information and details of a receiver which is easy to construct, economical in price and operation, and contains a minimum number of tubes consistent with loud speaker

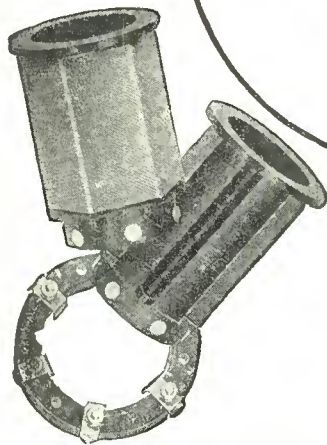


*The Universal Receiver installed in a console with appropriate accessories*

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

**SM**

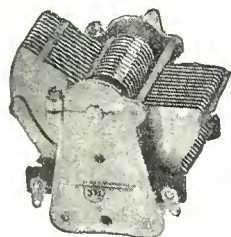
# Build YOUR Monotune Right



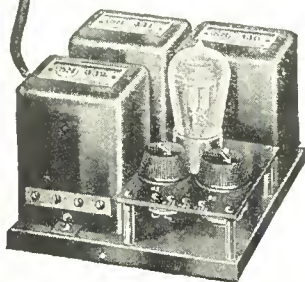
S-M Interchangeable Inductances, \$2.50 each. Coil socket, \$1.00.



S-M 220 audio and S-M 221 output transformers, \$6.00 each.



316-A and 316-B variable condensers, \$4.50 each.



650-C Plug-In "B," completely wired, \$33.50, less tube.  
650-D Plug-In "B," same as 650-C except unwired, \$29.00, less tube.

For years the research department of the Citizens Radio Call Book has rendered real and helpful service to radio experimenters. Now, for the first time, the Call Book has put forth a receiver designed exclusively by its laboratory experts. Needless to say, the Call Book's Monotune receiver does full justice to the years of work on the part of the Citizens Radio Service Bureau that every fan would expect—the perfection of design that has come as a result of the Bureau's work with practically every popular circuit ever built.

The Monotune was developed in answer to the demand for an efficient, sensitive, selective single-control set which will satisfy the Call Book's thousands of readers. The reproducing quality is the finest imaginable—the whole outfit a marvel of simplicity and efficiency, as it must be to be offered as the final answer to the hundreds of thousands of letters asking for the Call Book's own receiver.

That S-M parts should be used and recommended was inevitable, for the Call Book knew that nowhere could be found inductances as uniform and efficient, condensers as accurate and dependable, audio transformers of such perfection as those made and guaranteed by Silver-Marshall, Incorporated. So, in building the Call Book's own receiver, you, too, will make no mistake in using S-M parts.

Needless to say that the S-M 650-C Plug-In "B" power supply is ideal operation of the Monotune receiver. What more recommendation does it need than that of the Call Book's? Or the selection of its component parts by Radio Engineering for the *first* "A," "B" and "C" power supply for 201A and power tubes, as well as for the Radio News batteryless receiver is proof positive of its excellence.

*Prices 10% higher west of the Rockies*

## Silver-Marshall, Inc.

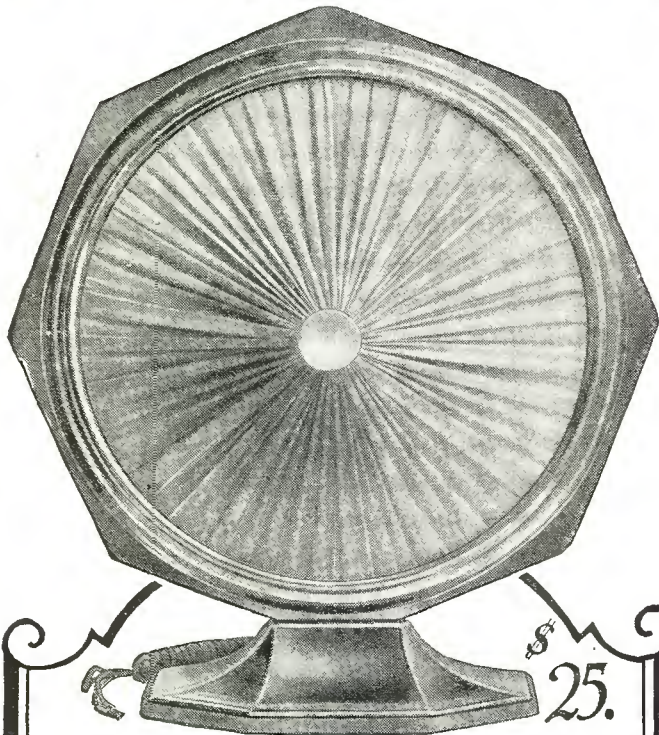
836 West Jackson Blvd.

Chicago, U. S. A.

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



# The new SONOCHORDE CONE



Don't buy ANY Speaker until you have heard Sonochorde—a new and wholly different cone conception. Besides its rich silk-covered front and many other exclusive features of appearance, Sonochorde delivers a wealth of tone and volume—simply a revelation. Ask your dealer to show you.

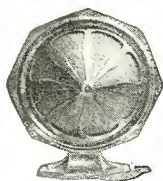
Write for the Sonochorde Story

**BOUDETTE MFG. CO.**

Chelsea, Mass.

Factory Sales Agents:

Hastings Elec. Sales Co., 42 Binford St., Boston



Showing the Protected Back

An entirely new conception is the Floor Standard Model



Also furnished for wall hanging



reproduction of good quality over long distances. In addition to this, many desire a receiver in which either dry cell or storage battery tubes may be used.

In our search for a receiver which would fulfill the requirements, our attention was attracted by many excellent circuits. Each was carefully experimented with and a selection made. We now offer our readers a receiver which we consider to be the ultimate in four tube possibilities. The Universal Receiver, as it is known, is comparatively new and while it has been described before in other publications, various changes and modifications have been made in the interest of increased sensitivity and selectivity as well as appearance and ease of wiring.

A combination of one stage of balanced tuned radio frequency amplification, a regenerative detector with a fixed tickler and two stages of first grade transformer coupled audio amplification with a power tube in the last stage make up the circuit in this unique receiver.

A .0001 mfd. variable condenser is in series with the antenna. This small condenser in the antenna system, when used in conjunction with the type 277-C coil, allows extreme selectivity with maximum sensitivity. If local broadcast interference is experienced, tuning may be sharpened by adjusting the capacity of the condenser toward minimum. For all-around reception the capacity of the condenser should be set at maximum. The type 277-C coil is the antenna coil, tapped to establish a bias on the radio frequency tube, and tuned by a .00035 mfd. variable condenser. The remaining major control is also a .00035 mfd. variable condenser tuning the type 277-D coil, which is a radio frequency transformer of the auto-transformer type, with a fixed tickler. A 500 to 50,000-ohm variable non-inductive resistance is in series with the tickler and adjusts it electrically. A pilot light operated from the "A" battery and controlled by the filament switch indicates at all times whether or not the tubes are burning. In the first stage of audio a 6-1 ratio audio transformer is used, the second stage using a 2-1 ratio audio transformer. These transformers when used with a good cone type of loud speaker will reproduce the lowest audio frequencies as broadcast today as well as the highest, with a very excellent tone quality. A first stage jack is not necessary, since the variable resistance in the tickler circuit acts as a very efficient volume control.

The Universal Receiver is designed to operate from a 6-volt storage "A" battery, using three UX 201-A tubes and one UX 112 power tube in the last stage of audio. To convert the receiver into one which operated on 4½ volts, substitute the UX 201-A tubes with UX 199 tubes and the UX 112 with a UX 120 power tube. Also remove the No. 112 and No. 1-A Amperite units and replace them with a No. 120 and 4 V 199 Amperite unit respectively. Circulars are supplied with the various tubes explaining their correct working voltage.

The Universal Receiver is shown in the illustration appearing herewith installed in a Charlotte Model 10 Console. The console is a product of the Charlotte Furniture Company of Charlotte, Michigan, and is exceedingly well constructed, being made entirely of high grade walnut and gum stock, and highly finished in lacquer and waxed. The top and ends of the console are in plain straight grain walnut, while the doors are of matched butt walnut.

A Model K-3 Acme Free-edge Cone Speaker, manufactured by the Acme Apparatus Company of Cambridge, Massachusetts, is used as a reproducer. This is one of the recent developments of this corporation, being tastefully finished in a neutral color, and capable of reproducing practically all audible frequencies now broadcast.

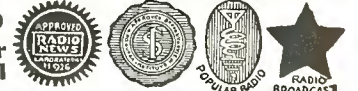
A new type of combination charger and "A" battery is used to supply "A" potential for the receiver. Sufficient space is allowed within the unit for a Willard Glass Case Battery which is connected directly to the charger. A pair of toggle switches in the case of the instrument allows either a high or low rate of charging to be used, as well as turning the charger on or off. This unit is manufactured by the Interstate Electric Company of St.

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



# 30 DAYS FREE IN YOUR HOME

Tested and approved by all of Radio's Highest Authorities



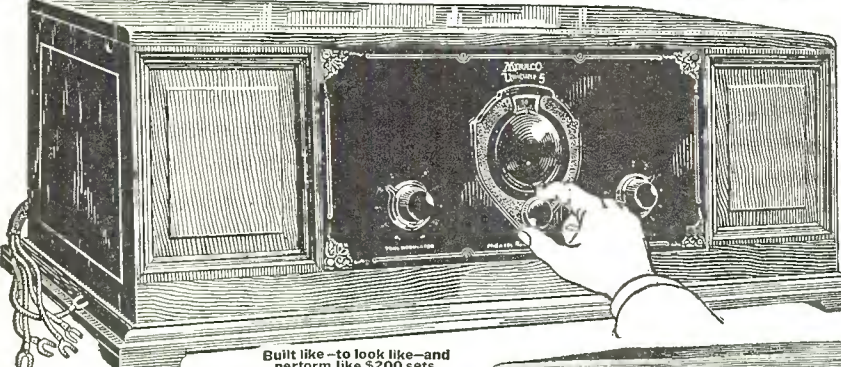
Send Coupon for Amazing Special Offer!

NOTE: This offer is made to prospective buyers by famous big Radio Corporation, one of America's oldest reliable manufacturers of fine sets—seventh successful year. Many satisfied users in every state. Postal or coupon brings testimony of nearby users and proof Miraco's outperform sets costing up to 4 times as much. Very easy to install and operate.

BEAUTIFUL · BIG · POWERFUL  
Ultra Selective **MIRACO** Ultra 5

Retail LIST Price **now only \$49.75**  
GET SPECIAL OFFER one year GUARANTEE

AMAZING SPECIAL OFFER to User-Agents who will allow friends to listen to their Miracos.



Built like—to look like—and perform like \$200 sets

## Real Single Dial Control!

Magnificent Big Powerful Miraco "Unitune-5" Get Special Offer and Amazing Low Price!  
The celebrated Miraco Ultra-5—U.S. Navy type circuit, has also been adapted to Single Dial Tuning—without sacrifice of selectivity, volume, clearness, power, tone, or distance getting qualities! In the magnificent big Miraco Unitune-5, above shown, you turn one vernier knob for stations everywhere. Beautiful hand-rubbed, piano hinged, solid walnut cabinet, 28 in. long, 15 in. deep, 10 in. high. Sloping Bakelite panel in walnut finished to match. Also offered on 30 days free trial!

## Coast to Coast and foreign Reception Certified by Miraco users



Notice! Enormous sales of the celebrated Miraco big fine Receivers (resulting from delighted users so highly endorsing them to friends) again enable us to add hosts of costly new features, latest refinements and up-to-the-minute improvements such as you might expect to find only on much higher priced sets. Miraco's this year are still better—more beautiful—more selective—more powerful for less money than ever before.

### USER-AGENTS WANTED - - WRITE!

Reports from users everywhere leave little for us to add. These are only a few of the many in our files and which we receive daily. Send coupon for plenty of additional proof and testimony of nearby users.

HAS NO EQUAL FOR TONE, VOLUME, DISTANCE. North Wildwood, N.J. Miraco best packed set I ever saw shipped. Words cannot express the wonderful tone quality, volume, and distance. First night received 47 stations on Loudspeaker. Up to last night, the 5th day, I have received exactly 103 stations. Farthest is KGO, Oakland, Calif. on loudspeaker. Also Porto Rico, Cuba and Canada. Frank H. L.

MOST SELECTIVE—SUPERIOR TO \$120.00 SET. Santa Cruz, California. I do not hesitate to show my friends the "Miraco Superiority" over my (names another set) costing \$120.00. The Miraco is the most selective set I have seen yet and cuts out the jumble of stations on the low wave lengths in 1 1/2 points. Wm. Schuetz.

MELLOW TONE -- LOUD AND CLEAR. Indian River City, Fla. A wonderful set. A handsomely finished result. I have had Miraco four nights and have stations on my list from Cuba to New York, Chicago, Denver, Texas, all coming in loud, mellow in tone and clear. I have not sold anybody but did not even try. Mr. H. G. Duff.

REFUSED TO TRADE IT FOR EXPENSIVE SET. Prosper, Ore. Over 31 stations brought in first night on loud speaker. I ordered the Miraco for a friend and he is more than pleased. I offered to trade my new Sony for it but he refused and it has the name of the best set in the community. M. E. Linton.

PENNSYLVANIA BEGINNER GETS 'EM ALL OVER. Curry, Pa. Have had Miraco one month today and have received over 115 stations from all parts of the United States, Canada, and Mexico. I think this is pretty good for one that never had any experience before. Clarence Dreyfelder.

LIKES IT BETTER THAN \$150 -- \$250 SETS. Westville, Ill. Miraco sure is a wonderful set. I get the stations easily without noise—that's one of the things I like about the Miraco. I've had three other sets that have ranged from \$150 to \$250 each but Miraco beats them all. My friends all like the Miraco. I have had stations all over the U.S.A. I tune in Mexico City and Havana, Cuba any time they are on the air. Alex Kinder.

BEATS COSTLIER SETS WITH MORE TUBES. Lexington, O. I have given Miraco a thorough try out and find it to do all you claim. 30 stations logged so far; setting new ones every week. This list includes coast to coast, Canadian, Cuban and Mexican stations. The selectivity is remarkable. Others here in town have more expensive and more tubes but do not give up this. Fuller Temple.

MIRACO OUTPERFORMS! W. W. St. Francis, Kansas. I've heard a lot of radios but the Miraco is best all around. I am proud of mine. Comes in line and clear. No noise. Get lots of distant stations. Surely am satisfied. Orvey Sharpe.

ONE. Philadelphia, Pa. Everyone that hears the Miraco is very pleased with tone, distance, etc. I tuned in during International Day in Philadelphia, Pa. I received 2511, Edinburgh, Scot.; also a station in Buenos Aires, Argentine. Geo. W. Hill, Jr.

WISCONSIN HEARS COAST TO COAST. Racine, Wis. I got station 21.0 London last Wednesday night on my Miraco. Heard a choir sing and announcement. Have also heard WJX, Havana, Cuba; W. W. City and 104 American stations from coast to coast. Lawrence Kishner.

SELECTIVITY—CUTS THROUGH STRONG LOCALS. Detroit, Mich. I am more than satisfied with my Miraco. I can cut through WWJ, WJX, WJR, WJL, WJZ, very strong local stations, and this is done with quarter of a turn. In every way it is simply perfect. Charles Paul.

UTAH ENJOYS COAST TO COAST PROGRAMS. Heber City, Utah. The Miraco sure can't be beat at any price. Coast to coast it sure does and more. I have had stations in New York and Cuba in the east, and scores of other stations on the west coast. I have logged up to date 150 stations and they all come in wonderfully. Monte Giles.

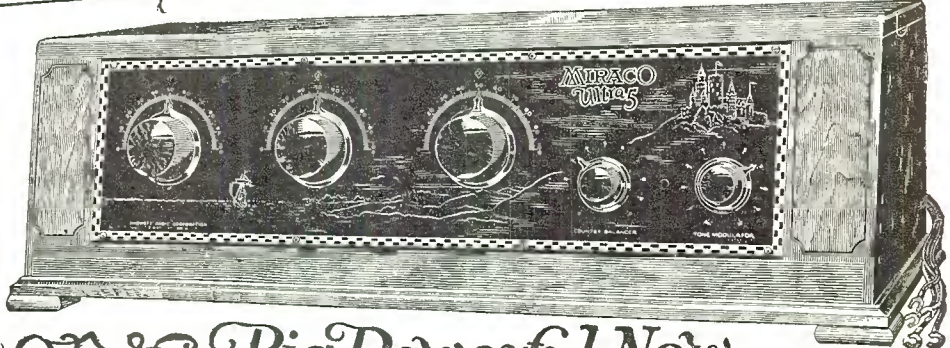
MIRACO WINS AGAINST 3 OTHER MAKES. Pearland, Texas. I tried three other makes and the Miraco is the best of them all. Received KFI, Los Angeles, Calif. on loudspeaker. O. H. Richards.

Nacogdoches, Texas. On my Miraco I have heard stations from Cuba to San Francisco and from Mexico City to Pittsburgh. Walter J. Frisbie.

COAST TO COAST LOUD AND CLEAR. Guthrie, Minn. We logged over 30 stations and got over 100 miles on the loud speaker the first night—our first experience tuning a radio. The third night we got WJAX Jacksonville, Florida and KFI Los Angeles, Calif., on the loudspeaker. Neighbors say Miraco is the best they have ever heard. O. R. Wolf.

MIRACO BEATS A SUPER EIGHT. Cobalt, Ontario, Canada. Miraco is one of the best radios in all the north country. There is a man here who has a big Super eight and our Miraco beats it. W. S. Cummings.

OUTPERFORMS SOME \$300 SETS. Bickley, Ga. I am well pleased with my Miraco. It does better than machines that cost \$300 or more. J. D. Tison.



Solid Walnut Cabinet

Unitune 5  
28 in. long

TRADE MARK REGISTERED  
**MIRACO**  
27 in. long

Solid Walnut Cabinet

## Big Powerful New Ultra-Selective Long Distance 5 Tube Sets Easy on Batteries Unless Trial Proves Your Miraco the Most Selective, Clearest Toned, and Most Powerful Distance Getter—Don't Buy it!

No need to wear out expensive batteries burning 6, 7 or 8 tubes when users everywhere are reporting that the big latest Miraco 5-tube sets actually are unsurpassed (even at much higher prices) for razor-edge selectivity, extreme long distance reception, clear natural tone and powerful loud speaker volume combined with great economy in use of battery current—at our risk—and be convinced! Your verdict final—absolutely no strings to this. Save or make a lot of money on sets and accessories this season by sending IMMEDIATELY for our Amazing Special Offer! Deal Direct with a Big Reliable Corporation

Our Factory Prices Save You Up to One-Half We deal direct by mail with users, agents and dealers, thereby effecting great savings which are reflected in amazingly low prices. Everything we sell is high-grade. Don't confuse Miraco's with small, cheap sets. You'll be Proud of Your Miraco

In its big, handsome, expensive-looking solid walnut cabinet with sloping front, you'll be proud to have friends examine and hear your Miraco. In construction, appearance and performance, every inch a high-priced set. Handsomely gold illustrated genuine Bakelite front panel and genuine Bakelite knobs—finished in grained walnut. Finest parts obtainable—the kind used in \$200 sets. Bakelite sub-panel. Many exclusive features. Each Miraco reaches you completely assembled, rigidly tested, speedily packed and factory guaranteed for one year. Easy to install and operate—full instructions supplied. Send NOW for testimony of nearby users and Amazing Offer!

Remember this offer is made direct to you by a big responsible manufacturing corporation—one of the oldest and most successful set-builders in the industry—a concern which has grown to immense size thru recommendations of its many thousands of satisfied customers who bought after trial.



