

Citizen's

RADIO CALL BOOK

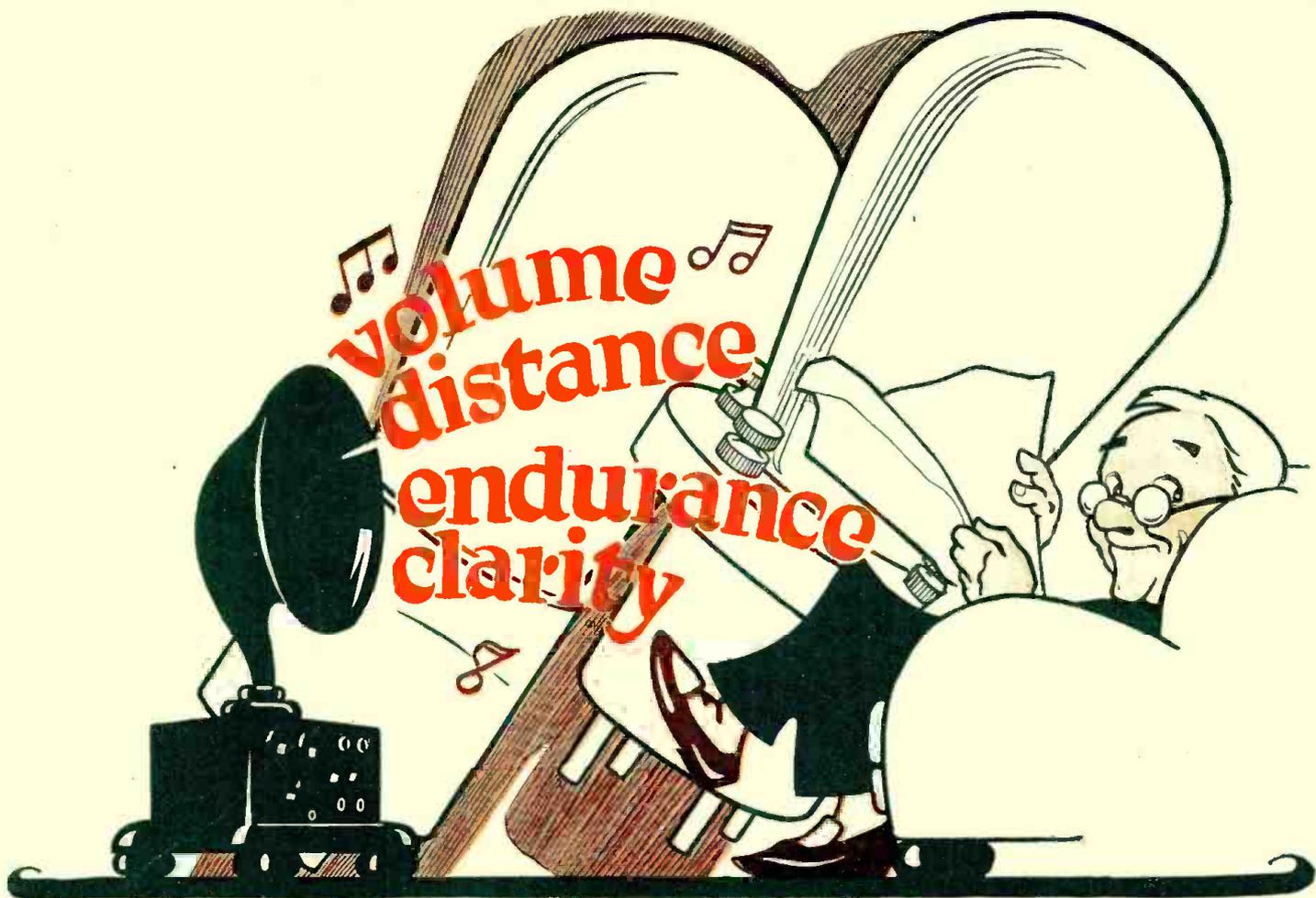
50¢

REG. U.S. PAT. OFFICE

A
COMPLETE
RADIO CYCLOPEDIA



See Page 220 for Art Contest



\$4.00

\$4.50

\$4.50

ENJOY the four qualities of high tube efficiency—volume, distance, clarity, endurance. Magnatrons have them all! Made by America's oldest exclusive manufacturers of radio tubes. Each one the best that approved materials, custom workmanship and long experience can produce. Each one must meet highest laboratory tests before release. The result is a quality of reception—even on low notes—that will give you a new appreciation of your receiver.

There are eleven different Magnatrons, including the popular power tubes—for every purpose and for every set. Whether you have the newest type set or one of the earliest circuits, Magnatrons will help your receiver give you the finest results. At all good dealers.

Connewey Electric Laboratories
Magnatron Building Hoboken, N. J.

**A MAGNATRON
for Every
Purpose**

DC-201A.....	\$1.75
DC-199	2.25
DC-200A	4.00
DC-120	2.50
DC-112	4.50
DC-171	4.50
DC-210	9.00
DC-216B	7.50
DC-213	5.00
Super-Rex	4.50
Rex	2.00



MAGNATRONS

SUBANTENNA

AMAZING NEW

Underground Antenna System

KILLS STATIC

Eliminates All Interference— Power Line Crackles, Etc.



Unless you have spent a radio evening with SUBANTENNA, you positive have no idea of how wonderful Radio really is. There is such an amazing difference in the performance of any set when connected to SUBANTENNA that no user would ever go back to the old style aerial again.

Real Clarity and Big Volume on DX Now Possible!

Imagine listening to beautiful music, thinking it is from a local station, then hearing the announcer clearly speak the call letters of a station a thousand miles away. Imagine the pleasure of getting real DX crystal clear on bad nights when STATIC is raging all around you. Imagine being able to bring in distant stations with tremendous volume on the same set which with an ordinary aerial gets only "air noises" and static crashes! Because the filtering action of SUBANTENNA delivers such a clean, clear signal to your set, you can turn the power full on when listening to DX. This means you can get bigger volume and more distance with your present set if you use a SUBANTENNA.

SUBANTENNA Uses Filtered Ground Waves

Instead of using noisy air waves, SUBANTENNA uses *filtered ground waves*. This means that STATIC, arc light sputters, power line crashes and other disturbing interferences are grounded and removed from the reception before it reaches your set. Read in the lower left corner of this announcement what a few of the thousands of enthusiastic SUBANTENNA users say about this new wonder device.

Nothing Else Like It

SUBANTENNA is not just a wire. It is a specially constructed, specially treated alloy wire differently insulated and sheathed in a lead jacket. At the far end of SUBANTENNA and at an electrically calculated correct location near its center are "building-up" coils which play an important part in SUBANTENNA'S startling performance.

Make this TEST

Install SUBANTENNA. Leave your old aerial up. Select a bad night when DX is almost impossible with the ordinary aerial. Make a comparison station for station, connecting first your aerial, then SUBANTENNA. From stations that are just a mess of jumbled noise with the old aerial, you'll get reception that parallels local in sweetness and clarity. Send coupon at once for scientific explanation of SUBANTENNA and for particulars of GUARANTEE and FREE TRIAL OFFER. Send COUPON NOW!

FREE TRIAL OFFER!

Read PROOF that SUBANTENNA is the Greatest New Thing in Radio

"Subantenna you shipped me now working and results are good. Had WJZ, WLS, KDKA, WTAX, WSM and others during thunderstorm." Signed,
L. T. DONALDSON, M. D., Louisiana

"I have a six-tube set and after installing Subantenna I received greater distance than ever before. On January 18th, I received a program on my set broadcasted from Buenos Aires, South America, at 10:15 in the evening. I never could receive such distance on my outside antenna." Signed,
W. C. FREYMUTH, River Forest, Illinois.

"I am able to report that static which was a source of much annoyance before, has been entirely eliminated so far as I am able to observe. For clarity and for its contribution to selectivity I think the Subantenna is the best device I have ever had any experience with." Signed,
REED L. PARKER, Chicago

"I am glad to report to you the wonderful reception that I am receiving without interference or static of any kind. It is, indeed, a wonderful thing for radio and my opinion is that it will revolutionize the industry." Signed,
CARL DESSAUER, Kansas

"My greatest pleasure with the Subantenna, however, comes through the clarity of tone and perfect reception of the programs. Since using the Subantenna, I am unable to understand how I got any pleasure at all out of my radio, using the old aerial, with its rasping, grating noises, and constant interference." Signed,
HERMAN SLESCHER, Chicago

MAIL THIS COUPON NOW!

CLOVERLEAF MFG. CO.,
2714-D Canal St.
Chicago.

Tell me all about SUBANTENNA and your FREE TRIAL OFFER.

Name.....

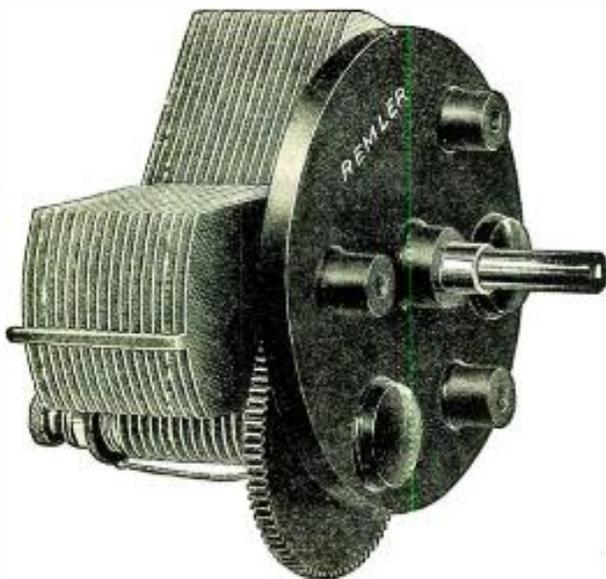
Address.....

CLOVERLEAF MANUFACTURING CO.

2714-D Canal Street, Chicago

*Every month new Stations—
The Air more crowded all the time*

**What's the Answer?
Clean Cut Accurate Tuning
with the 360°**



REMLER

TWIN-ROTOR CONDENSER

This is the instrument, built with micrometer accuracy, which has established new standards of tuning efficiency. Expensive to make; inexpensive to own. Your set deserves the tuning perfection which only Remler Twin-Rotor Condensers can give.

Straight Line Frequency

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 practically the entire dial is used in covering the broadcast range.

No. 648—.00035	max. less dial.....	\$4.50
No. 649—.0005	max. less dial.....	4.50
No. 659—.0001	max. less dial.....	4.50

Straight Line Wave-Length

This type gives greater dial separation to the long-wave class "B" stations somewhat at the expense of the short-wave stations. In the ordinary condenser, employing a 180° dial, this crowding of the low-wave stations might prove serious. But the SLWL Twin Rotor Condenser, because of its 360° dial, offers practically as great separation of short-wave stations as does the ordinary straight line frequency condenser.

No. 630—.00035, with dial.....	\$5.00
No. 638—.00035, less dial.....	4.50
No. 631—.0005, with dial.....	5.00
No. 639—.0005, less dial.....	4.50

Dial complete, 75c



Remler Improved Socket

Every Twin Rotor Condenser is backed by the Remler reputation for accuracy and reliability. The Remler name is your guarantee of utmost quality.

REMLER

Division of



Remler Infradyne Amplifier

Gray & Danielson Mfg. Company

260 First Street
San Francisco

Chicago

New York

Known
the
World Over

FROST-RADIO

Known
the
World Over



Ask Your Neighbor



LIST
\$1.25



FROST-RADIO Type 880
Super-Variable Resistances

Offers a precise and minute regulation of current flow in radio circuits where exact current values are essential. By moving the spring roller contact arm you obtain any degree of resistance from zero to maximum—without noise, jumps or sudden variations. Elements have large current carrying capacity—will not overheat—AND CANNOT WEAR OUT. Brass case is nickel plated and buffed. Has Bakelite pointer knob. Widely used for stabilizing radio frequency circuits, regeneration control, for output voltage and current control on "B" eliminators and as resistance elements in resistance coupled amplifiers.

TYPE 880—TWO TERMINALS
No. 880, 50,000 ohms No. 882, 200,000 ohms
No. 881, 100,000 ohms No. 885, 500,000 ohms
Price, any resistance, \$1.25



LIST
\$1.25

FROST-RADIO Type 890
Super-Variable Resistances

These are identical in design with our Type 880, except that the Type 890 has three terminals. Thousands of fans have found these ideal for stabilizing transformer coupled audio frequency circuits, for control of grid bias in radio frequency circuits and for volume and tone control in either resistance coupled or impedance coupled audio amplifiers. Operation of these resistances is smooth and noiseless, and because of our exclusive roller contact arm there is never any wear on the resistance strip. Our special circular about these amazing units gives wiring diagrams, complete data on performance, and valuable facts you should have. Mail coupon for this circular.

TYPE 890—THREE TERMINALS
No. 890, 50,000 ohms No. 892, 200,000 ohms
No. 891, 100,000 ohms No. 895, 500,000 ohms
Price, any resistance, \$1.25



LIST
50c

FROST-RADIO Type 700
Metal Frame Rheostats

The most phenomenally successful rheostat ever designed. Used as standard equipment by more than 60 leading radio manufacturers. Compact and sturdy to an unusual degree because frame is one piece of metal. Bakelite pointer knob. Resistance wire is finest grade Chromel A or Nichrome, and it cannot and will not burn out, for its capacity is ample for every radio requirement. You can secure these rheostats in the following resistances: 2, 2½, 3, 3½, 4, 5, 6, 7, 10, 15, 20, 25, 30, 50, and 75 ohms. Also as 200 or 400 ohm potentiometers.

Type 700 Rheostats, any resistance . . . 50c
Type 700 Potentiometers, 200 or 400 ohms, 75c

**They Swept the Land
From Coast to Coast!**

THE acceptance by radio set builders of these new items of **FROST-RADIO** was one of the most amazingly successful demonstrations of hitting the bull's eye that has ever been witnessed in the whole history of radio engineering. Almost as a unit the whole country, from coast to coast, demanded **FROST-RADIO** Super-Variable High Resistances, Metal Frame and Bakelite Rheostats, Gem-Jacs, No. 530 Sockets, and other new items in our line. There were two reasons for the overwhelming demand which has kept our factories busy every minute: First, 100% engineering design; and second, highest quality manufacturing. *Popular prices have always been a FROST-RADIO policy.*

Today, wherever sets are built, you will find fans talking and buying these new parts. Your dealer has them in stock, or can get them for you. Go to him today. Order from him the parts you will need in your new set. Then you will be sure of perfect operation and 100% reception.

FROST-RADIO Gem-Jacs

The smallest, finest radio jacks made. Project only 1 inch back of panel. Electric brass frames are nickel plated and hand buffed. Insulation is ground to exact thickness. Nickel silver contact springs with sterling silver contacts.



Anti-capacity, sturdy, good looking. Supplied in four popular types.
Prices, 40c to 50c

LIST
75c



FROST-RADIO Type 800
Bakelite Frame Rheostats

These air-cooled rheostats are the smallest, most compact and sturdiest made. Outside diameter is 1½ inches. Bakelite frame is provided with air gaps for quick cooling. Nichrome or Chromel "A" wire of ample size and length (number of turns) prevents burn-outs due to overheating. Fitted with Bakelite pointer knob. Lever contact arm works with wonderful smoothness. Single hole mounting. Supplied in following resistances: 2, 2½, 3, 3½, 4, 5, 6, 7, 10, 15, 20, 25, 50, and 75 ohms. Also as 200 or 400 ohm potentiometers.
Type 800 Rheostats, any resistance . . . 75c
Type 800 Potentiometers, 200 or 400 ohms, \$1

Mail Coupon for Complete Literature of the FROST-RADIO Line

We want every reader of the "CALL BOOK" to have our complete literature. By filling out and mailing the coupon below you will receive from us FREE our new circulars on "Super-Variable Resistance Units and How to Install Them," Parts and Accessories folders, and literature describing our Rheostats, Potentiometers, Sockets, Plugs, Jacks and many other items.

HERBERT H. FROST, Inc.		CRCB
160 N. LaSalle Street, Chicago		
Please send me FREE your literature about your Super-Variable High Resistance Units, Rheostats, Plugs, Jacks, Parts and Accessories.		
Name.....		
Address.....		
City.....	State.....	

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

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

CITIZENS RADIO CALL BOOK

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

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 Executive Offices:
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MARCH, 1927

Vol. 8, No. 1

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With the Editor

WE wish to thank the large number of readers who filled out and returned the Questionnaire which appeared on page 221 of the December issue. The fine interest and excellent co-operation of the many who went to considerable trouble of replying not only to the questionnaire, but to write additional letters of criticism as well, is greatly appreciated. All replies have been carefully tabulated, the results disclosing some very interesting facts. This information will be used by the Editors of the various departments and will be of considerable assistance to them in preparing editorial matter for future use, which will be of interest to the majority of readers.

THE \$100.00 prize offered for the best letter of constructive criticism received up to the time of going to press, has been awarded to Mr. Bert Barrows, care of the Kenosha Country Club, Kenosha, Wisconsin.

MAY we again call your attention to the recent announcement that the Citizens Radio Call Book will be published four times a year: January 1st, March 1st, September 1st and November 1st, beginning with the September, 1927, issue. This action is taken in compliance with many requests from our readers, and has been made possible only by a substantial increase in our organization. It has been our constant endeavor to furnish only authentic information of the highest quality relative to the construction and description of the various features contained in this publication. We believe we have succeeded in this respect and it is our intention to continue to publish only material of this nature in the future.

THE CITIZENS RADIO CALL BOOK is proud of the type of editorial content appearing in its pages. All material published, except on rare occasions, is the product of its own staff of competent engineers and writers. Receivers and circuits are described only in consideration of their merits and not through the influence of paid advertising. In this respect we believe we enjoy a very high degree of reader confidence, which is clearly demonstrated by the whole-hearted support which has been accorded the magazine by its readers.

F. C. BURLINGTON, 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. Rothmel, 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, E. E. Hayes, 508 So. Dearborn St. Wabash 1901.
 New York—(Branch Office) 1674 Broadway. Circle 4887. Cor. 52nd St.

Philadelphia—C. S. Palmer. 731 Victory Bldg. Walnut 6568.
 Boston—E. H. Jaudon, 99 Chauncey St. Hancock 6974.

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

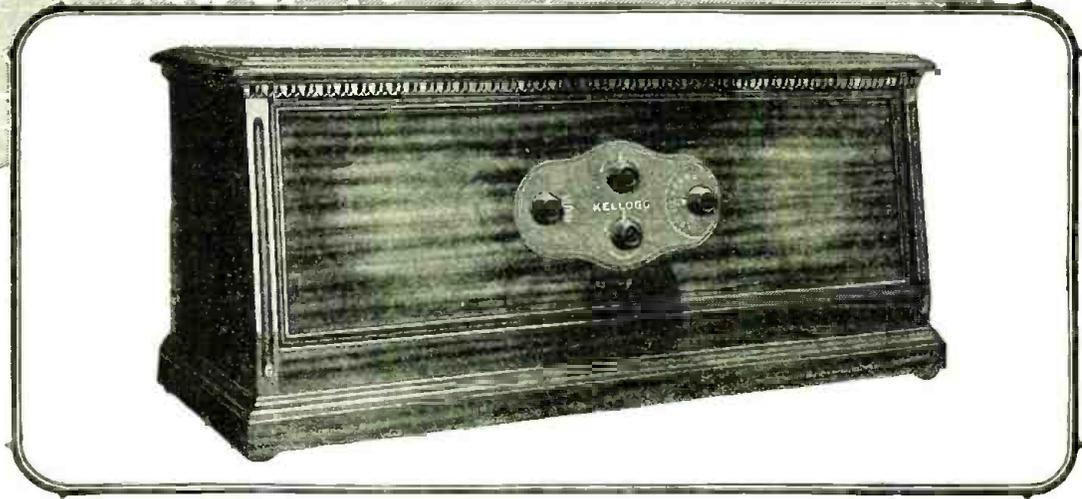
Pacific Coast Rep.—C. N. Ford, 1411 Alta Vista Blvd., Hollywood, Cal.



KELLOGG

Flawless Reproduction

Radio



Licensed under application for letters patent of Radio Frequency Laboratories, Inc. [R. F. L.]

Backed by 29 Years' Telephone Experience



Model 508 includes the apparatus of the table model and the famous Kellogg speaker, with ample space for all batteries or power supply

FLAWLESS, faultless radio reproduction such as Kellogg has attained can come from experience alone. In radio set building, nothing — absolutely nothing — matches experience.

Model 507 receiver is the finished result of our 29 years' experience in voice transmission — a set that cannot squeal or howl — that brings them in with a "punch" to delight the most critical radio fan.

Heavy shielding around and between the coils prevents interference, and three stages of radio frequency give maximum range and selectivity. Take our word for it—here's a receiver that's as perfect as can be made.

Mail this Coupon *Now* for full details of the new Kellogg 507 receiver with the refinements and improvements possible only from an experienced institution like Kellogg

Kellogg Switchboard & Supply Co.
1066 W. Adams St., Dept. 24-C, Chicago

DEALERS FRANCHISES
Dealers now receiving franchises. Write and let us tell you all the things we are doing to make Kellogg sets sell BIG.

Mail the Coupon Today

Please send me full information on the Kellogg Six Tube Receiver, model 507, and on the console model 508.

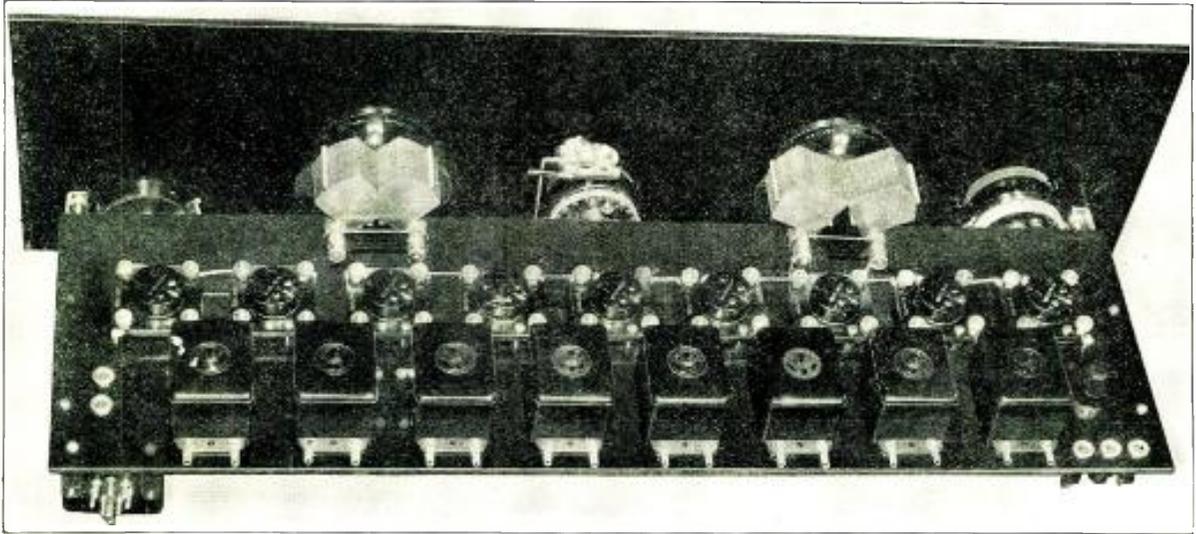
Dept. 24-C

Kellogg Switchboard & Supply Co.
1066 West Adams St. Chicago, Illinois

Name _____

Address _____

If a dealer, interested in a Kellogg Sales Franchise, check here



Nine In Line Today's Best Circuit—

The Nine in Line has become one of today's most popular circuits, chiefly through superior performance. A host of satisfied users from coast to coast endorse it. 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.

Scott World's Record Super Nine

Another circuit which we highly recommend is the Scott World's Record Super Nine, which has established the following distance records:

- (1) New World's Record for LOOP AERIAL RECEPTION—8,375 miles with Loud Speaker Volume.
- (2) New World's Record with the reception, in one night, of SIX FOREIGN STATIONS distant 6,000 miles or more.
- (3) New World's Record for GREATEST NUMBER OF BROADCASTING STATIONS heard that are located 6,000 or more miles away.

Complete kits for building this remarkable receiver, as well as many others, carried in stock. Write for prices.

—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. Only products of proven merit are considered by us and the lines which we carry represent the best in Radio. Our late net catalog No. CBW sent gratis to dealers. Write TODAY.

Distributors of Quality Radio Exclusively

TELEPHONE MAINTENANCE COMPANY

20 South Wells Street, Chicago, Illinois

Established

TELMACO

in 1918

Now! Steinite

Light Socket No-Battery Radio Complete in one Synchronized Unit



Fred W. Stein, Designer of the famous Steinite Circuit

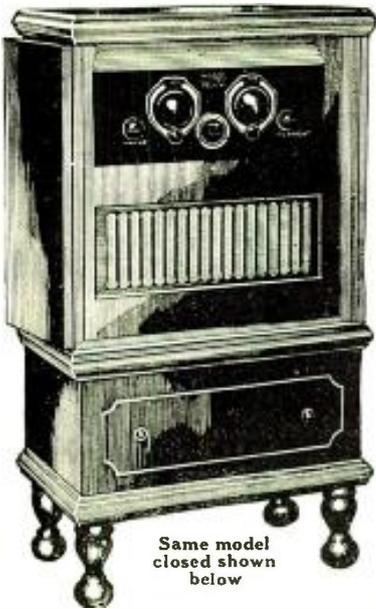
Now you see Steinite in up-to-the-minute models; thousands have marveled at such radio values. Fred W. Stein pioneered radio building. Was deep in its study when most everybody else thought it an idle dream. The Steinite Laboratories, with its large factory facilities, are the outgrowth of this Pioneer radio builder's ideas.

Steinite was first to make definite statements to the radio-interested public about what they could expect of a radio set. "What would it do?" was answered by their definite money-back guarantees.

In their immense factory they do not assemble radio parts, they build radios. With a new invention for a circuit, they first build a machine to make it—for radio, you know, is an absolutely new industry. Beautiful mahogany comes direct to them from the Philippines. This solid mahogany goes into beautiful cabinets, though they could be built of veneer for less money.

Steinite was first to give the radio public prices based on an extremely low profit-policy because of large production. First to change from season to season its manner of distribution to keep the price low and the Steinite Radio efficiency high. Steinite is first, and will continue to be, with astonishing values in Light Socket Radio—the kind demanded today by everyone using electric lighting service, and why? Because of endless battery expense and their renewals. It is a new radio day—regardless of millions invested in battery factories.

Today some people, before they hear the "tone-test," are skeptical of the lasting qualities and efficiency of electric radio—simply because it is new. Radio itself is new. They doubt the same as they did about our first radio models. Being pioneers in radio, we expect it. Any publication in which you see our national advertising will tell you of our reliability and the truth of our guarantees. Today you want to see the set you pay a good sum for. They can no longer be stuck in the mail and go quickly to Connecticut or Florida or Canada in first class shape. Radios the size of Steinite Electrics get right up against distribution problems. And then your dealer in radio is far more experienced today than he was when we began the building of radio. His dependability is higher. He is there regularly to answer your radio questions. With these facts before you, we urge you to see your Steinite dealer. Hear the tone test. Buy by test before you select any radio.



Same model closed shown below

\$150—The Highboy

Built-in Speaker

1c an hour to operate.

All Battery Expense stops now! Faithfully reproduces voices and every musical instrument. Dispels every critical objection you have found with Radio and Radio prices. Hear the tone test today and you will be astonished.

Your Steinite Dealer will show you every courtesy without obligation. Will answer every question you ask about these up-to-the-minute Steinite Models. They bring in every program with fidelity of tone. Highly selective with two-dial control.

**SOLID PHILIPPINE
MAHOGANY CABINETS**

All Models Use New Q. R. S. Rectifier Tube

**12 Months Guarantee
Against All Defects**

**\$100
Table Model**

Without Speaker

Attach to any 60-cycle circuit a.c. 95 to 125 v.

*Today's Outstanding
Values*

What may you expect in naturalness, volume, and lack of distortion. You have perhaps heard the latest type Phonographs that have employed some electrical and radio principles. You may expect the same truthful reproduction and fidelity of tone of this marvelous STEINITE NO-BATTERY RADIO. No chargers, acids or liquids to ruin rugs, furniture, etc.



NO BATTERIES

of any kind. No chemical Rectifiers, acids, liquids or chargers of any sort.

The Battery Expense you will save will pay for one of these Steinite Models.

Hear the Tone Test

Buy by Test—Compare

Pioneer radio experience makes possible this new sensational radio success. These absolutely New Models show prices without Tubes. Solid Mahogany. Cabinets, Dark Brown, Shaded lacquer Finish. 2-Dial control. Nothing needed to complete them but Tubes and aerial. Steinite was first to take extremely low profits because of large production. Hear the tone test—buy by test before you select any radio.

JOBBERS!
Write for Terms and Territory on these popular Steinite Models.
DEALERS!
Write your Jobbers Now

The
HIGHBOY
When
Closed
Makes an
Excellent
Period
Piece



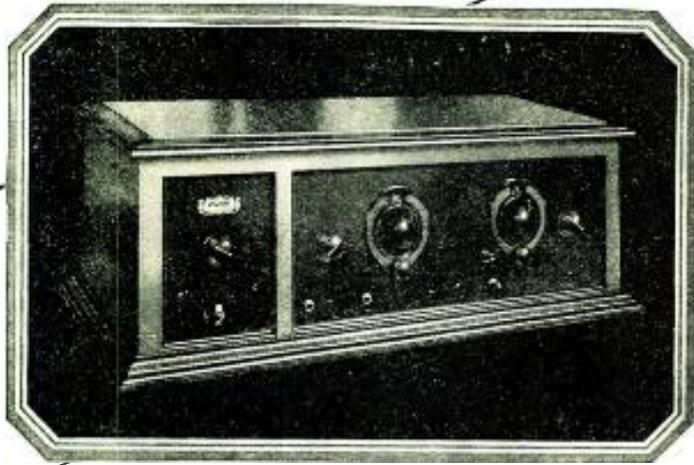
\$150

STEINITE LABORATORIES

Factory at
Atchison, Kansas

Largest Exclusive Radio Factory in the West

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



\$175⁰⁰

Complete with
5 McCullough Tubes
1 Rectron
But without Loud Speaker

Another Clearartone Sensation!

*New Price Reduction Makes Clearartone Model 110 the
Lowest Priced Successful Electric Set*

THINK of it! Only \$175.00 for an electrically operated radio set that eliminates "A" and "B" Batteries. Where else can you get a proven electric set for anywhere near this figure?

A few months ago the Clearartone Model 110 was considered a good buy at \$231.00. Now, in one sweep we have cut the price to \$175.00, including five McCullough Tubes and one rectron (without loud speaker).

How can we afford to do this? Only because mass production has lowered our manufacturing cost. And we are glad to pass this saving on to all radio fans who are looking for a set that will enable them to get rid of their old-fashioned, inconvenient "A" and "B" batteries forever.

Consider these advantages of the Clearartone Model 110: It uses the famous Kellogg McCullough Tubes—one of the most outstanding achievements in radio today. It has an unusually pure tone quality which reproduces instrumental and vocal selections with astonishing fidelity. It will successfully withstand variations of voltage in your house current. It will often bring in distant stations when other sets fail to get a peep out of the air.

The above are only a few of the advantages. You must hear this set to appreciate it. It has created a new era in radio. Write for full details and a demonstration will be arranged.

THE CLEARARTONE RADIO COMPANY
2434 Gilbert Ave., Cincinnati, Ohio

**Los Angeles and Cuba in
One Night!**

"Tested Model 110 out last night with an attic aerial and had Havana, KFI (Los Angeles) on loud speaker very loud. Cuba came in as loud as local stations."

M. G. CALLAHAN, Marion, Ind.



Model 110 T
\$210 with 5 McCullough
Tubes and 1 Rectron Tube

Dealers, Jobbers:

Enlarged production facilities make it possible for us to offer better arrangements. Write for details and quotations.

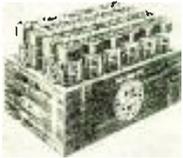
CLEARARTONE *Complete* RADIO SETS

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.

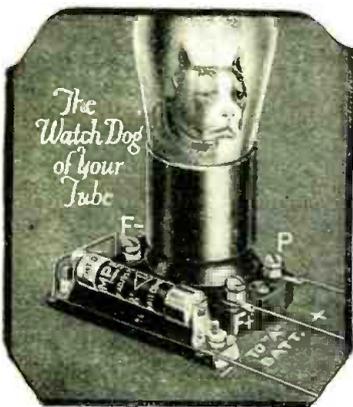
For sale by

The Willard Battery men

and authorized radio dealers



PERFECT Tube Performance demands **AMPERITE**



FREE — Write for
"The Radiall Book"
containing the latest popular
Hook-Ups and Construction
Data, to Dept. CCB-1

NO tube is better than its filament regulation. And Amperite alone guarantees that perfect regulation required to bring the utmost in clarity, volume and tone quality out of your tubes.

With Amperite you can forget both tubes and rheostats. At all times—under every varying battery condition—this variable tube filament current resistance works automatically, eliminating hand rheostats and rendering

every tube fool-proof against damage and premature burn-outs. If you want Amperite performance — insist upon Amperite. Don't be misled into buying substitutes represented as just as good. There is only one Amperite — and nothing else will do. Approved and specified by leading engineers in every popular circuit.

Types for every tube and battery. Sold everywhere. Price complete with mounting \$1.10 (in U. S. A.)

Radiall Company

52 FRANKLIN STREET, NEW YORK

AMPERITE

REG. U. S. PAT. OFF.

The "SELF-ADJUSTING" Rheostat



60c

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.

\$8 to \$11.75



**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.



\$10

**Model 506 "Convertible"
Pin-Jack Voltmeter**

Consists of a "Pin-Jack" voltmeter for use on Radiola, Victor, Brunswick-Balke, Standardyne and Bosch sets by simply plugging it into the pin jacks already provided by the manufacturer. Its use assures operation at correct filament voltage. Remove the "Pin-Jack" voltmeter from filament jacks and plug it into its High Range Stand and you at once have converted it into another instrument that will measure battery voltages and locate circuit troubles. Extra pin-jacks are supplied with each instrument so that it can be mounted on sets not already so equipped.

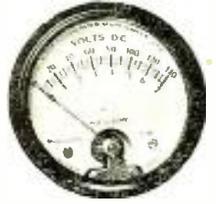
\$15



**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.

\$7 to \$9



**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.



\$13.50

**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.



\$28

**Model 489 Battery
Eliminator Voltmeter**

The latest instrument in the Weston Radio line for the measurement of battery eliminator voltage. Because it has an exceptionally high internal resistance of 1,000 ohms per volt it requires a current of only one milliamperes to produce full scale deflection.

\$13.50 to \$14.50

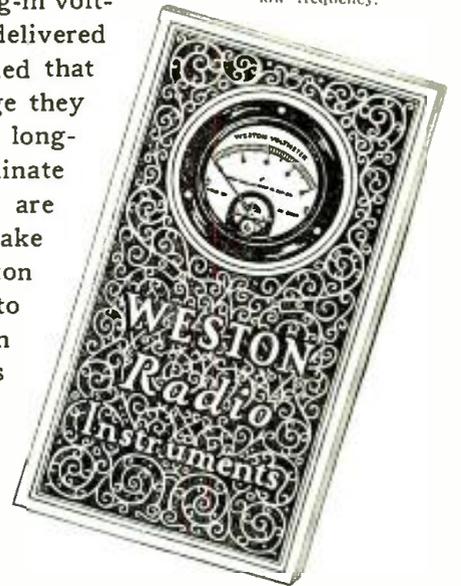


**Model 425
Antennae
Ammeter**

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.

No More Blind Operation!

THE modern trend in set design is toward either a panel voltmeter or pin-jacks for the reception of a plug-in voltmeter to tell the operator the exact voltage being delivered to his tubes. This is because it is well established that if sets are operated at the proper filament voltage they will not only perform better, but they will give long-time satisfaction, reduce tube expense and eliminate many annoyances of reception. Less and less are radios being operated blindly. There is no make of receiver or type of hook-up to which a Weston Quality Radio Instrument cannot be used to advantage. If you wish further information than your dealer can supply you, write us for the interesting free booklet, "Weston Radio Instruments."



WESTON ELECTRICAL INSTRUMENT CORPORATION

1 Weston Avenue.

Newark, N. J.



\$13

**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.

STANDARD THE WORLD OVER

WESTON

Pioneers since 1888



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

American Broadcasting Stations

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. Week days, market and weather reports, 10, 12, 3, 5, 7:20. Time signals, 11:55 am; dinner concert, 6 pm. Evening program, 8 pm; Tues, 7:30. Studio talks, Mon, Tues, Wed, Fri, 7:45. Concert, Tues, 11:35 pm; Thur, 11 pm. Sun, church services, 10:45 am; organ recital, 4 pm; vespers, 4:45; orchestra, 6:30; church services, 7:45.

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

KDYL Intermountain Broadcasting Corp., 1009-10-11 Ezra Thompson Building, Salt Lake City, Utah. 245.8 meters, 1220 kilocycles, 100 watts. Daily, including Sun, 3-5 pm, matinee program. Mon, 8-10 pm, dance orchestra. Tues, 8-9, classical. Wed, 7-8 pm, Courtesy Program. Daily ex Sun, 9-10 pm, 10-11 pm, 11-12 pm, dance orchestra. Mountain time.

KEX Western Broadcasting Co., Portland, Ore. 447 meters, 670.7 kilocycles.

KFAB Nebraska Buick Auto Co., 13th and Ives sts., Lincoln, Nebr. 340.7 meters, 880 kilocycles, 5000 watts. Sun, 9-10 pm. Mon, Tues, Wed, 9:30-9:55 am, 10:30-11 am, 2:15-1:30 pm, 3-3:30 pm, 5:30-6:30 pm, 8-10:10:30 pm. Thurs, 3-4 pm. Fri same as Mon, Tues & Wed. Sat, 9:30-9:55 am, 3-3:30 pm, 5:30-6:30 pm, 8:30-10:30 pm. Slogan: "Home, Sweet Home."

KFAD Electrical Equipment Co., 312-16 N. Central av., Phoenix, Ariz. 273 meters, 1100 kilocycles, 500 watts. Daily, 12-15:15, 3-4, 6-7:30 pm. Tues, Fri & Sat, 8-9 pm. Wed & Thurs, 9-10 pm. Sun, 11 am to 12:30 pm, 8:30-9:30 pm. Mountain standard time. Slogan: "The Voice of Phoenix" and "The Gold Spot of America."

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

KFAU High School, Boise, Idaho. 280.2 meters, 1070 kilocycles, 3000 watts. Sun, 7:30 to 8:30 or 9 pm, church services. Mon, Wed & Fri, 12:30 pm to 1 pm, market, weather, news. Tues, 12:30 to 1 pm, market, weather, news; 7:30-8 pm, 8 pm-10 pm Thurs; 12:30 pm to 1 pm, 8 pm, 10 pm, entertainment. No market or weather; 7:30 pm-8:30 pm, farm news by State Dept. of Agriculture.

KFBB F. A. Buttrey Co., Havre, Mont. 275.1 meters, 1090 kilocycles, 50 watts. Daily ex Sun, 12:30 am-1:30 pm. Wed evening, 7:30-9. Sun, 11 am. Mountain standard time.

KFBC W. K. Azbill and Union League Club of San Diego County, on Roof of Balboa Theater Bldg., San Diego, Calif. 380 meters, 789 kilocycles, 100 watts. Sun, 7-7:30 pm, religious lecture. Daily ex Sat & Sun, 7-10 pm, studio program. Sat, 7-12 pm, frolic. Pacific standard time.

KFBK Kimball Upson Co., 607 K 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 St. Matthews Cathedral (Bishop N. S. Thomas), Laramie, Wyo. 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 pm, studio program. Mountain standard time. Slogan: "The Top of the World."

KFCB Nielsen Radio Supply Co., 311 N. Central av., 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. Thurs, 8 to 9 pm, educational program. Fri, 9 to 10 pm, dance music. Sat, 9 to 10 pm, dance music. Sun, 9:30-10:30 am, community Bible class. Mountain standard time. Slogan: "Kind Friends Come Back."

KFCR Santa Barbara Broadcasting Co., Daily News Bldg., Santa Barbara, Calif. 413 meters, 726 kilocycles, 15 watts.

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

KFDM Magnolia Petroleum Co., Box 798, Beaumont, Tex. 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, 100 watts. Sun, 10:50 am, 7:45 pm. Wed, 9-10 pm. Central standard time.

KFDY South Dakota State College of Agriculture and Mechanic Arts, Brookings, So. Dak. 300 meters, 1000 kilocycles, 500 watts. Mon, Wed & Fri, 12:15 pm, music, weather & market report; 12:30, farm news. Tues, Thurs & Sat, 12:15, music; 12:30, farm news; 7:30 pm. Central standard time.

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 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 its extreme clarity and fidelity of reproduction.



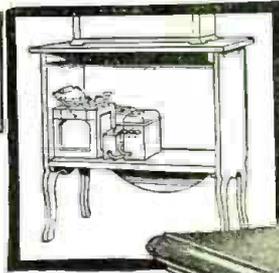
Model 210
22-inch Cone Loudspeaker with easel back
\$15.00
(West of Rockies \$18)
(Pat. Applied For)

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 **\$48.00**
(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 panel, 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



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 **\$40.00**
(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) **\$44.00**
(West of Rockies, \$52.00)



(Pat. Applied For)
Model 1000
with 22-inch Cone Loudspeaker

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.

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

KFDZ Harry O. Iverson, 2510 Thomas av., South Minneapolis, Minn. 230.6 meters, 1300 kilocycles, 10 watts. Central standard time.

KFEC Meier & Frank Co., Portland, Ore. 252 meters, 1190 kilocycles, 150 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.

KFEL Eugene P. O'Fallon (Inc.), Argonaut Hotel, Denver, Colo. 254.1 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."

KFEQ Scroggin & Co. Bank, Robidoux Hotel, St. Joseph, Mo. 267.7 meters, 1120 kilocycles, 2000 watts. Sun, 4:30-6 pm, 8:30-10 pm. Mon, Tues. Wed. Thurs, Fri, Sat, 2-3 pm, 8:30-10 pm. Central standard time.

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

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."

KFH Hotel Lassen (Rigby-Gray Hotel Co.), Wichita, Kan. 267.7 meters, 1120 kilocycles, 500 watts. Sun, 7-10 pm, church services, studio program. Daily ex Sun, 7-2 pm, every hour, markets; 7:30 pm, studio program. Central standard time. Slogan: "Kansas' Finest Hotel—In the Very Heart of God's Country."

KFHA Western States College of Colorado, Gunnison, Colo. 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."

KFHL Penn College, Oskaloosa, Ia. 239.9 meters, 1250 kilocycles, 10 watts. Central standard time.

KFI Earle C. Anthony, Inc., 1000 S. Hope st., Los Angeles, Calif. 467 meters, 642 kilocycles, 5000 watts. Sun, 10 am, church; 6:30-11 pm, musical program. Mon, Wed, Fri, 10:20-11 am, household talk. Daily ex Sat, Sun, 5:30-11 pm, musical program. Sat, 5:30 pm-2 am, musical program. Pacific standard time. Slogan: "National Institution."

KFIF Benson Polytechnic Institute, Portland, Ore. 247.8 meters, 1210 kilocycles, 150 watts. Pacific standard time.

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

KFIQ Dr. I. M. Miller, 332 Miller Bldg., Yakima, Wash. 256.3 meters, 1170 kilocycles, 100 watts. Wed, Sat, 7:30 pm, musical programs. Sun, 11 am, 7:30 pm, church services. Pacific standard time.

KFIU Alaska Electric Light & Power Co., Juneau, Alaska. 225.4 meters, 1330 kilocycles, 10 watts. Mon, Wed & Fri, 6-7 pm, daily news items, steamer sailings, music, vocal and instrumental. Alaska time. (Note: 6 am, Seattle time, is 5 am, Alaska time.) Slogan: "A Voice from the Far North."

KFIZ Fond du Lac Commonwealth Reporter, Fond du Lac, Wis. 272.6 meters, 1100 kilocycles, 100 watts. Daily, 5 to 5:30 pm, markets, weather and news. Occasional evening programs of music. Sun, 6-7 pm, dinner hour concert. Central standard time.

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

KFJF National Radio Mfg. Co., 406 N. Hudson st., Oklahoma City, Okla. 260.7 meters, 1150 kilocycles, 1000 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."

KFJI E. E. Marsh, Astoria, Ore. 245.8 meters, 1220 kilocycles, 15 watts. Wed, 9-10 pm, organ music. Sun, 12:30-1:30 pm. Sat, 10:30-11 pm. Pacific standard time.

KFJM University of North Dakota, Grand Forks, N. Dak. 277.6 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."

KFJR Ashley Dixon & Son, 1350 E. 36th st., Portland, Ore. 263 meters, 1140 kilocycles, 100 watts. Mon, 7:30-8:15 pm, story; 8:15-8:45, Listeners' Service. Tues, 7:30-8:15, junior program; 9:15-10:45, "Music of the Masters." Wed, 7:30-8:30 (1st & 3rd), Y. M. C. A. program (2nd & 4th). Thurs, 7:30-8:15 pm; 8:15-8:30, B. C. L. service; 9-10 pm, music. Fri, 12:30 (midnight), test program. Sat, 1:30-3 pm, music. Pacific standard time.

KFJY Tunwall Radio Co., 1004 Central av., Ft. Dodge, Iowa. 245.8 meters, 1220 kilocycles, 100 watts. Sun, 11 am, church services. Daily ex Sun, daily, 5:45 pm, market and weather reports. Mon, Wed, Fri, 10-11 am, musical. Mon, 11-12 pm, musical. Thurs, 7:30 pm, musical program. Central standard time.

KFJZ W. E. Branch, 3219 Avenue L, Fort Worth, Tex. 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.

KFKA Colorado State Teachers' College, Greeley, Colo. 272.6 meters, 1100 kilocycles, 100 watts. (Schedules to be announced.) Mountain time.

KFKB J. R. Brinkley, M.D., Milford, Kan. 434.5 meters, 690 kilocycles, 5000 watts. Sun, 10-12 am, church services; 8-12 pm, orchestra. Mon, 6-12 pm, popular music. Wed, 6-7, dinner hour; 7:45-8:30, church services. Slogan: "Kansas Folks Know Best."

KFKU University of Kansas, Lawrence, Kan. 275.1 meters, 1090 kilocycles, 500 watts. Mon & Thurs, 12:30-1:30. (Also special broadcasting.) Central standard time. Slogan: "Up at Lawrence on the Kaw."

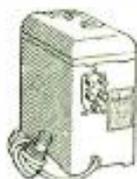
KFKX Westinghouse Electric & Mfg. Co., Hastings, Nebr. 288.3 meters, 1040 kilocycles, 5000 watts. Daily ex Sun & Sat, 9:30 & 10:30 am, 12:15-2 & 7 pm; musical program at 12:40 & 9 pm. Sat, 9:30 & 10:30 am, markets, also 12:15 pm. Slogans: "Empress of the Air" and "Pioneer Radio Repeating Station of the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

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



Add the new Balkite Combination to your radio set now

with your "A" battery it supplies all radio power automatically from the light socket



Three New Balkite "B"'s Including Balkite "B"-X for sets of 8 tubes or less

Eliminates "B" batteries and supplies "B" current from the light socket. Three new models. Balkite "B"-W at \$27.50 for sets of 5 tubes or less requiring 67 to 90 volts, Balkite "B"-X (illustrated) for sets of 8 tubes or less; capacity 30 milliamperes at 135 volts \$42. Balkite "B"-Y for any radio set; capacity 40 milliamperes at 150 volts—\$69. (In Canada: "B"-W \$39; "B"-X \$59.50; "B"-Y \$96.)



The Balkite Trickle and High-Rate Charger

MODEL J. Has two rates. A low trickle charge rate and a high rate for rapid charging. Can thus be used either as a trickle or as a high rate charger. Noiseless. Rates: with 6-volt battery, .25 and .5 amperes; with 4-volt battery, .8 and .2 ampere. Price \$19.50. (West of Rockies \$20. In Canada \$27.50.)



Balkite Trickle Charger, \$10

MODEL K. For those who require a charger of limited capacity only. Rate .5 ampere. Price \$10. (West of Rockies \$10.50. In Canada \$15.)

All Balkite Units operate from 110-120 volt AC with models for 60 and 50 cycles. The Balkite Charger is also made in a 25-40 cycle model.

Now you can operate your radio set from the light socket merely by adding the new Balkite Combination Radio Power Unit. Once connected to your "A" battery and set and plugged into the light socket, it supplies automatic power to both circuits. You need not even turn it off and on, for it is controlled by the filament switch already on your set and is entirely automatic in operation. It will give you a constant quality of reception that cannot be secured in any other way.

Balkite Combination can be installed in a few minutes, either near the set or in a remote location. Like all Balkite Radio

Power Units it has no tubes, nothing to replace or renew, is a permanent piece of equipment, and is built to conform with the standards of the Underwriters' Laboratories. It is noiseless in operation. It will serve any set now using either 4 or 6-volt "A" batteries and requiring up to 30 milliamperes at 135 volts of "B" current—any set of 8 tubes or less, including power tubes.

Add Balkite Combination now and know the pleasure of owning a receiver always ready to operate at full power not only this season but for years to come. Price \$59.50. [In Canada \$83.] Ask your dealer.

FANSTEEL PRODUCTS COMPANY, Inc., North Chicago, Illinois

Balkite Radio Power Units

THE BALKITE LINE OF ELECTROLYTIC DEVICES IS PROTECTED BY EDGAR W. ENGLE U. S. REISSUE PATENT NO. 16,438, DATED OCT. 12, 1926



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

KFLR University of New Mexico, Albuquerque, N. Mex. 254.1 meters, 1180 kilocycles, 100 watts. Fri, 8:10 pm. Mountain standard time. Slogan: "Sunshine Center of America."

KFLU San Benito Radio Club, San Benito, Tex. 236.1 meters, 1270 kilocycles, 100 watts. Wed & Sat, 8-9 pm. Central standard time.

KFLV Swedish Evang. Miss. Church, Rockford, Ill. 228.9 meters, 1310 kilocycles, 100 watts. Fri, 8:30 pm. Sun, 12:30 pm (Swedish), 9:30 pm (English). Central standard time.

KFLX George R. Clough, 3327 Avenue P, Galveston, Tex. 239.9 meters, 1250 kilocycles, 250 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, 500 watts. Sun, 7 pm, college vesper service. Tues, 9:30 pm, lecture. Wed, 9 pm, concert. Fri, 10 pm, organ recital. Central standard time.

KFNF Henry Field Seed Co., Shenandoah, Iowa. 461.3 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 av., Seattle, Wash. 454.3 meters, 660 kilocycles, 1000 watts. Mon, Tues & Sat, 12:30-10 pm. Wed, 12:30-7 pm. Thurs, 12:30-3 pm. Fri, 12:30 pm to midnight.

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

KFON Nichols & Warinner (Inc.), 212 Jergins Trust Bldg., Long Beach, Calif. 232.4 meters, 1290 kilocycles, 750 watts. Sun, 9:30-12 pm, bands, concerts, studio orchestra, etc. Daily ex Sun, 10:30-11:30 am, news bulletins; 11:30-1:30 pm, concerts, organ recitals, news bulletins, etc. Daily ex Mon, 2:30-4 pm, 4-5:30 pm. Daily, 4:30-12 midnight. Pacific standard time. Slogan: "Where Your Ship Comes In."

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

KFOR David City Tire & Elec. Co., David City, Nebr. 225.4 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. 230.6 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: "Radiocasting Church."

KFOX Technical High School, Omaha, Nebr. 247.8 meters, 1210 kilocycles, 100 watts. No regular schedule. Central standard time.

KFOY Beacon Radio Service, 4th & Robert sts., 612 Pioneer Bldg., St. Paul, Minn. 252 meters, 1190 kilocycles, 250 watts. Sun, 2:30 pm, musical. Central standard time.

KFPL C. C. Baxter, 205 Craiton st., Dublin, Tex. 252 meters, 1190 kilocycles, 15 watts. Sun, 7 am. Mon, Thurs, 7-8 pm. Central standard time. Slogan: "Baxter's Place."

KFPM The New Furniture Co., Box 628, Greenville, Tex. 241.8 meters, 1240 kilocycles, 10 watts. Sun, 11 am, services. Mon & Fri, 9 pm, music; Wed, 8 pm, music; 7:15, sports in season; 1 pm daily ex Sun, musical program. Central standard time. Slogan: "Biggest Little Ten Watts on the Air."

KFPR Los Angeles County Forestry, Los Angeles, Calif. 230.6 meters, 1300 kilocycles, 500 watts. Irregular schedule. Pacific standard time.

KFPW St. John's M. E. Church, Box 424, Cartersville, Mo. 258.5 meters, 1160 kilocycles, 50 watts. Sun, 1-2 pm, chapel service. Fri, 8-10 pm, popular and classical. Central standard time. Slogan: "Keeping Pace with Christ Means Progress."

KFPY Symons Investment Co., Symons Block, Spokane, Wash. 273 meters, 1100 kilocycles, 100 watts. Sun, 3:30-5:30, 9 am-10 pm, 11 pm to midnight. Mon, Thurs, 7-8 pm, 8-9 pm. Wed, 6:30-7 pm, 7-8 pm, 9-10 pm. Fri, 7-7:30 pm, 7:30-8 pm. Sat, 7-8 pm. Pacific standard time.

KFQA The Principia, 5539 Page av., St. Louis, Mo. 260.7 meters, 1150 kilocycles, 100 watts. Sun & Thurs, 8-9 pm, church services and lectures. Central standard time.

KFQB Searchlight Publishing Co., Ft. Worth, Tex. 508.2 meters, 1140 kilocycles, 1000 watts. Daily ex Sun & Wed, 8-12 midnight, musical. Sun, 10 am-12 pm, 3-10 pm, church services. Central standard time. Slogan: "Keep Folks Quoting the Bible—KFQB."

KFQD Anchorage Radio Club, Anchorage, Alaska. 300 meters, 999.4 kilocycles, 100 watts.

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

KFQU W. E. Riker, Holy City (Alma P.O.), Calif. 230.6 meters, 1300 kilocycles, 00 watts. 8-9 pm every evening ex Mon (silent). Sat, 11:30-12:30 midnight. Sun, 11 am-12 noon, 8-9 pm. Pacific standard time.

KFQW Carl F. Knierim, Continental Hotel, Seattle, Wash. 215.7 meters, 1390 kilocycles, 100 watts. Daily ex Sun, 4:30-7:30 pm, music; 8-12 pm, dance music. Pacific time. Slogan: "Gateway to Alaska and the Orient."

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

KFQZ L. E. Taft, 5653 De Longpre ave., Hollywood, Calif. 225.4 meters, 1330 kilocycles, 50 watts. Tues, Fri, 9-11 pm, musical program. Pacific standard time.

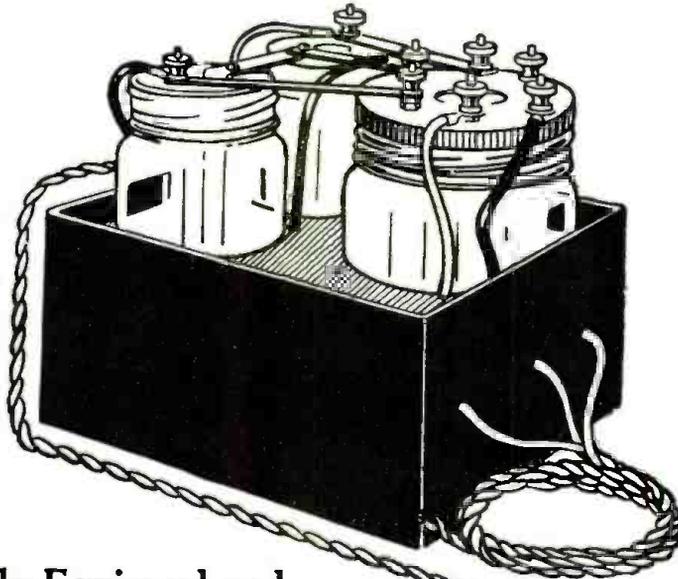
KFRB Hall Bros. (Rialto Theatre), Beeville, Tex. 247.8 meters, 1210 kilocycles, 250 watts. Central standard time.