### What a \$3,000,000 Federal Reserve Bank Says:

"For years the Midwest Radio Corporation of this city have been very satisfactory customers of this Bank, one of the largest in Southern Ohio. The Midwest organization was one of the very first to engage in the manufacture of radio sets, and to us their success is evidenced by the sound and steady expansion of their business which we have observed year after year. We are personally acquainted with all officers of the Corporation and from experience know them to be men of honor, integrity and ability. We consider them to be both morally and financially responsible. They have a reputation for fair and square dealings." THE PROVIDENT SAVINGS BANK & TRUST CO. Member Federal Reserve System. Capital and Surplus over \$3,000,000.

Midwest Radio Corporation 7th Successful Year Cincinnati, O.  
All the Proof you want is waiting for You!

Coupon or postal brings reports from hosts of users in your vicinity and elsewhere proving that Miraco sets at rock-bottom money-saving factory prices, outperform sets costing up to four times as much. You can also buy speakers, tubes, batteries, etc., at big savings from us! Get our proposition before spending money elsewhere.

Send coupon for Amazing Special Offer!

MIDWEST RADIO CORPORATION  
Pioneer Builders of Sets  
Cincinnati, O.  
531-R Miraco Building  
Without obligation, send free literature, testimony of users, AMAZING SPECIAL OFFER and full particulars of your big money-saving factory-price proposition on Guaranteed Miraco sets and all radio supplies. ( ) User ( ) Dealer  
NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_

AGENTS! DEALERS! Write for our latest Miraco proposition. Nation-wide popularity, superior performance of Miraco Radio sets, at amazingly lower prices, make them easy to sell. Send coupon today for proof

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

# every one a micadon



There are now three types of Micadons—each made to meet a new development in radio.

Micadon 601 is the standard of small fixed condensers. Designed on revolutionary principles, it was one of the first radio products to discard heavy molded insulation with its high dielectric losses. It provides and maintains a constant, fixed capacity wherever small condensers are required.

In Micadon 640, the need for higher capacities in super-heterodyne, reflex and resistance-coupled amplifiers has been met. The same accuracy, the same principles of insulation and protection against losses in its fixed and permanent capacity have given this condenser its unequalled popular demand.

Micadon 700 is the newest addition to this famous line. Completely shielded in its bright aluminum case, it is designed to withstand even the voltage found in low-power C.W. vacuum tube transmitters; thus providing the most compact, efficient and economical unit of fixed capacity that radio has yet known.

Three different types—but every one a Micadon. In the patented principles of their design; in the scrupulous care given to every stage of their manufacture; in their delicate precision, fully shielded and protected—worthy to bear the name of radio's greatest maker of condensers.

Send 10c for our 32 page booklet, "Seventeen Ways to Improve Your Set"

## Dubilier

CONDENSER AND RADIO CORPORATION

4377 Bronx Boulevard, New York, N. Y.

Louis, Missouri.

A Kingston "B" Battery Eliminator is used to supply the "B" potential for this receiver. It is a product of the Kokomo Electric Company of Kokomo, Indiana, and is capable of delivering sufficient current to properly operate the receiver without overloading. It uses the well-known Raytheon Tube for rectification purposes.

(If any further information on these accessories is desired, full descriptive matter may be obtained by writing the Manufacturers direct.)

### LIST OF PARTS

- These parts or their equivalent will give satisfactory results:
- 1—7x21x3/16 in. Drilled and Engraved I. C. A. Etchogravure Panel
  - 1—7x20x3/16 in. Drilled I. C. A. Etchogravure Sub-Panel
  - 1—Pair Type M-V Pan Brackets
  - 2—General Radio Type 247-H .00035 Variable Condensers
  - 2—General Radio Type 310 Dials
  - 1—General Radio Type 285 6-1 Ratio Audio Transformer
  - 1—General Radio Type 285-L 2-1 Ratio Audio Transformer
  - 4—General Radio Type 349 Sockets
  - 1—General Radio Type 277-C Coil
  - 1—General Radio Type 277-D Coil
  - 1—General Radio Type 301 12-ohm Rheostat
  - 1—General Radio Type 301 25-ohm Rheostat
  - 1—General Radio Type 368 Midget Condenser
  - 1—General Radio Type 236 .5 mfd. Paper By-Pass Condenser
  - 1—Yaxley Type 310 Pilot Light Bracket
  - 1—Yaxley Type 701 Open Circuit Midget Jack
  - 1—Yaxley Type 10 Filament Switch
  - 1—CRL 50,000-ohm Variable Non-Inductive Resistance
  - 1—Precise Type 940 .0001 mfd. Variable Condenser
  - 13—Eby Engraved Binding Posts
  - 1—Lynch Single Resistor Mounting
  - 1—Lynch 3-megohm Grid Leak
  - 1—Amperite Type No. 112
  - 1—Amperite Type No. 1-A
  - 1—Micamold .0001 mfd. Fixed Condenser
  - 1—Micamold .00025 mfd. Grid Condenser (without leak mounting)
  - 3—Dozen No. 6x32x1/2 in. Round Head Brass Machine Screws
  - 1—Dozen No. 6x32x1/2 in. Flat Head Brass Machine Screws
  - 3—Dozen Kellogg Tinned Soldering Lugs
  - 1—Blackburn Ground Clamp
  - 1—Package Kester Radio Solder
  - 50—Feet Belden No. 12-gauge Tinned Copper Hook-up Wire
  - 1—Foot Flexible Insulated Wire

### The Thordarson Power Compact

(See Illustrating Diagram on Page 144.)

WITH the advent of the "B" battery eliminator and the perfection of the same, there comes a demand for an eliminator which incorporates efficiency, compactness and flexibility, in such a form that the unit may be readily installed within the cabinet of the receiver and such that the output voltages may be regulated with ease and at will.

The "B" battery eliminator which is described in this review has the foregoing features embodied in its design and should give exceptional results if properly constructed and adjusted.

Full rectification is accomplished by means of a Raytheon Type BH rectifying tube. The low voltage primary windings, high voltage secondary windings, and the audio frequency chokes are contained in one unit. There is also a low voltage secondary winding, in case a power amplifier tube is used. This combination makes a very neat and highly efficient compact unit. A thirteen and one-half mfd. Sangamo filter condenser block is used in conjunction with the audio frequency filter chokes. A 10,000 ohm fixed resistance is shunted across the detector positive and the negative leads. This resistor acts as a voltage regulator or stabilizer, and retains the detector voltage constant through changes in the input line voltage. The flexibility of output voltage control is obtained by means of two Centralab Variable Resistances. A 50,000 ohm Variable Resistance is placed in the inter-

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

# FREE

## This 84 Page Wonder Book of RADIO Bargains



Send  
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Over  
**2000**  
-ITEMS-  
Everything  
in RADIO

Send for this guide to Radio prices and Radio quality. All of our vast resources and radio experience have been utilized to assemble for you in one gigantic institution, the best and newest things in radio. The Randolph catalog is indeed the radio market place of the world—a masterpiece of merchandising that befits our house—the largest exclusive radio mail order house in the world.

### What Our Catalog Contains

Over 2,000 items—from the most beautiful, fully equipped console model radio set, down to the smallest part or tool for the set builder—kits, parts, and supplies of every conceivable type and style. All beautifully illustrated and interestingly described. And to give this book added value, we have included radio data that makes it an invaluable text book for every lover of today's most fascinating and most wonderful achievement—RADIO.

#### Radio Sets

In this great radio market place you will find table model sets and console types with built-in loud speakers; the newest amphiphonic console sets; new Spanish period consoles; five, six, seven, and eight tube sets, with three dial, two dial, and the newest and most popular single simplified control. All sets are assembled in beautiful, genuine mahogany and walnut cabinets in a choice of latest types and designs.

**5 Tube sets as low as \$24.90**  
**Latest 1927 Models**

All Randolph sets are sold at amazingly low prices. No matter what kind of set you want—no matter how little you want to pay—you can select YOUR SET AT YOUR PRICE from the Randolph catalog.

#### Radio Parts—Supplies

The Randolph catalog also contains a most complete line of "B" Battery Eliminators, including the famous Raytheon Eliminators; the latest type of Loud Speakers, Cone Speakers, a complete line of quality "A" power units—in fact, you will find listed in this wonder book every part that goes into the construction of a radio set, or any accessories you desire, at prices that mean a substantial saving to you.

### YOU MUST HAVE THIS BOOK

Space limitations here prevent our telling you more about the Randolph Catalog. Simply fill out and mail the coupon—or you may send a postal or letter—and this truly remarkable Radio book will come to you **ABSOLUTELY FREE. MAIL THE COUPON NOW.**

**Randolph Radio Corporation**  
**180 North Union Avenue • Dept. 196 • Chicago, Ill.**

#### Why We Save You Money

Because we handle radio exclusively and sell a tremendous volume of everything in Radio, we can concentrate our buying power for the benefit of our customers. Volume purchases regulate prices. We command rock bottom prices from manufacturers, and in many cases we contract for entire factory output of exclusive products. You will benefit by our great volume of purchases and sales, by securing anything you may want in radio at a substantial saving.

#### Free Radio Service

Everyone has need for radio service. The average man has no time to keep up with the rapid developments of radio. We employ Radio Engineers who have made radio their life work. Their expert advice and helpful suggestions solve every radio problem of our customers.

#### Our Guarantee

Every article in our catalog is based on careful laboratory analyses and tests. We guarantee to back up every item in our catalog with our own as well as manufacturer's assurance of quality.

### All The Latest Radio Kits

Our catalog includes the following well known circuits, designed and approved by the world's foremost radio engineers: Karas Equamatic; Henry Lyford Receiver; B. T. Counterphase Power Six; Samson DeLuxe Transcript; Hammarlund Hi "Q" Receiver; Infradyne; Silver Marshall Kits; Neutrodyne; Remler Super; Bests 45,000 Cycle Super; Madison Moore Super; Nine-in-line Super; New Acme Reflex; Aerodyne; Sargents Infradyne; Victoreen; Short Wave Kits; Cockaday; Browning Drake. All classes of radio frequency, Superheterodyne and every other approved, popular circuit.

### This Coupon Brings the Great RADIO Book FREE

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Send me—free—your 84-page, 1927 Radio Book.

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

# Centralab

CENTRAL RADIO LABORATORIES

## PRODUCTS

1926-27

IN the past season more than 2000 newspapers recommended Centralab Products. Most radio magazines mentioned them frequently in circuit articles. Every product has distinctive features and obvious high quality.

### Centralab Modu-Plug

**The New Tone and Volume Control**  
Tone improvement is this year's only real radio advance. Just one change will modernize your present set. Replace your loud speaker plug with the Centralab Modu-Plug and your set will equal the tone performance of the latest high-priced receivers. Gives any degree of tone volume. No other control but the small knob on the plug. Interfering noises are reduced.



No. 1. Standard Type Modu-Plug for sets with one or more jacks, \$2.50.  
No. 2. Cord Type Modu-Plug for sets not equipped with jacks; has 24 in. phone cord, \$2.50.

### NEW Heavy-Duty RADIOHM

For Simple Control of "B" Battery Eliminator

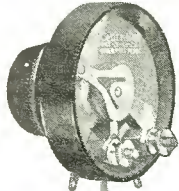
Get full efficiency from your "B" Battery Eliminator by installing a Centralab Heavy-Duty Radiohm. By using this device a single turn of the knob gives full resistance variation to control the output voltages. Tested and approved by Raytheon Laboratories.

Resistance remains permanent as adjusted (no carbon particles or discs) and remains same for any knob setting regardless of how often adjusted. Bushing and shaft insulated to withstand 1500 volts.

Resistances 2,000, 10,000 or 50,000 ohms.....\$2.00

#### Centralab Standard Radiohms

Can be varied smoothly throughout their entire range from zero to maximum resistance. Gives full resistance variation with single turn of the knob. Non-inductive, permanently noiseless in adjustment; no sliding contacts carrying current; maintain exact resistance values as adjusted.

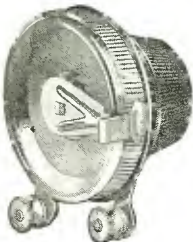


Resistances 2,000, 25,000, 50,000, 100,000, 200,000 or 500,000 ohms.....\$2.00

#### Centralab Rheostats

Centralab Rheostats always operate smoothly and noiselessly, for the resistance element is firmly clamped between insulated metal discs so that it cannot move or warp. This maintains uniform spacing between windings, giving even regulation and eliminating dead spots.

The large area of metal aids in cooling, and they carry unusually heavy current for their size. Centralab Ribbon Type Rheostat is wound with flat ribbon instead of wire. Will handle five to ten tubes with smooth, noiseless control.



Wire wound: 6, 10, 20 or 30 ohms .....\$1.00  
Ribbon wound: 2 or 3 ohms, price .....\$1.25  
Purchase any Centralab product at your dealer's or we will mail direct on receipt of price.

#### Central Radio Laboratories

26 Keefe Ave. Milwaukee, Wis.  
Makers of a full line of variable resistances for 69 manufacturers of leading standard sets

mediate voltage lead and a 100,000 ohm variable resistance is placed in the detector lead. By the means of these two variable resistances any desired or required voltage may be placed upon their respective circuits. The complete "B" supply unit occupies a space of but 6x9 in. without crowding.

This point is well worth bearing in mind, for it is now possible to build the "B" supply unit as a part of the receiver without cramping the other apparatus.

#### LIST OF PARTS

- 1—Thordarson Power Compact R-171
- 1—Raytheon Rectifying Tube, type BH
- 1—Howard Socket
- 1—Sangamo 13.5 mfd. Filter Condenser Block
- 1—Centralab 50,000 Ohm Variable Resistance
- 1—Centralab 100,000 Ohm Variable Resistance
- 1—Allen-Bradley 10,000 Ohm Fixed Resistance
- 7—Engraved Eby Binding Posts
- 1—Engraved Formica Drilled Panel
- 1—Wood Baseboard
- Assorted Screws and Copper Hook-up Wire

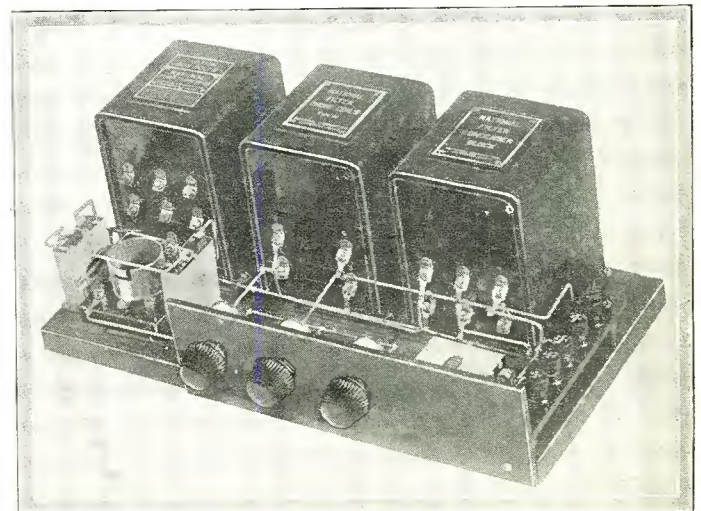
### National Power Amplifier and "B" Supply Unit

(See Diagram on Page 148)

WITH the coming of the "B" battery eliminator and the power amplifier there has come a request for a combination of these two units whereby the home builder may incorporate the two units in the design of his receiver in such a way that the output be very flexible, in order that various types of tubes may be used at their greatest point of efficiency and lend the appearance of a factory-built job.

The herein described unit has been designed with three thoughts in mind, namely: flexibility of output, utility, and neatness in appearance. The power supply unit consists of the necessary high tension transformer, filter chokes, and filter condensers. These units are in separate metal cases and are finished in black crystalline enamel. There are furnished variable high resistances in the intermediate and detector voltage leads for the purpose of adjusting the voltage applied to these tubes. A variable high resistance is also placed in the grid bias circuit. By the means of these variable resistances, the applied voltages on the various circuits may be so adjusted that the greatest point of efficiency of the tube in use may be obtained. A 10,000 ohm fixed resistance is shunted across the detector positive and negative leads, which will regulate or hold constant the voltage applied to the plate of the detector of a varying input line voltage. Full wave rectification is obtained by means of a Raytheon type BH tube.

The power amplifier unit consists of three stages of impedance



View of completed "B" Supply Unit. Note the extreme simplicity of the layout as well as the ease of wiring

# Centralab

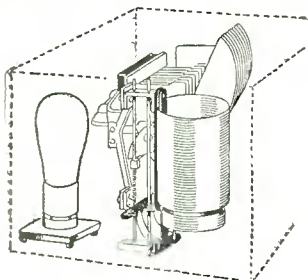
YOU CAN BUILD THE NEW SHIELDED HI-Q\*



The Hammarlund-Roberts Board of Engineers

The Hammarlund-Roberts Hi-Q Receiver is the joint creation of ten leading engineers. A wealth of experience plus highest reputation for quality parts guarantee unexcelled performance.

- Benjamin Electric Mfg. Co.
- Carter Radio Co.
- Durham Resistors
- Eby Mfg. Co.
- Hammarlund Mfg. Co.
- Martin-Copeland Co. Radiall Company (Amperite)
- Samson Electric Co.
- Saugamo Electric Co.
- Westinghouse Micarta



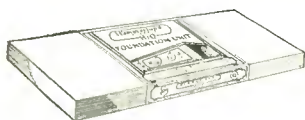
Automatic Variable Coupling

A wonderful new feature. Same control operates both tuning condenser and primary coil coupling. This gives maximum and equal amplification and selectivity over entire tuning range.



"How to Build It" Book

Written by the Hammarlund-Roberts Board of Engineers in very simple A B C language. Every detail described, numbered and diagrammed so that you can easily understand it. Send 25c for your copy.



The Hi-Q Foundation Set

The Key to this wonderful receiver. Includes drilled and engraved panel, and sub-panel and all the essentials required to start building. Price \$10.50.



Over 57,000 Built at Home You Can Do It Too

LAST year 57,453 radio lovers had the fun of building the Hammarlund-Roberts Receiver at home—a wonderful tribute to the genius of America's ten leading engineers, who designed this remarkable instrument.

The new Hi-Q Receiver is even more wonderful than our set of last year. A study of its modern features will disclose simple dual tuning, Complete Shielding, Automatic Variable Coupling, high detection efficiency, high power output and utter absence of oscillation.

An inspection of any home-built Hi-Q Receiver will prove that here for the first time 5 tubes equal 8. Actual test will prove a sensitivity equal to that of expensive "Supers." Reception is startling both in distance and power; volume is full and all signals have those rich, undistorted tone qualities which fall like a caress on the most sensitive ear.

Save \$50 to \$100—Build It Yourself

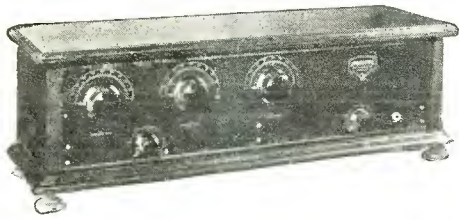
When over 57,000 novices have built successful Hammarlund-Roberts Receivers, you can build one, too. Send 25c for the "How to Build It" book or get a copy from your dealer. Follow the simple directions, solder a few connections and in a few hours you, too, will have the satisfaction of having built one of the world's finest receivers at less than half the price of factory-made sets not nearly so good.



\*High ratio of reactance to resistance. High Ratio—Great selectivity—Loud Signals.

HAMMARLUND-ROBERTS - 1182-T Broadway, New York

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



**For A Limited Time Only  
You Can Buy This  
Amazing New Kind  
of Radio Set  
At The Regular Dealers Price**

**SAVE \$27.30 ( Write for  
Details Today! )**

For a limited time only you can buy the famous AMBU FIVE, which regularly retails for \$75.00, at the low dealer's price of \$47.70. You save \$27.30 if you act NOW! This offer may be withdrawn without notice at any moment. Don't delay. Send the coupon for details, today.