KFRC Don Lee (Inc.), San Francisco, Calif. 267.7 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.

famous "Perfect" **ONLY** "B" **BELIMINATOR** \$ **4.75** Complete

Operates Splendidly On Any Type of Set

This wonderful new invention, using a special filter circuit, developed after months of experimenting, gives a uniform and constant flow of power that you cannot get from batteries. Special counterpoise effect minimizes "fading" and static. Can be plugged in to any kind of set up to seven tubes.



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Here's the announcement you have been waiting for. The amazing new "Perfect" "B" Battery Eliminator makes "B" Batteries obsolete. Costs much less than a set of cells (it's by far the lowest priced Eliminator ever offered) and it ends plate current troubles forever.

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No "extras" of any kind to buy. The amazingly low price—\$4.75—covers everything. No "bulbs" to break or wear out. No moving parts. A solidly built, permanent addition to your set, all ready to plug in. Works perfectly on ordinary house current, either alternating or direct. Gives power up to 90 volts, using the full wave of the power supply. Operates any set up to seven tubes.

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Once hooked up it works automatically. Just attach it and forget it. Milliampere supply twice as great as any other Eliminator. Only our direct sale method, cutting out the retailers' and jobbers' profits, makes this amazingly low price possible.

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Pin a dollar to the coupon and mail it to us today. The postman will deliver you "Perfect" Eliminator within a few days. Pay him the balance due (\$3.75 plus a few cents postage). Plug in the Eliminator and use it for ten days. If not more than satisfied with results, return it and get your money back. Act NOW and become one of our thousands of enthusiastic users.

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Thousands of enthusiastic users all over the country testify to the quality of "Perfect" Eliminators. And our absolute Money-Back Guarantee makes you the sole judge. If, for any reason, you are not satisfied, simply return your Eliminator in good condition within ten days after you receive it and we will refund your money.

PERFECT ELIMINATOR CO.,
H-11, National Theatre Bldg.,
Cincinnati, Ohio.

I attach \$1.00. Please send "Perfect" Eliminator to me C. O. D. for balance (\$3.75 plus a few cents postage) on your Guarantee as stated above.

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

PROOF! *

"We did not know what a good set we had until we hooked up your Eliminator. It is indeed a 'Perfect' instrument."
—, Louisville, Ky.

"All my friends are asking about my 'Perfect.' It makes my set work better than batteries ever did."
—, St. Louis, Mo.

"I was doubtful about an Eliminator at your astonishingly low price. But you certainly do deliver the goods. I congratulate you on the quality of the device and wish you success."
—, New York, N. Y.

*Names of writers on request.

Reference:

Pearl Market Bank, Cincinnati

Perfect Eliminator Co.

H-11, National Theatre Building

Cincinnati, Ohio

KFRU Stephen's College, a Junior College for Women, Columbia, Mo., "The Athens of the West." 499.7 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."

KFSD Airian 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 Echo Park Evangelistic Association, 1100 Glendale Blvd., Los Angeles, Calif. 275.1 meters, 1090 kilocycles, 500 watts. Sun, 10:30 am-12:30 pm, 2:30-4:30 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., 2126 Markets, Galveston, Tex. 258 meters, 1160 kilocycles, 50 watts. Daily, 10:30 am. Fri, 8 pm. Central standard time. Slogan: "The City of Perpetual Sunshine."

KFUM W. D. Corley, Nevada and Pikes Peak ave., Colorado Springs, Colo. 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. 234.2 meters, 1280 kilocycles, 50 watts. Mountain time.

KFUR Perry Building Co., 420 Twenty-fifth st. (H. W. Peery, Mgr.), Ogden, Utah. 223.7 meters, 1340 kilocycles, 50 watts. Tues, Thurs, Sat, 9:50-11:50 pm, dance music. Mountain time.

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

KFUT University of Utah, Salt Lake City, Utah. 263 meters, 1140 kilocycles, 100 watts. Off air until October or later.

KFVD W. J. & C. I. McWhinnie, Venice, Calif. 208 meters, 1441 kilocycles, 500 watts. Sun, 10-12 pm, Ball Room orchestra. Daily ex Sun, 8-10 pm, musical; 10-12 pm, Ball Room orchestra. Sat, 12 pm, Midnight Frolic from Ship Cafe. Pacific time.

KFVE Benson Broadcasting Corp., 1111 Olive st., St. Louis, Mo. Studio. Missouri Hotel. 240 meters, 1250 kilocycles, 5000 watts. Daily, 10-11 pm. Mon, Wed, Fri & Sat, 7-11 pm. Tues & Thurs, 7-12 pm. Central standard time.

KFVG First Methodist Episcopal Church, 204 S. Penn. ave., Independence, Kan. 236.1 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. 239.9 meters, 1250 kilocycles, 10 watts. Central standard time.

KFVN Carl E. Bagley, Fairmont, Minn. 227.1 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 Olinger Corporation, Denver, Colo. (near), 1075 Pennsylvania st. 243.8 meters, 1230 kilocycles, 50 watts. Mon, Tues, Wed, Fri & Sat, 7-9:30 pm, 12-2 am. Thurs nite silent. Wed, Thurs, 12-1 am. Mountain time.

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

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

KFWB Warner Bros. Motion Picture Studios, Inc., 5842 Sunset Blvd., Hollywood, Calif. 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, San Bernardino, Calif. 291.1 meters, 1030 kilocycles, 200 watts. Sun, 9-12 am, church services; 9-12 pm, musical. Mon, 9 am-1 pm, 4-12 pm. Tues, 11:30 am-12:30 pm, 3-5 pm. 9-12 pm. Wed, 11:30 am-12:30 pm, 4-6 pm, 9-12 pm. Thurs, 12-1 pm, 4-6 pm, 9-12 pm. Fri, 11:30 am-12:30 pm, 3-5 pm, 9-3 pm. Pacific standard time. Slogan: "The Voice of the Orange Empire."

KFWF St. Louis Truth Center, 4030 Lindell st., St. Louis, Mo. 214.2 meters, 1400 kilocycles, 500 watts, non-commercial. Sun, 10:45 am, 7:45 pm, 9 pm, organ & chimes. Thurs, 10:45 am, sunshine hour; 7:45 pm, sermon; 9 pm, music. Central standard time. Slogan: "The Voice of Truth."

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

KFWI Radio Entertainments, Inc., 205 Wiley B. Allen Bldg., San Francisco, Calif. 249.9 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 pm.

KFWM Oakland Educational Society, 1126 Bella Vista av., Oakland, Calif. 325.9 meters, 920 kilocycles, 1000 watts. Sun, 9:30-11 am, 2-3 pm, 7:30-9 pm. Mon, Tues, Thur & Sat, 8-10 pm. Tues, Wed & Fri, 2-3 pm. Pacific standard time. Slogan: "Voice of Oakland."

KFWO Major Lawrence Mott, 346 Claressa av., Avalon, Catalina Island, Calif. 211.1 meters, 1420 kilocycles, 500 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.



Jewell Instruments — —the Standard of Radio

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Dealers
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*Jewell Instruments serve them
← all—and well. There is a Jewell
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Pattern No. 135-A
Tip-Jack voltmeter for filament control



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High resistance, B-eliminator voltmeter



Pattern No. 135-C
Double scale voltmeter for radio testing



Pattern No. 53
Panel mounting voltmeter for the radio set



Pattern No. 135-B
Double scale, panel mounting voltmeter with push button switch. An ideal instrument

The testing needs of the Radio industry and trade required the production of special instruments and test sets. Jewell pioneered in this field. Far in advance of the established demand for radio testing equipment we have foreseen the need and completed the development of new instruments to meet that demand.

Our line of quality instruments is very complete, with a great variety to cover the field. The testing needs of the dealer have been cared for in special devices. For the amateurs and set builders we have provided many styles of portable and panel mounting instruments.

Jewell Instruments are reliable, and they are the universal choice of radio.



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Radio voltmeter for testing batteries, circuits, etc.



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Ask us to send you a copy of our Radio Instrument catalog No. 15-C, which describes our various instruments in detail.



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Two-inch panel, mounting instrument for the radio set. Either voltmeter or milliammeter



Pattern No. 107
Jr. tube checker for testing tubes at home



Pattern No. 110
Radio tube tester for dealers



Lightning Arrester
The standard lightning protection for radio sets



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An automatic trickle charger and B-eliminator switch. Very convenient



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"27 Years Making Good Instruments"

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

KFWV Broadcast Studios, Inc., 385 58th st., South Portland, Ore. 212.6 meters, 1410 kilocycles, 50 watts. Sun, 6-7 pm, Benson Hotel dinner music. Mon, Fri & Sat, 10-11 am, housewife hour. Mon, 9-10 pm, 6-7 pm, Benson; 7-8 pm, organ; 8-9 pm, dinner music. Tues, 10-11 am, housewife hour; 6-7 pm, Benson; 7-8, 8-9, 9-10, 10:40-12 pm, musical program. Wed, 10-11 am, housewife hour; 5-6 pm, 6-7 pm, 7-8 pm, organ; 8-9, 9-10, 10-11 pm, music. Thurs, 10-11 am, housewife music hour; 5-6, 6-7 pm, Benson; 7-8 pm, organ, 8-9 pm. Sat, 10:40-12 pm.

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

KFXD Service Radio Co., East Center st., Logan, Utah. 205.4 meters, 1460 kilocycles, 10 watts. Mountain time.

KFXF Colorado Radio Corporation, Brown Palace Hotel, Denver, Colo. 422 meters, 710 kilocycles, 500 watts. Mon, Tues, Wed, Fri & Sat, 6:30-12 pm. Slogan: "The Voice of Denver."

KFXH Bledsoe Radio Co., 115 S. El Paso st., El Paso, Tex. 241.8 meters, 1240 kilocycles, 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 R. G. Howell Olinger Gardens, Edgewater, Colo. (Portable) 215.7 meters, 1390 kilocycles, 50 watts input. Mon & Fri, 1-2 pm, matinee; 6-7 pm, dinner hour. Tues, Thurs & Sat, 6-7 pm. Wed, 1-2 pm, 6-7 pm. Sun, 5:30-6:30 pm, organ recital. Slogan: "America's Senic Center."

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

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

KFYF Carl's Radio Den (Carl Newcomb), Oxnard, Calif. 214.2 meters, 1400 kilocycles, 15 watts. Mon, Tues, Wed, 5-6 pm, crop reports, news, music; 8-11 pm, music. Fri & Sat, 5-6 pm, crop reports, news, music. Slogan: "The Baby Super Station."

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

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

KFYR Hoskins-Meyer, Inc., 200 4th st., Bismarck, N. Dak. 247.9 meters, 1210 kilocycles, 15 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.

KGAR The Tucson Citizen, 80 S. Stone av., 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. Mon, Tues, Wed, Thurs, Fri, 4-5 pm. Mountain standard time.

KGBS Arthur C. Daily, 844 E. 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.

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

KGBW Martin Brotherson, 112 W. 6th st., Joplin, Mo. 262.3 meters, 1066 kilocycles.

KGBX Foster-Hall Tire Co., 1221 Fred av., St. Joseph, Mo. 347.8 meters, 862 kilocycles, 15 watts.

KGBY A. C. Dunning, Shelby, Nebr. 202.6 meters, 1480 kilocycles, 15 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. Greeley, Decorah, Iowa. 280.2 meters, 1070 kilocycles, 10 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.

KGCB Wallace Radio Institute, 105 W. 13th st., Oklahoma City, Okla. 331 meters, 905.8 kilocycles, 100 watts.

KGCC Moore Motor Company, Newark, Ark. 239.9 meters, 1250 kilocycles, 100 watts. Sun, 2:30-3:30 pm, concert. Wed, 9-10 pm, popular concert. Sat, 10-11 pm, frolic. Central standard time.

KGCH Wayne Hospital, Wayne, Nebr. 434.5 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."

KGCI Searcy M. Rhodes, 716 Gramercy st., San Antonio, Tex. 239.9 meters, 1250 kilocycles, 100 watts.

KGCL Louis Wasmer and Archie Taft, 609 Washington Blvd., Seattle, Wash. 230.6 meters, 1300 kilocycles, 15 watts.

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

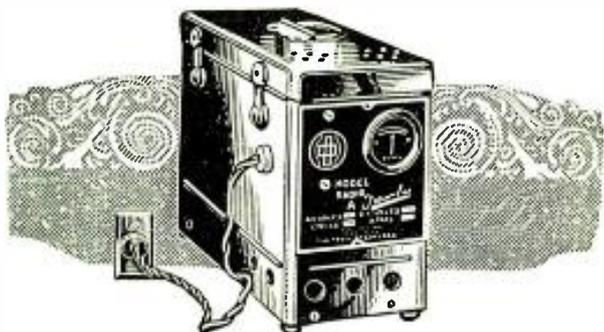
KGCR Cutlers Radio Broadcasting Service, 415 Main st., Brookings, S. Dak. 252 meters, 1190 kilocycles, 15 watts.

KGCU Mandan Radio Association (A. W. Nordholm), Mandan, N. Dak. 285 meters, 1052 kilocycles, 100 watts.

KGCX First State Bank of Vida, Vida, Mont. 240 meters, 1249 kilocycles, 7½ watts.

KGDA Home Auto Co., Dell Rapids, S. D. 254.1 meters, 1180 kilocycles, 15 watts.

A·B & C Radio Power from your light socket



Kodol Transifiers

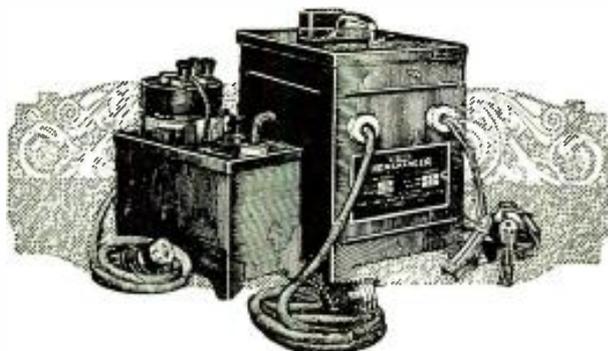
Operate any radio receiver direct from the light socket. Eliminate all A, B and C batteries. Absolutely no hum or noise—gives increased volume, a purer, richer tone—will improve the reception from any receiver. No moving parts to wear out. Will last indefinitely. Can be used on any make or type of set, 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 180 volts "B" current.....	\$60.00
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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.]

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*The World's Largest
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KODEL
POWER SPECIALISTS SINCE 1912

*of Radio Power
Devices*

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

KGDE Jaren Drug Co., Barrett, Minn. 232.4 meters, 1290 kilocycles, 50 watts.

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

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

KGDM Victor G. Hoping, 332 E. Channel st., Stockton, Calif. 217.3 meters, 1380 kilocycles, 5 watts.

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

KGDP Boy Scouts of America, Pueblo Council (John D. Price). 260.7 meters, 1150 kilocycles, 10 watts.

KGDR Radio Engineers, 315 W. Travis st., San Antonio, Tex. 240 meters, 1249 kilocycles, 15 watts.

KGDW Frank J. Rist, Humboldt, Nebr. 241.8 meters, 1240 kilocycles, 100 watts.

KGDX William E. Antony, 1513 Laurel st., Shreveport, La. 291.1 meters, 1030 kilocycles, 500 watts.

KGDY J. Albert Loesch (Hanson Hardware Co.), Oldham, S. Dak. 210 meters, 1428 kilocycles, 15 watts.

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

KGEF Trinity Methodist Church, Los Angeles, Calif. 516.9 meters, 580 kilocycles, 1000 watts.

KGEH Eugene Broadcast Station, Eugene Hotel, Eugene, Ore. 236.1 meters, 1270 kilocycles, 50 watts.

KGEN E. R., Irey & F. M. Bowles, El Centro, Calif. 281 meters, 1067 kilocycles, 15 watts.

KGEQ The Glenwood Radio Station, Minneapolis, Minn. 330 meters, 908.6 kilocycles, 50 watts. Daily, 7:30 pm, news, weather reports, road conditions, etc.

KGER C. Merwin Dobyns, Long Beach, Calif. 325.9 meters, 920 kilocycles, 100 watts.

KGES Central Radio Electric Co., Central City, Nebr. 205.4 meters, 1460 kilocycles, 10 watts.

KGEU L. W. Clement, Lower Lake, Calif. 222 meters, 1351 kilocycles, 10 watts.

KGEW City of Fort Morgan, Fort Morgan, Colo. 256 meters, 1171 kilocycles, 10 watts.

KGEY J. W. Dietz, Denver, Colo. 204 meters, 1470 kilocycles, 15 watts.

KGO General Electric Co., Oakland, Calif. 361.2 meters, 830 kilocycles, 5000 watts. Sun, 11 am, 7:30 pm, church services; 6:30-7:30 pm, 9-10 pm, concert music. Daily ex Sun, 11:30 am, luncheon program; 1:30 pm, stock reports; 6 pm, dinner concert; 6:55 pm, evening reports. Mon, 5:30 pm, Kiddies' Club. Wed, 5:30 pm, Columnist. Thurs, 5 pm, Boys' hour. Tues, Thurs, Sat, 9:15 pm, studio program. Wed, 8 pm, farm program. Sat, 8 pm, sport review. Tues, Fri, Sat, dance program. Pacific standard time. Slogan: "Pacific Coast Station."

KGRC Gene Roth & Co., San Antonio, Tex. 315 meters, 951.8 kilocycles, 50 watts.

KGRS Gish Radio Service, 108 E. 8th st., Amarillo, Tex. 234.2 meters, 1280 kilocycles, 100 watts, class A. Daily ex Sun, 6:30 am-6:30 pm; 10 am, weather & markets. Mon, Wed, Fri, 9 pm. Sun, 11:30 am, 4:30 pm, 7:30 pm. Central standard time.

KGTT Glad Tidings Temple—Bible Institute, 1471 Ellis st., San Francisco, Calif. 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."

KGU The Advertiser Publishing Co., 217 King st., Honolulu, Hawaii. 270.1 meters, 1110 kilocycles, 500 watts. 2½ hours later than Pacific time. Daily ex Sun, 12-1 pm, weather, stocks, musical. Mon & Thurs, 7:30-9:30 pm, Tues & Fri, 7:30-9 pm, musical. Sat, 1:45-5 pm, sports. Sun, 11 am-12 pm; 6:30 pm, 7:30-9 pm, church services. Slogan: "In the Land of Sunshine, the Future Playground of America."

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

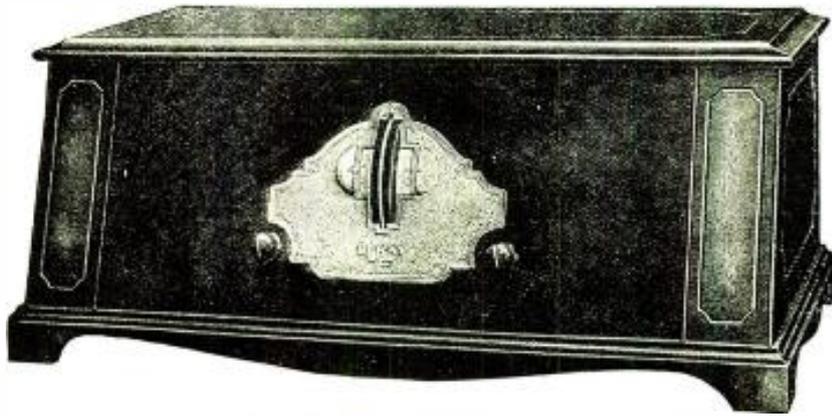
KGY St. Martins College, Lacey, Wash. 277.6 meters, 1080 kilocycles, 50 watts. Tues, Thurs, Sun, 8:30-9:30, PST concert. Pacific standard time. Slogan: "Out Where the Cedars Meet the Sea."

KHJ Times-Mirror Co., 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., Peyton Building, 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."

KICK Atlantic Automobile Co., Anita, Ia. 272.6 meters, 1100 kilocycles, 100 watts.

KJBS Julius Brunton & Sons Co., 1380 Bush st., San Francisco, Calif. 234.2 meters, 1280 kilocycles, 5 watts. Sun, (summer schedule—silent). Daily ex Sun, 9-11:30 am, 2-4 pm. Slogan: "San Francisco's Baby Station."



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ELKAY owners do not abandon their receivers in hot weather; they move them out into the sun parlor! The Elkay Senior is an all-year satisfaction. It is extremely sensitive to far-distant signals. This, with good, uniform volume, practically solves what is really summer's only handicap.

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The "Junior" is Elkay quality thru and thru. It is a T. F. R. receiver built after the most approved practice of the day. Shielded coils, cushioned detector, simplified dual thumb dial tuning, combined transformer and resistance coupling. Designed for those who want Elkay quality and precision engineering, but who cannot afford to invest more than \$80, which is the price minus accessories. Write for folder.



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THE LANGBEIN-KAUFMAN RADIO CO.

Dept. C,

62 Franklin Street,

New Haven, Conn.

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

KJR Northwest Radio Service Co., 611 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.

KKP City of Seattle, Harbor Department, Seattle, Wash. 260 meters, 1153 kilocycles, 15 watts.

KLDS Reorganized Church of Jesus Christ of Latter Day Saints, Independence, Mo. 440.9 meters, 680 kilocycles, 1000 watts. Sun, 8:30-11 am. 3-6:30 pm, 9 pm. Mon, silent. Tues, 6:30 am, 2:30 pm, 7 pm, 8 pm. Wed, silent. Thurs, 2:30 pm, 7 pm, 8 pm. Fri, 6:30 pm. Sat, 7 pm, 8 pm. Morning devotional, Tues & Fri, 6:30 am. Slogan: "The Station Dedicated to Knowledge, Liberty, Divinity and Service."

KLS Warner Bros. Radio Supplies Co., 2201 Telegraph av., 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 & Sat, 7-7:30 pm, news broadcast. Wed, 6:30-7 pm, orchestra; 7-7:30 pm, news; 8-10 pm, studio. Fri, 7-7:30 pm, news; 8-10:30, studio. Pacific standard time. Slogan: "Where Rail and Water Meet."

KLZ Reynolds Radio Company, 17th and Broadway, Denver, Colo. 384.4 meters, 780 kilocycles, 500 watts. Sun, 7:45-10, services from Sunshine Rescue Mission; 11 pm, Rivoli Theatre. Mon, 8-10 pm, studio program; 11 pm, organ program. Tues, 8-10 pm, studio program. Wed, 7-9 pm, studio program. Fri, 6:30-7 pm, Movie Club; 7 pm, Wilshire lecture; 9 pm, dance program. Sat, 8 pm, studio program; 9 pm, dance program.

KMA Earl E. May Seed & Nursery Co., Shenandoah, Iowa. 461.3 meters, 650 kilocycles, 500 watts. Sun, 8:30-9:30 am, sacred; 12:15-1:30 pm, talk and music; 4-5 pm, sacred service. Mon, 6-7 am. 9-10 am. 11-12:30 pm, 5:30-7 pm, 9-11 pm. Wed, 5:30-7 am, 11-12:30, 5:30-7 pm, 9-11 pm. Thurs, 9-10 am, 11:30-12:30, 5:30-7:30 pm. Fri, 6-7 am. 9-10 am, 11-12:30, 5:30-7, 9-11 pm. Sat, 6-7 am, 9 am, 11-12:30, 2-3 pm, 5:30-7 pm, 9-11 pm. Central Standard time. Slogan: "Keeps Millions Advised."

KMED W. J. Virgin, Sparta Bldg., Medford, Ore. 250 meters, 1199 kilocycles, 50 watts.

KMIC J. R. Fouch, Inglewood, Calif. 387 meters, 774.7 kilocycles, 500 watts.

KMJ Fresno Bee, Fresno Calif. 234.2 meters, 1280 kilocycles, 50 watts. Mon, Wed, Fri, 7:15-9 pm. Pacific time.

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

KMMJ M. M. Johnson Co., Clay Centre, Neb. 228.9 meters, 1310 kilocycles, 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 Hotel Winthrop (Love Electric Co.), Tacoma, Wash. 250 meters, 1200 kilocycles, 500 watts. Sun, 11-12 am, 6:15-7 pm, 8-9 pm. Mon, 10-11 am, 2-4 pm, 7-8 pm. Tues, 10-11 am, 2-4 pm, 7:30-11 pm. Wed, 10-11 am, 2-4 pm, 8-9 pm. Thurs, 10-11 am, 2-4 pm, 8-10 pm. Fri, 10-11 am, 2-4 pm, 7-8, 10-11 pm. Sat, 10-11 am, 2-4 pm, 6:15-7 pm, 10-11 pm. Pacific time.

KMOX KMOX, Voice of St. Louis (Inc.), St. Louis, Mo. 280.2 meters, 1070 kilocycles, 5000 watts. 9 pm, Skouras Brothers Sunday night club; 6:30 pm, Jacquinet Jules, organist; 7 pm, KMOX Radio orchestra; 8 pm, KMOX Radio orchestra; 9 pm, "By the Banks of Bonny Doon." KMOX Radio orchestra; 10 pm, KMOX Radio orchestra.

KMTR Echophone Mfg. Co., 1025 N. Highland av., Los Angeles, Calif. 370.2 meters, 810 kilocycles, 500 watts. Sun, 6:30-7, 7-9 pm, church services. Daily ex Sun, 9:30 am, 12 midnight, programs vary. Pacific time. Slogan: "Echoes of Hollywood."

KNRC Kierulff & Ravenscroft Co., Municipal Auditorium Bldg., Ocean Park, Santa Monica, Calif. 238 meters, 1260 kilocycles, 500 watts. Sun, 10:45-11:45 am, 2:30-4 pm, 5:15-10 pm. Mon, Tues, Wed, Thurs & Fri, 6-11 pm. Sat, 6 pm-1 am. Pacific standard time. Slogan: "The Station With a Smile."

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; 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, 1000 watts. Mon, 11:55 am-12 pm, time signals; 9:55-10 pm, time signals; 12-12:02 n, weather reports; 12:02-12:10 pm, New Mexico road reports; 12:10-12:30 pm, news briefs. Wed, 9:55-10 pm, standard mountain time signals; 10-10:02 pm, U. S. W. B. reports; 10:02-10:10 pm, New Mexico road reports. Mountain standard time. Slogan: "The Sunshine State of America."

KOCH Central High School, Omaha, Neb. 258.5 meters, 1160 kilocycles, 500 watts. Sun, 3-5 pm, classical. Mon, Tues, Thurs, & Sat, 9-10:30 pm, musical. Central standard time. Slogan: "The Voice of 2,000 Students."

KOCW Oklahoma College for Women, Chickasaw, Okla. 252 meters, 1190 kilocycles, 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 Co., 1124 6th st., Council Bluffs, Iowa. 305.9 meters, 980 kilocycles, 5000 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 KOIN (Inc.), Sylvan, Ore. 319 meters, 940 kilocycles, 1000 watts. Daily ex Sun, 3-4 pm, news bulletin and musical program from The Portland News. Nightly ex Sat & Sun, studio diversified musical program from 8-10 pm. Sat night silent. Sun, 6-7 pm, 7:50-9 pm, broadcast of church services from First Church of Christ, Scientist, Portland, Ore. Slogan: "The Station of the Hour."

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Any radio set—no matter what type, make, or age—can instantly be transformed to give you such rich and clear and natural reproduction of music and speech that you will be absolutely astounded. You cannot duplicate Truphonic amplification, *no matter how much you can afford to pay.* At the low price of \$25, the Truphonic brings a thrilling new enjoyment of radio within the reach of all.

Truphonic amplification is not surpassed—at any price

If you want this new thrill in radio, do this: Get the Truphonic Amplifier at your radio dealer's. Place it alongside, or behind your set. Make one simple connection to your set. (A clip goes over one prong of the detector tube—done in 10 seconds.) Connect the battery cable. Take the regular standard audio tubes from your set. Insert them in the Truphonic, along with an extra tube (either 201A or power tube). Plug loud speaker into Truphonic. That is all. The rest is a song of praise from you and from all of your friends who hear it.

The Truphonic employs an audio coupling system that is definitely superior to transformers, resistance coupling, or impedance. Three stages of this advanced coupling give much greater distortionless volume than is possible by any other method.

Power tubes can be used, and in fact are recommended for the very best results, owing to the fact that for great volume a power tube has a much greater undistorted output capacity than a 201A.

We recommend using a UX171 tube. (The wiring to extra

B and C batteries is provided for in the Truphonic cable.) This combination gives exceptional volume, with an unapproached faithfulness. But in any case, whether you use a power tube or not, the Truphonic will vastly improve upon your present reproduction.

Truphonic Amplification is also available in the form of a complete Catacomb Assembly in which, in addition to three stages of Truphonic audio coupling and an output unit, sockets are provided for 6 tubes, enabling the set-builder to merely assemble and hook up to the tuning end. A professional set incorporating the 6 tube Catacomb Assembly (\$25) and the Triple Localized Control Tuning Unit (\$10) is described in this magazine.

If your dealer has not yet stocked Truphonic Amplifying units, we will send the type you want, direct. Give your dealer's name and address.

Alden Mfg. Company, Dept. F-6, Springfield, Mass.

NA-ALD

TRUPHONIC
POWER AMPLIFIER

NA-ALD

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

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

KOWW Frank A. Moore (Inc.), Elks Bldg., Walla Walla, Wash. 285 meters, 1052 kilocycles, 500 watts. Daily ex Sat-Sun, 4:15 pm, news, markets & weather, 7-8 daily ex Sun; 8-12 pm, studio & orchestra. Sun, church service, 11-12 am.

KPCB Pacific Coast Biscuit Co., Seattle, Wash. 521 meters, 575.5 kilocycles, 50 watts.

KPJM Wilburn Radio Service, Journal Miner Bldg., Prescott, Ariz. 215 meters, _____ kilocycles, 15 watts. Indefinite schedule, broadcasting only sports & feature news. Mountain 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."

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

KPRC Houston Post-Dispatch, Houston, Texas. 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 & Sun, 11-12 midnight. Central standard time. Slogan: "Kotton Port Rail Center."

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

KQV Doubleday Hill Elec. Co., 719 Liberty av., Pittsburgh, Pa. 409 meters, 733.4 kilocycles, 500 watts. Daily ex Sat & Sun, 10:30-11:15 am, music; 3-4 pm, music and baseball scores. Eastern standard time. Slogan: "The Smoky City Station."

KQW 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 service. 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."

KRAC Caddo Radio Club, State Fair Grounds, Shreveport, La. 220 meters, 1363 kilocycles, 50 watts.

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

KRLD Dallas Radio Laboratories (Inc.), 208 N. St. Paul st., Dallas, Texas. 357.1 meters, 839.6 kilocycles, 500 watts.

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

KRSC Radio Sales Corp., 1202 Fifth av., Seattle, Wash. 499.7 meters, 600 kilocycles, 50 watts.

KSAC Kansas State Agricultural College, Mantattan, 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. 261 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. Wed, 8-9, musical. Thurs, Fri, 8-9 pm, musical. Sat, 9-11, hotel dance. Central standard time. Slogan: "Keep Shreveport Before America."

KSD St. Louis Post-Dispatch, 12 & 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, Wed & Fri, 9-11 pm. Daily ex Sun, 3-4 pm. Sat, 10-12 pm. Western time. Slogan: "Kummunity Southeast Idaho."

KSL Utah Radio Service Corp., Vermont Bldg., Salt Lake City, Utah. 299.8 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."

KSMR Santa Maria Valley R. R., Santa Maria, Calif. 282.8 meters, 1060 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. 405.2 meters, 740 kilocycles, 500 watts. Sun, 11 am, church services. Mon, Tues, Wed, Thurs, Fri, 12 noon, 6:30-8:30 pm, musical. Sat, 12 noon, Sunday school. Sat, silent night. Central standard time. Slogan: "Keep Serving Others."

KSOO Sioux Falls Broadcast Association, 609 Minnehaha Bldg., Sioux Falls, S. D. 360 meters, 832.8 kilocycles, 100 watts.

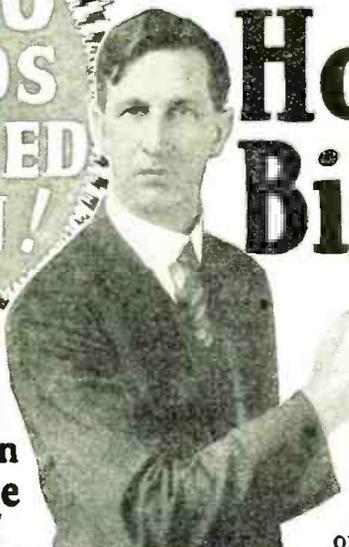
KTAB The Associated Broadcasters (Inc.), 1410 10th av., Oakland, Calif. 302.8 meters, 990 kilocycles, 1000 watts. Sun, 9:45-12:30 pm, 7:45-9:30 pm, church services. Daily ex Sun, 8:45-10 am, 5-6 pm, 7-7:30 pm. Daily ex Sat, Sun, 8-10 pm. Pacific standard time. Slogan: "Knowledge, Truth and Beauty."

KTAP Robert B. Bridge, Radio Service Shop, 2412 Main av., San Antonio, Texas. 263 meters, 1140 kilocycles, 50 watts. Sun, 4-6 pm, varied musical program. Daily ex Sun, 6:30-7:30, calisthenics; 10:15-11:30, weather bulletins, music; 12:30-2 pm, road bulletins, music; 6:30-7:45 pm, music; 9:30-10:30 pm (ex Mon), music. Central standard time. Slogan: "Kum To America's Playgrounds."

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 lessons. Sun, 10:45 am, 7:15 pm, church services; 6 pm, vespers. Pacific standard time.

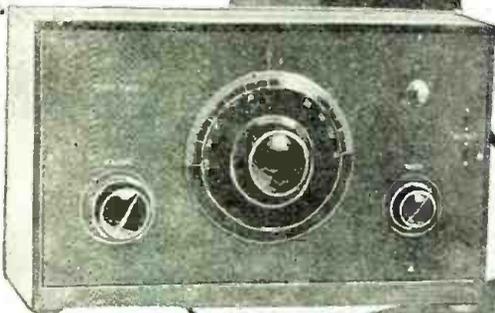
KTBR Brown's Radio Shop, 393½ Yamhill st., Portland, Ore. 263 meters, 1140 kilocycles, 50 watts. Mon & Wed, 11 am-12 noon, 1:30-2:30 pm, 6-7:30 pm, 8:30-9:30 pm. Tues, 11 am-12 noon, 1:30-2:30 pm, 7-7:30 pm. Thurs, 11 am-12 noon, 1:30-2:30 pm, 6-9 pm. Sat, 11 am-12 noon, 3-4 pm, 7-9:30 pm.

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"I am in business for myself and RECENTLY MADE \$70 in ONE DAY. I was an electrician of rich experience, occupying a splendid position as telephone superintendent when I enrolled with you believing it would open up greater opportunities—have not been disappointed. Estimate Radio will be worth tens of thousands of dollars to me in next few years." T. M. Wilcox, Belle Island, Newfoundland.

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My Radio course World-Famous as the training that "pays for itself." Make more money QUICK when you take up this practical course. Work on millions of antennae, receiving sets, offers you big chance to make spare time cash while you're learning. I'll show you how—teach you the latest "dope," furnish you with business cards, show you how to get the business and make it pay. My students don't wait a year to increase their income—they report QUICK INCREASES as a result of this course—often two or three weeks after starting. Howard Luce, Friedens, Pa., made \$320 in 7 weeks during spare time. D. H. Suitt Newport, Ark., writes, "While taking the course I earned in spare time work about \$900." Earl Wright, Omaha, reports making \$400 in a short time while taking course—working at Radio in spare time! Sylvester Senso, Kaukanna, Wis., made \$500. These records not unusual—these men a few of hundreds.

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We who know the results this practical tested training gets—the increased earnings it has brought to men everywhere—stand behind it all the way under a contract that pledges you full satisfaction or money refunded on completing our training. No strings to this offer—you yourself are the only judge. Get started today! It's your big chance for one of the bigger Radio jobs—mail coupon NOW for my Big FREE BOOK and proof! No obligation.

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"Accepted a position with the Chicago Daily News Station WMAQ. MY INCOME PRACTICALLY DOUBLED thanks to you. I handle all consultation, also do operating. Your course taught me not only the theoretical but also the practical knowledge that makes my work easy for me." Keith Kimball, Station WMAQ, Chicago, Ill.

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KTHS The Arlington Hotel, Hot Springs, Ark. 374.8 meters, 800 kilocycles, 1000 watts. Sun, 11 am-12:15 pm, 9-12 pm, music. Daily ex Sun, 12:30-1:30 pm, markets; 9 pm-12 midnight, music. Central standard time. Slogan: "Kum to Hot Springs."

KTNT Norman Baker, Muscatine, Iowa. 333.1 meters, 900 kilocycles, 10,000 watts. Daily ex Sat & Sun, 12-12:30 noon, 8-9 pm; home folks program, 12-12:30 pm. Sun, 2:30-3 pm, 9-10 pm. Central standard time. Slogan: "Caliphone Studio KTNT First New Tone in 40 Years."

KTUE Uhalt Electric Co., 614 Fannin St., Houston, Tex. 263 meters, _____ kilocycles, 5 watts. Daily, 5:30-6:30 pm. Central standard time.

KTW First Presbyterian Church 7th av. and Spring st., Seattle, Wash. 454.3 meters. 660 kilocycles, 1000 watts. Sun, 11 am to 1 pm, 3-4 pm, 7:30-9:30 pm. Pacific time.

KUJ Puget Sound Radio Broadcasting Co., 5811 5th av., Seattle, Wash. 352.5 meters. 850.6 kilocycles, 15 watts.

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

KUOM State University of Montana, Missoula, Mont. 243.8 meters, 1246 kilocycles, 500 watts. Mon & Thurs, 8 pm, music & popular educational talks. Sun, 9:15 pm, sacred concert & sermon. Mountain standard time.

KUSD University of South Dakota, Vermillion, S. D. 277.6 meters, 1080 kilocycles, 1000 watts. Wed, 8-10 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."

KVI Puget Sound Radio Broadcasting Co., 9th & A sts., Tacoma, Wash. 342.5 meters, 875.4 kilocycles, 15 watts.

KVOO South Western Sales Corp., Bristow, Okla. 374.8 meters, 800 kilocycles, 1000 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 band. Central standard time.

KVOS L. L. Jackson & L. Kessler, 1208 10th av., Seattle, Wash. 333.1 meters, 900 kilocycles, 500 watts.

KWCR H. F. Paar, 1444 2nd av. E., Cedar Rapids, Iowa. 296 meters, 1013 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., Port Stockton, Calif. 248 meters, 1210 kilocycles. 50 watts. Sun, 4-5 pm, ensemble. Daily ex Sun, 4-5 pm, 8-9 pm. Pacific time. Slogan: "The Voice of the San Joaquin Valley."

KWKC Wilson Duncan Studios, 39th & Main sts., Kansas City, Mo. 236.1 meters. 1270 kilocycles. 100 watts. Tues, Wed, Thurs, Fri, 7-9:15 pm. Central standard time. Slogan: "Keep Watching Kansas City."

KWKH W. K. Henderson Iron Works & Supply Co., Spring & Fanning sts., Shreveport, La. 312.3 meters, 960 kilocycles, 1000 watts.

KWSC The State College of Washington, Pullman, Wash. 348.6 meters, 860 kilocycles, 500 watts. Mon, Wed, Fri, 7:30-9 pm. Pacific standard time. Slogan: "The Voice of the Cougars."

KWTC Dr. John Wesley Hancock, 1101 N. Ross st., Santa Ana, Calif. 263 meters. 1140 kilocycles. Daily ex Sun, 6:30-7:15, dinner hour; Mon, Thurs & Sat, 8-9, studio program; Tues, 8-10, studio program. Sat, 10:30-12, frolic & radio revue. Slogan: "Kum West to California."

KWUC Western Union College, Le Mars, Iowa. 252 meters, 1190 kilocycles, 1500 watts. Sun, 4-5 pm, vesper service. Wed, 7-8 pm, sacred; Sat, 10-11 pm, college. Central standard time.

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

KXL KXL Broadcasters (Love Electric Co.), 501 Pantages Bldg., Portland, Ore. 400 meters, 749.6 kilocycles, 50 watts.

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

KYA Pacific Broadcasting Corp., Clift Hotel, San Francisco, Calif. 399.8 meters, 750 kilocycles, 1000 watts.

KYW Westinghouse Elec. & Mfg. Co., 72 W. Adams st., Chicago, Ill. 535.4 meters, 560 kilocycles, 4500 watts. Sun, 11 am, church services; 4 pm, musical; 7 pm, Sunday Evening club; 9 pm, symphony. Daily ex Sun, 11:35 am, table talks; 12 noon, concert; 6 pm, bedtime stories; 7 pm-12 midnight, musical program. Central standard time. Slogan: "KYW, Pioneer Radio Station of West."

KZRO Far Eastern Radio (Inc.), Manila Hotel, Manila, P. I. 400 meters, 749.6 kilocycles, 500 watts.

KZKZ Electrical Supply Co., 109 Plaza Moraga, Manila, P. I. 270.1 meters, 1110 kilocycles, 100 watts.

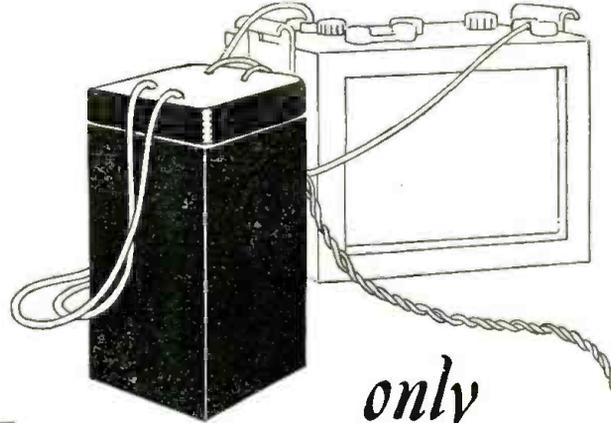
KZM Preston D. Allen, 13th & Harrison sts., Hotel Oakland, Oakland, Calif. 240 meters, 1250 kilocycles, 100 watts. Daily ex Sun, 6:30-8 pm, Hotel Oakland dinner orchestra. Pacific standard time.

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

WAAD Ohio Mechanics Institute, Cincinnati, Ohio. 258.5 meters, 1160 kilocycles, 25 watts. Central standard time.

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Thousands of fans are using this wonderful power unit. They have said good-bye to "A" power troubles. They know what better reception means. You, too, may enjoy this wonderful improvement for the small sum of \$2.95. This amazingly low factory-to-user price is possible only because we make enormous quantities and sell direct to radio set owners. You pay no middlemen's profits. R. B. Specialties are not sold in stores. That's why we are saving thousands of dollars for radio fans all over the country.

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- "Your 'A' Battery Unit is just what I have always wanted. Reception is much better. When something good is on the air, I know I can get it." H. S., _____, N. Y.
- "I received the 'A' Power Unit and will say its performance is all I could ask." M. T., _____, California.
- "Just received your 'A' Power Unit. Certainly works fine." A. P., _____, Ohio.
- "Please send another 'A' Power Unit C. O. D. at once. I let a friend have the other one." J. J. M., _____, Ill.
- "I'm tickled with your 'A' Power Unit. All of my friends think it's great, too." C. A. P., _____, Ind.



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Just write your name and address carefully in coupon and mail to us. Enclose \$2.95 (bills, money-order or stamps), plus 15c postage and we will send this complete "A" Power-Unit postpaid together with full instructions for hook-up. Use ten days, then if not perfectly satisfied, send it back and we will refund your money.

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You're safe. You take no risk. If for any reason you're not wonderfully pleased, ship it back and get your money promptly. You have ten days to satisfy yourself that it is the finest device of the kind you ever saw. Send for YOUR "A" Power-Unit now and forget your "A" Battery troubles forever. Only \$2.95 plus postage. Mail coupon now.

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I enclose \$2.95 plus 15c postage. Please send me one "A" Power-Unit, consisting of charger and semi-automatic switch. It is understood that if I am not satisfied after 10 days' trial you will refund my money upon return of the power-unit.

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WAAF Chicago Daily Drivers Journal, 836 Exchange av., Chicago, Ill. 277.6 meters, 1080 kilocycles, 500 watts. Daily ex Sun & holidays, 8:45 am, markets; 10:30 am, weather; 10:50 am, markets; 11 am, estimated receipts of following day; 12:30 pm, weather; 12:50 pm, markets; 3 pm, markets; 4:30 pm, eastern meat trade conditions. Sat. 12:30 pm, final weather & market reports. Central standard time.

WAAM I. R. Nelson Co., 1 Bond st., Newark, N. J. 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."

WAAT Bremer Broadcasting Corp., Hotel Plaza, Jersey City, N. J. 235 meters, 1276 kilocycles. 500 watts. Daily ex Sun, 6 pm-11:30 pm. Sun. 2 pm-11:30 pm. Tues & Thurs, 2-4 pm. Sat, 12 (noon) to 1 pm. Slogan: "The Voice At the Gate of the Garden State."

WAAW Omaha Grain Exchange, Grain Exchange Bldg., 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 Radio Co., 424 Market st., Harrisburg, Pa. 204 meters, 1470 kilocycles, 10 watts.

WABC Atlantic Broadcasting Corp., Richmond Hill, N. Y. 315.6 meters, 950 kilocycles, 5000 watts. Sun, 11 am-12:30 pm, 7:30-9 pm. Central standard time.

WABF Markle Broadcasting Corp., Kingston, Pa. 410.7 meters, 730 kilocycles, 500 watts.

WABI First Universalist Church, Park st., Bangor, Me. 240 meters, 1250 kilocycles, 100 watts. Sun, 10:30 am-12 pm, morning services; 7:30-9 pm, evening services. Eastern standard time. Slogan: "The Pinetree Wave."

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

WABQ Keystone Broadcasting Co., Philadelphia, Pa. 261 meters, 1150 kilocycles, 500 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, 1830 Pendbscot Bldg., Detroit, Mich., near Mt. Clemens, Mich. 245.8 meters, 1220 kilocycles, 500 watts. Central standard time.

WABY John Magaldi, Jr., 930 S. 8th st., Philadelphia, Pa. 241.8 meters, 1240 kilocycles, 50 watts. Eastern standard time.

WABZ Coliseum Pl. Baptist Church, 1376 Camp st., New Orleans, La. 275.1 meters, 1090 kilocycles, 100 watts. Sun, 10:55 am to 12:30-7:25 to 9:15 pm. Central standard time.

WADC (Allen T. Simmons) Allen Theater, Cadillac Bldg., W. Market st., Akron, Ohio. 258.5 meters, 1600 kilocycles, 1000 watts. Daily ex Sun, 11 am-12 noon. Mon, Wed, Fri, 5:30-6:30 pm. Mon, Fri, 8-11 pm. Eastern standard time. Slogan: "Watch Akron Develop Commercially."

WAFD Albert B. Parfet Co., 1432 Military st., Detroit, Mich. 312.3 meters, 960 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 R. L. Miller, Royal Oak, Mich. 225.4 meters, 1330 kilocycles, 100 watts. Sun, Mon, Wed & Fri, 8-10:30 pm. Slogan: "The Little Station With the Big Reputation."

WAGS Willow Garages (Inc.), 131 Willow av., Somerville, Mass. 250 meters, 1199 kilocycles, 5 watts.

WAIT A. H. Waite & Co. (Inc.), 32 Weir st., Taunton, Mass. 229 meters, 1310 kilocycles, 10 watts, class A. No regular schedule. Eastern standard time.

WAJU American Insurance Union, Columbus, Ohio. 293.9 meters, 1020 kilocycles, 5000 watts. Sun, 2-4 pm, vesper, 1st & 3rd Sun, 6-12 midnight. Daily ex Sun. 10:05 am, 12-1 ex Sat, daily Mon, Tues, Wed & Thurs, 6-7 pm. Fri & Sat. 6-7 pm., studio concert. Tues, Sat, 9:15-12 pm. Fri. 6-11:30 pm. Eastern standard time.

WAMD Radisson Radio Corp. & Stanley E. Hubbard, 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.

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

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

WARS Amateur Radio Specialty Co., Brooklyn, N. Y. 295 meters, 1016 kilocycles, 500 watts.

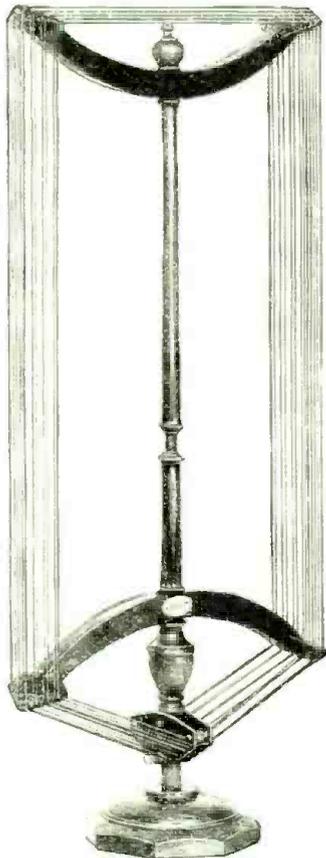
WASH Baxter Launderers & Cleaners, 747 Fountain st., N. E., Grand Rapids, Mich. 356.4 meters, 1170 kilocycles, 500 watts. Sun, 11 am-12:15 pm. Daily ex Sun, 12:30-1:30, 5:30-6, 7-8 pm. Sat, 2:15 pm (football season only). Central standard time.

WATT Edison Elec. Illuminating Co., 39 Boylston, Boston, Mass. (portable). 243.8 meters, 1230 kilocycles, 100 watts.

Sensitivity—Selectivity

FIAT Leads Them All

THE FIAT BANKWOUND LOOP has in the present radio season more than maintained its leadership. It has added new conquests to its honor list. The Fiat Loop is now specified as Standard Equipment in St. James Superhetrodyne and Impedance Coupled Superhetrodyne Sets (See articles on these two sets in this number of the "Citizens Radio Call Book"); also in Madison-Moore, Victoreen, Nine-in-Line, Melo-Heald, and many other superhetrodynes; also for Browning-Drake and all other circuits designed for loop antenna.



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

The Fiat Console Loop Antenna meets completely the requirements of the *ideal* loop antenna.

The Fiat Loop possesses the highest degree of Sensitivity and Directional Efficiency.

The Bank Winding by our exclusive patented method secures a high ratio of inductance to distributed capacity insuring an unusual degree of sensitivity. The long perpendicular side effects gain in directional efficiency.

Our patented method of Bank Winding also makes the attractive small size of the Fiat possible.

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.

The usual Guarantee of perfect workmanship and condition goes with each Fiat Loop.

Reliable dealers almost everywhere have Fiat Loops for sale. If yours has not, orders direct will be promptly filled, sent post paid on receipt of list price.

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		West of Rockies -	13.50
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WBAA Purdue University, West Lafayette, Ind. 273 meters, 1100 kilocycles, 500 watts. Daily 9:50 am. Mon & Fri, 7:15 pm, special programs as athletic contests, football, basketball, banquet talks, etc. Mon, Fri, 9:50 am, markets & WX; 7:15 pm, lecture, entertainment. Tues, Wed, Thurs, 9:50 am, markets & WX. Sat, 9:50 am, markets & WX. Central standard time. Slogan: "School of E. E."

WBAK Pennsylvania State Police, 18th & Herr sts., Harrisburg, Pa. 275.1 meters, 1090 kilocycles, 500 watts. Daily ex Sun, 2 pm, weather, police information, etc.; 11:30 am, agricultural 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. 270.1 meters, 1100 kilocycles, 100 watts, class A. Irregular schedule. Central standard time.

WBAP Carter Publications (Inc.), 400 W. 7th st., 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., 7th av., South & Broad sts., Nashville, Tenn. 236.1 meters, 1270 kilocycles, 100 watts, class A.

WBAX John H. Stenger, Jr., 66 Gildersleeve, Box 104, Wilkes-Barre, Pa. 256.3 meters, 1170 kilocycles, 100 watts. 6:30 pm, studio. Mon, 7-8 dance music. Tues, 7-9 pm, main studio; 10:30 pm, classical. Thurs, 9-10:30 pm, recital; 3:15-5 pm, lectures; 11:15-2 am, witching hour. Sat, 10-12 pm, dance. Eastern standard time. Slogan: "In Wyoming Valley, Home of the Anthracite."

WBBC Peter J. Testan, 2123 Troy av., 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. 228.9 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., 1826 Diversey pkwy., Chicago, Ill. 225.4 meters, 1330 kilocycles, 10,000 watts. Mon, 4-7 pm. Sun, Tues, Wed, Thurs, Fri & Sat, 4-6 pm. Tues, Thurs, 8-midnight. Sun, Wed, Sat, 8-10 pm, midnight-2 am. Central standard time. 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 People's Pulpit Association, 124 Columbia Heights, Brooklyn, N. Y. 416.4 meters, 720 kilocycles, 1000 watts. Sun, 10-12 am, orchestra, lectures, lessons; 2:4-3:30 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. 222.1 meters, 1350 kilocycles, 50 watts. Programs vary. Eastern standard time.

WBBY Washington Light Infantry, 240 King st., Charleston, S. C. 267.7 meters, 1120 kilocycles, 15 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 S. 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-12:15 pm, church services; 4-6 pm, classical; 7:45-9:30 pm, church services. Daily ex Sun, 9:45-11 am, home service program; 5:30-6 pm, police bulletins; 6 pm, Tea Time matinee. Daily ex Sun & Mon, 7-8 pm, classical program. Wed, Fri & Sat, 10-12 pm, popular program. Tues & Thurs, 10-11 am, popular program. Central standard time. Slogan: "World's Best Community Newspaper."

WBES Bliss Electrical School, Takoma Park, Md. 222.1 meters, 1350 kilocycles, 100 watts, class A. Eastern standard time.

WBET Boston Transcript Co., 324 Washington st., Boston, Mass. 384.4 meters, 780 kilocycles, 100 watts.

WBKN Arthur Faske, 1515 Eastern pkwy., Brooklyn, N. Y. 291.1 meters, 1030 kilocycles, 100 watts.

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

WBMH Braun's Music House, Detroit, Mich. 352.7 meters, 850 kilocycles, 100 watts.

WBMS George Julius Schowerer, State Capital Theater Bldg., Union City, N. J. 223.7 meters, 1340 kilocycles, 100 watts. Sun, 3-6 pm, 7:30-10:30 pm, entertainment. Daily ex Sun, 12-1 pm noon, dinner music; 7-12 pm, entertainment. Sat, 7 pm-3 am, studio frolics. Slogan: "Where Broadcasting Means Service."

WBNY Baruchrome Corp., 145 W. 45 Tilmor Bldg., New York, N. Y. 322.4 meters, 930 kilocycles, 750 watts. Daily ex Sun, 7-11 pm. Sun, 2:30-6 pm. Eastern standard time. Slogan: "The Voice of the Heart of New York."

WBRC Birmingham Broadcasting Corp., 1913 5th av. N., Birmingham, Ala. 247.8 meters, 1210 kilocycles, 250 watts. Sun, 11 am-12:30 pm, 7:30-9 pm, church services. Mon, Wed, Thurs, Fri, 8-10 pm, musical. Tues, 7:30-8 pm, musical. Central standard time. Slogan: "The Biggest Little Station in the World."