*Two New Exclusive Features Enable*

**The AMBU-5**

**To Get All Programs from 40 to 600 Meters**

The AMBU FIVE has two features not to be found in any other set. The sub-panel is inlaid with copper that has been shot into prepared grooves so that complete assembly of set is simply a matter of screwing parts into place. Connections are automatic and everlasting. 105 points of contact, yet only 4 soldered connections.

The AMBU all-wave coils,—enables the operator to bring in any stations broadcasting on a wave length of from 40 to 600 meters. Ordinary sets do not go below 200 meters.

**Demonstrator Set FREE by This Plan**  
If you are interested in radio training you can get the famous AMBU FIVE, FREE, as a demonstrator set. It is included with the Ambu Institute Training in Radio Engineering. If interested in this plan check coupon in space provided.

This amazing set over-night has become a favorite of thousands. Factory production has been doubled twice to keep up with demand. Get coupon below in the mail today for free facts. No obligation.

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2633 L Prairie Avenue, Chicago, Ill.

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Coupon  
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Facts**

**AMBU ENGINEERING INSTITUTE,**  
2633 L Prairie Avenue, Chicago, Illinois

Send at once free facts concerning dealer proposition on AMBU FIVE. I am not obligated.

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Address.....

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

Check here for information on Radio Training.

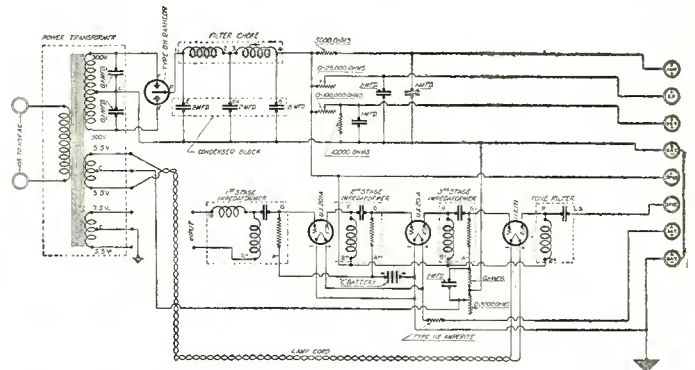
coupled amplification. By this method the tonal quality of reproduction is quite unsurpassed, clearly bringing out all audio frequencies from the lowest bass to the highest treble when a good grade of speaker is used. The units of the power amplifier are contained in separate metal cases and are also finished in black crystalline enamel. A "tone filter" is placed in the loud speaker circuit, which keeps the high plate voltages from entering and damaging the windings of the loud speaker, also filtering any ripples that may have come through the power supply unit.

A UX 171 power tube is used in the last stage, so that all available power may be handled without danger of excess distortion. The conventional "A" type of tube is used in the two preceding stages.

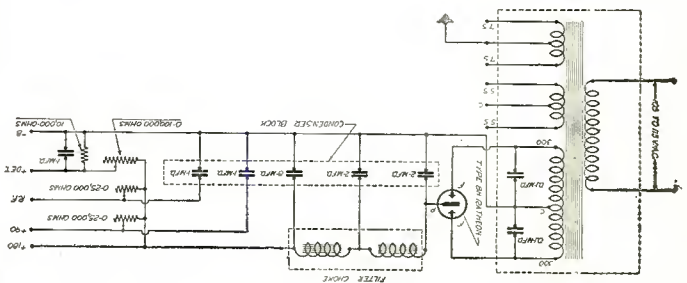
By utilizing these two units, two very important factors in radio reception are accomplished. A continuous, steady flow of plate voltage at any desired potential and flawless reproduction may be reproduced if constructed properly and with care.

**LIST OF PARTS**

- 1—National Power Transformer
- 1—National Type 80 Filter Choke
- 1—National Filter Condenser Block
- 3—National Impedaformers
- 1—National Tone Filter
- 4—Tobe 1 mfd. By-Pass Condensers
- 1—Allen-Bradley 3,000-ohm Variable Resistance
- 1—Allen-Bradley 25,000-ohm Variable Resistance
- 1—Allen-Bradley 10,000-ohm Variable Resistance
- 1—Allen-Bradley 10,000-ohm Fixed Resistance
- 1—Allen-Bradley 5,000 Fixed Resistance
- 3—Frost Sockets
- 1—Lynch .1-megohm Resistor and mounting
- 1—Type 112 Amperite and mounting
- 10—Engraved Eby Binding Posts
- 1—Package Kester Solder
- 25 feet Belden No. 12 gr. Tinned Copper Wire



*Schematic wiring diagram of National "B" Eliminator and power amplifier*



*Schematic wiring diagram of National "B" Eliminator*

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

## No Circuit Since The Birth of Radio

is as nearly perfect, by actual test and comparison, with every quality set now on the market, as the NEW

### HENRY-LYFORD RECEIVER

Were a manufacturer to build this set, with labor, overhead and selling costs, which, of necessity must be added to material, it would easily come within the \$300 class.

#### IT'S THE OUTSTANDING CIRCUIT OF THE YEAR

Henry-Lyford has been endorsed and approved by magazines and newspapers from California to New York, including Radio News, Radio, Popular Radio, Radio Mechanics, Radio Age, Radio Review and this magazine. Read about it in this number of the Call Book.

#### Henry-Lyford Is a Plug-in Coil Receiver With a Deliberately Unbalanced Circuit

##### COMPLETE LIST OF PARTS With Coils 185 to 550 Meters

- 1 Bakelite panel, 7 x 24, drilled and engraved.
- 1 Bakelite sub-panel, drilled, with 5 Benjamin sockets mounted.
- 2 Precise 350 mmfd. variable condensers, type 845.
- 1 Precise 55 mmfd. variable condenser, type 940.
- 1 Centralab modulator, type 500 M.
- 1 Carter or Yaxley "Imp" filament switch.
- 1 Carter or Yaxley No. 102-a jack.
- 1 Carter or Yaxley No. 103 jack.
- 1 University antenna coupling transformer, type B-1.
- 1 University tuned radio freq. transformer, Type B-3.
- 2 Thordarson Audio Transformers, type B-200.
- 5 Tobe-Deutelmann 1 mfd. fixed condensers.
- 1 Micamold .002 mfd. permanent condenser.
- 1 Micamold .001 mfd. permanent condenser.
- 3 Amperites, type 112.
- 10 Coil mounting jacks.
- 1 Pair of Benjamin brackets, type 8629.
- 1 Sub-panel supporting post.
- 2 Rhy binding post marked Ant. Gnd.
- 2 4" Kurz Kasch dials, 100 to 0.
- 1 8-wire battery cable.
- 1 Coil of Belden hook-up wire.
- 1 Complete set of hardware.

Complete Parts.....\$69.50

If your dealer cannot supply you order direct from us.

UNIVERSITY  
RADIO MFG.  
CORP.

50 Park Place  
New York

##### COUPON

Gentlemen:  
Please send me booklet describing in detail full particulars of the NEW Henry-Lyford.

A Plug-in Coil  
Receiver  
With A  
Deliberately  
Unbalanced  
Circuit

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

DEALERS & JOBBERS  
Can Be Supplied Write Now

# The LYNCH Metallized RESISTOR ASSORTMENT

Contains the following:

- Three .1 Meg.
- One 1 Meg.
- One .5 Meg.
- One .25 Meg.
- One 2 Meg.
- Complete, \$4.25

METAL long has been recognized as the best of electrical conductors. The Lynch Metallized Resistor has received the unqualified endorsement of leading engineers, experimenters and test laboratories because it is absolutely silent in operation and remains permanently accurate.

Comprising a concentrated metallized deposit one-thousandth of an inch thick upon a glass core and sealed within a glass tube, each LYNCH METALLIZED FIXED RESISTOR wins in the exacting tests of time and service.

#### Warranted—

**Absolutely Noiseless  
Permanently Accurate  
Dependable!**

If your dealer cannot supply you, we will ship by return mail. You take no risk as Lynch products are sold on a money-back guarantee. Use the Convenience Coupon below.

PRICES	{	.25 to 10 Megohms	.50
		above .01 to .24 "	.75
	.001 to .01 "	\$1.00	
	Single Mounting	.35	
	Double Mounting	.50	

### ARTHUR H. LYNCH, Inc.

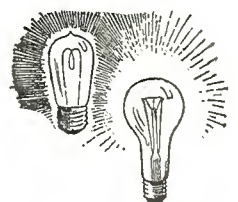
Manufacturers of Radio Devices  
Fisk Bldg., B'way & 57th St.  
New York, N. Y.

[The new Lynch Equalizer for any combination of tubes, \$1.00, with mounting.]

ARTHUR H. LYNCH, Inc., Fisk Bldg., New York, N. Y.  
Send me the Lynch Assortment described above (7 Lynch Metallized Resistors) with the understanding that I am to receive my money back if not satisfied. I will pay postman on delivery \$4.25, plus postage.

(Name) \_\_\_\_\_ (Address) \_\_\_\_\_

Or send check or money order and save postage.

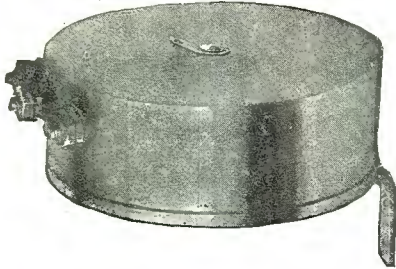


The old carbon lamp consumed more current to give less light. Tungsten, which is metal, proved more efficient, more dependable. The Lynch Metallized Resistor gives non-arcing, conductive resistance. It marks as great an advance as did the tungsten lamp.

Arthur H. Lynch

# AALCO Shielded T. R. F. Transformer

A product of remarkable results and compactness. Can be mounted at any angle and within one-half inch of each other. No inter-stage coupling, greater selectivity. Shielding on coils is of copper and lacquered so as not to discolor or corrode.



Aalco T. R. F. Transformer

Can be used on all circuits, such as Freshman type, Neutrodyne, Infradyne, and all others using .00035 variable condenser. AALCO SHIELDED COILS may be mounted direct to condenser or on sub-panel. Dimensions of case, 1 1/8 x 3 inches.

List price, \$2.00 each

### Aalco Shielded Coupler

For .0005 condenser having three windings, which makes it possible for use in oscillator circuits. Small in size and mounted in copper shield, the same specifications as above.

List price, \$3.00

**Aalco Radio Laboratories, Inc.**  
1912 Wabash Ave., Chicago  
Makers of the Famous Aalco Loop

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Your name and address on a postal or in a letter, will bring you—absolutely FREE—

## THIS 84-PAGE BARGAIN RADIO CATALOG

Contains the most complete array of Sets, Kits, Parts and Supplies, at prices that will astonish you.

**SPECIAL—We Are Also Featuring the Wonderful Karas Equamatic Set.**

Write for Book Today  
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180 N. Union Ave., Dept. 198  
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## RADIO CABINETS

Panel	Depth	Prices
7x18	10 in.	\$6.95
7x21	10 in.	7.50
7x24	10 in.	8.25
7x26	10 in.	8.75
7x30	10 in.	9.85
7x18	8 in.	6.10
7x21	8 in.	6.50
7x24	8 in.	6.70
7x26	8 in.	7.10

Princess Cabinet, Genuine Black Walnut  
Transportation extra.  
The upper panel strip is removable to allow set to slide into place through slide groove. No screws necessary. Panel or mounting board not included. Equipped with piano hinges and lid holders.

Description: Our Princess Cabinets are finely finished, very pretty and well proportioned, with plain, graceful lines. The tops of these cabinets are made of solid, selected black walnut, hand faced so they cannot warp. The ends also are made of solid black walnut and set in cross ways grain. The backs and bases are selected hand faced gumwood.

These cabinets have a beautiful hand rubbed genuine lacquer finish. You can easily notice the distinctive difference this cabinet will make in your set. We also carry a fine line of Consoles, Desks and Tables. Send for Catalog. **UTILITY RADIO CABINET COMPANY, 448 27th Street, Milwaukee, Wis.**

# FREE HOOK-UPS

# AND BIG RADIO GUIDE

## NEW EDITION

Complete Parts for All the Newest Circuits—Browning Drake, Victoreen, Etc.

Read through this issue of the CALL BOOK—then let BARAWIK fill your order for the parts of the newest circuit you wish to build. We supply over 1/4 million radio fans with everything from complete factory built console sets to the thinnest magnet wire, or smallest screw. If it's radio, we have it, for we carry the biggest radio stocks in the world. Get the parts you need from BARAWIK—quick—and save money, time and trouble.

164 Pages of 1927 Goods—  
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Our newest 1927 Radio Guide contains 164 pages brimful of radio's newest creations, just what you have longed for, at the lowest prices in radio history. You'll be astounded at the savings. All brand-new merchandise of the famous makers, standard guaranteed goods of known value. Everything you need is here, including the newest amateur receiving and transmitting equipment—a new department directed by F. J. Marco, 9ZA. Send for free copy of this new Radio Guide today—NOW. Also please send names of other radio fans you know.

**The BARAWIK CO.**

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# The flux is everything in radio soldering says this Radio Engineer

"In our laboratory we made a thoro analysis of the two groups of fluxes (natural and chemical). We found the natural flux, rosin, the only safe one to use on radio work.

Pure rosin, as in Kester Radio Solder, will not fume, sputter, or cresp over large areas, and being a hard, dense substance, rosin will not attract and collect dust (carbon particles), which makes an excellent path for leakages. These are the faults of fluxes containing chloride, be it either in paste,

liquid or compound form. Any flux containing chloride will eventually cause heavy leakage. Hence they should be strictly avoided.

We find Kester Radio Solder the most convenient way to solder on radio work, for it has the proper amount of pure rosin right inside the solder itself. In fact, we used it exclusively on all of our work."

There's your guide, radio fans—the approval of an expert radio engineer. Surely there can be no doubt as to what you should use on YOUR SET.



A free Sample write for it now

## KESTER Radio SOLDER

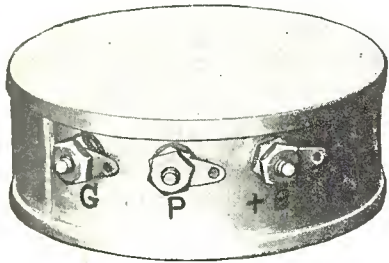
the safe solder for radio, requires only heat

**CHICAGO SOLDER CO.**

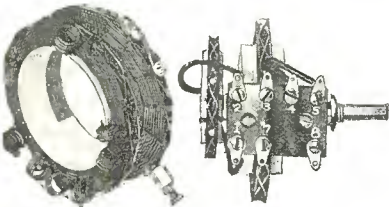
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Manufacturers of Self-fluxing Solder

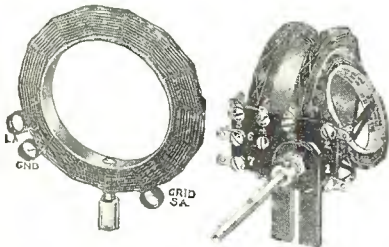




No. 30 Shielded Tuned Radio Frequency Transformer .....\$2.00



No. 18A Roberts Circuit.....\$8.00 set



No. 24 Browning-Drake.....\$7.50 set

# DIAMOND-WEAVE SICKLES COILS

(TRADE-MARK REGISTERED Aug. 4, 1925)

(Patented Aug. 21, 1923)

Our No. 30 Shielded Tuned Radio Frequency Transformer is designed on entirely new scientific principle. It will tune sharply to wave lengths from 200 to 550 meters with a .00035 variable condenser. The shielding prevents intercoupling between coils, and local interference. Outside dimension of shield 3 in. diameter, 1 1/8 in. high.

Our No. 18A Coils are designed for use in all Roberts Circuits with or without reflex. They are equipped with the new center-tap NP Coil, and are provided with one whole panel mounting.

Our No. 24 Coils are carefully designed to meet all specifications of the Brown & Drake Circuit. The windings in the regenerative unit are designed to attain maximum magnetic and minimum capacity coupling.

Special Coils will be made for other circuits if desired.

## OTHER COIL PRICES

	Set
No. 20 Craig Circuit.....	\$4.50
No. 19 Acme Reflex.....	4.50
No. 8 Knockout Reflex.....	4.00
No. 21 Hoyt Circuit.....	10.00
No. 25 "Aristocrat" Circuit.....	8.00

Send for descriptive catalog

## THE F. W. SICKLES CO.

144 Union Street

Springfield, Mass.



## The Famous Melo-Heald Eleventh Circuit

THE CIRCUIT FOR PARTICULAR SET BUILDERS



The One Circuit That Lives Up to Its Reputation and Claims!

Cuts Through All Interference—Cross Country on Any Night!

Robertson-Davis Co.  
Chicago, Ill.

Nov. 5, 1926.

Gentlemen:— I have finished the construction of the Melo-Eleven superheterodyne. It certainly is a "knock-out"; it is far better than my expectations. I can tune in on nearly any station in St. Louis, Canada, Mexico, or any place in the United States, consistently and at will, without any interference from another station. The selectivity of the set is nothing short of marvelous, and the volume of these distant stations when tuned in is so great that the set can be heard out on the street.

I really doubted the claims that were made for the "Eleven," but in this instance hearing is believing. I believe that I am safe in saying that there is nothing obtainable at the present time that can equal its performance.

The tone is marvelous and it is difficult for me to tell from volume which is out-of-town broadcast.

Yours truly,  
(Signed)

DR. LOUIS G. FRUMSON,  
Missouri Theatre Bldg.,  
St. Louis, Mo.

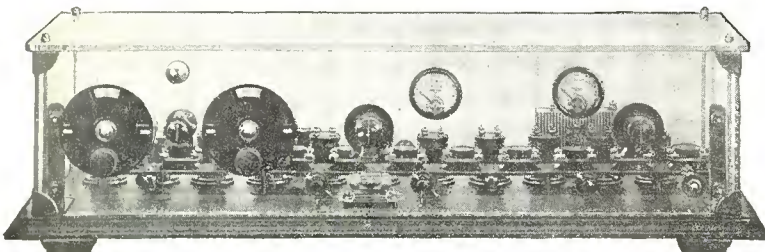
The accompanying letter is a word for word copy of letter received unsolicited from Dr. Frumson. Photograph gladly sent on request.

Dr. Frumson's experience is not the exception. In our advertisements in the current Citizens' Radio AMATEUR Call Book, and Everybody's Radio Home Builder for Oct. 15th and Nov. 1st, we published the letters of Mr. John J. Christoffel and Mr. J. H. Jenkins, of Chicago. Did you read them?

These letters are typical of hundreds of messages that are constantly pouring in. They explain, better than anything we, as originators of the famous Melo-Heald Eleventh Circuit might say, why it is the circuit for particular set builders.

The Certified Meloformer and Melocouplers are the audio frequency and radio frequency transformers upon which the great success of this circuit depends. All the other parts are standard, stock parts of no particular make, that you can purchase anywhere.

Only two major controls are embodied in the MELO-HEALD ELEVEN TUBE CIRCUIT—loop and oscillator. It enables the operator to handle or dispense with local stations with such ease that distant stations come in clearly even in the most congested districts.



**FREE BLUE PRINTS—FULL SIZE** The illustration above gives an idea of the simplicity of wiring and constructing a receiver from this wonderful circuit. You can build one in about one-third the time required for the average eight-tube set. Only 7-in. by 30-in. panel needed. Neat and sturdy. Send for FREE Blue Prints.

Mail Coupon or Write Today

**ROBERTSON-DAVIS COMPANY, INC.**

DEPT. RCB-12

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Chicago, U. S. A.