WBRE Baltimore Radio Exchange, 17 W. Northampton, Wilkes-Barre, Pa. 230.6 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, 23 Summer st., Tilton, N. H. 365 meters, 821.4 kilocycles, 500 watts. Sun, 10:30-11:30 am, 7-8 pm, church services. Tues, Fri, 10-11:30 pm, dance program. Mon, Wed, Thurs, Sat, program varied. Eastern time. Slogan: "The Voice of the Granite State."

WBRS Universal Radio Mfg. Co., 1062 Broadway, Brooklyn, N. Y. 394 meters, 761 kilocycles, 100 watts.

WBSO Babson's Statistical Organization, Wellesley Hills, Mass. 242 meters, 1239 kilocycles, 100 watts.

WBT C. C. Coddington, 500 W. Trade st., Charlotte, N. C. 275 meters, 1096 kilocycles, 250 watts. Sun, 11 am & 7:30 pm, church services. Tues & Thurs, 9 pm, organ recital. Daily, 7:30 pm, organ recital. Fri, Mon, Tues, Thurs, 12:30 pm; 4 pm, Radiola hour. Thurs, 9 pm, Broadway Theater. Sat, 12 noon, markets; 4-5:30, A. K. Eastern standard time. Slogan: "The Queen City of the South."

**The
Safe
Sane
Effective
INDOOR
AERIAL!**

Easy to install!



WHY

**Risk Life and Limb
Erecting an Outside Aerial?**

PLAY 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.

Easily Installed

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.

Radio Fans Go Wild Over Remarkable Results

Binghamton, N. Y., user writes: "I never have heard as good reception as is given on your aerial."
A Youngstown radio man says: "Nothing like the New Effarsee. Twice the range and more volume with less battery consumption than outside antennae."
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Fishwick Radio Company
Dept. 71, 133 West Central Parkway
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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.

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

Fishwick Radio Co.
Dept. 71, 133 West Central Parkway
Cincinnati, Ohio

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

WBZ Westinghouse Electric & 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, 500 watts. Eastern standard time.

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

WCAD St. Lawrence University, Canton, N. Y. 263 meters, 1140 kilocycles, 500 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 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, 8-11 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."

WCAH C. Aentrekin, 321 W. 10th av., Columbus, O. 1130 meters, 265.3 kilocycles, 500 watts. Sun, 10:30-12, church services. Daily, 11:30 am-12:30 pm, 7:30-9:30 pm.

WCAJ Nebraska Wesleyan University, University Place, Nebr. 254.1 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; Mon, 7 pm, Bible study hour. Sun, 11 am, church; 7:30 pm, service. 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. Sunday, 8:30 am, Norwegian Church service; 9:15 pm, sacred music, sermon. Mon, 7 pm, classical program; 8:15 pm, book talk; 8:50 pm, music. Daily ex Sun & Thur, 9:45 am, chapel. Sun, 8:30 am, church; 3 pm. Central standard time. Slogan: "The College on the Hill."

WCAM City of Camden, Camden, N. J. 336.9 meters, 890 kilocycles, 1000 watts. 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.

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

WCAT South Dakota State School of Mines, Rapid City, S. Dak. 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. 252 meters, 1190 kilocycles, 100 watts. Fri, 7:30-8:30 pm, education & entertainment. Eastern standard time. Slogan: "The Voice of the Green Mountains."

WCAZ Carthage College, Carthage, Ill. 245.8 meters, 1220 kilocycles, 50 watts.

WCBA Charles W. Heimbach (Queen City Radiophone Station WCBA), 1015 Allen st., Allentown, Pa. 254.1 meters, 1180 kilocycles, 150 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 & Sun, 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., 1219 N. Rampart st., 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 (near Oxford, Miss.), University, P. O. 241.8 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, Charles st. & North av., Baltimore, Md. 228.9 meters, 1310 kilocycles, 100 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 av., Providence, R. I. 234.2 meters, 1280 kilocycles, 100 watts. Daily ex Sun, 6:30 pm, 7:30 pm, 9-10 pm. Eastern time.

WCBS Harold L. Dewing & Charles H. Messter, 6 N. Main st., Providence, R. I. (Portable.) 242 meters, 1239 kilocycles, 250 watts. Sun, church services; Mon, Tues, Wed, Thurs, Fri, 7-10 pm; Sat, 7-9, 10-12 pm.

WCCO Washburn-Crosby Co., St. Paul & Minneapolis, Minn. 416.4 meters, 720 kilocycles, 5000 watts. Daily, 9:30 am, 9:35 am, 9:45 am, 10:30 am, 11:30 am, 12 noon, 1:30 pm & 2 pm, news, markets, weather, noon concert & 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. Sun, 10:50 am, 2:30-11 pm. Central standard time.

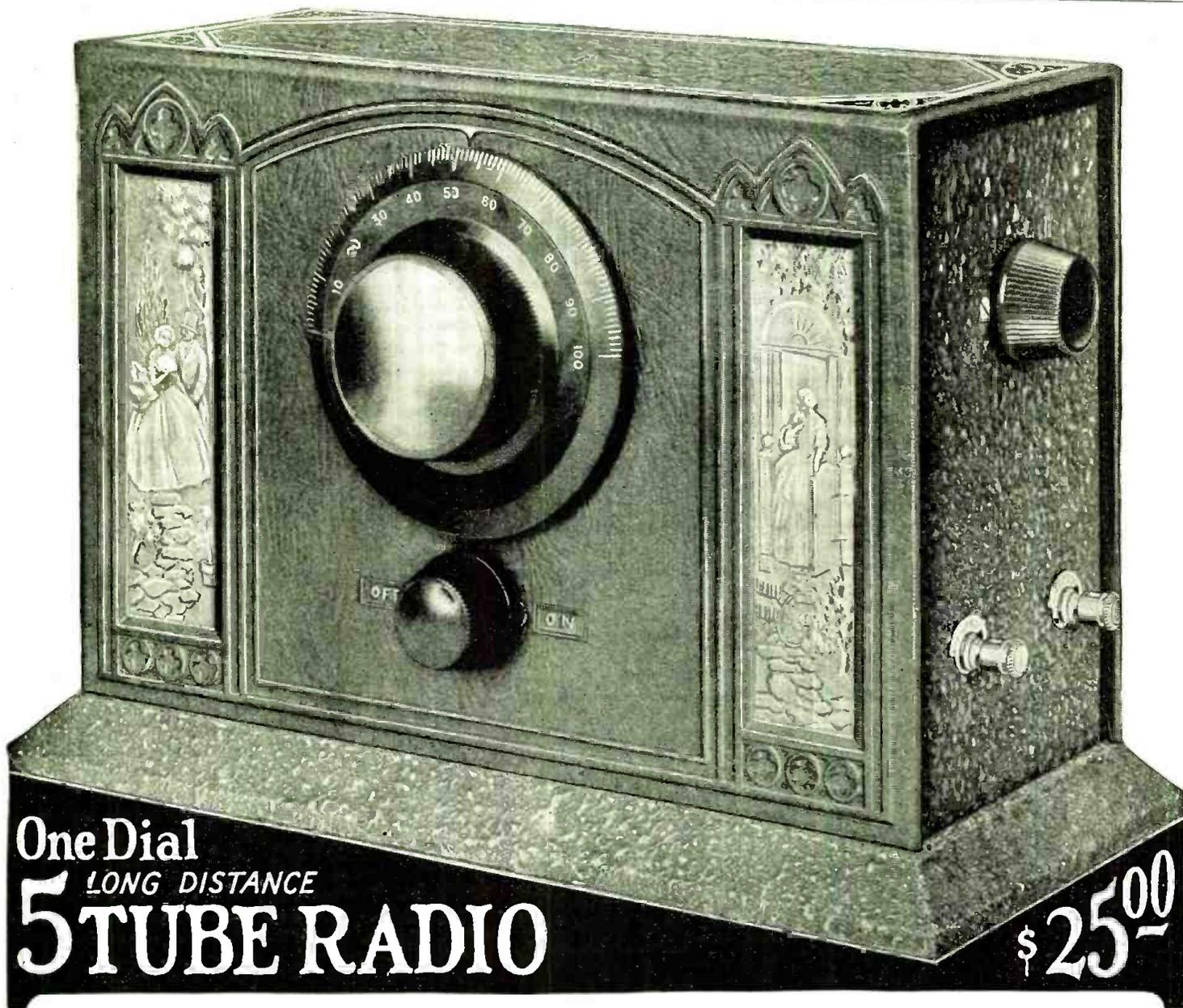
WCFL Chicago Federation of Labor, 166 W. Washington st., Chicago, Ill. 491.5 meters, 610 kilocycles, 500 watts. Daily from 6 pm to 1 am. Alamo Orchestra. Fed. talks, Brevoort concert trio, and entertainment. Sun, 2 pm, C. F. of L. popular program; 4:7:45 pm, church services. Slogan: "The Voice of Labor."

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

WCGU Chas. G. Unger, New Perl House, Lakewood, N. J. 350.6 meters, 855.2 kilocycles, 500 watts.

WCLO C. E. Whitmore, Camp Lake, Wis. 230.6 meters, 1300 kilocycles, 1000 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 WCLS, Inc., 301 E. Jefferson st., Joliet, Ill. 214.2 meters, 1400 kilocycles, 150 watts. Central standard time.



One Dial
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 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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SEND FOR 100 PAGE FREE BOOK

WCMA Culver Military Academy, Culver, Ind. 258.5 meters, 1160 kilocycles, 500 watts. Daily, 12:15 pm. public service hour, highway reports, etc. Sun, 11 am, chapel service. Mon, 8:30 pm, band concert & studio. Wed, 9:15 pm, dance music & studio. Slogan: "The Voice of Culver."

WCOA Municipal Broadcasting Station, City Hall, Pensacola, Fla. 222 to 252 meters, 1190 kilocycles, 500 watts. Sun, 12:30 pm, weather forecasts. Daily ex Sun, 10:30 am-12:30 pm, weather forecasts; 6:30-10 pm, studio concerts. Central standard time. Slogan: "Wonderful City of Advantages."

WCOM New Hampshire National Guard, 172nd Field Artillery, Headquarters Battery, Manchester, N. H. 252 meters, 1190 kilocycles, 100 watts.

WCOT Jacob Conn. Olneyville, R. I. 265.3 meters, 1130 kilocycles, 100 watts.

WCRW Clinton R. White, 817 Grace st., Chicago, Ill. 416.4 meters, 720 kilocycles, 50 watts. Sun, 7:30-11 pm. Daily ex Sun & Mon, 11-12 am, orchestra request hour; 7:30-11 pm. Mon, 11-12 am. Slogan: "For Your Entertainment."

WCSH Henry P. Rines, Congress Square Hotel, Portland, Maine. 499.7 meters, 600 kilocycles, 500 watts. Sun, 10:30-12 noon, 1:30-2:30 pm, 4:5-3:30 pm, 7:30-10 pm. Mon, 10-12 am, 12:1-3:30 pm, 3-4 pm, 6-11 pm. Daily ex Sun, same as Mon. Slogan: "The Voice from Sunrise Land."

WCSO Wittenberg College, Springfield, O. 247.8 meters, 1210 kilocycles, 1000 watts. Mon & Fri, 7-9 pm. Wed, 9:45-10:45 am, chapel hour. Irregular schedule. Central standard time.

WCWK Chester W. Keen, 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."

WCWS Chas. Wm. Selan, 850 Lafayette st., Providence, R. I. (Portable.) 232.4 meters, 1290 kilocycles, 100 watts.

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

WDAD & WLAC, Dad's Auto Accessories (Inc.) & Life & Casualty Insurance Co., 171-173 8th av. N., Nashville, Tenn. 225.4 meters, 1330 kilocycles, 1000 watts. Daily ex Sat, 3-4 pm, musical (Sun, sacred program). Daily ex Sun, 7-10 pm, musical. Central standard time. Slogan: "Where Dollars Are Doubled."

WDAE Tampa Daily Times, Tampa, Fla. 272.6 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, Wed & Fri, 10:45-11:05 am, 12:45-1:15 pm, 3:30-4:30 pm, 6-7, 8-10, 11:45 to 1 am. Tues & Thurs, 12:45-1:15 pm, 3:30-4:30 pm, 6-7 pm, 11:45 pm to 1 am. Sat, 3:30-4:30 pm, 6-7 pm, 8-9:30 pm, 11:45 pm to 1 am. Central standard time. Slogan: "Enemies of Sleep."

WDAG J. L. Martis, 605 E. 4th st., Amarillo, Texas. 263 meters, 1140 kilocycles, 100 watts. Week days, 12:45 pm, chats, markets & weather; 9-10 pm, entertainment. Fri, 8-10 pm, entertainment. Sun, 9:45 am, Bible class. Central standard time. Slogan: "Where Dollars Always Grow."

WDAH Trinity Methodist Church, El Paso, Tex. 267.7 meters, 1120 kilocycles, 100 watts. Sun, 10:45 am, 7:30 pm, church services. Standard mountain time.

WDAY Radio Equipment Corporation, 119 Broadway, Fargo, N. Dak. 261 meters, 1150 kilocycles, 500 watts. Sun, 10:30 am, church services; 2 pm, International Bible Students Assn.; 3 pm, organ concert; 4 pm, studio program. Daily ex Sun, 10 am, markets, news, weather; 10:15 am, chapel; 11 am, market; 12 noon, markets; 12:05 pm, farm dialogue; 12:20 pm, The Bug; 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, studio program. Tues, Thurs, Sat, 7:30 pm, musical program. Central standard time. Slogan: "The Biggest Little City in the World."

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

WDBJ Richardson Wayland Electric Corp., 106 Church st., S.W., Roanoke, Va. 228.9 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 The WDBK Broadcasting Station Co., Inc., 13918 Union & Kinsman sts., Cleveland, Ohio. 227.1 meters, 1230 kilocycles, 100 watts. Tues & Fri, 8-10 pm. Eastern standard time. Slogan: "Broadcasting from Cleveland."

WDBO Rollins College, Winter Park, Fla. 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, 850 watts.

WDEL Wilmington Electric Specialty Co., 405 Delaware av., Wilmington, Del. 265.3 meters, 1130 kilocycles, 100 watts. No regular schedules at present. Slogan: "The Gateway to the Delmarvia Peninsula."

WDGY Dr. George Young's School of Optometry, 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.

WDOD Chattanooga Radio Co., Inc., 615 Market st., Chattanooga, Tenn. 256.3 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."

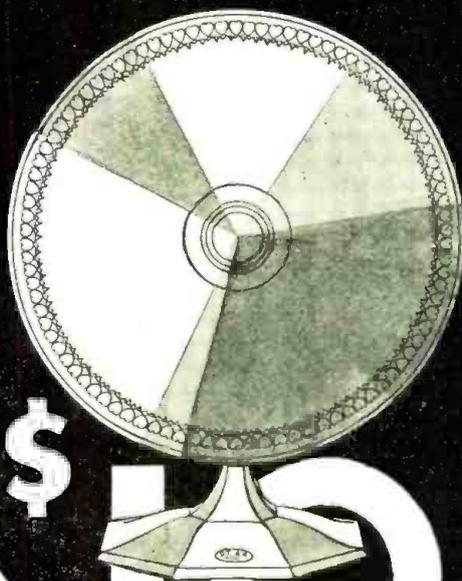
WDRC Doolittle Radio Corp., 115 Crown st., New Haven, Conn. 268 meters, 1119 kilocycles, 500 watts. Sun, 11 am-12 pm. Thurs, 8-9 pm. Summer schedule. Eastern standard time.

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

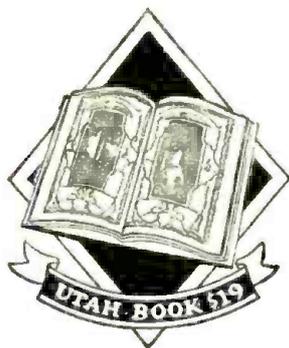
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Each One Guaranteed

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

WDWM Radio Industries Broadcast Co., 20 Central av., Newark, N. J. 280.2 meters. 1070 kilocycles, 500 watts. Eastern standard time.

WDXL D X L Radio Corp., 5769 Stanton av., Detroit, Mich. 296.9 meters, 1010 kilocycles, 250 watts.

WDZ James L. Bush, Star Store Bldg., Tuscola, Ill. 277.6 meters, 1080 kilocycles, 10-100 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 National Broadcasting Company, Inc., Rm. 412, 195 Broadway, New York City. 491.5 meters, 610 kilocycles, 5000 watts. Sun, 2-10:15 pm. Daily ex Sun, 6:45-8 am, 4-6 pm, 6-12 midnight. Daily ex Sun, Sat, 11 am-1:15 pm. Sat. 12:45-1:45 pm. Eastern time.

WEAI Cornell University, Ithaca, N. Y. 254.1 meters, 1180 kilocycles, 500 watts. Eastern standard time.

WEAM Borough of North Plainfield, North Plainfield, N. J. 260.7 meters, 1150 kilocycles, 250 watts. Eastern standard time.

WEAN The Shepard Co., 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. 7-9 pm, lectures, music. Wed. 8-10 pm, lectures, music. Thurs. 8-10 pm, lectures, music. Eastern standard time.

WEAR The Willard Storage Battery Co., 2026 Union Trust Bldg., Cleveland, Ohio. 389.4 meters, 770 kilocycles, 1000 watts. Daily ex Sun. 11:30 am-12:05 pm, weather, markets. Daily ex Sat & Sun, 3:30-4:10 pm, weather, markets. Eastern standard time. Slogan: "Goodyear Tires—WEAR."

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

WEBC Walter C. Bridges, 1225 Tower st., Superior, Wis. 241.8 meters, 1240 kilocycles, 100 watts. Central standard time.

WEBH Edgewater Beach Hotel, Chicago Evening Post, 5349 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, 2396 Third st., New York, N. Y. 272.6 meters, 1100 kilocycles, 500 watts. Tues & Fri, 7-9 pm, popular and educational. Wed, 8-10 pm, popular and educational. Eastern standard time.

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

WEBQ Tate Radio Co., Harrisburg, Ill. 225.4 meters, 1330 kilocycles, 15 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."

WEBR H. H. Howell, 54 Niagara st., Buffalo, N. Y. 243.8 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, 750 watts. Sun, 4:25-5:30 pm, vesper services. Wed, 8-9:30 pm. Central standard time.

WEDC Emil Denmark Broadcasting Station, 3860 Ogden av., Chicago, Ill. 249.9 meters, 1200 kilocycles, 1000 watts.

WEEI 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 A. T. Becker, Evanston, Ill. 241.8 meters, 1240 kilocycles, 10 watts.

WEMC Emmanuel Missionary College, Berrien Springs, Mich. 315.6 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, 8:15 pm, old-time hymns, sacred songs, etc. Central standard time. Slogan: "The Radio Lighthouse."

WENR All-American Radio Corp., 4201 W. Belmont av., Chicago, Ill. 266 meters, 1130 kilocycles, 1000 watts. Sun, 2-4 pm, 9:30-10:30 pm, classical music; 10:30-12, Samovar Orchestra. Daily ex Sun & Mon, 1-3 pm, All-American popular program; 6-7 pm, dinner concert; 8-10 pm, popular program; 12-3 am, Midnight Frolic. Central standard time. Slogan: "Radio Built for Years to Come."

WEPS Ralph Glendon Mathewson, Gloucester, Mass. 295.9 meters, 1016 kilocycles, 100 watts.

WEW St. Louis University, University Station, St. Louis, Mo. 360 meters, 832.8 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 to 6 pm, 6:30-7:30 pm, 8:30-9:30 pm. Sun, Tues, Sat, 11-12 pm. Central standard time. Slogan: "Working for All Alike."

WFAM St. Cloud Daily Times, St. Cloud, Minn. 273 meters, 1100 kilocycles, 10 watts. Daily, 5:30-6 pm, markets, news, weather. Standard time.

WFAV Dept. of Elec. Engineering, University of Nebraska, Lincoln, Nebr. 275.1 meters, 1090 kilocycles, 250 watts. Central standard time.

WFBC First Baptist Church, Knoxville, Tenn. 249.9 meters, 1200 kilocycles, 50 watts. Sun, 10:30 am, 7:30 pm, church services; 4 pm, concert sacred music. Central standard time.

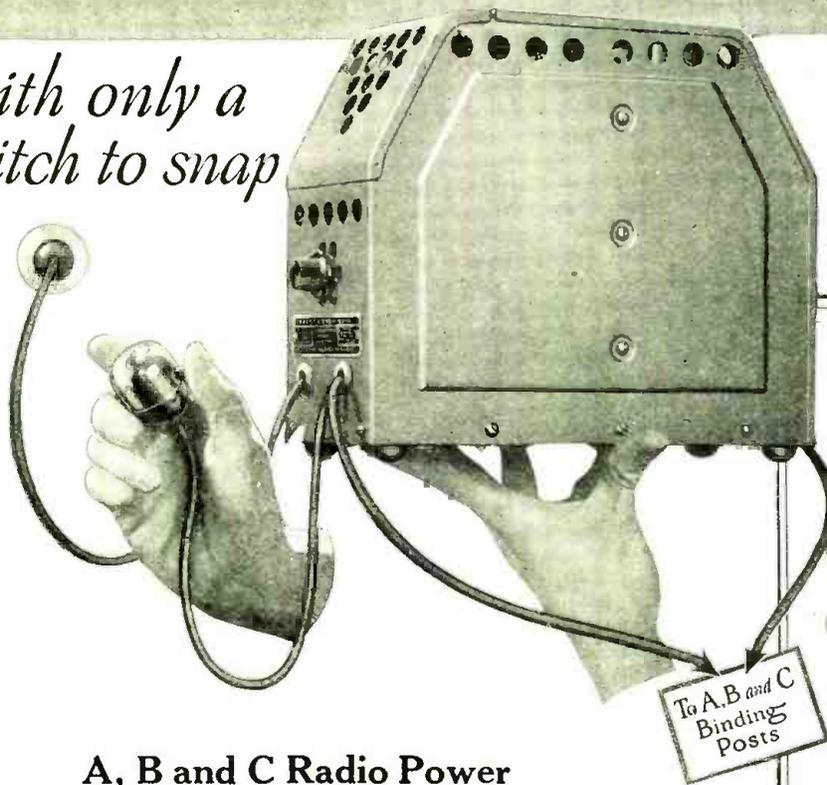
WFBE The Garfield Place Hotel Co., Cincinnati, Ohio. 232.4 meters, 1290 kilocycles, 500 watts.

*Long prophesied
Often attempted
Makeshifts frequently employed
Here at last!*

CROSLLEY

Radio Energy

*with only a
switch to snap*



A, B and C Radio Power

from house current outlet direct into your radio with no more attention or thought than you bestow on a vacuum cleaner or your electric iron.

This wonder box weighs only 13 lbs., stands 9 inches high and is 4 inches wide and is about half the size of ordinary A storage battery. It is a mechanical device transforming ordinary 110 volt 60 cycle house lighting power into smooth, quiet radio energy for the new Crosley radios without slightest interfering hum and with the certainty of an electric motor.

Price \$50

Crosley radios designed for use with this marvelous power supply are the AC-7, a 6-tube table model at \$70, and the AC-7CC, a 6-tube console at \$95. See these wonderful sets at any Crosley dealers, or write Dept. 41 for descriptive literature.

Crosley sets 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.

The Crosley Radio Corporation

Powel Crosley, Jr., Pres.
Cincinnati, Ohio

No more batteries to fuss with.
No more batteries or battery charger to water.
No failure of the power plant just as you sit down to a fine program.
No batteries to recharge.
No batteries to renew.
No apologies to make to callers because "the batteries must be getting low."
No upsetting the house to have the radio serviced.
NO MORE annoyances from the vital power supply end of your radio. A snap of the switch is the only demand your radio makes upon you from NOW ON.

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

WFBG Wm. F. Gable Co., Altoona, Pa. 277.6 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."

WFBJ St. Johns University, Collegeville, Minn. 236.1 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, 1000 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., 2 W. Washington st., 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, Fifth Regiment Armory, 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."

WFBZ Knox College, Galesburg, Ill. 254.1 meters, 1180 kilocycles, 50 watts.

WFCI Frank Crook, Inc., 103 Exchange st., Pawtucket, R. I. 258.5 meters, 1160 kilocycles, 100 watts. Mon, 8-9 pm, orchestra. Wed & Fri, 8-10 pm, entertainment. Slogan: "The City of Diversified Industries."

WFDF Frank D. Fallain, Police Building, Flint, Mich. 234.2 meters, 1280 kilocycles, 100 watts.

WFI Strawbridge & Clothier, Market, 8th & Filbert sts., 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 tearoom ensemble, market reports & recital; 5:45-7:15, dance music. Tues, Thurs & Sat, 10:15 am, market reports; 1-3 pm, S & C tearoom ensemble, markets, reports & studio recital; 6:45-7:15 pm, concert & dance orchestra; 8-11:30 pm, musical program. Morning & evening Sunday services alternating & 9:15 Atwater-Kent radio hour (every Sunday). Eastern standard time.

WFKB Francis K. Bridgman, 4536 Woodlawn av., Chicago, Ill. 217.3 meters, 1380 kilocycles, 500 watts. Daily ex Sun, 2:30-4 pm. Mon, silent night. Tues, Wed, Thurs, Fri & Sat, 7-8 pm, classical; 9-11 pm, popular. Central standard time. Slogan: "Station of Vesta Battery Corporation."

WFKD Foulkrod Radio Engineering Co., 1510 Oxford st., Philadelphia, Pa. 249.9 meters, 1200 kilocycles, 10 watts.

WFRL Flatbush Radio Laboratories, Inc., 635 Fulton st., Brooklyn, N. Y. 329.5 meters, 910 kilocycles, 100 watts. Eastern standard time.

WGAL Lancaster Elec. Sup. & Const. Co., 23 E. Orange st., Lancaster, Pa. 247.8 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. 243.8 meters, 1230 kilocycles, 150 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. 277.6 meters, 1080 kilocycles, 10 watts. Sun, 9:55 am & 7:30 pm, church services. Central standard time.

WGBF 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. Mon, 7-12 pm, musical program. Tues, 8-11 pm, music. Fri, 7-11 pm, musical program. Sun, irregular schedule. Central standard time. Slogan: "Gateway to the South."

WGBI Scranton Broadcasters, Inc., 608 Linden st., Scranton, Pa. 239.9 meters, 1250 kilocycles, 50 watts.

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

WGBS Gimbel Brothers, Inc., 33rd st. and Broadway, New York, N. Y. 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 Florida Cities Finance Co., Fulford-by-the-Sea, Fla. 277.6 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 May Radio Broadcast Corp., 319 Central av., 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 Oak Leaves Broadcasting Corp., 128 N. Crawford av., Chicago, Ill. 315.6 meters, 950 kilocycles, 1000 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 Fort Harrison Hotel, Clearwater, Fla. 266 meters, 1130 kilocycles, 500 watts. Daily ex Sun, 7 pm, dinner music; 8 pm, orchestra program; 8:30 pm, studio program; 9 pm, band; 10:30 pm, orchestra. Eastern standard time. Slogan: "WGHB Inviting the World to the Springtime City."

WGHP George Harrison Phelps, Inc., Radio Division, Moccobee Temple, Woodward & Putnon av., Detroit, Mich. 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; 10-11, frolic; 11-12 pm, dance program. Eastern standard time.

WGL International Broadcasting Corp., 165 Broadway, New York, N. Y. 442.2 meters, 678 kilocycles, 1000 watts.

WGM Verne & Elton Spencer, 501 Cowan av., Jeannette, Pa. 296 meters, 1115 kilocycles, 10 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."

CASH IN ON RADIO Now

EARN \$75.00 a Week in your spare time

BUILD SETS FOR YOUR NEIGHBORS

HELP YOUR DEALER

ACT AS A RADIO DOCTOR

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

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

Earned \$500 in Spare Hours

Hundreds of members earn \$3 an hour serving their communities as "radio doctors." Member Lyle Follick, Lansing, Mich., has already made \$500 in his spare time. Member Werner Eichler, Rochester, N. Y., is earning \$50 a week. Member F. J. Buckley, Sedalia, Mo., is earning as much money in his spare time as he receives from his employer.

The Association will train you to be a "radio doctor" and to build sets "tailored" to your neighborhood needs, that you can sell for less than the "ready-made" sets offered by your local dealers.

We Will Start You in Business

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

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

Many have followed this plan and established radio stores.

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

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

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

From Clerk to Owner

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

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

Membership Privileges

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

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

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

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

RADIO ASSOCIATION OF AMERICA
4513 Ravenswood Avenue
Chicago, Ill. Dept. RCB-3

Gentlemen:

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

Name.....

Address.....

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

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

WGMU A. H. Grebe & Co., Inc., Richmond Hill, L. I., N. Y. (portable). 236.1 meters, 1270 kilocycles, 100 watts, class A. Unlimited schedule. Eastern standard time.

WGN The Chicago Tribune, Drake Hotel, 140 E. Walton pl., Chicago, Ill. 302.8 meters, 990 kilocycles, 1500 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; 10:15-11:15, concert. Mon, 12 noon, reports; 1-1:30 pm, ensemble; 2:30 pm, program; 6:30, music; 7:30, reports; 1-1:30, ensemble; 2:30 pm, program; 6:30, music; 7:30, reports; 8-11 pm, program. Wed, 12 noon, reports; 1-1:30, ensemble; 2:30 pm, concert; 6:30 pm, music; 7:30, reports; 8-11 pm, program. Thurs, 12 noon, reports; 1-1:30, ensemble; 2:30 pm, program; 6:30 pm, music; 7:30 pm, reports; 8-11 pm, program. Fri, 12 noon, reports; 1-1:30, ensemble; 2:30, concert; 6:30, music; 8 pm-1 am, program. Eastern standard time. Slogan: "Key City of Industry."

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

WGWB Radiocast Corp. of Wisconsin, 144 Broadway, Milwaukee, Wis. 384.4 meters, 780 kilocycles, 1000 watts. Daily ex Sun, 6:30-7:30 pm, dinner music. Mon, 7:30-9 pm, studio artists. Wed & Sat, 9-12 pm, dance music.

WGY General Electric Co., 1 River Road, Schenectady, N. Y. 379.5 meters, 790 kilocycles, 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, 7:30 pm, musical program. Wed, 8 pm. Programs on these evenings consist of educational talks, music, athletic events, etc. Central standard time.

WHAD Marquette University - Milwaukee Journal Bldg., 4th and State sts., Milwaukee, Wis., 275.1 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 and financial news; 6:15 pm, dinner orchestra; 8:30 pm, popular program. Wed, 11:30 pm, midnight recital. Central standard time. Slogan: "The Voice of Wisconsin."

WHAM Eastman School of Music, Rochester, N. Y. 277.6 meters, 1080 kilocycles, 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., 9 W. 96th st., New York, N. Y. 431 meters, 695.6 kilocycles, 1000 watts, class A. Sun, 7:15-9:15 pm. Mon, Wed & Fri, 7-11:15 am, silent; 9:55-10:15 for N.A.A. on 434.5. Daily ex Sun. Eastern standard time. Slogan: "The Station for Public Service."

WHAR Pioneer Broadcasting Station of Atlantic City, the Hotel Seaside, Atlantic City, N. J. 275.1 meters, 1090 kilocycles, 1000 watts. Sun, 10:45-1 pm, 2:15-3:10 pm, 7:45-10 pm. Daily ex Sun & Wed, 2-3 pm, 7:45-9 pm. Eastern standard time. Slogan: "Pioneer Broadcasting Station of Atlantic City."

WHAS The Courier-Journal Co. and The Louisville Times Co., Louisville, Ky. 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 Rensselaer Polytechnic Institute, Troy, N. Y. 379.5 meters, 790 kilocycles, 500 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 and Electrical School, Kansas City, Mo. 365.6 meters, 820 kilocycles, 500 watts. Mon, Tues, 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. 249.9 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.

WHBC Rev. E. P. Graham, 627 McKinley av., Canton, Ohio. 254.1 meters, 1810 kilocycles, 15 watts. Mon, 8-8:30 pm, lecture, sermon. Eastern time. Slogan: "Dispelling Ignorance."

WHBD Chamber of Commerce, 118½ N. Main st., Bellefontaine, Ohio. 222.1 meters, 1350 kilocycles, 100 watts. Sun, 10:45 am, 7:30 pm. Daily ex Sun & Sat, 7:30-9 pm. Eastern standard time. Slogan: "Ohio's Highest Point."

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

WHBL C. L. Carrell, 36 S. State st., Chicago, Ill. 215.7 meters, 1390 kilocycles, 50 watts, class A. Central standard time.

WHBM C. L. Carrell (portable), 1506 No. American Bldg., 36 S. State st., Chicago, Ill. 215.7 meters, 1390 kilocycles, 20 watts, class A. Central standard time.

WHBN First Avenue Methodist Church, 1st av. & 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. 256.3 meters, 1170 kilocycles, 100 watts, class A. Daily ex Sun, 4-5. Sun, 2:30. 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 avs., Memphis, Tenn. 232.4 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, 15 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. 215.7 meters, 1390 kilocycles, 100 watts, class A. Wed, pm. Eastern standard time.

WHBY St. Norbert's College, West De Pere, Wis. Green Bay-De Pere Broadcasting Station. 249.9 meters, 1200 kilocycles, 50 watts. 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 and stock quotations. Central standard time.

WHDI Dunwoody Industrial Institute, 818 Superior blvd., Minneapolis, Minn. 277.6 meters, 1080 kilocycles, 1500 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.

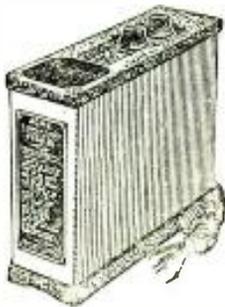
“Remarkable—
to hear each
instrument”



Acme K-1 Enclosed Double Free Edge Cone Speaker, (shown above). Diameter of Cone, 14 ins. Tan metal case.

Price: \$25.00

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



**No noise,
No hum, No “B” batteries**

For sets up to eight tubes (E-3) \$35.00
For sets up to twelve tubes (E-1) \$50.00

DC Eliminator (E-2).....\$25.00

THE ACME APPARATUS COMPANY developed and perfected the circuit for AC Eliminators, now accepted as standard.

Complete lamp socket operation for radio sets is clearly illustrated and described in our new 32-page booklet “Power Supply for Radio Sets.” Send 10 cents for your copy to Acme Apparatus Co., 37 Osborn Street, Cambridge, Mass.

Mail this Coupon for
“Amplification Without Distortion”

ACME
~ for amplification



“We were never before
so thrilled by
radio reproduction!”

“... that’s remarkable: of all the radio we’ve ever heard, we’ve never been so thrilled as today, when, with our new Acme Speaker, which daddy got us, we could plainly hear every instrument that was playing in the orchestra. . . .”

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.

**See 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.

Send for this Acme Book

“Amplification Without Distortion”, now in its 13th edition. Written by a prominent radio engineer in a non-technical and interesting manner. It gives you a clear picture of radio reception, and shows exactly how you can eliminate distortion and improve the operation of your set. It also describes fully these wonderful new Acme loud speakers—and includes details of the complete Acme line of transformers, impedances, condensers, potrehos, choke coils, etc. Send coupon below.

ACME APPARATUS CO.,
Dept. 08, Cambridge, Mass.

Enclosed find 10 cents (stamps or coin) to cover cost of sending me one copy of “Amplification Without Distortion”, 13th edition.

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Street.....
City..... State.....

WHEC Hickson Electric Co., Inc., 36 South av., 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 WHEC, the Voice of Rochester."

WHFC Triangle Broadcasters, 4145 Broadway, Chicago, Ill. 258.5 meters, 1160 kilocycles, 200 watts. Sun midnight to 4 am, Low Twelve Club. Mon, Wed & Fri, 4-7 pm. Wed & Fri, 1:10 pm-3 am. Tues, Thurs & Sat, 4-6 pm, 7 pm-3 am. Slogan: "Where Happiness First Commences."

WHK The Radio Air Service Corporation, Inc., 1220 Huron road, Cleveland, Ohio. 272.6 meters, 1100 kilocycles, 1000 watts. Sun, 10 am-10:30 pm, church and 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's Pioneer Broadcasting Station."

WHN George Schubel, 1540 Broadway, New York, N. Y. 361.1 meters, 830 kilocycles, 500 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 am, 11:35 am, 2 pm, market reports. Mon, Tues, Thurs, Fri, 7:30-9 pm and 11-12 pm. Wed, 6 pm-12 midnight. Sun, 11 am, 4-6 pm, 7:30-9 & 11-12 pm. Central standard time. Slogan: "Who (WHO) Bankers Company, Des Moines, Iowa."

WHOG Huntington Broadcasters Assn., 409 N. Jefferson st., Huntington, Ind. 241.8 meters, 1240 kilocycles, 15 watts.

WHT Radiophone Broadcasting Corp., Wrigley Bldg., 410 N. Michigan blvd., Chicago, Ill. 238 meters, 1260 kilocycles, 5000 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 av., Philadelphia, Pa. 249.9 meters, 1200 kilocycles, 100 watts, class A. Tue, Fri, 9 pm. Eastern standard time.

WIAS Home Elec. Co., 315 N. Third st., Burlington, Iowa. 254.1 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-Strand Theatre Station, 16 E. Mifflin st., Madison, Wis. 236 meters, 1270 kilocycles, 100 watts, class A. Mon & Wed, 8:30-10 pm. Mon, 11-12 pm. Fri, 6:15-7 pm. Sat, 11 pm to midnight, Cuckoo Club Music. Central standard time. Slogan: "The Four Lakes City."

WIBG St. Paul's Protestant Episcopal Church, Elkins Park, Philadelphia, Pa. 222.1 meters, 1350 kilocycles, 50 watts, class A. Sun, 10:45 am, 3:45 pm. Eastern standard time.

WIBI Frederick B. Zittrell, Jr., 49 Boerum av., Flushing, L. I., N. Y. 218.8 meters, 1370 kilocycles, 500 watts, class A. Eastern standard time.

WIBJ C. L. Carrell, 36 S. State st., Chicago, Ill. (portable). 215.7 meters. 1390 kilocycles, 50 watts, class A. Central standard time.

WIBM C. L. Carrell, 36 S. State st., Chicago, Ill. 215.7 meters, 1390 kilocycles, 100 watts, class A. Daily ex Sun, 8:45-9:45 pm. Central standard time. Slogan: "The Gypsy Station."

WIBO WIBO Broadcasters, Inc., 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 Service Co. (Thurman A. Owings, Mgr.), Steubenville, Ohio. 246 meters, 1220 kilocycles, 50 watts, class B. Fri, 8-11 pm. Eastern standard time.

WIBS Lieut. Thomas F. Hunter (portable), 921 Edgewood road, Elizabeth, N. J. 202.6 meters, 1480 kilocycles, 150 watts, class A. Eastern standard time.

WIBU The Electric Farm, R. F. D. No. 3, Poynette, Wis. 222.1 meters, 1350 kilocycles, 20 watts, class A. Central standard time.

WIBW C. L. Carrell, 36 S. State st., Chicago, Ill. 215.7 meters, 1390 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 noon, 7-9 pm. Central standard time. Slogan: "WIBW On the Banks of the Wabash."

WIBX WIBX, Inc., 102 Lafayette st., 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 Catoma 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 The Bridgeport Broadcast 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, etc. Thurs, 8 pm, 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., 918 Pine st., St. Louis, Mo. 258 meters, 1162 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, 10-11 am, 1-2 pm, 3-4:30 pm, 6-7:30 pm. Sun, 10:30 am-12:30 pm, 4-6 pm, 7-9:15 pm, 9:15 pm-12 midnight. Eastern standard time. Slogan: "Watch Its Progress."

WJAD Frank P. Jackson, 801 Austin av., Waco, Tex. 352.7 meters, 850 kilocycles, 750 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."

WJAG Norfolk Daily News, Norfolk, Neb. 270.1 meters, 1110 kilocycles, 500 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, Radio Chapel; 1 pm, Thurs & Sat, organ request program.

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WJAM D. M. Perham, 322 3rd av. W., Cedar Rapids, Iowa. 267.7 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. 485 meters, 620 kilocycles, 500 watts. Daily ex Sun, 1:05 pm, musical; 1:30, weather reports. Mon, 8 pm, 9 pm & 10 pm, musical programs & grand opera. Tues, 7 pm, 8 pm, 9 pm, musical; 10 pm, bridge. Wed. 7:30 pm, music. Thurs, 8, 9 & 10 pm, music & entertainment. Fri, 8:20, 8:30, 9 & 11 pm, music & entertainment. Sun, 7:20 pm & 9:15 pm. Eastern standard time. Slogan: "The Southern Gateway of New England."

WJAS Pittsburgh Radio Supply House, 963 Liberty av., Pittsburgh, Pa. 275.1 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. Sun, 11 am-8 pm, church services. Mon, 7-7:30, 8, 9, 10, 11 12 pm. Tues, Fri & Sat, 7, 8, 9, 10, 11 pm. Wed, 7:30, 8, 9:30, 10:30 pm. Thurs, 7:45, report; remainder silent. Eastern standard time. Slogan: "In the Land of Sunshine."

WJAZ The American Radio Broadcasting Corp. of the Shoreland Hotel, and Chez Pierre Club, 247 E. Ontario st., Chicago, Ill. 329.6 meters, 910 kilocycles, 10,000 watts. Sun, 6:30-9:30 pm. Tues, Wed, Thurs, 6:30-12 midnight. Fri, 6:30-2 am. Sat, 6:30-1 am. Central standard time.

WJBA D. H. Lentz, Jr., 301 Whitley av., 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. 254.1 meters, 1180 kilocycles, 10 watts, class A. Eastern standard time. Slogan: "Land of Perpetual Sunshine."

WJBC Hummer Furniture Co., Second and Joliet, La Salle, Ill. 234.2 meters, 1280 kilocycles, 100 watts. Sun, 10-11 am, Catholic church services; 7:30-9:30 pm, Baptist church services. Mon, 8-10 pm, studio program. Tues, Thurs, Sat, 12:30-1 pm, organ concert. Sat, 1-2 pm, children's program. Central standard time. Slogan: "Better Homes Station."

WJBI Robert S. Johnson, 63 Broad st., Red Bank, N. J. 218.8 meters, 1370 kilocycles, 250 watts. Wed, 8 pm-12 midnight, entertainment. Eastern standard time.

WJBK Ernest F. Goodwin, 803 Congress st., Ypsilanti, Mich. 232.4 meters, 1290 kilocycles, 15 watts, class A. Central standard time.

WJBL Wm. Gushard Dry Goods Co., 301 N. Water st., Decatur, Ill. 270.1 meters, 1110 kilocycles, 500 watts, class B. Mon, Wed & Sat, 9 pm. Sun, 3 pm. Central standard time.

WJBO Valdemar Jensen, 119 South st., New Orleans, La. 267.7 meters, 1120 kilocycles, 100 watts.

WJBR Gensch and Stearns, Omro, Wis. 227.1 meters, 1320 kilocycles, 100 watts.

WJBT John S. Boyd, 5454 Howard st., Chicago, Ill. 468.5 meters, 640 kilocycles, 500 watts.

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

WJBW Serve-U-Radio Co., 2743 Dumaine st., New Orleans, La. 270.1 meters, 1110 kilocycles, 30 watts. Tues, Fri, 7-8 pm. Central standard time. Slogan: "The Serve You Broadcasting Station at New Orleans."

WJBY Electric Construction Co., 517 Broad st., Gadsden, Ala. 260.1 meters, 1153 kilocycles, 15 watts.

WJBZ Roland G. Palmer and A. Coppotelli, 144 East 16th st., Chicago Heights, Ill. 419.3 meters, 715 kilocycles, 100 watts. Mon & Tues, 7-10 pm. Slogan, "Crossroads of the Nation."

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."

WJPW J. P. Wilson, Ashtabula, Ohio. 239.9 meters, 1250 kilocycles, 15 watts.

WJR Jewett Radio & Phonograph Co., Pontiac, 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."

WJUG Uda B. Ross, 30 Park pl., New York City, N. Y. 516.9 meters, 580 kilocycles, 500 watts. Daily on air. Unlimited time. Eastern standard time. Slogan: "The Jug."

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

WJZ Radio Corporation of America, 33 W. 42nd st., New York, N. Y. 454.2 meters. 662 kilocycles, 5000 watts, class none. Sun, 9-12:30 pm, 3:55-5:30 pm, 7-11:30 pm. Mon, 1-2:40 pm, 4:30-6 pm, 7-11:30 pm. Tues, 1-2:40 pm, 4:30-6 pm, 7-11:45 pm. Wed, 1-2:40 pm, 4:30-6 pm, 7-11:30 pm. Thurs, 1-2:40 pm, 4:30-6 pm, 7-11:30 pm. Fri, 1-2:40 pm, 4:30-6 pm, 7 pm-12:15 am. Sat, 1-4 pm, 4:30-6 pm, 7 pm-11:30 pm. Eastern standard time.

WKAF WKAF Broadcasting Corp., 130 Second st., Milwaukee, Wis. 260.7 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."

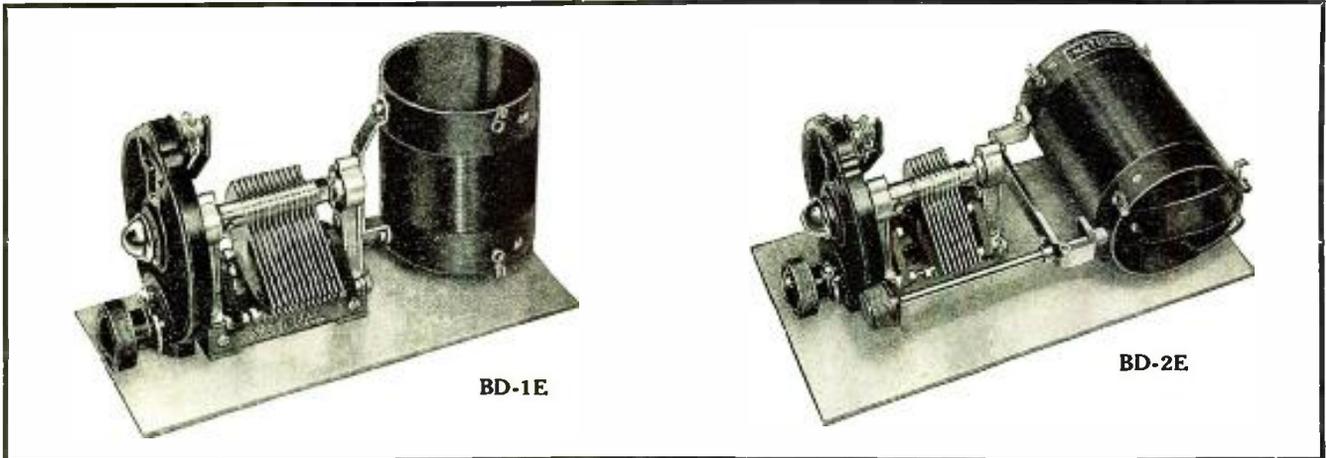
WKAQ Radio Corp. of Porto Rico, Telephone Bldg., San Juan, Porto Rico. 340.7 meters, 880 kilocycles, 500 watts. Mon, 8-9 pm, Rialto Theater; 9-10:30 pm, studio program. Wed, 8-10 pm; musical band of San Juan. Fri, 8-9 pm. Local time (one hour earlier than E.S.T.). Slogan: "The Island of Enchantment."

WKAR The Michigan State College, East Lansing, Mich. 285.5 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.

WKAV Laconia Radio Club, 480 Main st., Laconia, N. H. 223.7 meters, 1340 kilocycles, 100 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.

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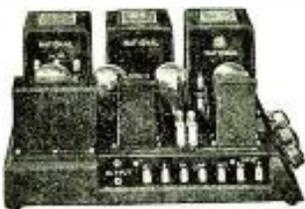


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WKBC H. L. Ansley, 1428 N. 12th av., Birmingham, Ala. 225 meters, 1333 kilocycles, 50 watts. Tues, Thurs, Sat, 7:30-8 pm, music. Sat. Sunday school talks on lessons for Sunday. Central standard time.

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

WKBF Noble B. Watson, 233 Iowa st., Indianapolis, Ind. 244 meters, 1229 kilocycles, 100 watts.

WKBG C. L. Carrell, 36 S. State st., Chicago, Ill. (Portable). 215.7 meters, 1390 kilocycles, 100 watts.

WKBH Callaway Music Co., 221 Main st., LaCrosse, Wis. 249.9 meters, 1200 kilocycles, 500 watts. Mon & Fri, 6-7 pm, organ; 7:15-8 pm, bedtime stories, 8-10 pm. Wed, 6-7 pm, organ; 7:15-8 pm, bedtime stories; 9-11 pm, dance program. Daily 12:10 noon, weather and stock reports.

WKBI Fred L. Shoenwolf, 1917 Warner av., Chicago, Ill. 220.4 meters, 1360 kilocycles, 50 watts.

WKBJ Gospel Tabernacle (Inc.), 5th av. & 10th st. S., St. Petersburg, Fla. 280 meters, 1071 kilocycles, 250 watts.

WKBL Monrona Radio Mfg. Co., 16 S. Monroe st., Monroe, Mich. 252 meters, 1190 kilocycles, 15 watts. Mon, 8-9 pm. Wed, 9-10:30 pm. Thurs, 8-10 pm. Fri, 8-11 pm. Sat, 9-12 pm. Slogan: "The Most Powerful 15-Watt Station in the World."

WKBM John W. Jones, 130 Broadway, Newburgh, N. Y. 285.5 meters, 1050 kilocycles, 100 watts. Sun evening, church services. Mon, dinner musical program. Tues, Thurs, 6-12 pm, studio program. Fri, 7-11 pm, studio program. Sat, 10:30 am, morning program; 9 pm, dance music. Eastern time.

WKBN Radio Electric Service Co., 26 Auburndale av., Youngstown, Ohio. 360 meters, 832.8 kilocycles, 50 watts.

WKBO Camith Corp., Jersey Observer Bldg., Jersey City, N. J. 3039 meters, 986.6 kilocycles, 500 watts.

WKBP Battle Creek Enquirer & News, Battle Creek, Mich. 265 meters, 1131 kilocycles, 50 watts.

WKBQ Starlight Amusement Park, 1100 E. 177th st., New York City, N. Y. 285 meters, 1052 kilocycles, 10 watts. Daily ex Sun. Irregular hours. Eastern standard time.

WKBR Charles J. Heiser, Heiser Radio Laboratory, 55 Frances st., Auburn, N. Y. 225 meters, 1333 kilocycles, 100 watts output. Sun, 2-3 pm, religious services. Sat, 11-12:30 pm. Slogan: "Auburn, N. Y., the Heart of the Finger Lakes Region."

WKBS Weinberg Arcade, Galesburg, Ill. 361.2 meters, 830 kilocycles, 200 watts. Sun, religious, 3-4 pm. Daily ex Sun, 8-10 pm. Wed & Sat, 10-11 pm, frolic. Slogan: "Where Knowledge Becomes Sure."

WKBT First Baptist Church, 3436 St. Charles av., New Orleans, La. 252 meters, 1190 kilocycles, 50 watts. Sun, 11 am & 7:30 pm, church services & special music.

WKBU H. K. Armstrong, 1037 Maryland av., New Castle, Pa. (Portable). 238 meters, 1260 kilocycles, 50 watts.

WKBV Knox Battery & Electric Co., 658 Main st., Brookville, Ind. 236.1 meters, 1270 kilocycles, 75 watts.

WKBW Churchill Tabernacle, 1420-28 Main, Buffalo, N. Y. 362.5 meters, 827 kilocycles, 100 watts, class B. Sun, 10:30 am-3, 7, 10:15 pm until midnight, religious; 12:15 noon to 2:15 pm, dinner music. Mon & Tues, 6:15-7:30, dinner music. Wed, Thurs & Fri, 8 pm, concert. Slogan: "Well Known Bible Witness."

WKBY Fernwood Quick, 347 Mill st., Danville, Pa. (Portable). 220 meters, 1363 kilocycles, 50 watts.

WKBZ Karl L. Ashbacker, First National Bank Bldg., Ludington, Mich. 256.3 meters, 1170 kilocycles, 15 watts.

WKDR Edward A. Dato, 936 N. Michigan av., Chicago, Ill., Kenosha, Wis. 428.3 meters, 700 kilocycles, 5 watts.

WKJC Kirk Johnson & Co., 16-18 W. King st., Lancaster, Pa. 258.5 meters, 50 watts, 1160 kilocycles. Sun, 9-10:30 pm. Mon, Wed, Fri, 8-10 pm.

WKRC The Kodel Radio Corp., 507 E. Pearl st., Cincinnati, Ohio 329.5, 522.3 meters, 920, 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, 1911 W. Ash st., 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.

WLAC Life and Casualty Insurance Co., Nashville, Tenn. 225.4 meters, 1330 kilocycles, 150 watts.

WLAL First Christian Church, 9th & Boulder sts., Tulsa, Okla. 249.9 meters, 1200 kilocycles, 100 watts, class A. Wed, 9:30 pm. Sat, 7:30 pm. Sun, 7:30 pm, church. Central standard time.

WLAP Virginia Av. Baptist Church, 2600 Virginia av., Louisville, Ky. 275.1 meters, 1090 kilocycles, 20 watts, class A. Thurs, Fri, 9:20-10 pm. Central standard time.

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

WLBA Philadelphia School of Wireless Telegraphy, 1533 Pine st., Philadelphia, Pa. 236.1 meters, 1270 kilocycles, 50 watts.

WLBC D. A. Burton, 2224 S. Jefferson st., Muncie, Ind. 223.7 meters, 1340 kilocycles, 50 watts.

WLBE J. H. Fruitman, 2029-65th st., Brooklyn, N. Y. 230.6 meters, 1300 kilocycles, 15 watts.

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Waterman, Cal. I have your "B" Eliminator and like it very much.

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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.

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 Dept. T-10,
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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.

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THE ROLL-O RADIO CO.
Dept. T-10, 3rd & Sycamore St., Cincinnati, Ohio

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

WLBF Everett L. Dillard, 300-A E. 33rd st., Kansas City, Mo. 211.1 meters, 1420 kilocycles, 25 watts.

WLBG R. A. Gamble, 126 N. Sycamore st., Petersburg, Va. 332.2 meters, 902.2 kilocycles, 100 watts.

WLBH Joseph J. Lombardi, Farmingdale, N. Y. (Portable). 230 meters, 1304 kilocycles, 30 watts.

WLBI Aloysius Yarc, 314 Elm st., East Weuona, Ill. 296.9 meters, 1010 kilocycles, 250 watts.

WLBJ Henry Grossman, Cleveland, Ohio. 300 meters, 999.4 kilocycles, 100 watts.

WLBL Wisconsin Department of Markets, Stevens Point, Wis. 277.6 meters, 1080 kilocycles, 750 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."

WLBN William E. Hiler, 339 S. Homan av., Chicago, Ill. (Portable). 225.4 meters, 1330 kilocycles, 5 watts.

WLBO Frederick A. Trebbe, Jr., 526 Monmouth blvd., Galesburg, Ill. 243 meters, 1234 kilocycles, 100 watts.

WLBP Robert A. Fox, 25 College av., Ashland, Ohio, 220.4 meters, 1360 kilocycles, 15 watts.

WLBQ E. Dale Trout, Atwood, Ill. 230.6 meters, 1300 kilocycles, 25 watts.

WLBR Alford Radio Co., Belvidere, Ill. 335 meters, 895 kilocycles, 15 watts.

WLBT Harold Wendell, 317 E. North st., Crown Point, Ind. 230 meters, 1304 kilocycles, 100 watts.

WLBW Matthew B. Greiner, Canastota, N. Y. 220 meters, 1363 kilocycles, 5 watts.

WLBV John F. Weimer & D. A. Snick, 122 Park av., East Mansfield, Ohio. 230.6 meters, 1300 kilocycles, 50 watts.

WLBW Petroleum Telephone Co., 1 Sycamore st., Oil City, Pa. 321 meters, 934 kilocycles, 250 watts.