**FILL IN AND MAIL THIS COUPON TODAY FOR BLUE PRINT AND PLANS FREE**  
**Robertson-Davis Co., Inc., 412 Orleans St., Chicago, U. S. A.**

Gentlemen:— I am interested in the Melo-Heald Eleventh Circuit and the transformers used to build a receiver of that type. Please send me Blue Prints, Plans, Specifications and literature about your products, which I understand will be sent FREE and without obligation.

Name: \_\_\_\_\_  
 (WRITE OR PRINT CLEARLY)  
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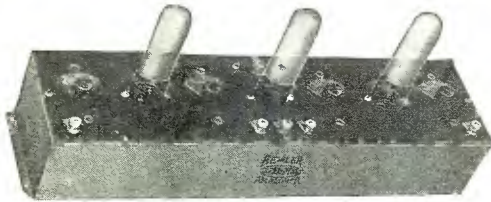
RCB 12

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

# REMLER

## INFRA-DYNE

# AMPLIFIER



## Dominant in 1927 Radio

The Remler Infradyne Amplifier is now the big, outstanding success of the Radio Season. From Maine to California it is demonstrating that it does give extraordinary results—either as part of the Sargent Circuit or as an addition to any tuned radio frequency or neutrodyne set.

### A Milestone

This Amplifier is a definite milestone in radio research. It makes the best results of a year ago seem ordinary. Radio enthusiasts—men who demand exceptional results—are making it the dominant favorite of 1927 radio.

### Amplification at 86 Meters

Multi-tube amplification at a fixed short wave length of 86 meters is responsible for this phenomenal success. Write us for complete instruction booklet and two-color descriptive folder. You won't be satisfied until you get the results that the Remler Infradyne Amplifier is giving to thousands of others.

Price \$25.00

# REMLER

Division of  
Gray & Danielson Mfg. Co.  
260 First Street

Chicago

San Francisco

New York

(Continued from Page 123)

fers. Due to this fact, it stands to reason that greater volume and selectivity will be available than heretofore supposed possible. It then follows that distant stations will be more readily received during favorable and unfavorable conditions and considerable more volume on all stations than is usual in the ordinary methods of amplification.

Fig. 1 shows a schematic wiring diagram of the complete receiver. A standard tuned radio frequency circuit of the non-oscillating type, tuned by a triple gang condenser, is used before the detector. The audio frequency of the receiver is of standard transformer coupled type.

Fig. 2 is a graphic illustration, showing in pictorial manner all the necessary connections for properly wiring the receiver. Photograph "A" is a rear view of the completed receiver removed from the cabinet. It will be noted the simplicity and the symmetrical arrangement of the various parts and the unusual absence of unsightly wiring.

As we go to press, Mr. Sargent, inventor of the Infradyne, writes that Silver-Marshall 220 audio transformers are his final selection for the Infradyne. Needless to say, these transformers as well as the S-M No. 110 oscillator coupler and the S-M midget condensers also selected by Mr. Sargent can be satisfactorily substituted in our model of the Infradyne.

### LIST OF PARTS

These parts or their equivalent will give satisfactory results:

- 1—7x28x3/16-inch Insuline Panel
- 1—8¾x27x3/16-inch Insuline Sub-Panel
- 1—Remler Type 700 Infradyne Amplifier
- 1—Remler Type 630 .0035-mfd. Variable Condenser
- 1—Gardner & Hepburn or Cardwell .00035-3-gang Variable Condenser
- 1—Weston Model 506, Type 217 O-7-140 Voltmeter
- 1—Pair Karas Shelf Brackets
- 1—Benjamin Type 9040 UX Cushion Sockets
- 1—Yaxley Double Circuit Jack. Pup Model
- 1—Yaxley Single Circuit Jack. Pup Model
- 1 Set Camfield Type 22K Duoformers
- 2—Amertran De Luxe Audio Frequency Transformers or
- 2—Silver-Marshall Type 220 Audio Transformers
- 2—Kurz-Kasch Aristocrat Vernier Dials
- 1—Jones Type BM Multiplug
- 2—10-ohm Electrad Rheostats
- 6—Frost No. 530 UX Sockets
- 1—Frost Type 608 Filament Switch
- 1—200,000-ohm Electrad Variable Resistance
- 1—50,000-ohm Electrad Variable Resistance
- 1—Electrad .00025-mfd. Grid Condenser with Prongs
- 2—Electrad .0005-mfd. Fixed Condenser
- 1—Electrad Grid Leak Mounting
- 1—Electrad 2-megohm Grid Leak
- 1—Electrad 1-megohm Grid Leak
- 2—Sangamo 1-mfd. By-Pass Condensers
- 2—Silver-Marshall 25-mmf. Midget Condensers
- 1—Silver-Marshall No. 110 or Camfield No. 23 Oscillator Coupler
- 1—No. 112 Amperite
- 1—No. 1-A Amperite
- 1—No. 1 Amperite
- 3—Amperite Mountings
- 5—Eby Engraved Binding Posts
- 2 Dozen No. 6x1-inch R. H. Br. Mach. Screws
- 2 Dozen No. 6x½-inch R. H. Br. Mach. Screws
- 1 Dozen No. 6x½-inch Flat Head Br. Mach. Screws
- ½ Dozen No. 5x1-inch Flat Head Br. Mach. Screws
- 1 Dozen No. 6x¼-inch R. H. Br. Mach. Screws
- 100 Kellogg Tinned Soldering Lugs
- 50 Feet Belden No. 12 Copper Tinned Wire

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



Famous Orchestration Horn Speaker

THE PEER OF THEM ALL  
**ORCHESTRION**  
 LINE OF ALL WOOD  
**Radio Loud Speakers**



Orchestration Console Speaker

**Bigger Values, Better Efficiency, Greater Beauty**

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Known the World Over for Clarity of Tone, the All-Wood Orchestration is admittedly the peer of all Loud Speakers.

**Now**

Because of quantity production this wonder reproducer is offered

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and is the greatest quality value ever offered.

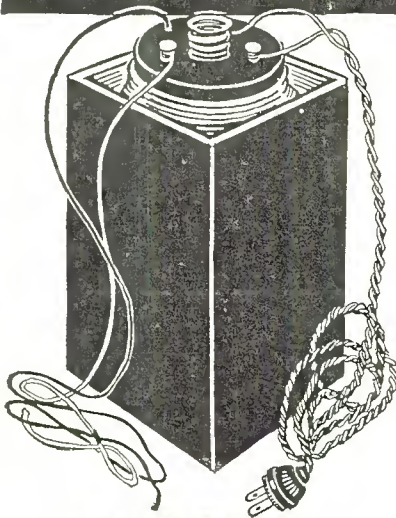
Your Inquiries Solicited

**Now Comes the Orchestration Console Model Speaker**

A fitting companion in Beauty, Tone Quality and Radio excellence to the horn model, the ORCHESTRION CONSOLE SPEAKER is a beautiful piece of furniture PLUS the FAMOUS ORCHESTRION TONE ARM AND UNIT, reproducing true tones with sweetness and clarity and ample volume. Rigidly and permanently built of five-ply sliced Walnut, beautifully finished, it is 36 inches long, 30 inches high and 15 3/4 inches wide, giving ample room on which to place even the largest table-type radio receiving sets. Cabinet space ample for batteries, socket power units or charger. Priced at **ONLY \$35.00.**

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**"A" & "B" Charger**



**PROOF!**

"Received your charger and am very much pleased with it. It certainly does charge up a battery in quick time."

S. S. JEFFRIES, St. Louis

"The charger I received from you is giving entire satisfaction."

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"I have seen no charger that I prize as highly as I do this one, and I don't see how it can be put out at such a low price. I am having great success with it."

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"The charger certainly does the work."

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**SATISFACTION GUARANTEED**

WHAT? A practical A and B Battery Charger for only \$2.00? Yes? And what's more, it is guaranteed to work to your complete satisfaction—to give a full, complete charge to any type of storage A or B Battery, or you don't pay a penny.

**Why Buy \$10 and \$15 Chargers?**

This amazing R. B. Battery Charger has won its way to popularity overnight. For it does the work as well as the \$10.00 and \$15.00 chargers, and yet costs but a trifling sum. A few cents worth of ordinary house current—either alternating or direct—and your batteries are strong and fresh and powerful again. Positively guaranteed not to injure any battery.

**Order Direct from Maker—Mail Coupon**

Simply sign the coupon and mail it to us at once with \$2.00 (bills, money order, check, or postage). Add 10c in stamps or coin to pay mailing cost. The charger, complete, will be sent to you postpaid. Use it for five days. See how it works on your own batteries. If you're not delighted with the results, return it, and we'll send back your money. Thousands of radio fans have taken us up on this straightforward, iron clad, money-back guarantee—and now they write us letters of praise. You will, too. Mail this coupon to us today.

**Made by Radio Inventor for Long Service**

The R. B. Charger is scientifically constructed with a top of molded Bakelite. Easy to handle. Hooked up in a moment. Any one can operate according to simple, complete instructions. Many radio fans find this wonderful invention a tremendous success as a trickle charger.

**R. B. Specialty Company**

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**\$ only 2.00**

**No Expensive Extras to Buy—Comes Complete**  
 Positively no expensive "extras" to buy. Just hook it up and watch it work.

R. B. Chargers are not sold in stores. They are distributed only by the manufacturers. They can be obtained only from advertisements like this. Our direct-from-maker-to-you plan of selling explains this astonishing low price. Mail the coupon for your charger now. Satisfaction guaranteed, so you take no risks whatever. Reference: The Pearl Market Bank, Cincinnati.

R. B. Specialty Co.,  
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 Cincinnati, Ohio.

Please send A & B Charger, complete, at once. I enclose \$2.00 (plus 10c postage). If not satisfied I may return charger within ten days and my money will be refunded.

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Town.....State.....

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

Blueprints of Tested Circuits  
Monthly Corrected Broadcast Station List  
Many Other Features

You are not getting the utmost out of radio reading unless

# RADIO AGE

*The Magazine of the Hour*

The Original Blueprint Magazine  
(Established 1922)

is handy to your work bench or receiving set. A magazine for the broadcast listener as well as the experimenter.

There are more angles to the radio game than facets on a diamond. You have not covered the field until you have read the conservative Radio Age. Regardless of the number of magazines you may buy, you are passing up an opportunity of getting another viewpoint if you fail to get this magazine every month.

In every issue there are plenty of hook-up articles, a blueprint section, a complete and always up-to-the-minute list of broadcasting stations; some of the lighter aspects of radio; a readers' forum where ideas are exchanged, all carefully edited with a view of giving safe and sane information to our readers.

Twelve issues a year for \$2.50. **Special rate on two years' subscription, \$4.00, and three years' subscription, \$5.00.**

**-Send in your subscription today-**

Radio Age, Inc.,  
500 North Dearborn St.,  
Chicago, Ill.

**\$2.50 a Year**

Gentlemen:

Please enter my subscription for RADIO AGE, the Magazine of the Hour, for <sup>One</sup><sub>Two</sub><sub>Three</sub> year(s) beginning with the

.....issue, for which I enclose <sup>\$2.50</sup><sub>4.00</sub><sub>5.00</sub>. (Please underline subscription term desired.)

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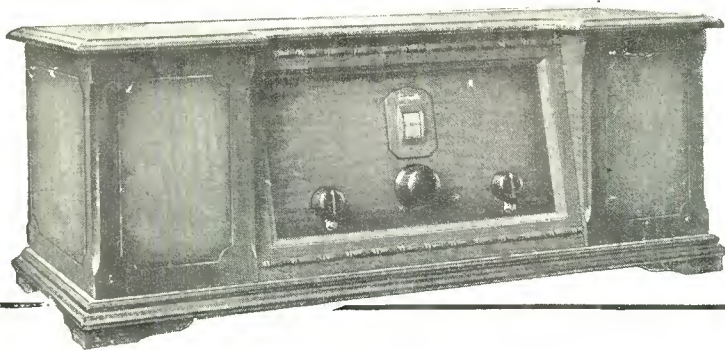
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City.....State.....

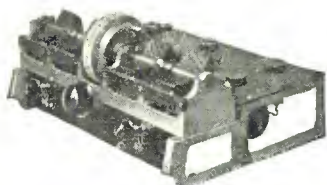
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*Tell 'Em You Saw It in the Citizens Radio Call Book*



# Announcing the SIGNOLA Radio Receiver

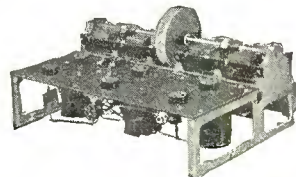


This is the front view of the Signola Radio Receiver chassis. Note the sturdy construction which prevents parts getting out of adjustment.

**C**HASSIS is cast aluminum. Six tubes operate in full floating sockets. Transformers are matched and synchronized tuning units permit absolute single control. Unit is encased in a handsome two toned walnut cabinet, lacquer finished.

All of our thirty years' experience in designing and constructing electrical transmitting and receiving apparatus is built into the Signola Radio Receiver. Absolute uniform reception on upper and lower wave lengths. Volume and unusual clearness are just some of the outstanding qualities which are best appreciated when you hear the set in operation.

Have your radio dealer demonstrate a Signola in your home. If he hasn't one on hand, ask him to write us at once. Circulars and further details on request.



The rear view of the Signola Radio Receiver chassis showing the six full floating sockets so important to efficient tube operation.

**Branch Offices**

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| Boston       | Minneapolis   |
| New York     | San Francisco |
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**SIGNAL ELECTRIC MFG. CO.**

Manufacturers of Signal Fans, Telegraph Instruments, Bells, Buzzers, Wireless Practice Sets and Radio Parts

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Menominee, Mich.

**Jobbers and Dealers**

The Signola Radio Receiver is designed for discriminating buyers. If your customers want a set that works and works well all of the time, stake your reputation on this set. Get the facts today.

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The Wonder Set Of The Day!  
Featured In Our Latest Catalog  
FOR DEALERS ONLY**

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Quality radio merchandise at astonishingly low prices. Sets, kits, parts, cabinets, consoles—everything new and good in radio for immediate shipment.

**You Can't Afford To Be Without This Catalog**

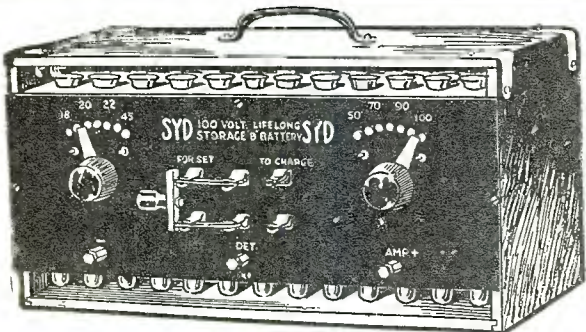
Every live radio dealer needs this book—the most complete radio catalog ever compiled.

**FREE** Send for a copy today. Write on your business stationery.



**COLUMBIA RADIO CORP.**  
711 West Lake St. Dept. 316 Chicago, Ill.

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



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, 7 1/2 inches high and 6 1/2 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.**  
1452 1/2 South Wabash Avenue Chicago  
Mail Orders Filled Promptly

Slightly higher west of Rockies and Canada

# SYD 100 VOLT LIFE LONG SYD STORAGE "B" BATTERY

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—

- 100 Volts**  
Complete with Charger  
**\$15.50**
- 145 Volts**  
Complete with Charger  
**\$21.50**

### 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 electrolyte 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. Over-charging or heavy loads, even short circuits, have no effect on the life of the battery.

The Syd battery consists of ninety-one Edison cells mounted in a cabinet. Each cell delivers 1.5 volts at full charge. The bakelite front panel has a voltage selector switch and various binding posts which make it easy to obtain voltages from 16 to 100 volts. The battery unit is 14 inches long, 7 1/2 inches high and 6 1/2 inches wide. It weighs eighteen pounds.

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Now is the opportunity to secure radio's newest creations, to build for yourself any of the new, up-to-date circuits, at bigger savings than ever before. You want the latest. We have it—bargain prices, too.

**164-Page Guide Free.** To everyone writing us we will mail free the new 1927 Barawik Radio Guide. It shows 164 pages of everything for the radio fan—complete factory-built sets, speakers, batteries, tubes, accessories, new devices and complete parts for every known circuit, including the newest in amateur equipment—a new Dept. directed by F. J. Marco, 9ZA. Never in the history of radio has such a tremendous collection of radio supplies been assembled.

## BARAWIK CO.

540-570 Monroe St., CHICAGO, U. S. A.

Choose with Confidence

**World Radio Storage "B" Battery**  
12 Cell—24 Volt

275

**WORLD BATTERY COMPANY**

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Makers of the Famous World Radio "A" Storage Battery  
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In building your "A" or "B" Eliminator it is absolutely necessary to use the finest condensers. Even if the other parts are the best to be had, good results are impossible if the condensers are not equal to their job.

Potter Filter Condensers are made with the best foil, best insulation and best impregnating compounds obtainable. They take the kinks out of current, remove all traces of A.C. impulses, eliminate all hum. They stand up longer under continuous use.

Made in 3 types: Type A, tested 300 Volts D.C.; Type B, tested 500 Volts D.C.; Type C, tested 1000 Volts D.C. Each type comes in all capacities.

There is a Potter Filter Condenser to Fit Every Specification

At your dealer's  
If he cannot supply you, write direct to us

# Potter FILTER Condensers

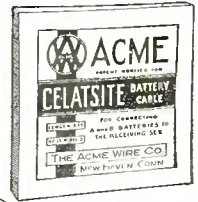
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—a silk-covered cable of various colored Flexible Celatsite wires, for connecting batteries to set. A color for each terminal. You know whether you have the right connection or not.

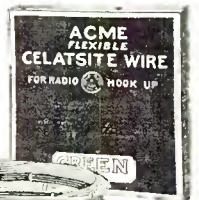
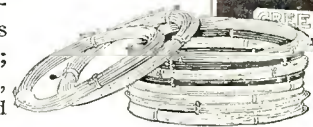
Prevents "blowing" of tubes and gives set an orderly appearance.



Does Away With Tangled Wires

### FLEXIBLE CELATSITE

Flexible Celatsite is a flexible, stranded wire for point-to-point and sub-panel wiring. It has a non-inflammable "spaghetti" covering that will not ignite from a hot soldering iron. Strips clean. 5 colors; black, yellow, green, red and brown; a color for each circuit. In 25-ft. coils; individual boxes.



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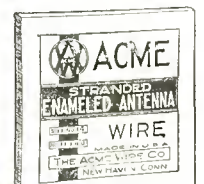


—a tinned, copper bus bar wire for wiring sets. Has non-inflammable "Spaghetti" covering (same as our Flexible Celatsite) over No. 14 wire. Is smaller than "spaghetti" over bare wire and makes a neater job. Black, yellow, green, red and brown; 30-inch lengths. We also offer highest grade "spaghetti" tubing for Nos. 10 to 18 wires. Same five colors; 30-inch lengths.

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Write for Folder "C"  
It describes all these Acme products in detail and gives hints on soldering.

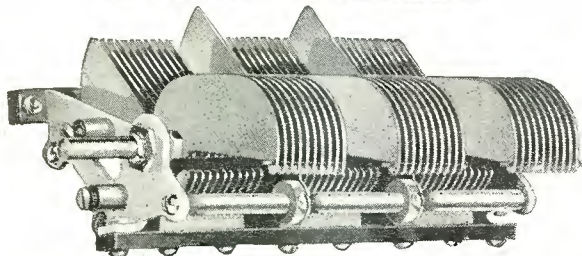


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## ACME WIRE MAKES BETTER RADIO

# CONTINENTAL LO LOSS

Recommended by  
**E. M. SARGENT**  
for the



Capacity .00035

**Price \$9.50**

At Most Reliable Dealers—  
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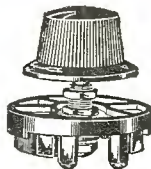
It is the only condenser used in Infra-Dyne Circuit that has an adjustable balancing feature. Furthermore, Continental Lo Loss is the one instrument licensed under Hogan Patent No. 1014002 to be found in Infra-Dyne receivers.