WLBX John N. Brahy, 283 Crescent st., Long Island City, N. Y. 230.6 meters, 1300 kilocycles, 250 watts.

WLBZ Aimone Electric, 1236 Carpenter st., Iron Mountain, Mich. 249.9 meters, 1200 kilocycles, 50 watts.

WLBZ Thompson L. Guernsey, Dover, Me. (Foxcroft). 200 meters, 1003 kilocycles, 250 watts.

WLBI Lutheran Association of Ithaca, Ithaca, N. Y. 266 meters, 1127 kilocycles, 50 watts.

WLIB Liberty Magazine, Chicago, Ill. 302.8 meters, 990 kilocycles, 4000 watts. Daily ex Sun & Mon, 7-8 pm, 11-12 pm. Sun, 5-6 pm. Central standard time. Slogan: "Liberty—A Weekly for Everybody."

WLIT Lit Bros., Philadelphia, Pa. 394.5 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 & Co., Chicago, Ill. 344.6 meters, 870 kilocycles, 5000 watts. Sun, 10:45-12:20, U. of C. church; 12:20-1, organ; 1-1:30, trio concert; 6-8, Little Brown church. Mon, markets; 9-9:10-10-10:30-11-11:30-11:45, markets every day ex Sun; R. F. D. program & markets, 12-1 pm; closing markets every day, 1:25-1:35; home makers' hour, Mon, Tues, Wed, Fri, 2:30-3:30 pm; organ every day ex Sat & Sun, 5:30. Birthday time, ex Sat & Sun, 5:45 pm. Supper bell program ex Sun, 6 pm. Sports time ex Sun, 6:30 pm. Silent after 7 pm Mon, Tues, 5:30-8, 10:30-12:30 pm. Wed, 5:30-12 pm. Thurs, 5:30-8, 10:30-12:30 pm. Fri, 5:30-12 pm. Sat, 6-1 am. Central standard time. Slogans: "World's Largest Store," "Work Better, Live Better, Sell Better."

WLSI Lincoln Studios (Inc.), 335 Westminster st., Providence, R. I. 440.9 meters, 680 kilocycles, 500 watts.

WLTS Lane Technical High School, 1225 Sedgwick st., Chicago, Ill. 258.5 meters, 1160 kilocycles, 100 watts. Fri, 1-2 pm. Tues, 1-2:30 pm, educational & musical. Central standard time.

WLW The Crosley Radio Corp., Harrison, 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, 8:30-11 pm, musicals, lectures, popular talks, etc. Eastern standard time.

WMAC Clive B. Meredith, Cazenovia, N. Y. 275.1 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. Thurs, Primer for Town Farmers. Fri, 7:30 pm, Agricultural Interview; 8:30 pm, classical program. Sat, Farm News Digest. Eastern time. Slogan: "Voice of Central New York."

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

WMAK Lafayette Broadcasting Studios, (Inc.), Hotel Lafayette, Buffalo, N. Y. 266 meters, 1130 kilocycles, 500 watts. Sun, 10:25 am-7:50 pm, church services; 10:20 pm, Sylvania dance program. Daily ex Sun & Sat, 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, 12 noon, Thurs, 10:30 pm, musical program. Tues, 11:30 pm, organ recital. Eastern time.

WMAL Washington Radio Forum, owned & operated by the M. A. Leese Radio Co., 720 11th st., N. W., Washington, D. C. 293.9 meters, 1020 kilocycles, 100 watts, class A. Tues, Thurs & Sat, 7 pm, varied. Eastern standard time.

WMAN First Baptist Church, Columbus, Ohio. 277.6 meters, 1080 kilocycles, 50 watts, class A. Sun, 10:30-12 noon, 7:30-9 pm, church services. Eastern standard time.

Greater Distance, Finer Selectivity, Greater Power with These

AERO COIL

SUPER-SENSITIVE INDUCTANCE UNITS

AERO TUNED RADIO FREQUENCY KIT—PRICE \$12.00

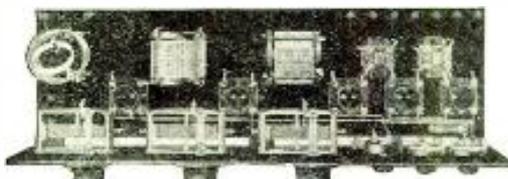


Replace your present inductance with this Aero Coil Tuned Radio Frequency Kit. It will positively improve the performance of your receiver. Special patented Aero Coil construction eliminates radio frequency losses. You will notice instantly, a tremendous improvement in volume, tone and selectivity.

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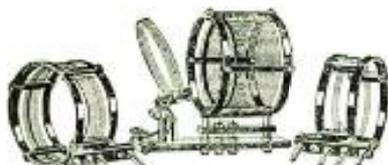
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This is the super-sensitive set that has caused such a sensation because of its remarkable performance and extreme selectivity under the most adverse conditions. Tunes extremely sharp. Brings in far distant stations through heaviest local broadcasting. Remarkable in tone. All in all, probably the most efficient 5-tube set thus far perfected. You should build it. It's easy with the instructions we furnish. These instructions contain an insert showing how to wire up for power tube, if desired.

Aero Short Wave Kit



Stock No. LWT-125
Completely Interchangeable

Adopted by experts and amateurs. Range 15 to 130 meters. Completely interchangeable. Includes 3 coils and base mounting, covering U. S. bands 20, 40 and 80 meters. Use .00014 condenser on secondary, and .00025 on feedback control.

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Stock No. RFR-110

One Radio Frequency Coil and one tapped 3-circuit tuner. Makes the world's most efficient 4-tube set; uses .00035 condenser.

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**Aero Interchangeable Coils
No. 4 and 5**



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Stock No. INT-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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Stock No. OS-55

Greatly improves the performance of the oscillator circuit of super-heterodynes, uses .0005 condenser.

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The true low-loss tuner. Variable primary, uses .00035 condenser.

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

WMAQ The Chicago Daily News, 15 N. Wells st., Hotel La Salle, Chicago, Ill. 447.5 meters, 670 kilocycles, 1000 watts. Daily ex Sun & Mon. 6:30-8 to 11 am, 12 noon to 3 pm. 4 to 7 pm. 8 to 10 pm. Mon. 9 am to 11 am. 12 noon to 4 pm, 4 to 7 pm. Central standard time.

WMAZ Kingshighway Presbyterian Church, St. Louis, Mo. 247.8 meters, 1210 kilocycles, 100 watts, class A. Sun, 11 am-12 pm, 8-9 pm, church services. Central standard time.

WMAZ Mercer University, Macon, Ga. 260.7 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."

WMBA Leroy J. Beebe, 13 Robinson st., Newport, R. I. (Portable). 249.9 meters, 1200 kilocycles, 1000 watts.

WMBB American Bond & Mortgage Co., 6201 Cottage Grove av., Chicago, Ill. 249.9 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 Savoy, Detroit, Mich. 256.3 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."

WMBE Dr. C. S. Stevens, St. Paul, Minn. 220 meters, 1363 kilocycles, 5 watts.

WMBF Fleetwood Hotel Corp., Miami Beach, Fla. 384.4 meters, 780 kilocycles, 500 watts. Daily, 7-8 pm, concert orchestra; 8-9 pm, popular program; 10-1 am, dance music. Eastern time. Slogan: "Wonderful Miami Beach Fleetwood."

WMBG Havens & Martin, 914 W. Broad st., Richmond, Va. 220 meters, 1363 kilocycles, 5 watts. Mon, Tues, Thurs, Fri & Sat, 1-3 pm. Slogan: "The Daytime Station."

WMBH Edwin Dudley Aber (Portable), Chicago, Ill. 280 meters, 1071 kilocycles, 100 watts.

WMBI The Moody Bible Institute of Chicago, 153 Institute pl., Chicago, Ill. 288.3 meters, 1040 kilocycles, 500 watts. Sun, 3:30-5 pm, 7-9 pm, Bible classes. Daily ex Sun, 7-7:40 am, morning worship; 12:30-1:30 pm, organ program; 10:30-11:30 am, missionary hour, Bible study; evening, 8-9 pm, Bible study. Central standard time. Slogan: "The West Point of Christian Service."

WMBJ Wm. Roy McShaffrey, Monessen, Pa. 277.6 meters, 1080 kilocycles, 50 watts.

WMBK John C. Slade, Hamilton, Ohio. 360 meters, 832.8 kilocycles, 10 watts. Sun, 2:30 pm, 8:30-10:30 pm, 12-2 am.

WMBL Benford Radio Studios, Lakeland, Fla. 410 meters, 731.3 kilocycles, 10 watts.

WMBS Macks Battery Service, 60 S. Cameron st., Harrisburg, Pa. 360 meters, 832.8 kilocycles, 500 watts.

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 (Greeley Square Hotel Co.), Hoboken, N. J. 340.7 meters, 880 kilocycles, 500 watts.

WMHA Young Men's Hebrew Association of Washington Heights, 975 St. Nicholas av., New York, N. Y. 230 meters, 1304 kilocycles, 30 watts.

WMPC First Methodist Protestant Church, Lapeer, Mich. 222 meters, 1351 kilocycles, 30 watts.

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

WMSG Madison Square Garden, 319 W. 49th st., New York, N. Y. 302.8 meters, 990 kilocycles, 500 watts.

WMVM Edward J. Malome, Jr., 126 1st st., Newark, N. J. 475.9 meters, 630 kilocycles, 500 watts.

WNAB The Shepard Stores, Winter st., Boston, Mass. 280.2 meters, 1070 kilocycles, 100 watts, class A. Daily ex Sun. 3-4 pm, daily Phonograph 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; 3-4 pm, musicale; 7:30-9 pm, church services. Daily ex Sun. 10:30-11:30 am, women's club; 12:15-1 pm, church services; 1-2 pm, luncheon concert; 4-5 pm, music; 6-6:30 pm, children's club; 6:30-7:30, dinner dance; 7:30-8 pm, news & talks; 8-10 pm, concert; 10:05-11 pm, dance program. Eastern time.

WNAD University of Oklahoma, Norman, Okla. 254 meters, 1180 kilocycles, 500 watts, class A. Mon. 7:15-8 pm. Tues. 12:15-1 pm, 2:30-3:30 pm. Wed, 7:15-8 pm. Thurs, 7:15-8 pm. Fri. 12:15-1 pm, 2:30-3:30 pm. Sat, broadcast of athletic events. Central standard time. Slogan: "The Voice of Soonerland."

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

WNAT Lennig Bros. Co., Spring Garden & 9th 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. 243.8 meters, 1230 kilocycles, 100 watts, class A. Daily ex Sun, 11:30 am, markets & 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.

Real Beauty That Appeals

Every Radio Lover wants this Supreme Value in Radio Cabinets

The Charlotte Radio Cabinets lend charm to the appearance of your home and more enjoyment to your radio, because of the accessibility, convenience and beauty of the Charlotte Cabinet.



Cabinet No. 33 1/2

Specifications for R-10

Butt Walnut fronts, plain Walnut tops and ends. Balance Gum, finished Hugonot Walnut, lacquered and waxed. Dimensions in inches: Top, 36 1/4 x 15 1/4. Height, 41. Upper Compartment, 32 1/4 x 14 x 8 high. Lower Compartment, 32 1/4 x 14 x 12. Will take panel 8 high and leave 12 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.

Because of the exquisite walnut finish and the many practical new features, Number 33 Walnut Cabinet is the crowning achievement of Charlotte for Radio Owners. The appearance of this Radio Cabinet will make every set owner enthusiastic.

Specifications for R-33

Height, 45 inches. Width, 31 1/2 inches.

Depth, 16 3/4 inches outside measurement.

Maximum size of set panel, 26x9. Maximum depth behind set panel, 12 1/2 inches.

Battery compartment, 26 1/2 x 14 1/2 x 11 inches high.

Grille opening, 18x18.

The list prices are as follows, with Loud Speaker, Unit and Grille:

No. 33 1/3 butt walnut fronts.....\$140.00

No. R-33 plain walnut fronts..... 125.00



Cabinet No. 10

Enhance the beauty and utility of your set with a Charlotte Cabinet.

THE CHARLOTTE FURNITURE CO.

CHARLOTTE, MICHIGAN, U. S. A.

RADIO CABINETS of  **BEAUTIFUL UTILITY**

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

WNJ Herman Lubinsky, 89 Lehigh av., Newark, N. J. 350 meters, 856.6 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, 5000 watts, class A. Mon, Wed, Fri, 8-10 pm. Central standard time. Slogan: "Smoky Mountain Station."

WNRC Wayne M. Nelson, 7 W. 4th St., Greensboro, N. C. 223.7 meters, 1340 kilocycles, 10 watts.

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, Tex. 394.5 meters, 760 kilocycles, 5000 watts. Sun, 11 am-7:45 pm, church services. Daily ex Sun, 6:15, sports; 10 am, weather, markets, etc.; 12:15-3 pm, music. Tues, 6:15-7:15 pm, organ concert. Daily ex Sat. Sun, Mon, 8:30-9:30 pm, varied program. Central standard time.

WOAN The Vaughan School of Music, Lawrenceburg, Tenn. 356.4 meters, 841.2 kilocycles, 500 watts, class B. Daily ex Sun, 9-10 pm, musical. Central standard time. Slogan: "Watch Our Annual Normal."

WOAX Franklin J. Wolff, the Monument Pottery Co., Trenton, N. J. 240 meters, 1250 kilocycles, 500 watts. Daily ex Sun, 12:15-12:30 pm, music, weather forecast, police reports, crop reports for New Jersey. Wed, 7:30-9:30 pm, popular program. Sun, 7:30-8:30 pm, dance orchestra. Eastern standard time. Slogan: "The Voice from Trenton."

WOBB Longacre Engineering & Construction Co., 127 N. Dearborn st., Chicago, Ill. 555.2 meters, 540 kilocycles, 5 watts.

WOC The Palmer School of Chiropractic, 1002 Brady st., Davenport, Iowa. 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 pm, WEAF; 9:30 pm, musical or lecture. Wed, 4-4:45 pm, musical; 9-9:30 pm, WEAF; 9:30-10:30 pm, organ. Thurs, 7-7:30 pm, WEAF; 7:30-8, Quartet Ploowboys; 8-10 pm, WEAF. Fri, 7-7:30 pm, Ivory Twins; 7:30-8:30 pm, Melody Mexicos; 8:30-9:30 pm, musical from WEAF. Sat, 8-9 pm, WEAF. Central standard time. Slogan: "Where the West Begins and in the State Where the Tall Corn Crows."

WOCB Orlando Broadcasting Co., P. O. Box 451, 19 S. Main st., Orlando, Fla. 293.7 meters, 1021 kilocycles, 50 watts. Daily ex Sun, 3-4 pm, 7:30-8 pm. Sat, 6:7 pm. Eastern time. Slogan: "Orlando, City Beautiful."

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

WODA The O'Dea Temple of Music, 115 Ellison st., Paterson, N. J. 390.9 meters, 767 kilocycles, 1000 watts. Sun, 10:30 am, 7:30 am, church services. Daily ex Sun, 12-1 noon; 5-7 pm, studio; 8-11 pm, studio. Tues, 11:30-12:30 am, Nite Club. Thurs, 11-12 midnight, Nite Club. Fri, 10:30-11:30 pm, dance; 11:30-12:30 am, Nite Club. Eastern standard time. Slogan: "The Voice of the Silk City."

WOI Elec. Engineering Dept., Iowa State College, Ames, Iowa. 270.1 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. 217.3 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 Harold E. Smith, Peekskill, N. Y. 232.4 meters, 1290 kilocycles, 50 watts, class A. Mon, Thurs, Sat, 7-12 pm. Tues & Fri, 7-12 pm, non-regular. Eastern standard time.

WOKT Titets Corp., 710 Terminal Bldg., Rochester, N. Y. 340 meters, 831.8 kilocycles, 1000 watts.

WOMT The Mikadow Theater, Manitowoc, Wis. 254.1 meters, 1180 kilocycles, 50 watts.

WOO John Wanamaker, Philadelphia, Pa. 508.2 meters, 590 kilocycles, 500 watts. Daily ex Sun, 11 am, music; 11:30, weather; 11:55 am, time signals; 12 noon, music; 4:40 pm, news reports; 4:45 pm, musical; 9:55 pm, time signals; 10:02 pm, weather report. Mon, Wed, Fri, 7:30-11 pm, concerts. Sun, 10:45 am or 7:45 pm, 2:15 pm, Sunday school musical program; 6 pm, organ recital. Eastern standard time.

WOOD Grand Rapids Radio Co., 211 Diamond av., S. E., Grand Rapids, Mich. 241.8 meters, 1240 kilocycles, 500 watts.

WOQ Unity School of Christianity, 917 Tracy av., 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, 6:15-7:15 pm, orchestra music; 10-11 pm, special radio healing service. Sun, 11 am-12:30 pm, morning service; 7-9:15 pm, evening services; 11 am, daily prayer service. Central standard time.

WOR L. Bamberger & Co., 46 Bank st., Newark, N. J. 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, Batavia, Ill. 275.1 meters, 1090 kilocycles, 5000 watts. Sun, 10-11 am, 2:30-4 pm, 7-8 pm, 9-11 pm. Tues, Wed, Thurs, Fri, Sat, 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, 1-2-4 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."

WOW The Voice of the Woodmen of the World Life Insurance Association, Headquarters Bldg., Omaha, Neb. 536 meters, 570 kilocycles, 1000 watts. Sun, 9-10:45 am, 2-4 pm, 6-7 pm, religious services; 9-11 pm, religious. Mon, Tues, Thurs & Fri, 8-9 am, stock report; 10-11:30 am, 12:30-2 pm, stock reports & musical; 4-6 pm, miscellaneous; 6-7:30 pm, dinner concert; 9-11, concert. Sat, regular programs till 7:30 pm. Additional programs under the Omaha Chamber of Commerce. Central standard time. Slogan: "The Omaha Station."

WOWO The Main Auto Supply Co., 215 W. Main st., Fort Wayne, Ind. 227 meters, 1320 kilocycles, 1800 watts. Mon, Wed, noon & night. Tues, Fri, Sat, noon. Central standard time. Slogan: "Wayne Offers Wonderful Opportunities."

WPAB Radio Corp. of Virginia, 305 Plume st., Norfolk, Va. 319 meters, 940 kilocycles, 100 watts.

WPAK North Dakota Agricultural College, Fargo, N. D. 271.5 meters, 1090 kilocycles, 50 watts. Mon, Wed & Fri, 7:30 pm, during school terms. Central standard time.

WORKRITE "26"— A Popular Priced Console

A Power Unit Set

Built-In Cone
Speaker

High Quality
Materials

Perfect Radio
Reception

A remarkable
achievement for the
moderate price

\$160.00



WORKRITE RADIOS WORKRITE

IN this Model "26" WorkRite Radio is found every essential of successful reliable service—A 6-tube neutrodyne circuit; 3-way switch—"off"—"soft"—"loud" turns off switch, turns on five tubes and then six tubes; straight line broadcast condensers; cabled wire; uses batteries or power unit from light socket; two dial control. These are some of the features that make this WorkRite Model so popular.

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of pleasing design encases the set. A twenty inch cone speaker mounted on a sounding board gives a wonderful tone.

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WORKRITE MODEL "16"

Same chassis as Model "26" mounted in a table receiver. Walnut cabinet with panel to match, gold trimmed. Price . . . **\$80.00**

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NEUTRODYNE
Pat. March 27 1933 and April 1 1934.
Reactive Pat. Nos. 1,430,080 and 1,430,222
Other Patents Pending

WORKRITE
SUPER NEUTRODYNE RADIOS

WPAP Palisade Amusement Park, Cliffside, N. J. 361.2 meters, 830 kilocycles, 500 watts.

WPCC North Shore Congregational Church, Chicago, Ill. 258.5 meters, 1160 kilocycles, 500 watts.

WPCH Peoples Broadcasting Corp., Park Central Hotel, 55th, 56 st. & 7th av., New York City, N. Y. 272.6 meters, 1100 kilocycles, 1500 watts. Mon, 1 pm-12 midnight. Tues, 12 noon-7 pm, 9 pm-midnight. Wed, 1 pm, 8 pm, 10 pm-midnight. Thurs, 12 noon to midnight. Fri, 1-7 pm, 9 pm-midnight. Sat, 12 noon-3 Sun am. Sun, 11 am-12 noon, 4:30 pm-midnight. Eastern standard time. Slogan: "Voice of Central Park."

WPDQ The Norwood Garage Station, 3165 Bailey av., Buffalo, N. Y. 205.4 meters, 1460 kilocycles, 300 watts, class A. Tues, Thurs & Sat, 8:30-11 pm. Daily ex Sun, organ recitals, 6:45 pm. Eastern standard time.

WPEP Maurice Mayer, 1432 North av., Waukegan, Ill. 212.6 meters, 1410 kilocycles, 500 watts.

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-midnight. Eastern standard time.

WPRC Wilson Printing & Radio Co., 1740 5th st., Harrisburg, Pa. 215.6 meters, 1390 kilocycles, 100 watts, class A. Sun, 9-11 pm. 1st & 3rd Mon, 9-11 pm. Eastern standard time. Slogan: "The Capital City of the Keystone State."

WPSC Pennsylvania State College Dept. of Elec. Engineering, State College, Pa. 260.7 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.

WQAE Moore Radio News Station, 41 Main st., Springfield, Vt. 245.8 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. Evenings, 5:45-7:30, studio; 7:45-8:45, orchestra and entertainment. Mon, Wed & Fri, 9-9:30, band. Tues, Thurs & Sat, 9:10, band. Eastern time. Slogan: "The Most Southern Broadcasting Station in the U. S."

WQAN Scranton Times, 222 Spruce st., Scranton, Pa. 249.9 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, Cliffside, N. J. 361.2 meters, 830 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 Stations, Clark & Lawrence, Chicago, Ill. 447.5 meters, 670 kilocycles, 500 watts. Mon, 11 am-12 noon, 3-4 pm, home economics. Tues, Wed, Thurs, Fri & Sat, 11 am-12 noon, 3-4 pm, 7-8 pm, 10 pm-2 am. Central standard time. Slogan: "Chi-Caw-Go."

WRAF The Radio Club (Inc.), 719 Michigan av., LaPorte, Ind. 223.7 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."

WRAH Stanley N. Read, 191 Alabama av., Providence, R. I. 235 meters, 1276 kilocycles, 450 watts.

WRAK Economy Light Co., 1105 Ludington st., Escanaba, Mich. 256.3 meters, 1170 kilocycles, 100 watts, class A. Sun, 6:30-8 pm, classical. Mon & Fri, 10:30-11 am, household hints and weather forecast; 6:30-7 pm, late news and weather forecast followed by musical program. Tues & Thurs, same as Mon & Fri. Wed, 10:30-11:30 am, household hints & weather forecast. Sat, 10:30-11 am, household hints & weather forecast; 6-6:30 pm, late news & weather forecast, followed with dance program. Eastern standard time. Slogan: "The Gateway to Cleveland."

WRAM Lombard College, Galesburg, Ill. 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. Thurs, 9-10 pm. Sun, 7 pm. Central standard time.

WRAP Avenue Radio & Electric Shop, 460 Schuykill av., Reading, Pa. 238 meters, 1260 kilocycles, 10 watts, class A. Tues, 9 pm, EST entertainment. Thurs, 10 pm. Eastern standard time. Slogan: "The Schuykill Valley Echo."

WRAX Berachan Church (Inc.), 1608 Alleghany av., Philadelphia, Pa. 267.7 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, 3308 14th st., 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."

WRCO Wynne Radio Co., 8 W. Hargett st., 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., White Haven, Tenn. 254.1 meters, 1180 kilocycles, 10 watts. Daily, 7-8 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. Daily ex Sun, 6-7 pm. Tues, Thurs, 8:15-10 pm. Sat, 10-12 midnight. Sun, 10 am, chimes; 10:30 am & 7:30 pm, church services. Eastern standard time.

WRES Harry Leonard Sawyer, Wollaston, Mass. 295 meters, 999.4 kilocycles, 50 watts. Mon & Thurs, 8 pm, entertainment.

WRHF Washington Radio Hospital Fund, Colorado Bldg., Washington, D. C. 256.3 meters, 1170 kilocycles, 50 watts. Eastern standard time.

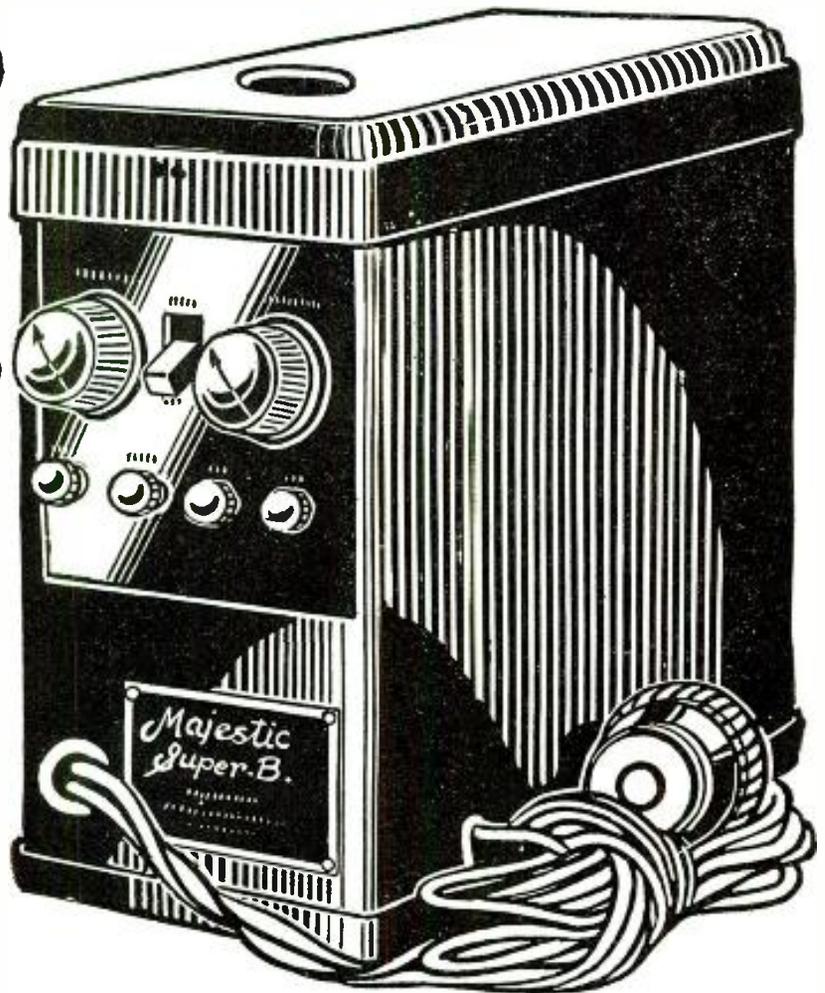
WRHM Rosedale Hospital (Inc.), Nicollet & 44th st., Minneapolis, Minn. 252 meters, 1190 kilocycles, 50 watts, class A. Thurs, 9-11 pm, music. Sun, 1:30-2:30 pm, children's hour; 2:30-4:30 pm, music; 9:15-10:30 pm. Central standard time.

No More "B" Batteries on Your Radio

At last a practical reliable "B" battery eliminator for your radio. Does away with "B" batteries; no charging; no replacing. Always 100% efficiency in "B" current. The most revolutionary development in radio.

1-Year Guaranteed
Majestic "B" Eliminator
Sent for only

\$1.00 down!



The Majestic is connected to your radio just like "B" batteries and attached to an ordinary electric socket. (For 1 to 12 tube radios.) Replaces "B" batteries entirely and furnishes "B" current direct from regular house lighting current. Simplifies radio receiving. More efficient than dry or wet "B" batteries. Entirely noiseless. Operates from 110 120 AC, 50-60-cycle current.

Cabinet finished in rich black crystal enamel. Dimensions: 10 1/4 inches deep by 5 1/2 inches wide by 9 inches high. Weight: 20 pounds net; 25 pounds packed. Bakelite Panel. Complete with extension cord and attachment plug. One RAYTHEON tube with G-G-H protective packing. Packed in individual padded wire-bound wood cases.