**GARDINER & HEPBURN, Inc.**  
611 Widener Bldg., Philadelphia

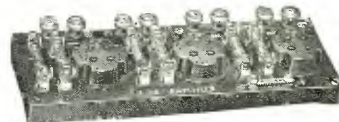
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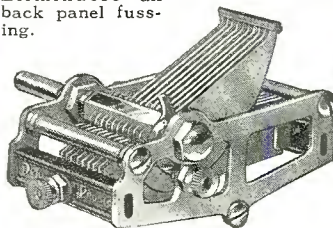


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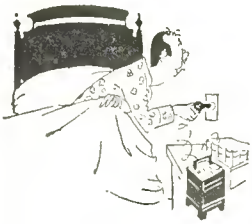
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*when you keep power in your set with*

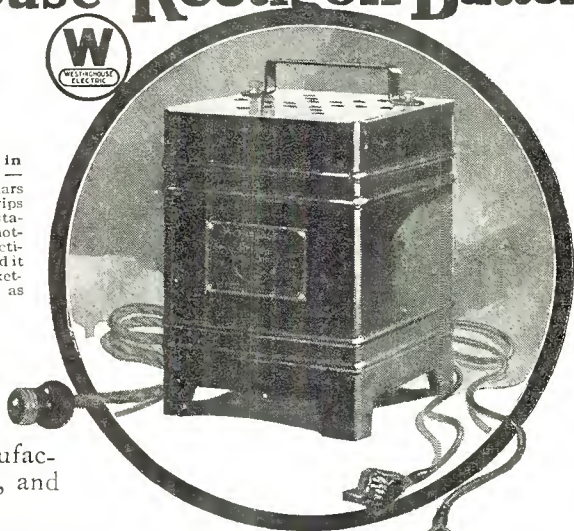
## The Westinghouse Rectigon Battery Charger



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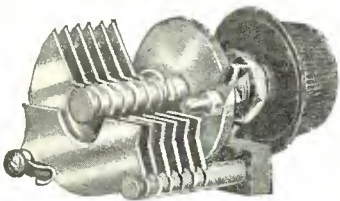
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No Storage Battery Radio is Complete Without a Rectigon

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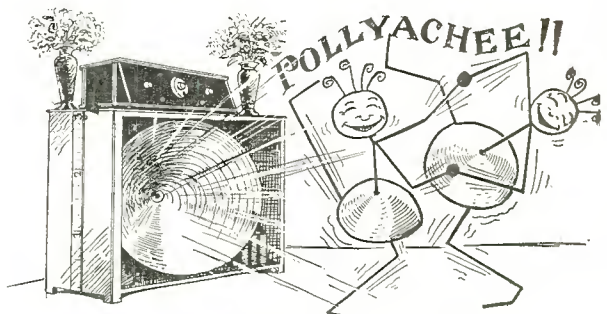
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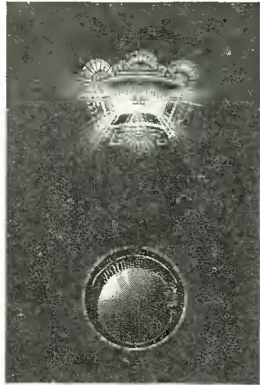
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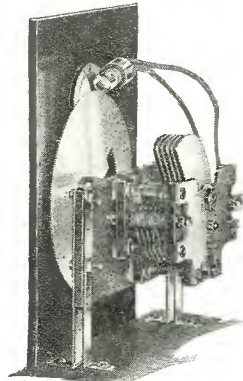
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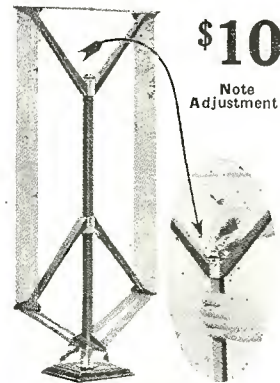
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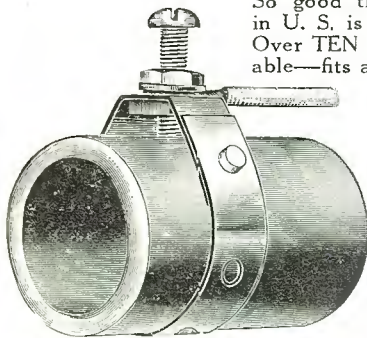
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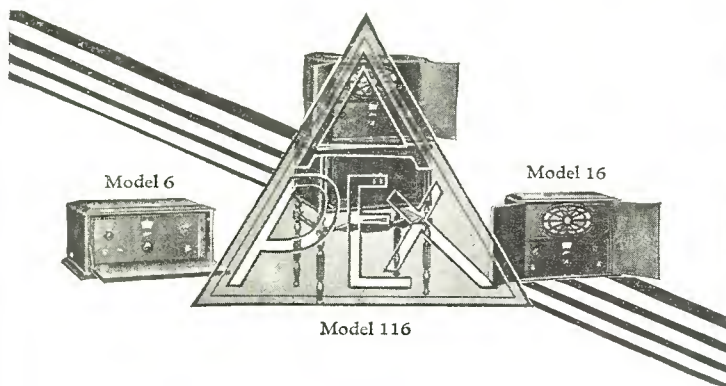
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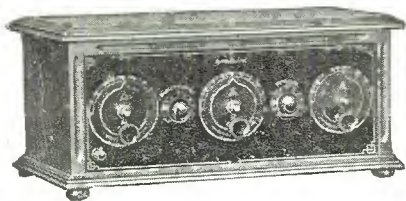
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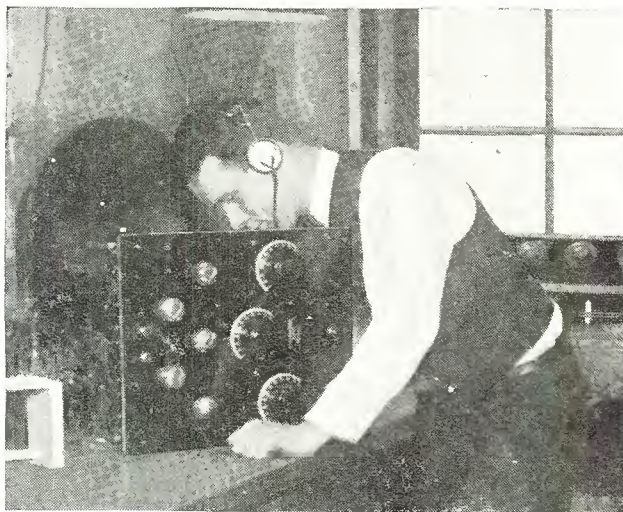
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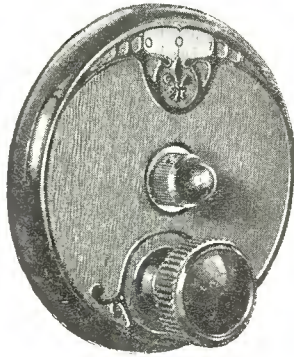
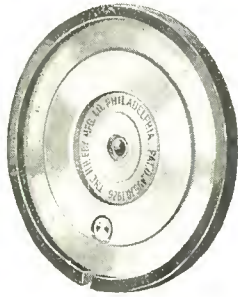
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A complete metallic shield forms the back of this new dial and minimizes the effect of body capacity. When the hand is removed the set stays tuned to the station coming in when your hand was on the dial.

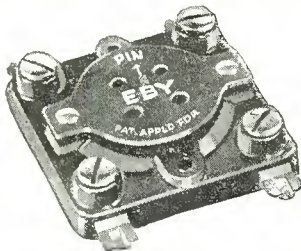
# EBY SHIELDED DIALS

Completely shielded by its metallic back, this dial minimizes the effect of body capacity and improves the appearance and performance of any set. Sensitive and finely constructed, it makes accurate tuning possible and keeps the instruments set even after your hand is removed from the dial.

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No gears or washers to wear out. Smooth, noiseless, sensitive action, obtained by an anti-backlash friction drive and non-microphonic construction. List \$2.50.

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Assure a positive three-point wiping spring contact at all times. When the tube moves the contact actually gets tighter and checks the jar. After all, it is only a matter of common sense—everybody knows that this is the most scientifically perfect type of contact known.

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Tested and endorsed by all leading authorities and engineers. A. C. set complete in one cabinet, the latest and best in radio. Sold on a money back basis.

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**You, Too, Can Make Electric Sets**

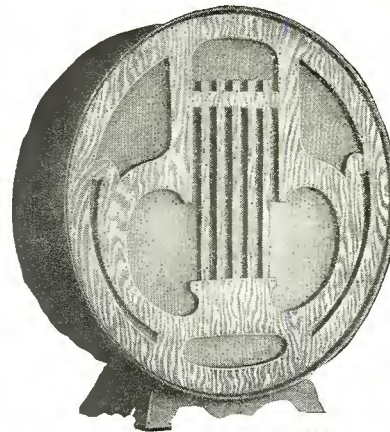
Send \$1.00 for "Powerola Power Circuits," our booklet; contains 29 new diagrams and instructions, showing power parts used, and how to build or re-wire radio circuits, sets and parts at small cost, to operate, hum-free and successfully, from A. C. or D. C. power mains, without A and B batteries, chargers, chemicals, etc. System is now being used and copied by big manufacturers, and is fundamentally correct and time-proven. Invaluable for the service man, set builder and trade-ins.

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**Drum Loud Speaker**



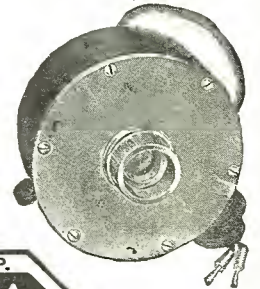
Artistically designed to grace the most beautifully-appointed living room. Operetta's advanced principles of acoustics sets a new high standard for radio reception. This new speaker represents the utmost in workmanship and the development of sound values, and produces a mellow tone of extreme clarity, entirely free of distortion. Compare the Operetta by actual test with the most expensive instruments. Drum is of aluminum finished in either Tuscan bronze or gold crackle.

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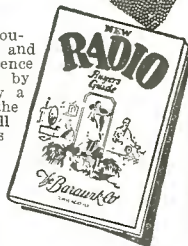
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For Testing 6 volt Storage Battery.



3/4 Size

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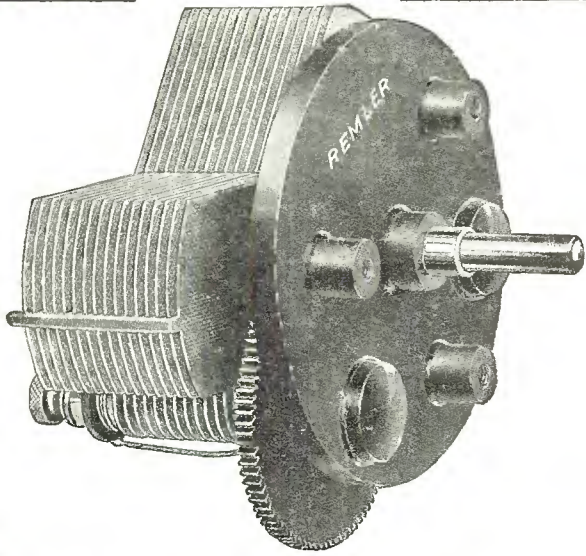
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Worcester Mass.

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



# Remler TWIN ROTOR Condenser

## SO GOOD

that your set certainly deserves it

Tuning is vitally important in the performance of your radio set. Condenser efficiency is the key to results which may improve the reception of your present set a full 100%. The ordinary run of condensers cannot give the tuning efficiency you demand. Why not replace them with Remler Twin-Rotor Condensers and get all the performance of which your radio set is capable.

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In this type equal divisions on the 360° dial represent equal frequency bands. A special adjustment permits variation of the minimum capacity over a limited range without any change in the maximum capacity. This allows the lowest wave length station to be so located that the entire dial is used in covering the broadcast range.

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- No. 649—.0005 max. less dial..... 4.50
- No. 659—.0001 max. less dial..... 4.50

### STRAIGHT LINE WAVE-LENGTH

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- Dial complete, .75

# REMLER

Division of  
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Chicago

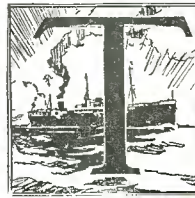
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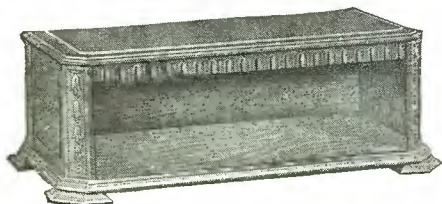
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The Choice of Leading Engineers

when showing their new hookups. Regarded by the trade as the finest Radio Cabinets made.

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SOLID WALNUT

Made in all standard panel sizes, from 18 in. to 30 in. Inside depth 12 in. Inside height 8 in.

Identical in outer design and finish to the Standard Super. Has Instrument Panel Door with Diamond Insert of genuine Burled Walnut—Handle, Antique Brass. Top Panel strip (back of door) has Inverted Panel Lighting, an exclusive feature on Fritts Cabinets only.

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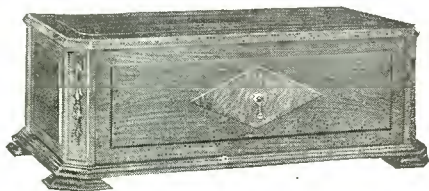
Our line also includes Consolettes and Radio Tables. Descriptive leaflets and prices upon request.

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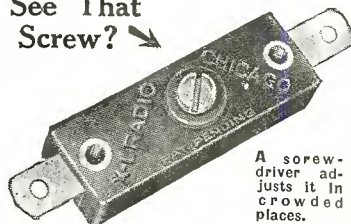
SOLID WALNUT

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A screw-driver adjusts it in crowded places.

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Results in easier tuning, more distance, volume and clarity—greater stability. Indorsed by leading authorities.

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Push it down with your thumb, insert wire, remove pressure and wire is firmly held. Releases instantly. Price 15c.

**X-L PUSH POST PANEL**  
permanently marked in white on black insulating panel. In box, including soldering lugs, raising bushings and screws for mounting, etc. Price \$1.50.



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**BURTON-ROGERS COMPANY**

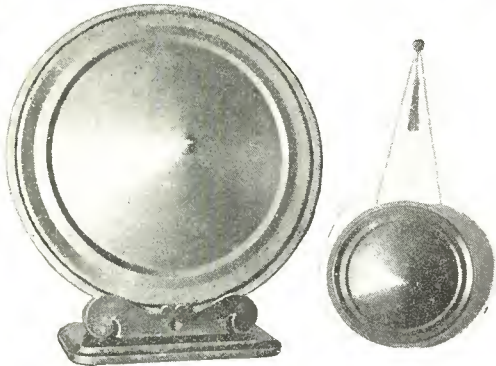
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*The scientific curve of sound reproduction*



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TWO MODELS—EACH THE BEST OF ITS TYPE



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14 1/2 inches

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

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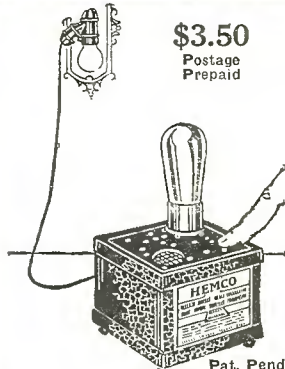


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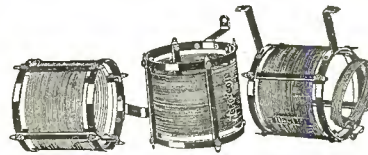
# AERO COIL

## SUPER-SENSITIVE INDUCTANCE UNITS

*The most important factors in set performance*

Aero Coils are the perfect supersensitive inductance units! Due to their special patented construction, high frequency resistance is reduced to a minimum. Hence Aero Coils are capable of greater volume, and are sensitive to all the radio frequencies, thereby correcting the real cause of distortion, impossible to correct with other types of coils. But more! No dope is used. So if you are interested in better performance from any set, be sure to build with Aero Coils.

### Tuned Radio Frequency Kit



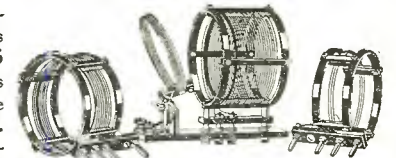
Price.....**\$12.00**

The Aero Coil Tuned Radio Frequency Kit illustrated above will positively improve the performance of any receiver. Patented Aero Coil Construction eliminates radio frequency losses and brings tremendous improvement to volume, tone and selectivity.

Kit consists of three matched units. The antenna coupler has variable primary. Uses .00035 condenser. Eight-page color circuit, layout and instruction sheet for building the supersensitive 5 tube Aero-Dyne receiver packed with each kit. Extra copies, 75c each.

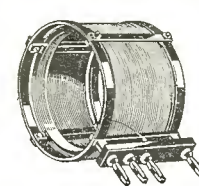
### Low Wave Tuner Kit

Completely interchangeable. Adapted by experts and amateurs. Range 15 to 130 meters. Includes three coils and base mounting, covering U.S. bands 20, 40 and 80 meters. You can increase the range of this short wave tuner by securing coils No. 4 and 5. Combined range of 15 to 550 meters. Both interchangeable coils fit same base supplied with short wave kit and use the same condensers. Coil No. 4, price \$4.00; Coil No. 5, price \$4.00.

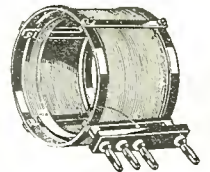


Price.....**\$12.50**

### Aero Interchangeable Coils No. 4 and 5



Increase range of your short wave tuner by securing coil No. 4 and coil No. 5, combined range 125 to 550 meters. Both interchangeable coils fit the same Aero base supplied with the



short wave kit, and uses the same condensers.  
Coil No. 4—Range 125 to 250 meters.....**\$4.00**  
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### Other Supersensitive AERO Inductance Coils

There is an Aero Coil for every inductance requirement. In addition to these described above we make the following coils: Aero 3 Circuit Tuner, \$6.50. Aero Radio Frequency Regenerative Kit, \$10.00. Aero Low-Loss Antenna Coupler, \$4.50. Aero Oscillator (for Superheterodynes), \$5.50. Aero Wave Trap Unit, \$4.00.

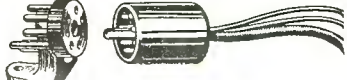
You can get any or all of these coils from your nearest dealer. See him TODAY.

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(Pacific Coast Representatives)  
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377 Brannan St., San Francisco, Calif.


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



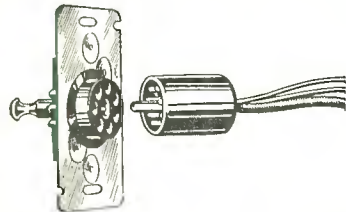
PM socket only.....\$0.80  
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BP socket only.....\$1.80  
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 BP Multi-Plug, 4' only..... 2.20  
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THE STANDARD SET CONNECTOR

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## CONSTANT POWER FOR THE "A" CIRCUIT ON YOUR RADIO

Using **SILITE**  
*the Wonder Rectifier*  
**PRACTICAL EFFICIENT NOISELESS AND ECONOMICAL Beyond Belief**



Sets requiring 6 volts operating on 110 volt 50-60 cycle house lighting current ..... **\$27<sup>00</sup>**

Costs only 1/15 cent per hour to operate. No tubes or parts whatever to replace. Fully guaranteed.

Other sizes and types to meet all requirements.

It's remarkable the difference a CONSTANT POWER makes in a radio receiver. It operates your tubes always at their maximum efficiency. Stations roll in with greater power and more volume—a sweetness of tone that was formerly possible only when your battery was at full charge. Positively no hum or distortion and is not affected by variations of line voltage, as the current is actually supplied by a quality storage battery, which in turn is automatically kept at full charge by the marvelous SILITE system of rectifying the house current.

**Radio-Rubr Storage Battery Corporation**  
 2012-14 Locust Blvd. St. Louis, Mo.

Your Dealer Has It  
 If not, have him write us, or write direct.

# Radio Dealers:

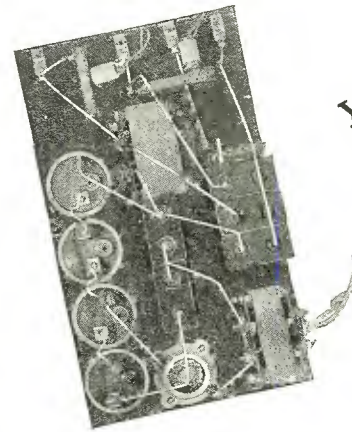
We furnish all the parts for the following circuits described in this magazine:

- Remer-Tully Power Six Receiver
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- Name the circuit, we have the parts.

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## THE BEST B-UNIT

Low in Cost  
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Quality  
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Power

THE "Molliformer" "B" Unit  
Guaranteed

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Anyone can assemble either model "Molliformer" in an hour or two with perfect success. Detailed building instructions with each kit make assembly simple and sure.

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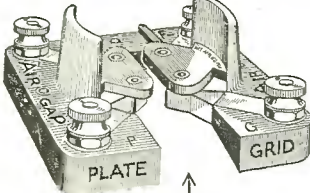
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Units for 23 and 40 cycle current \$2.00 additional.

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UX Type, 60c



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## The AIRGAP SOCKET

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Selected for "The Fenway" because of the gap which reduces capacity so low, compared to other sockets that it makes a surprising difference in reception.

The difference on lower wave lengths within the broadcast range will surprise you.

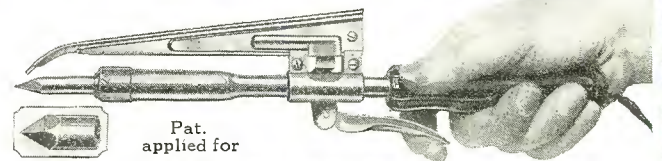
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Pat. applied for

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A great invention. Indispensable for all kinds of soldering work. Convenient, simple, economical. One hand does the work of two. Made with removable tip— $\frac{3}{8}$ " and  $\frac{3}{4}$ " round, making it adjustable for light or heavy work. Trigger Press-to-Feed attachment takes all sizes of solder wire. Operates on either D. C. or A. C. 110 to 115 volts, 50 watts. Attachments are made to fit all leading makes of electric soldering irons.

Price complete with Press-to-Feed attachment .....\$3.50  
Attachment only, \$1.50

### Radio Work

requires this iron. Gets into tight places with ease. Speeds up radio set building.

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164 PAGES—NEW EDITION

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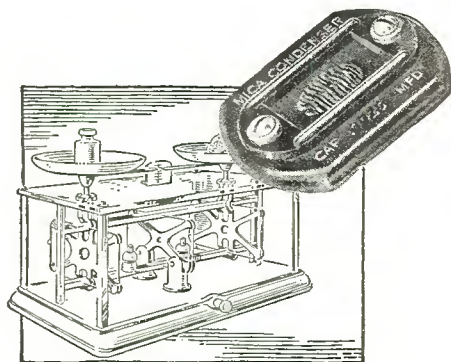
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A. C. L.

TECHNICAL men were quick to appreciate Sangamo condensers in intermediate capacities. One engineer, well known to readers of radio publications—Austin C. Lescarbourea—sends us the following characteristic comment, which is published with his consent:

“In my laboratory we develop new circuits and variations of old circuits, publishing the results in radio magazines. Needless to say, we are using and specifying Sangamo condensers throughout. In my opinion there is no other fixed condenser that can compare with the Sangamo in accuracy, permanent capacity value, neatness and handiness.

“The Sangamo condenser weighs out just the right capacity as the apothecary weighs out a precious drug.”

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### Mica Condensers

are made in 34 sizes, ranging from 0.00004 mfd. to 0.012 mfd. Sangamo Wound Condensers are ready in capacities from 1/10 mfd. to 4 mfd.; Series A guaranteed for continuous operation at 250 volts A.C., 400 volts D.C.; Series B guaranteed at 500 volts A.C., 1000 volts D.C.; also 12 and 14 mfd. block.



Sangamo Electric Company

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Springfield, Illinois

RADIO DIVISION, 50 Church Street, New York

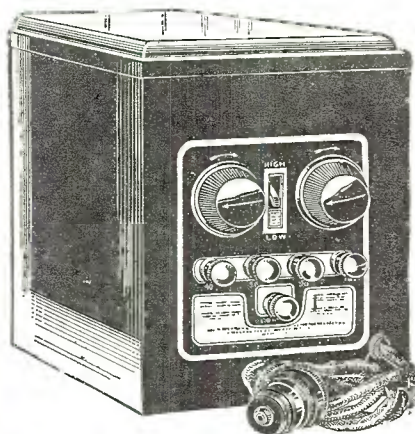
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# Genuine RAYTHEON “B” Battery Eliminator

\$50 Value  
 Our Price  
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**\$22<sup>95</sup>**



Capacity  
 50 Milliamps  
 200 Volts  
 Adequate  
 for 1 to  
 15 Tubes

## Positively the Greatest Value in “B” Eliminators

While the regular market price of Raytheon is around \$50.00, our factory-to-you price is only \$22.95. At this price, everyone can afford to own a Raytheon and forever discard his B batteries. A “B”-eliminator enables you to draw your B current from the light socket. There is more uniform and constant power, no more battery replacements, more volume, improved tone quality, positive regulation of voltage, and absolutely NO HUM. By stopping battery replacement, Raytheon pays for itself.

### CANNOT DETERIORATE WITH USE—NOTHING TO WEAR OUT!

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The materials used in making the Raytheon are the finest unit parts, laboratory matched; the case with its rich, genuine Brewster Green Duco finish; the metal fittings of polished nickel; the genuine RAYTHEON tube. Comes completely wired and ready to use from 60-cycle, 110-volt alternating current. The filtering system with its extra capacity, 1000-volt test condensers, and massive, over-size 40-Henry chokes smooth out every ripple and hum from the alternating current. There is nothing to deteriorate, wear out, or replace; Raytheon is good for a lifetime of service, and fully guaranteed. Capacity, 50 milliamps up to 200 volts for 15-tube sets or less.

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Send C. O. D. I will pay \$22.95 and charges.

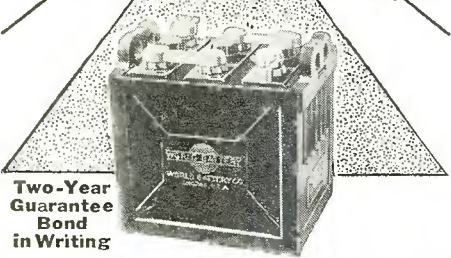
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Approved and Listed as Standard by Leading Authorities including Radio News Laboratories, Popular Sci. Institute Standards, Pop. Radio Laboratories, Radio Broadcast Laboratories, Radio in the Home and Lefax, Inc.

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Just state number wanted and we will ship same day order is received, by express C.O.D. Pay expressman after examining batteries. 5% discount for cash with order. Remember, you save 50% on World Batteries—so send your order today.

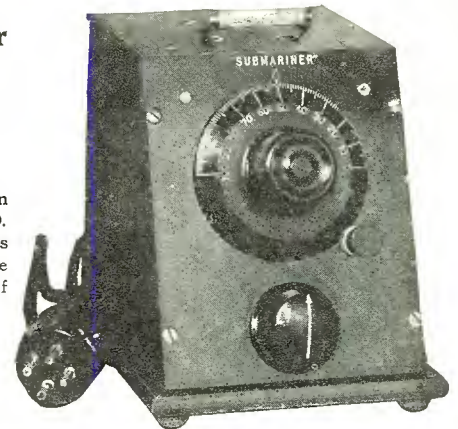
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Dept. 26  
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Jerry Sullivan, Dir. and Announcer "Chl-CAW-go"

## Changes Your Set Into a Low Wave Receiver

Sent postpaid upon receipt of \$15 M. O. —or C. O. D. plus postage. State name of set and type of tubes you use.



## The "SUBMARINER"

Converts any set, regardless of make or number of tubes used, into a high class low wave tuner, with which you may experience the thrill of listening to voices from all parts of the world on low wave lengths. No changes necessary to your present set.

**EVERYWHERE A SENSATION**

No jumble of stations on low waves—no disagreeable noises—practically no static. Learn code by listening to amateurs from all parts of the world. Comes ready to attach; no extras needed. Just plug in and you have command of the low wave lengths. Operates as a wave changer in super-heterodynes. Connected and disconnected instantly. Order today.

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## BURNS B-POWER

The Eliminator you have been waiting for. Delivers always the same correct plate voltage. Operates from house lighting current. No acids, no hum. Small, neat case.

Price with tube—\$45.00

Kit sets also furnished for those who wish to build their own eliminator.

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It will pay you to get our prices for complete parts for the popular circuits featured in the Call Book and other radio magazines. Whenever a new circuit appears for which you want complete parts, write or wire us and they'll be on their way to you quickly. We guarantee you a big saving on every order.

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This is the finest receiver ever designed for the home constructor and if specifications are followed will result in the equivalent of a factory made product of the finest design.

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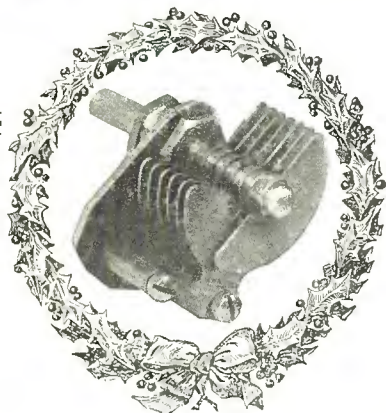
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Tell 'Em You Saw It in the Citizens Radio Call Book

# Cardwell Condensers



## The Cardwell "BALANCET"

Type 609-A  
Cap.—.000033  
Price \$1.25

# Specified for the Best Receivers

THE Sixth Christmas of the Cardwell Condenser finds its popularity undimmed, and during these years it is the only condenser whose basic design has not been radically changed.

During this period, editors and engineers have fallen into the habit, when quality is the only consideration, of invariably specifying "Cardwell."

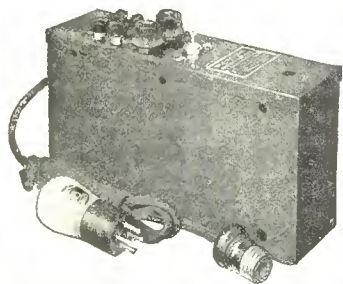
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"THE STANDARD OF COMPARISON"

Write for Information  
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# NEW DEWITT-LAFRANCE SUPERADIO ELIMINATORS

## Powerful—Silent "A" "B" "C" Supplies Positively No Hum

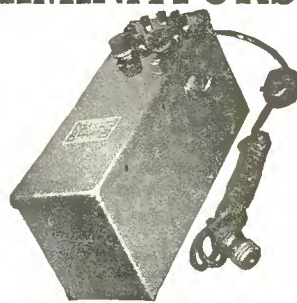


Model "E" and "G" (Tube Type)

Model E taps Neg., Var. Det., Var. Int., and Amp.  
Model G taps Neg., Var. Det., 2 Var. Int. and Amp.  
Output low: 35 Mil at 90 v.  
Output high: 45 Mil at 135 v.

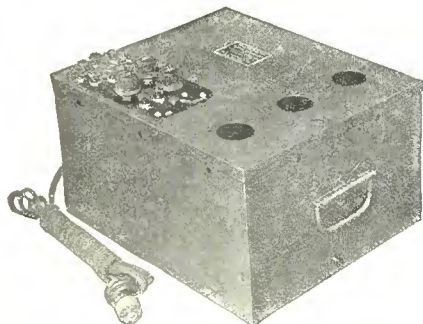
Price, Model E.....\$35.00  
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We manufacture our own rectifier tubes and supply manufacturers, jobbers and dealers.



Models "A" and "C"  
Designed for use with Radiola Receivers.

Size—Case only 12½" long x 4¼" wide x 5½" high.  
Size—Overall 12¾" long x 5" wide x 6⅝" high.  
"B" Supply Taps Detector 0-80 volts variable, 45 v., 67 v., 90 v., 135 v.  
"C" Supply Taps 4-, 9-, Variable 0-40.  
Maximum Output 180 v. at 60 milliamperes.  
Model "A".....\$42    Model "C".....\$47  
*Model C is equipped with a master control which regulates all voltage.*



Model "F"  
SUPERADIO Power Unit  
Model "F" consists of a Model "C" Eliminator, complete wiring and compartments for a G. E. Trickle Charger and a storage "A" Battery up to 10½" x 7" x 4⅝" in size. Such as Philco No. UD86. Auxiliary switch with 10 feet of cable and a C.E. master switch for controlling all units.  
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The SUPERADIO DYNOMETER is direct reading and will tell you how good your tubes are, how you can use them and where. You can get an engineer's result without experience, tubes being tested at the rate of 3 per minute. True Dynamic readings are obtained with Laboratory accuracy. List price with phones and plug..... **\$120**



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Cambridge, Mass.

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

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## You Can

Pick out the program you want without getting interference from other nearby stations with a better tone and plenty of volume by using an

## Austin Aerial

Cuts out the local noises sometimes mistaken for static;

Makes your radio easy to tune;

Receives equally well in all directions; Will not pick up hum from electric lines;

Easily installed on your own property; Clarifies the tone; Guaranteed.

Size 8x24, scientifically designed with a low-loss coil, furnished complete with base, 10 ft. standard and lead-in wire.

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**THE TRIANGLE ELECTRIC**  
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164-  
Page  
Radio  
Guide  
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**Make a Good Receiver Better**

**CeCo**

**A Type for Every Radio Need**

## Try These CeCo Developments Endorsed by Radio Authorities



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"CeCo" type "F" corresponds to UX-112 and is a power amplifier tube for the last stage of audio frequency. For use with storage battery, and best results will be obtained when used in conjunction with "CeCo" "A" type.

Price \$4.50



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**For Impedance and Resistance Coupling**  
When used in all audio sockets, except last or output, of such receivers will surprise and delight the user with their clearer reproduction and increased volume.  
"CeCo" Type "G" tube will carry more power without overloading than any other available High Mu.  
Average voltage amplification 20—Average output impedance 25,000.

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Will give improved reproduction and avoid the usual rushing and hissing sounds of the "soft" detectors.  
Using a higher plate voltage than previous types, it will handle powerful signals with less overloading. Average mutual conductance 940. Voltage amplification factor 14.4.

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Will handle sufficient power to operate the largest loud speakers at full volume. Does not require high voltage plate supply. At 90 volts it will give twelve times the undistorted power of the ordinary "A" type.  
To be used in receivers where a separate "C" Battery connection for the last tube is furnished. Can be used on voltages up to 180, with enormous volume output, provided a special output circuit is used to protect the loud speaker. Filament 5 Vol.—1/2 Amp.

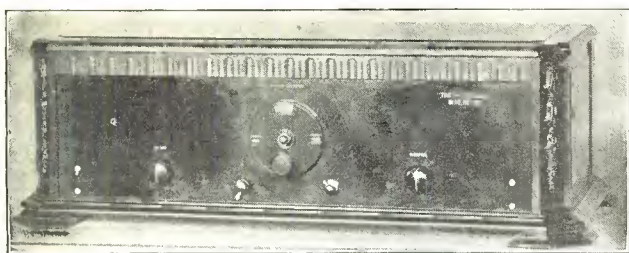
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LARGEST PLANT IN WORLD DEVOTED EXCLUSIVELY TO THE MAKING OF RADIO TUBES





Front View of Unicontrolre Nine-in-Line Receiver

# Unicontrolre Nine-In-Line Receiver

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1 Hammarlund .0005 Dual Condenser....	8.50
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1 Hammarlund Midget .000045 Condenser	1.80
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2 Sangamo .0005 By-Pass Condensers @ \$0.40 .....	.80
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1 Can Kester Solder.....	.25
1 Amperite 1A .....	1.10
1 Amperite 3A .....	1.10

\$108.70

We also carry a complete line of parts to following circuits:

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SAMSON T. C.          CAMFIELD DUOFORMER  
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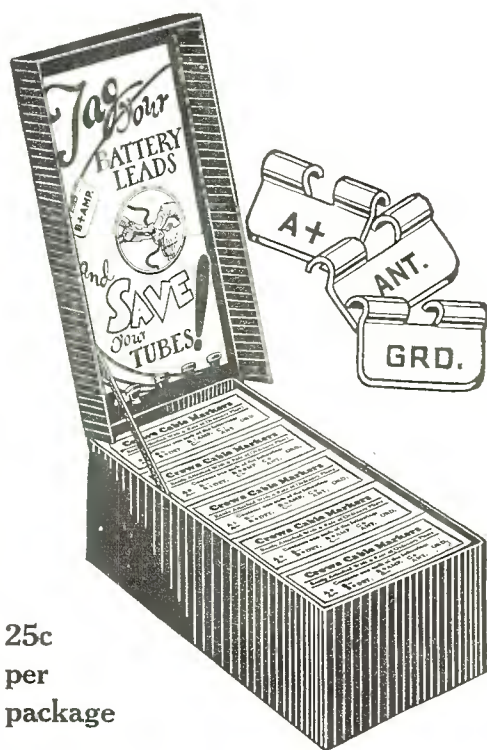
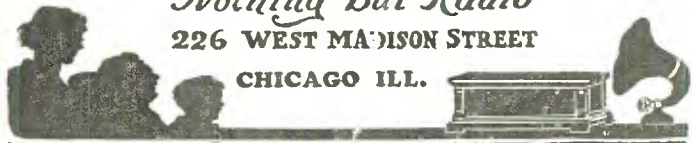
In writing us, specify circuit you are interested in  
Wholesale — Retail

## NEWARK ELECTRIC CO.

*"Nothing But Radio"*

226 WEST MADISON STREET

CHICAGO ILL.



25c  
per  
package

## Insure Your Tubes

with

# CROWE CABLE MARKERS

These handy markers applied to your battery cables indicate plainly the various connections and avert the burning out of tubes. Each package contains nine standard markings.

**MADE OF METAL  
BOLD, BLACK MARKINGS**

Easily and quickly attached with a pair of ordinary pliers.

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If your dealer does not carry Crowe markers, write us.

**Crowe Name Plate & Mfg. Co.**

1749 Grace Street  
Chicago

Dealers: Write for counter folders and window display card, with list of wholesale distributors who can supply you with Crowe markers.

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The  
**KINGSTON**

Price  
Complete with  
Raytheon Tube

**\$37.50**

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**Extreme Flexibility:** Each tap is adjustable over a wide range, making any voltage from 5 to 150 possible.

**The Raytheon Tube:** The Raytheon Tube is used as a rectifier—only the highest quality is used in the Kingston.

**Is Without Noise:** The Kingston operates with extreme quietness and without vibration, and will not heat.

**No Acid or Solution:** No trouble to operate, and operation cost is extremely low. Will not get out of order.

THE KINGSTON B BATTERY ELIMINATOR, a quality product throughout, marks a new era in radio reception. Made of the finest materials, absolutely guaranteed to give complete satisfaction, handsomely finished in black and nickel, and backed by a vigorous national advertising and merchandising campaign, dealers everywhere will find it one of their most popular items.

Write At Once for Full Particulars



# KINGSTON



As in the Harp, whose short and long strings produce high and low notes, the SAAL Ec-centric provides a short radius for high notes, a long radius for bass tones.

# Ec-centric

—the new scientific SAAL EC-CENTRIC CONE whose balanced tone color is the sensation in radio today.

On the principle of the harp, whose short strings produce the high treble notes, whose long strings give forth the deep bass tones, the Saal Ec-centric, with its "center" actually off-center, provides a short vibrating radius for the high notes, a long radius for the rich low tones.

These exact relative proportions of vibrating area, definitely fixed by scientific principles, are provided for the first time in the Saal Ec-centric Cone. All rumble or "barrel tone" is eliminated.

The Saal Ec-centric comes in two models: 20-inch, \$25; 14-inch (Junior), \$15. Slightly more west of Rockies



The SAAL Pedestal is an ornament to the most beautiful surroundings. Its pure wooden tone chamber, three feet in length, gives exceptionally clear mellow reception. Price, \$38.

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# "Super Ball" Antenna

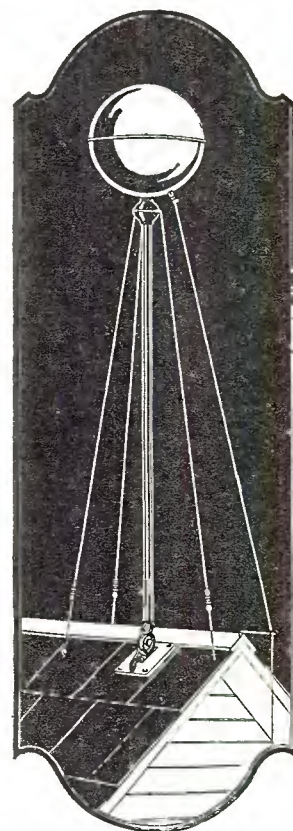
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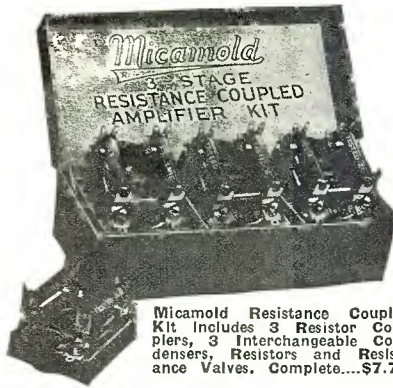
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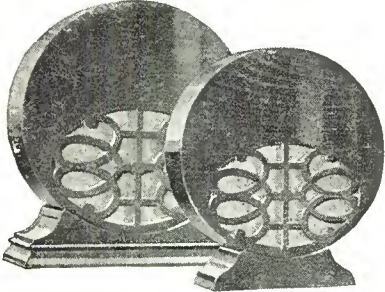
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See Page 155

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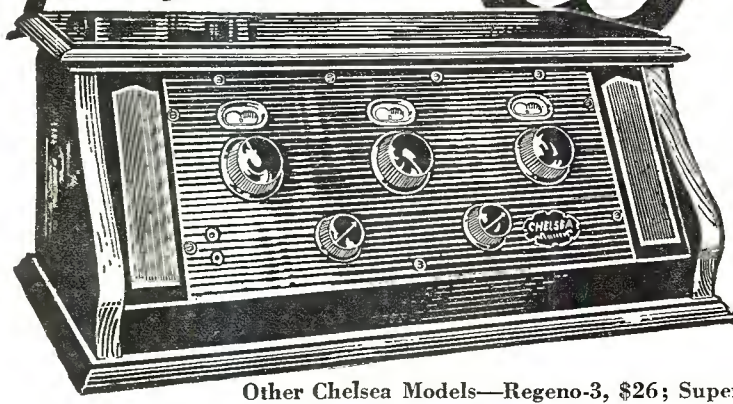
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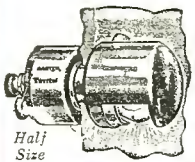
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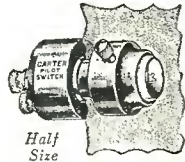
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"IMP" Battery Switch, 65c  
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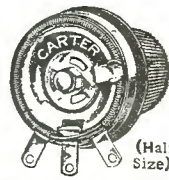
Lock Switch.....75c



"IMP" Pilot Switch \$1.50



"IMP" Inductance Switches  
4 to 9 Point  
\$1.00 to \$1.25



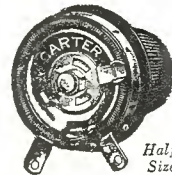
"MIDGET" Potentiometer, 200 or 400 ohms  
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Short Jack, Open Circuit.....25c ea.  
Closed Circuit, 30c ea.



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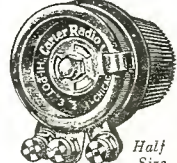


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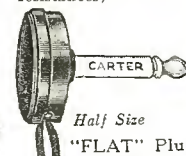
Portable Jack.....75c



"HI-OHM" Volume Control \$2.00 (1/2 meg. and other resistances)



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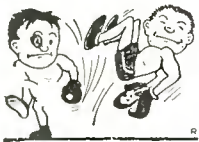
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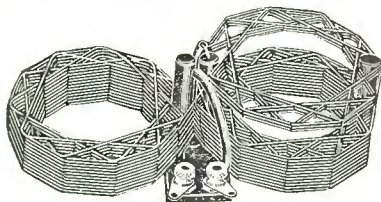


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The Only Fig. 8 Basket Weave

4 **WRITE** 5  
Tube Set for Hook-ups Tube Set

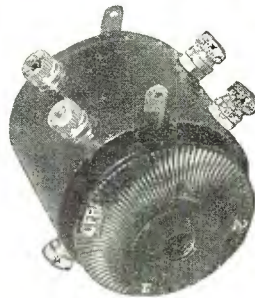
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Multi Stage Jack  
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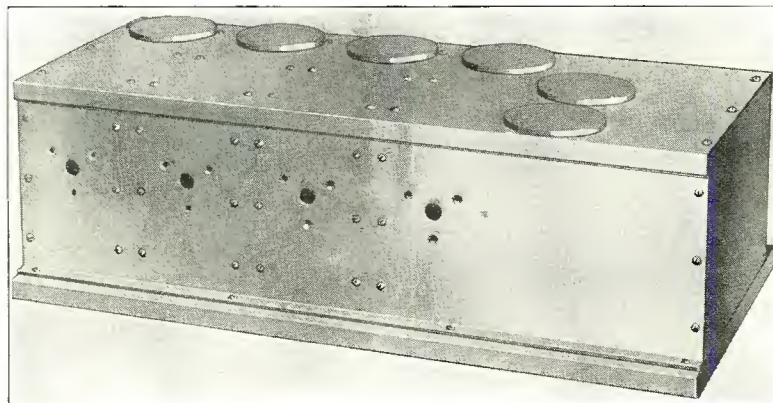
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*Designers and Makers of Radio Apparatus*

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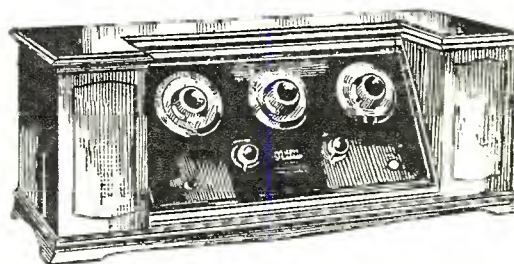
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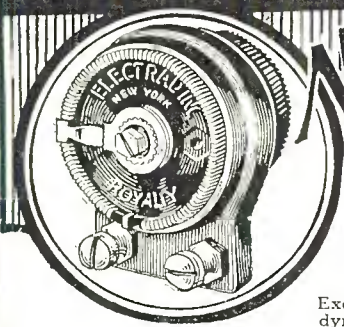
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**New**

## ELECTRAD Royalty Variable High Resistances

Used and endorsed by leading radio authorities.

Exclusively licensed by the Technidyne Corporation under U. S. Patent No. 1593685, July 27, 1926.

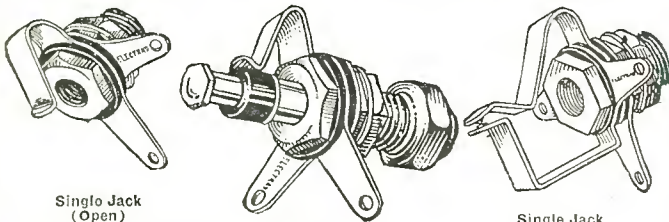
Where dependable and accurate resistances are required, the radio engineer or technician specifies "ROYALTY." Built to last, all of these resistances will dissipate a maximum of three watts without overheating. Note the following features of superiority:

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- Type G—0 to 10,000 ohms.
- Type H—0 to 25,000 ohms.
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- Type K—0 to 5000 ohms.
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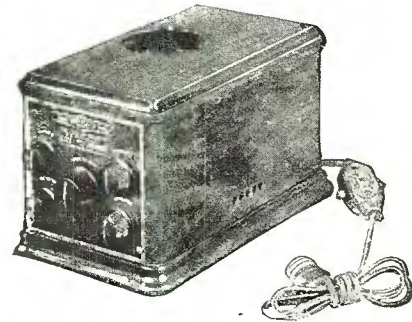


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# ELECTRAD

## Webster "Little Giant B-C"

With Raytheon Tube and  
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## Ample Power for the Largest Set

The Webster "Little Giant B-C" under load delivers a surplus current supply to the most powerful receiver. Ideal for sets with power tubes. ALL TAPS ARE MINUTELY CONTROLLABLE TO THE EXACT REQUIREMENTS for best reception. Adjustments easily made and when set require no further attention. The detector B supply is variable from 5 to 90 volts; the intermediate amplifier B from 20 to 125 volts; the power tube B supply from 125 to 180 volts; the intermediate C supply from 0 to 45 volts; and the power tube C supply from 0 to 45 volts. May be used without ground on loop receiver.

Its beauty adds a touch of distinction to any set.  
PRICE COMPLETE with Raytheon B. H. Tube.....\$50.00

Two other models; the Webster "Super B" has three voltages with positive variable controls. The detector supply from 5 to 75 volts, the intermediate amplifier supply 20 to 125 volts and the power tube supply from 125 to 180 volts. Nothing better for a straight "B" eliminator for over 5 tube set.  
PRICE WITH Raytheon B Tube.....\$39.00

"POPULAR-B"—Open type. Delivers ample "B" current for the detector supply, intermediate amplifier supply and power tube supply for any receiver requiring up to 35 milliamperes with 7 standard tubes or 6 standard and one power tube.  
PRICE COMPLETE with Raytheon B Tube, Cord and Plug.....\$35.00

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Actual Size Detailed Drawings of Panel, Baseboard, and Sub-Panel Layouts, and Graphic and Schematic Wiring Diagrams of Any Receiver Described in The Citizens Radio Call Book.

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No. 40	Inexpensive 5 Tube T. R. F. Receiver
No. 41	Samson Special T. C. Receiver
No. 42	Improved Infradyne Receiver
No. 43	Six Tube T. R. F. Receiver Using Alden Localized Control
No. 21	All-American 5 Tube Toroid Receiver
No. 22	Premier 5 Tube T. R. F. Receiver
No. 29	6 Tube All-American Toroid Receiver Using Impedance Amplification

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All necessary parts for any of the above circuits will be quoted upon request, if you are unable to purchase them in your locality. If we supply the kit to you, every piece of apparatus will be tested in our laboratory without charge, insuring the best operation of your set.

## Construction and Designing

Our completely equipped laboratory is at your service. We will design, construct, or repair any make set you desire or advise receiver best suited for your location. We will rebuild your present receiver—bringing it up to date.

The charges will be nominal and all work fully guaranteed as to performance. This work is under the personal supervision of our Chief Engineer and is part of our service to our thousands of readers. If you are unable to call in person do not telephone, but write us giving details and we will give estimate of cost by letter. If you merely wish to ask a question regarding some type of apparatus or problem, please consult top of page 155.

CITIZENS RADIO LABORATORY

508 So. Dearborn St.

Chicago, Ill.

**THE "MODERN"**

**"B" COMPACT**

**WITH RAYTHEON TUBE**

*The Biggest Value in "B" Eliminators*

Designed Right

Built Right

Equipped with  
Imported Condensers



Ample Capacity for  
6 Tubes Including  
1 Power Tube

Hum-Free

The Modern "B" Compact

The Compact is supplied with two variable voltage controls and is designed to operate efficiently with practically every type of receiving set.

Prices effective November 15, 1926: \$32.50; West of Rockies, \$35.00. At your favorite dealers or shipped direct upon receipt of remittance.

**THE MODERN ELECTRIC MFG. CO.**

TOLEDO, OHIO, U. S. A.

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

# 25c

## For The Whole Story

California Hears Australia—Sounds almost too good to be true. But it's a fact. Oakland, California, brings in Pittsburgh and seven Chicago stations in one evening—all on the loud speaker. The Infradyne is the receiver used for these wonderful records of DX reception on the loud speaker. Mr. E. M. Sargent has prepared a handy Official Infradyne Manual—telling you how to operate the Infradyne—how to wire it—how to construct it for maximum results—how to bring in stations you never heard before—how to get selectivity—hair-breadth selectivity—tone quality such as you have never heard excelled. All this on the Infradyne—the receiver a year ahead of the times. The receiver you have long waited for is here. You can also use the Infradyne Amplifier in conjunction with your present tuned r.f. set or neutrodyne. What a difference it makes. The Official Infradyne Manual tells you how to use it. The Manual sells for 25 cents and a copy will be sent to you postpaid immediately upon receipt of the coupon below—and a quarter.

# INFRADYNE

E. M. Sargent's Official Infradyne Manual is your guide to record smashing winter reception. Learn how to use the Infradyne Amplifier with your present set. The manual tells how.

**RADIO DEALERS AND JOBBERS**  
Are Invited to Write for Proposition

Pacific  
Radio Pub.  
Company,  
Pacific Building,  
San Francisco, Cal.

Here is 25 cents. Send me, at once, a copy of E. M. Sargent's Official Infradyne Manual as advertised in Citizens Radio Call Book.

Name.....

Address.....

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

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

Contrast the clumsy dials of only two years back . . . with the handsome illuminated controls MAR-CO makes today. Here is another good reason for building your set yourself!



## Now dials give place to glowing spots of light

- PICTURE a soft, subdued light in the room . . .
- • • your set in the corner with glowing spots of light illuminating its swiftly readable *back panel* scales.
  - • • this is radio at its handsomest . . .
  - • • this is the panel arrangement, the type of skillful tuning that distinguishes the 1927 trend in set construction.

Already, these new MAR-CO controls are specified or optional equipment in a score of this season's most advanced circuits. At once, they have become the standard in tuning control design. Use them, in whatever set you build, to give the final touch of style, and the utmost in precision control. MAR-CO controls are easy to install. The steel template pro-

vided reduces panel-drilling to the simple, fool-proof operation illustrated below. The original MAR-CO "friction-drive"—the action that makes backlash impossible—has been strengthened, to accommodate gang condensers. The MAZDA lamp supplied runs on your "A" battery, using only .1 ampere. The switch that controls this lamp may also be used as your filament switch, the lighted scales then serve as pilots. Scales read 0 to 100, or 100 to 0, as preferred. Price, including template, bulb, and bezel, \$3.50. Replacement bulbs, \$.20. Write today for the booklet that illustrates 15 standard makes of condensers mounted on MAR-CO back-panel controls. Martin-Copeland Company, Providence, R. I. Branch offices and representatives in principal cities.

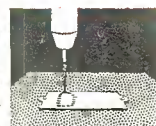
Prominent among the advanced circuit designs which call for MAR-CO controls, is the Madison-Moore

## MAR-CO *Illuminated* Controls

Here's how you drill the panel..



Screw Template to panel



Drill holes through Template.



Remove window opening



Bezel covers rough edge

that's ALL you CAN'T go wrong!

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

(Continued from Page 133)

- 4—Type 4 Elky Equalizers with mounting
- 1—Type 2 Elky Equalizer with mounting
- 1—Type 4/3 Elky Equalizer with mounting
- 1—Dubilier 2-meg. Grid Leak
- 1—Sangamo .00025 mfd. Fixed Condenser
- 1—Sangamo .005 mfd. Fixed Condenser
- 2—Sangamo 1 mfd. By-Pass Condensers
- 1 Pair Sangamo Grid Leak Clips
- 1—Yaxley Cable Connector, complete
- 7—Eby Engraved Binding Posts
- 1 Package of Kester Solder
- 60 Feet of Belden No. 12 Gauge Tinned Copper Wire
- Miscellaneous Screws, Nuts, Soldering Lugs, etc.

The Madison-Moore Receiver, in Photo "A," is shown installed in a Model 22 Excello Console, manufactured by the Excello

Products Corporation, Chicago. Sufficient space is allowed in the upper compartment so that any panel up to 10½x32-inch may be accommodated by using the adjustable filler pieces supplied with the console. The battery compartment measures 14x32 inches and is provided with a sliding leaf upon which the "A" battery is placed. Walnut is used throughout in the construction of this console. Sufficient "B" potential to properly operate the receiver is secured from the Majestic Standard "B" Eliminator. This eliminator is manufactured by the Grigsby-Grunow-Hinds Company of Chicago, and uses the new Raytheon Rectifying Tube. The Willard Storage Battery Company of Cleveland make the "A" battery shown, while the Fansteel Products of North Chicago, Ill., manufacture the Balkite Charger, which will serve admirably to keep the battery at full charge.

(If any further information is desired regarding the accessories shown, full descriptive matter will be supplied if you will address the manufacturer direct.)

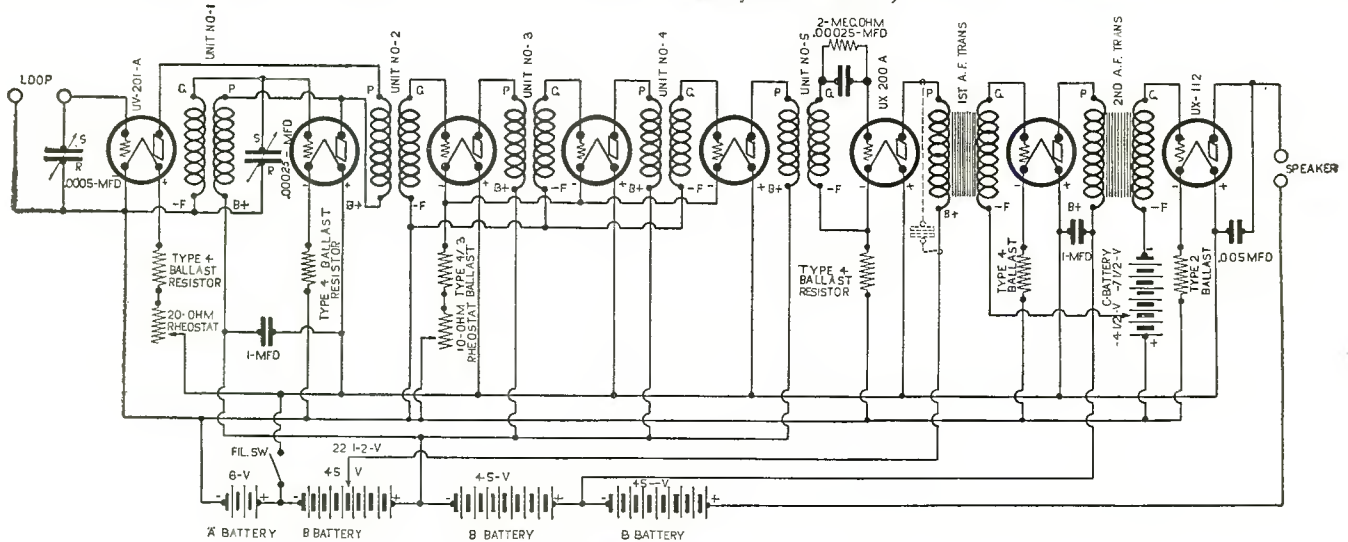


Fig. 4. Schematic wiring diagram

## Let Us Build Your

**SILVER SHIELDED SIX** in a Fritts Super Cabinet .....\$125.00

Parts only..... 95.00  
Cabinet only..... 22.00

**HAMMARLUND HI-Q** in a Fritts Super Cabinet .....\$95.00

Parts only..... 63.05  
Cabinet only..... 22.00

All parts guaranteed to be exactly as specified.

Every set custom built and laboratory tested.

Official service station in the Middle West for the above manufacturers.

The best equipped set department for building and servicing any nationally known circuits.

Service and repairs on any make of sets, eliminators, and speakers.

Dealers and set builders, write for discounts

### PUBLIC RADIO SERVICE, INC.

66-68 East South Water St.

CHICAGO

ILLINOIS

Prompt and Intelligent Service

## It's Impossible to Fail

WITH the Roberts Short Cut to the code, anybody can learn the code in one evening. Designed by a naval officer to teach operators for war purposes, when speed was paramount.

### Fifty Cents U. S. Stamps or Coin

Used in schools and by thousands of students, the world over. No phonograph records or mechanical devices needed. Just send 50c in stamps and you will get a thrill from receiving messages from every country in the world.

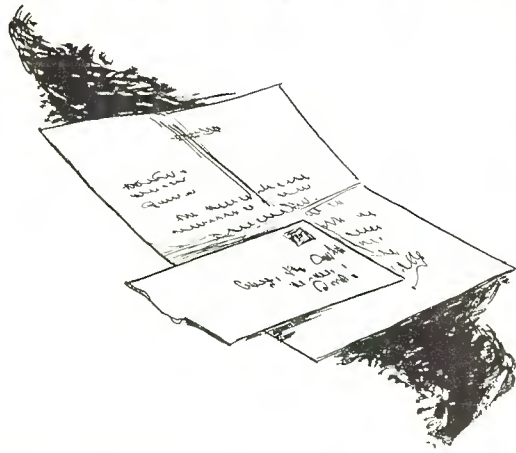
### FAILURE IMPOSSIBLE

Remember—No Tedious Weeks and Months—One Night and the Code Is Mastered

### ROBERTS RADIO SERVICE

780 Caxton Building

Chicago, Ill.



# \$100 for a Letter

THE publishers of The Citizens Radio Call Book being extremely anxious to place before our readers the exact kind of content that the readers of this publication may desire, offer one hundred dollars for the best letter of constructive criticism received before March 1, 1927.

**THE RULES ARE AS FOLLOWS:**

Not over 1500 words. Write on one side of paper only; typewritten preferred but not necessary. The letter should show information on what you like best in our book as it is now and what suggestions you have to improve it, specifying what kind of editorial—nature of same—that you think would tend to improve same. No letter will be entered unless this questionnaire is filled out fully and attached.

**SPECIAL REQUEST**

We are extremely anxious to obtain the answers contained in the questionnaire below. Even if you do not write us a letter, won't you be so kind as to tear out this page and mail it to us? It will enable us to give you just the kind of editorial you want.

**QUESTIONNAIRE**

Would you like to see us print the following? Pictures of broadcasting studios.....  
 Pictures of broadcasting transmitters..... Pictures of Radio wrinkles on how to improve your present receiver..... More construction articles..... More details on construction articles..... Notes how to tune different receivers..... Pictures ..... How to hook up your batteries..... Radio cartoons..... Past history of Radio..... Any new method of listing broadcasting stations..... More logging space..... Answers to questions in Question and Answer Dept..... Simple hookups, such as crystal sets..... One tube sets..... Two tube sets..... Three tube sets..... Highly technical articles..... Very simple articles, written for beginners..... Tips on installing aerials and ground systems..... History of lives of prominent men and their achievements in Radio..... Do you like the Rotogravure Section of pictures..... Do you read any other Radio magazines, and if so, how many..... Have you ever built any receiver described in our columns..... How many of each..... How many different circuits..... Did you follow our specifications..... Did they give entire satisfaction..... What do you care most for in your receiver, distance or quality..... Would you like to see one or two very high class designed receivers, completely shielded, laboratory work only that would cost from \$150 to \$200, that would be so laid out that they would be simple for the home constructor to build..... There have been nine separate issues of the Citizens Radio Call Book printed since 1921—how many of them have you purchased..... How many have you now.....

Answer the questions that interest you "Yes" or "No." Place an X in those that you are not interested in.

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

Kindly mail filled-in Questionnaire to D. H. Bell, Managing Director, Citizens Radio Call Book, 508 So. Dearborn Street, Chicago, Ill.





THE LARGEST RADIO STORE IN THE WORLD

**SAVE MONEY**  
On the Best and Latest

**KNOCK-DOWN SETS**

**Superheterodynes:**

Madison-Moore  
Best's 45,000 Cycle  
St. James  
Victoreen

**Also:**

Universal 4-Tube  
Nine-in-Line  
Infradyne  
Aerodyne  
Silver Six  
620 Silver Cockaday  
B. T. Counterphase  
Hammarlund-Roberts  
Samson T. C.  
Short Wave  
Browning Drake  
Qualitone

**BATTERY ELIMINATORS**

**Kits and Factory Built**

Acme  
All-American  
Bremer-Tully  
Burns  
Thordarson  
Silver-Marshall  
General Radio  
Majestic  
And other popular makes

**A Complete Line of Parts and Accessories by Leading Manufacturers Such as:**

Acme  
All-American  
Amsco  
Belden  
Benjamin  
Bremer-Tully  
Bruno  
Buell  
Comsco  
Dubilier  
General Instrument  
Hammarlund  
Karas  
National  
Remler  
Signal  
Silver-Marshall  
Walbert  
And many others

*All in our new 1927  
100 page Catalogue  
sent to you FREE.*

**SAVE MONEY**



*Our New  
1927  
100  
Page*

**RADIO CATALOG  
FREE**

**B**EFORE you build or buy a radio be sure to consult our new 100-page catalog—sent to you free. All the latest kits, accessories, and parts—a million dollar radio stock to choose from.

**We Save You Money**

We handle only brand-new apparatus—standard makes that are fully guaranteed. QUANTITY sale of QUALITY parts explains our low prices. Compare with others and see why thousands of fans look to us as radio headquarters. Write for your copy of this new catalog today.

**CHICAGO SALVAGE STOCK STORE**

"The World's Largest Radio Store"

509 South State Street

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CHICAGO, U. S. A.

A MILLION DOLLAR RADIO STOCK TO CHOOSE FROM

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

## For Christmas

be sure to include a Belden Fused Radio Battery Cord with the new radio set. This remarkable cord replaces the usual tangle of battery wires, and greatly improves the appearance of the radio set installation in the living room. A Belden Fused Radio Battery Cord in the distinctive Belden carton makes a convenient and inexpensive gift for the Christmas stocking.



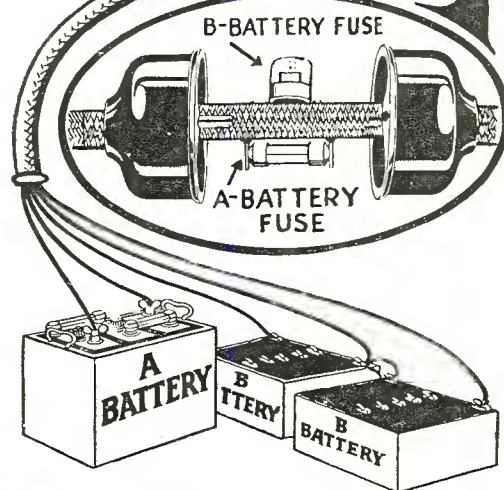
# Make Your Set Safe With a Belden Fused Radio Battery Cord

THOUSANDS of radio set owners are improving their sets by adding the protection of the Belden Fused Radio Battery Cord. The two small fuses in the neat bakelite two-piece cover are on guard, night and day. The A-battery fuse prevents the damage caused by accidental short circuits. The fire hazard is eliminated.

The small B-battery fuse is protection for the tube filaments in case the B-battery voltage is accidentally applied to A-battery terminals.

The Belden Fused Radio Battery Cord is a Christmas gift of all-year utility. Ask your dealer about it, today!

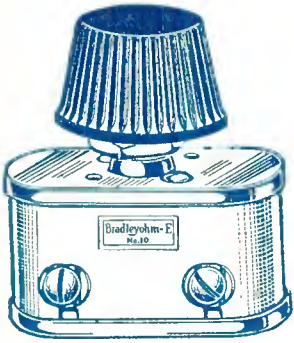
Belden Manufacturing Company  
2322-A So. Western Ave. Chicago, Illinois



# Belden Fused Radio Battery Cord

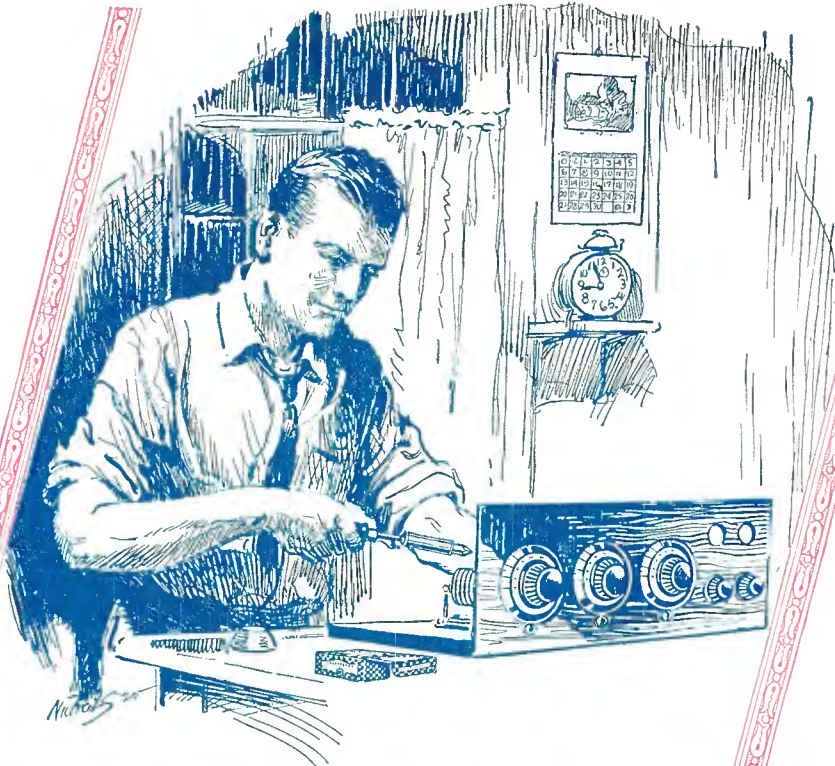


Tell 'Em You Saw It in the Citizens Radio Call Book



**Bradleyohm-E**  
PERFECT VARIABLE RESISTOR

This new oversize resistor is used as standard equipment by leading B-eliminator manufacturers such as Acme, All-American, American Bosch, Majestic, Philadelphia Storage Battery, and Willard. It is the ideal variable resistor for controlling plate voltage output. The scientifically treated graphite discs in Bradleyohm-E provide stepless, noiseless, plate voltage control, and the setting will be maintained indefinitely. Do not experiment with makeshift variable resistors, when Bradleyohm-E has been pronounced the ideal unit by the largest manufacturers of B-eliminators in the world. Ask your dealer for Bradleyohm-E when you build your B-eliminators.



*For Radio Sets or B-Eliminators  
Use Allen-Bradley Radio Devices*

RADIO set owners throughout the country are improving their sets by substituting resistance coupled amplifiers for their old audio transformers, or by replacing their old B-batteries with B-eliminators.

If you are building a B-eliminator, be sure to ask your dealer for Bradleyohm-E. Avoid the delay and expense of experimenting with substitutes. Follow the example of successful B-eliminator manufacturers by standardizing on Bradleyohm-E for your kit.

The Bradleystat, Bradleyleak, and other Allen-Bradley perfect radio devices will make your old radio set more perfect in operation. Send the coupon for latest folder on Allen-Bradley perfect radio devices.



**Bradleyunit-A**  
PERFECT FIXED RESISTOR

Another triumph of the Allen-Bradley Research Laboratory is Bradleyunit-A, a perfect fixed resistor that contains no glass, requires no hermetic sealing, and can be soldered into place without the use of clip mountings. Bradleyunit-A is not affected by temperature or moisture and it maintains its calibration indefinitely. It is not affected by the weather.

Be sure to ask your dealer for Bradleyunit-A when you need a fixed resistor for any purpose.



**Bradley-Amplifier**  
Resistance-Coupled  
PERFECT AUDIO AMPLIFIER

ALLEN-BRADLEY COMPANY  
488 Clinton St., Milwaukee, Wisconsin

Please send me by return mail your latest folder of Allen-Bradley perfect radio devices.

Name.....

Address.....

# Know these RADIOTRONS— and keep your set up to date



RADIOTRON AND RECTRON CHARACTERISTICS																			
GENERAL							DETECTION				AMPLIFICATION								
MODEL	USE	BASE	MAXIMUM OVERALL DIAMETER	MAXIMUM OVERALL HEIGHT	"A" BATTERY VOLTAGE (SUPPLY)	FILAMENT TERMINAL VOLTAGE	FILAMENT CURRENT (AMPERES)	DETECTOR GRID RETURN LEAD TO	GRID LEAK (MEG OHMS)	GRID CONDENSER (MFD)	DETECTOR "B" BATTERY VOLTAGE	DETECTOR PLATE CURRENT (MILLIAMPERES)	AMPLIFIER "B" BATTERY VOLTAGE	AMPLIFIER "C" BATTERY VOLTAGE	AMPLIFIER * PLATE CURRENT (MILLIAMPERES)	OUTPUT RESISTANCE * (OHMS)	MUTUAL CONDUCTANCE * (MICROMHOS)	VOLTAGE AMPLIFICATION FACTOR	MAXIMUM UNDISTORTED OUTPUT (WATTS)
RADIOTRON UX-201-A	Detector Amplifier	RCA Large Standard UX Base	1 11/16"	4 11/16"	6 Storage	5.0	.25	+F	2 to 9	.00025	45	1.5	135 90	9 4 1/2	2.5 2	11,000 12,000	725 675	8 8	55 15
RADIOTRON UX-199	Detector Amplifier	RCA Small Standard UX Base	1 1/16"	3 1/2"	Dry Cell 4 1/2 Storage 4	3.0	.06	+F	2 to 9	.00025	45	1	90	4 1/2	2.5	16,500	380	6.25	7
RADIOTRON UX-199	Detector Amplifier	RCA Large Standard UX Base	1 11/16"	4 11/16"	Dry Cell 4 1/2 Storage 4	3.0	.06	+F	2 to 9	.00025	45	1	90	4 1/2	2.5	15,000	400	6	7
RADIOTRON WD-11	Detector Amplifier	WD-11 Base	1 3/16"	4 1/8"	Dry Cell 1 1/2 Storage 2	1.1	.25	+F	3 to 5	.00025	22 1/2 to 45	1.5	90	4 1/2	2.5	15,000	400	6	7
RADIOTRON WX-12	Detector Amplifier	RCA Large Standard UX Base	1 7/16"	4 11/16"	Dry Cell 1 1/2 Storage 2	1.1	.25	+F	3 to 5	.00025	22 1/2 to 45	1.5	90	4 1/2	2.5	15,000	400	6	7
RADIOTRON UX-200	Detector Only	RCA Large Standard UX Base	1 13/16"	4 11/16"	6 Storage	5.0	1.0	-F	1/2 to 2	.00025	16 1/2 to 22 1/2	1	—	—	—	—	—	—	—
RADIOTRON UX-200-A	Detector Only	RCA Large Standard UX Base	1 13/16"	4 11/16"	6 Storage	5.0	.25	-F	2 to 3	.00025	45	1.5	—	—	—	—	—	—	—
RADIOTRON UX-120	Power Amplifier	RCA Small Standard UX Base	1 3/16"	4 1/8"	Dry Cell 4 1/2 Storage 4	3.0	.125	—	—	—	—	—	—	—	—	—	—	—	—
RADIOTRON UX-112	Power Amplifier	RCA Large Standard UX Base	1 13/16"	4 11/16"	6 Storage	5.0	.5	—	—	—	—	—	—	—	—	—	—	—	—
RADIOTRON UX-171	Power Amplifier Last Audio Stage Only	RCA Large Standard UX Base	1 13/16"	4 11/16"	6 Storage	5.0	.5	—	—	—	—	—	—	—	—	—	—	—	—
RADIOTRON UX-210	Power Amplifier Oscillator	RCA Large Standard UX Base	2 3/16"	5 3/8"	Transformers or Storage	6.0 6.0 6.0 6.0	1.1 1.1 1.1 1.1	—	—	—	—	—	—	—	—	—	—	—	—
												RECTIFIERS							
MODEL	USE	BASE	MAXIMUM OVERALL DIAMETER	MAXIMUM OVERALL HEIGHT	PURPOSE	Filament Terminal Voltage:.....5.0 Volts Filament Current:.....2.0 Amperes Max. AC Input Voltage per plate:.....220 Volts (RMS) Δ Max. Rectified Current (both plates):.....65 Milliamperes													
RECTRON UX-213	Full Wave Rectifier	RCA Large Standard UX Base	2 3/16"	5 5/8"	For use in rectifying systems particularly designed for this Rectron.	Filament Terminal Voltage:.....7.5 Volts Filament Current:.....1.25 Amperes Max. AC Input Voltage:.....550 Volts (RMS) Δ Max. Rectified Current:.....65 Milliamperes													
RECTRON UX-216-B	Half Wave Rectifier	RCA Large Standard UX Base	2 1/16"	5 3/8"	For use in rectifying systems particularly designed for this Rectron.	SPECIAL PURPOSE RADIOTRONS Especially designed for use in the following devices operated from alternating current lighting mains: RCA Duo-Rectron ("B" Battery Eliminator) RCA Loudspeaker Model 104													
RADIOTRON UX-874	Voltage Regulator Tube	RCA Large Standard UX Base	2 1/16"	5 5/8"	Constant Voltage Device	Especially designed for use in the following devices operated from: Radiola 30 RCA Loudspeaker Model 104 Brunswick Models: PR-16C, 26C, 36C, 46C, P-3 Victrol Models: WV 15-1, WV 9-2, WV 12-2													
RADIOTRON UV-876	Ballast Tube	Standard Mogul Type Screw Base	2 1/16"	8"	Constant Current Device	Especially designed for use in the following devices operated from: Radiola 30 RCA Loudspeaker Model 104 Brunswick Models: PR-16C, 26C, 36C, 46C, P-3 Victrol Models: WV 15-1, WV 9-2, WV 12-2													
RADIOTRON UV-886	Ballast Tube	Standard Mogul Type Screw Base	2 1/16"	8"	Constant Current Device	Used in "B" battery circuits to prevent excessive current resulting from short circuit which might damage tubes or wiring. Vector Models: WV 15-1, WV 9-2, WV 12-2													
RADIOTRON UV-877	Protective Tube	Double Contact Bayonet Automobile Type	1 1/16"	2 1/8"	Current Limiting Device	Used in "B" battery circuits to prevent excessive current resulting from short circuit which might damage tubes or wiring. Filament 5 At 20 Milliamperes DC 45 At 90 Milliamperes DC													

† Loudspeaker coupling recommended at this plate potential due to large plate current.  
 \* At indicated "B" and "C" battery voltages

Δ R. M. S. indicates "Root Mean Square" as indicated on an AC voltmeter.  
 ΔΔ Connection to shell of base for third terminal which is the lead to mid-point of filament.

RADIO CORPORATION OF AMERICA  
 New York Chicago San Francisco

# RCA Radiotron

MADE BY THE MAKERS OF THE RADIOLA