1-Year Guarantee
Majestic Eliminator and RAYTHEON tube are both guaranteed for one year against electrical and mechanical defects. A printed guarantee enclosed with each unit.

\$5.00 a Month, If Satisfied After Trial

Only \$1.00 with the coupon brings the Majestic "B" Eliminator to your home on trial. Try it out thoroughly before you pay another penny. See how it improves reception. See how much more convenient than using batteries. Judge for yourself how it will save you money and make your radio set more enjoyable. Then, if not satisfied, send it back at our expense and we'll refund your \$1.00 plus all transportation charges. If you decide to keep the Majestic "B" Eliminator, start paying only \$5.00 a month until you have paid the total price of only \$35.00. That's the price others ask for spot cash. We give you the lowest cash price on easy monthly payments you will never feel.

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Don't miss this opportunity to get the 1 year guaranteed Majestic "B" Eliminator at the rock-bottom cash price on easy monthly payments. Send coupon now while this offer lasts. Order by No. Y8789A, \$1.00 with coupon; \$5.00 a month; total price \$35.00.

Straus & Schram, Dept. R-3413, Chicago, Ill.

STRAUS & SCHRAM, Dept. R-3413, Chicago
 Enclosed find \$1.00. Ship special advertised Majestic "B" Battery Eliminator. I am to have 30 days free trial. If I keep it, I will pay you \$5.00 monthly. If not satisfied, I am to return it within 30 days and you are to refund my money and any express charges I paid.
Majestic "B" Battery Eliminator, No. Y8789A, \$35.

Name.....

Street, R. F. D.
or Box No.....

Shipping Point.....

Post Office..... State.....

Married or Single..... Nationality or Color.....

WRK Doron Bros. Elec. Co., 329 North st., Hamilton, Ohio. 270.1 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 or oftener, no definite time selected, also basketball games and other athletic contests. Central standard time.

WRMU A. H. Grebe & Co., Inc., Mu-I (yacht), Richmond Hill, N. Y. (Portable.) 236.1 meters, 1270 kilocycles, 100 watts. Unlimited schedule. Eastern standard time.

WRNY Experimenter Publishing Co., New York City, N. Y. 373.8 meters, 802 kilocycles, 500 watts. Sun, 4-5 pm. 7:30-9 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, 11:30 am-12:30 pm. 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, 6-7, 8-9. Mon, 9:30-10:30 pm. Fri, 8-10 pm. Sun, 10:45-12 am, 7:30-9 pm, 9:30-10:30 pm. Thurs, 9:30-10:30 pm. Central time. Slogan: "City of Achievements."

WRRS Racine Radio Station, Arcade Bldg., Racine, Wis. 360 meters, 832.8 kilocycles, 10 watts.

WRSC The Radio Shop (William S. Pote), 56 Washington av., Chelsea, Mass. 270.1 meters, 1110 kilocycles, 15 watts.

WRST Radiotel Mfg. Co., Inc., 5 First av., Bay Shore, N. Y. 215.7 meters, 1390 kilocycles, 500 watts. Daily ex Sun, 12 noon-1 pm. Mon, Wed & Fri, 7-11:30 pm, concerts. Tues & Thurs, 8-11:30 pm. Sat, 7-11:30 pm. Sun, 11 am-12:45 pm, church services; 7-11 pm, musical concert. Eastern standard time. Slogan: "Bay Shore, Garden Spot of Long Island."

WRVA Larus & Brothers Co., Inc., 21st & Cary sts., Richmond, Va. 256 meters, 1170 kilocycles, 1000 watts. Mon, Thurs, 8-12 pm. Fri, 7-12 pm. Wed, 12 noon-1:30 pm. Eastern standard time. Slogan: "Carry Me Back to Old Virginny."

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 Publishing Co., Inc., Allentown, Pa. 228.9 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 N. Main St., Fall River, Mass. 322 meters, 931.1 kilocycles, 100 watts, class A. Daily ex Sun, 12-1 pm. Sun, 10:30-12 m. Eastern standard time.

WSAX Zenith Radio Corp., 3620 Iron st., Chicago, Ill. 267.7 meters, 1120 kilocycles, 100 watts, class A. (Portable.) Central standard time.

WSAZ Chase Elec. Shop, Pomeroy, Ohio. 243.8 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 av., broadcasting from New Southern Hotel, Chicago, Ill. 288.3 meters, 1040 kilocycles, 1000 watts. Sun, 5-7 pm, classical; 9 pm-1 am, popular program. Mon, 5:30-7 pm, dinner concert. Tues, 6:30-7:15, dinner concert; 7:15 pm, Sangor Tour Travelogue; 9 pm-1 am, popular. Wed, 6:30-7:15 pm, 7:15-8 pm, School of Music. Thurs, 6-7 pm, 9 pm-1 am. Fri, 6:30-7:15 pm, 7:15-8 pm, 9 pm-1 am, popular program. Sat, 6:30-8 pm, 9 pm-1 am, 2-4 am, DX program, "The Tavern by the Road" (The Listeners' Inn). Daily ex Sun, Mon, 6:30-8:30 pm, dinner concert; 9:30 pm-1 am, popular program. Central standard time.

WSBF Stix, Baer & Fuller, 6th & Washington av., St. Louis, Mo. 272.6 meters, 1100 kilocycles, 250 watts. Sun, 9-10 pm, theater. Mon, 1 pm, 3-4 pm, 7:30-8, 8-9, 9 pm, musical talks. Tues, 1 pm, 3-4 pm, popular. Wed & Fri, 12 noon-1 pm, 3-4 pm, 7:30-8 pm, 8-9 pm, music. Thurs, 12 noon-1 pm, 3-4 pm, popular. Sat, 12 noon-1 pm, 3-4 pm. Central standard time.

WSBT South Bend Tribune, South Bend, Ind. 315.6 meters, 950 kilocycles, 500 watts, class B. Mon, 7:15-10 pm, C. S. Wed, 7:15-9:15 pm. Fri, 7:15-9:30 pm. Slogan: "Voice of the Hoosier State."

WSDA The City Temple, 122 W. 76th st., New York City, N. Y. 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.

WSEA Virginia Beach Broadcasting Co., Virginia Beach, Va. 516.9 meters, 580 kilocycles, 500 watts.

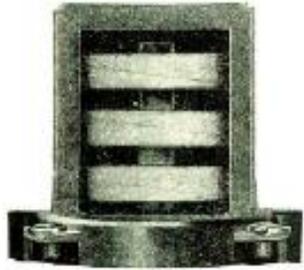
WSKC World's Star Knitting Company, Bay City, Mich. 261 meters, 1150 kilocycles, 500 watts. Sun, 11 am. Daily, 12-1 pm, dinner hour; 4 pm, news events, features. Mon, 9-11 pm, 12 midnight-2 am. Wed, 9-11 pm, request program. Sat, 10-11 pm. Sun, 11 am, church service. Eastern standard time. Slogan: "Where the Summer Trails Begin."

WSM The National Life and Accident Ins. Co., Inc., Seventh av. N. & Union st., Nashville, Tenn. 282.8 meters, 1060 kilocycles, 5000 watts. Mon, 6:15-10:30 pm. Tues, 8-10:30 pm. Wed, 6:15-10 pm. Thurs & Sat, 6:15-11 pm. Sun, 6:20-7:15 pm & 7:15-8:15 pm. 11 am, alternating. Central standard time. Slogan: "We Shield Millions."

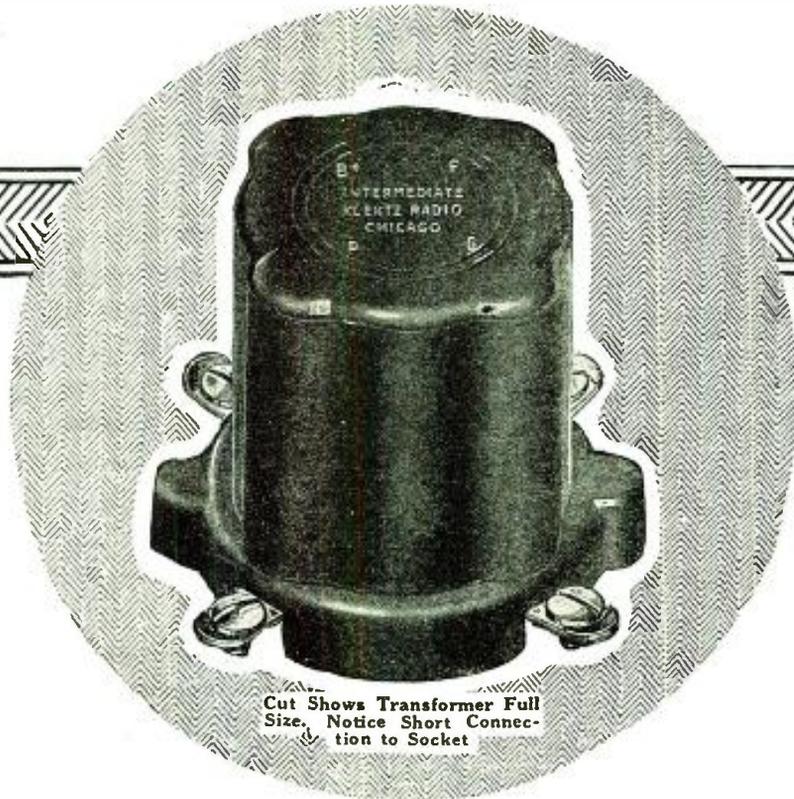
WSMB Saenger Theatres, Inc., 1401 Tulane av., New Orleans, La. 319 meters, 940 kilocycles, 500 watts, class B. Daily ex Sun, 12:30-1:30 pm, 6:30-7:30 pm, 8:30-10:30 pm, entertainment. Central standard time. Slogan: "America's Most Interesting City."

WSMH The Shattuck Music House, 207 Washington st. N., Owosso, Mich. 239.9 meters, 1250 kilocycles, 20 watts, class A. Wed, 8 pm, vocal & instrumental music. Sat, 10 pm, popular music. Sun, 10 am, church service. Eastern standard time.

WSMK The WSMK Radio Corp., 812 Gibbons Hotel, Dayton, Ohio. 275.1 meters, 1090 kilocycles, 500 watts, class A. Daily ex Sun & Thurs, 12 noon-1 pm, dinner music. Daily ex Sun, 4-4:30 pm, news reports. Daily ex Sun & Wed, 6-7 pm, dinner concert; 8-10:30 pm, studio concert. Sat, "Dum Dora Club," midnite frolic. Central standard time. Slogan: "The Home of Aviation."



Sectional View



Popular Demand Is the Best Testimonial for This Remarkable Transformer

THE Klentz 100 kilocycle Air Core Transformer is a precision unit of the highest magnitude.

The performance of any receiver is no better than that of the composite parts. Bakelite construction throughout, hermetically sealed, stagger windings, perfect matching, increased amplification, selectivity and convenient terminals permitting ease of assembly are only a few of the features that produce quality reception.

Satisfaction is obtained if you install Klentz Transformers in your receiver.

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Set .00015 Matched Condensers, \$1.50 Per Set of Four

Correspondence Invited on Short Wave R. F. Transformers from 80 Meters Up

Write for Descriptive Literature
Jobbers and Dealers: Write for Discounts

KLENTZ RADIO CO.

2324 No. Sawyer Ave., Chicago, Ill.

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

WSOE School of Engineering of Milwaukee, Oneida & Jackson sts., Milwaukee, Wis. 245.8 meters, 1220 kilocycles, 1000 watts. Daily (inc Sun), program as announced. Central standard time. Slogan: "In the Land of the Sky Blue Waters."

WSOM Union Course Laboratories, 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.

WSRO Radio Company (Harry W. Fahrlander), 421 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. 260.7 meters, 1150 kilocycles, 100 watts. Sun, 10:15-12 noon, 6:30-9 pm.

WSUI State University of Iowa, Capitol & Washington sts., Iowa City, Iowa. 483.6 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 Gold."

WSVS Seneca Vocational School, 666 East Delavan av., Buffalo, N. Y. 218.8 meters, 1370 kilocycles, 50 watts. Wed, 7:40-8 pm, code lessons; 8-9:30 pm, musical program. Fri, 8-9:30 pm, musical program. Eastern standard time. Slogan: "Watch Seneca Vocational School."

WSWS Richmond Harris & Co., Batavia, Ill. 275.8 meters, 1090 kilocycles, 1000 watts. 6-7 pm, classical and semi-classical concert program; 8-9 pm, semi-classical and popular radio artists; 10-11 pm, dance music and feature entertainment; 12 midnight-1 pm, radio round table entertainment. Mon, silent night. Central standard time.

WSYR Clive B. Meredith, Hotel Syracuse, Syracuse, N. Y. 352.7 meters, 850 kilocycles, 500 watts.

WTAD Illinois Stock Medicine Broadcasting Corp., Quincy, Ill. 236.1 meters, 1270 kilocycles, 500 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, 100 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., 2026 Union Trust Bldg., Cleveland, Ohio. 389.4 meters, 770 kilocycles, 5000 watts. Sun, 11 am-12:30 pm, 3-4:30 pm, 6-11:15 pm. Mon, Tues, Wed, Thurs, Fri, Sat, 10:45-11:30 am, 12:30-1:30 pm, 2:30-3:30 pm, 6 pm-12 midnight. Eastern standard time. Slogan: "The Voice from the Storage Battery."

WTAQ Gillette Rubber Co., Eau Claire, Wis. 254 meters, 1180 kilocycles, 1000 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 av., Norfolk, Va. 260.7 meters, 1150 kilocycles, 100 watts, class A. Daily ex Sun, 6 pm, weather, markets & news. Eastern standard time. Slogan: "Down in Old Virginia."

WTAS WTAS Broadcasting Station, Kimball Hall, Chicago, Ill. 275.1 meters, 10 pm-1 am.

WTAW Agricultural & Mechanical College of Texas, College Station, Texas. 270 meters, 1110 kilocycles, 500 watts, class A. Mon, Tues, Wed, Thurs & Fri, 12:15 pm. Tues & Fri, 7:30 pm. Sun, 11 am. Central standard time.

WTAX Williams Hardware Co., 115 S. Vermillion st., Streator, Ill. 230.6 meters, 1300 kilocycles, 50 watts, class A. Tues, 8-10 pm. Thurs, 8-12 pm. Central standard time.

WTAZ Thomas J. McGuire, 48 N. Main st., Lambertville, N. J. 260.7 meters, 1150 kilocycles, 15 watts, class A. Mon, 8-10 pm, musical. Eastern standard time.

WTHO W. J. Thomas Radio, 137 E. Woodland av., Ferridale, Mich. 407 meters, 736.7 kilocycles, 750 watts.

WTIC The Travelers Insurance Co., 700 Main st., Hartford, Conn. 475.9 meters, 630 kilocycles, 500 watts. Daily ex Sun, 11:45 am-12:15 pm, 6-11 pm. Mon, Tues, Thurs, Fri, 11:45 am-1 pm. Mon, 6-11:30 pm. Sun, 6-7 pm. Eastern time. Slogan: "The Insurance City."

WTRC 20th Assembly District Regular Republican Club, 62 Woodbine st., Brooklyn, N. Y. 239.9 meters, 1250 kilocycles, 50 watts. Sun, 2-6 pm, general entertainment. Mon, 8-11 pm, musical program, sports, news items. Tues, Wed, Fri, 7-11 pm, general program. Eastern time.

WTRL Technical Radio Laboratory, 28 Si-comac av., Midland Park, N. J. 280.2 meters, 1070 kilocycles, 15 watts.

WWAE L. J. Crowley, Chicago, Ill. 241.8 meters, 1240 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 Detroit News, Detroit, Mich. 352.7 meters, 850 kilocycles, 1000 watts. Sat, 9 pm, same as WEAJ. Sun, 7:20 pm, same as WEAJ. Daily ex Sat & Sun, 6 pm, dinner concert; 8 pm, entire program from WEAJ. Eastern standard time.

WWL Loyola University, New Orleans, La. 275.1 meters, 1090 kilocycles, 100 watts, class A. Sat, 7:30-8:30 pm. Central standard time.

WWNC Chamber of Commerce, Asheville, N. C. 254.1 meters, 1180 kilocycles, 20 watts.

WWPR Detroit Police Department, Detroit, Mich. 300 meters, 999.4 kilocycles, 500 watts.

WWRL Woodside Radio Laboratories, 4130 58th st., Woodside, L. I., N. Y. 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.

WWVA John C. Strobel, Jr., National Road, Wheeling, W. Va. 384.6 meters, 860 kilocycles, 100 watts.



Automatic Power Control

For Trickle Charger and B Eliminator

You need no longer bother with turning several switches every time you turn your set on and off. The Yaxley Automatic Power Control does it all for you. It takes care of your B eliminator or trickle charger or both. When you turn your set on, the trickle charger is off, the B eliminator is on. When you turn the set off, the Power Control is standing guard for you. It works automatically and without fail to turn off the B eliminator and turn on the trickle charger.

No. 444. Series Type—for use with sets with tubes having a current draw equal to or greater than 6 U.V.-199 type tubes. Each.....\$5.00

No. 445. Multiple Type—for use with any set and especially for sets having tubes with a current draw lower than that of 6 U.V.-199 type tubes. Each.....\$6.00

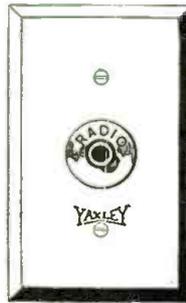


Cable Connector Plug

One of the most practical accessories to a radio outfit. Simplifies the battery wiring and makes sure of an instant and correct battery connection any place the radio set may be moved to. Banishes the old-fashioned unsightly mass of battery wires. Bakelite construction, neat and handsome in appearance. 5-ft. cable furnished.

No. 670—For the set with binding posts. No soldering. Just hook up the terminal to your set and the batteries and the job is done.....\$4.00

No. 660—Cable Connector Plug. Complete.....\$3.50



Radio Convenience Outlets

You will like the neatness and efficiency of these Yaxley Radio Convenience Outlets. They will enable you to enjoy your favorite programs in any room in the house. Your batteries can be placed in the basement, closet or any out-of-the-way place, and wires brought to set from Convenience Outlet with cable and plug that keeps the wires together in a neat, attractive way. Plug cannot be inserted incorrectly. Yaxley Radio Convenience Outlets are easily installed. Fit any standard switch box.

not be inserted incorrectly. Yaxley Radio Convenience Outlets are easily installed. Fit any standard switch box.

No. 135—For Loud Speaker.....\$1.00

No. 137—For Battery Connections.....2.50

No. 136—For Aerial and Ground.....1.00



Jacks

Jacks can be furnished in all combinations, from open circuit to Interstage Filament Control.



Battery Switch

A very efficient filament control switch. Quick make and break. Standard in many leading sets.



Rheostats

Air-cooled, smooth as silk in operation. Mounts in standard 7/16-in. hole. From 2 ohms to 100 ohms.



Panel Lights

A great convenience for every receiving set. Let every dial be lighted with one of these.

You can get Yaxley Approved Radio Products at your dealer's —if he cannot supply you, send his name with your order to

Yaxley Mfg. Company
Dept. C, 9 So. Clinton St.
Chicago, Ill.



Yaxley Mfg. Company
Dept. C, 9 So. Clinton St.
Chicago, Ill.

U. S. Broadcasting Stations Listed by States

ALABAMA
 Auburn, WAPI
 Birmingham, WBRC, WKBC
 Gadsden, WJBY

ALASKA
 Anchorage, KFQD
 Juneau, KFIU
 Ketchikan, KGBU

ARIZONA:
 Phoenix, KFCB
 Prescott, KPJM
 Tucson, KGAR

ARKANSAS
 Fayetteville, KUOA
 Hot Springs, KTHS
 Newark, KGCG

CALIFORNIA:
 Alma, KFQU
 Avalon, KFVO
 Berkeley, KRE
 Big Bear Lake, KFNB
 Burlingame, KFOB, KFPR
 Eureka, KFWH
 Fresno, KMJ
 Hollywood, KFQX, KFWB
 Long Beach, KFQX
 Los Angeles, KFI, KFR,
 KFSG, KGEF, KHJ,
 KMTR, KNRC, KXX,
 KTBI
 Oakland, KFUS, KFWM,
 KGO, KLS, KLN, KTAB,
 KZM
 Oxnard, KFYP
 Pasadena, KPCC, KPSN
 Sacramento, KFBK
 San Bernardino, KFVC
 San Diego, KFBC
 San Francisco, KFRC,
 KGTT, KJBS, KPO, KYA
 San Jose, KFAF, KQW
 Santa Ana, KWTC
 Santa Barbara, KFRC
 Santa Maria, KSMR
 South San Francisco, KFWI
 Stockton, KGDM, KWG
 Venice, KFVD

COLORADO
 Colorado Springs, KFUM,
 KFNF
 Denver, KFEL, KFUP, KOA
 Edgewater, KFJX
 Greeley, KFKA
 Gunnison, KFHA
 Pueblo, KGDP
 Trinidad, KFBS

CONNECTICUT
 Bridgeport, WICC
 Hartford, WTIC
 New Haven, WDRC

DELAWARE
 Wilmington, WDEL

DIST. OF COLUMBIA:
 Washington, WMAL, WRC,
 WRHF

FLORIDA
 Clearwater, WGHB
 Fuldorf-by-the-Sea, WGBU
 Jacksonville, WJAX
 Lakeland, WMBL
 Miami, WQAM
 Miami Beach, WIOD,
 WMBF
 Orlando, WOCB
 Pensacola, WCOA
 Petersburg, WHBN, WJBB
 St. Petersburg, WKBJ
 Tampa, WDAE
 Winter Park, WDBO

GEORGIA
 Atlanta, WDBE, WGST,
 WSB
 Macon, WMAZ

HAWAII
 Honolulu, KGU

IDAHO
 Boise, KFAI, KFDD
 Kellogg, KFEY
 Pocatello, KSEI

ILLINOIS
 Atwood, WLBO
 Batavia, WOKD, WSW
 Belvidere, WLBR
 Carthage, WCAZ
 Chicago, KYW, WAAF,
 WBBM, WBBZ, WBCN,
 WCFL, WCRW, WEBH,
 WEDC, WENR, WFKB,
 WGES, WGN, WHBL,
 WHBM, WHBC, WHF,
 WIHJ, WIBM, WIBO,
 WIBW, WJAZ, WJBT,
 WKBG, WKBI, WLBK,
 WLJB, WLS, WLTS,
 WMAQ, WMBB, WMBH,
 WMBI, WOB, WPCC.

WQJ, WSAX, WSBC,
 WVAE
 Chicago Heights, WJBZ
 Decatur, WBAO, WJBL
 East Wenona, WLBI
 Evanston, WEHS
 Galesburg, WFBZ, WKBS,
 WLBO, WRAM
 Harrisburg, WEBQ
 Homewood, WOK
 Joliet, WOLS, WJBA,
 WKBB
 LaSalle, WJBC
 Mooseheart, WJJD
 Peoria Heights, WMBD
 Quincy, WTAD
 Rockford, KFLV
 Rock Island, WHBC
 Sreator, WTAX
 Tuscola, WDJ
 Urbana, WRM
 Waukegan, WPEP
 Zion, WCB

INDIANA
 Anderson, WHBU
 Brookville, WKBV
 Crown Point, WLBT
 Culver, WCMA
 Evansville, WGBF
 Fort Wayne, WCWK,
 WOWO
 Huntington, WHOG
 Indianapolis, WFBM,
 WKBF
 Kokomo, WJAK
 Laporte, WRAF
 Muncie, WLBC
 South Bend, WSBT
 Valparaiso, WRBC
 West Lafayette, WBAA

IOWA
 Ames, WOI
 Anita, KICK
 Burlington, WIAS
 Cedar Rapids, KWCR, WJAM
 Clarinda, KSO
 Council Bluffs, KOIL
 Cresco, KGDJ
 Davenport, WOC
 Decorah, KGCA, KGDZ
 Des Moines, WHO
 Ft. Dodge, KFJY
 Iowa City, KFQP, WSUI
 Le Mars, KWUC
 Marshalltown, KFJB
 Muscatine, KFYD, KGEX,
 KTNT
 Oskaloosa, KFHL
 Shenandoah, KFNF, KMA
 Sioux City, KFMR, WEAU

KANSAS
 Concordia, KGCN
 Independence, KFVS
 Lawrence, KFBU
 Manhattan, KSAC
 Milford, KFKB
 Wichita, KFH, KFOT

KENTUCKY
 Louisville, WHAS, WLAP

LOUISIANA
 New Orleans, KTUE, WABZ,
 WCRE, WJBD, WJBW,
 WKBT, WSMB, WWL
 Pineville, KFWU
 Shreveport, KFDX, KGDX,
 KRAC, KSBA, KWKH

MAINE
 Bangor, WABI
 Dover, WLZ
 Orono, WGBX
 Portland, WCSH

MARYLAND
 Baltimore, WBAL, WCAC,
 WCBM, WFBR
 Takmoa Park, WBES

MASSACHUSETTS
 Boston, WATT, WBET,
 WBZA, WEEL, WNAB,
 WNAC
 Chelsea, WRSC
 Dartmouth, WMAF
 East Springfield, WZ
 Fall River, WSAR
 Gloucester, WEPS
 Medford Hillside, WARC
 New Bedford, WNBH
 Somerville, WAGS
 Taunton, WAIT
 Webster, WKBE
 Wellesley Hills, WBSO
 Wollaston, WRES
 Worcester, WTAG

MICHIGAN
 Battle Creek, WKBP
 Bay City, WSKC
 Berrien Springs, WEMC

Detroit, WAFD, WBMH,
 WDXI, WDXL, WGHF,
 WMBC, WWJ, WWPR
 Escanaba, WRAK
 Ferndale, WTHO
 Flint, WFDF
 Grand Rapids, WASH,
 WOOD
 Iron Mountain, WLBY
 Lapeer, WMPC
 Lansing, WKAR, WREO
 Ludington, WKBZ
 Menominee, WDM
 Monroe, WKBL
 Mt. Clemens, WABX
 Oak, WAGM
 Owosso, WSMH
 Petoskey, WBBP
 Pontiac, WCN, WJR
 Ypsilanti, WJBK

MINNESOTA
 Barrett, KGDE
 Collegeville, WFBJ
 Fairmont, KFVN
 Minneapolis, KFZ, KGEQ,
 WAMD, WCCO, WDGJ,
 WHOI, WLB, WRHM
 Northfield, KFMX, WCAL
 St. Paul, KFOY, WMBE

MISSISSIPPI
 Oxford, WCBH

MISSOURI
 Cape Girardeau, KFVS
 Carterville, KFVW
 Columbia, KFRU
 Independence, KIDS
 Jefferson City, WOS
 Joplin, KGBW
 Kansas City, KMJP, KWKC,
 WDAF, WBB, WLBF,
 WOO
 Kirksville, KFKZ
 Kirkwood, KMXX
 Moberly, KFFD
 St. Joseph, KFEQ, KGBX
 St. Louis, KFOA, KFVO,
 KFVE, KFWE, KDS,
 WVEW, WIL, WMAY,
 WSBF

MONTANA
 Havre, KFBB
 Vida, KGCC
 Missoula, KUDM

NEBRASKA
 Central City, KGES
 Clay Center, KMMJ
 David City, KFOR
 Hastings, KFKN
 Humboldt, KGDW
 Lincoln, KFAB, WFAV
 Norfolk, WJAG
 Omaha, KFQX, KOCH,
 WAAW, WNAL, WOW
 Shelby, KGBY
 University Place, WCAJ
 Wayne, KGCH
 York, KGBZ

NEW HAMPSHIRE
 Laconia, WKAU
 Manchester, WCOM
 Tilton, WBRL

NEW JERSEY
 Atlantic City, WHAR, WPG
 Camden, WCAM
 Cliffside, WPAI, WQAO
 Elizabeth, WBS
 Hoboken, WMCA
 Jersey City, WAAT, WKBO
 Lakewood, WCGU
 Lambertville, WTAZ
 Midland Park, WTRL
 Newark, WAAM, WDWDM,
 WGCP, WMVM, WNJ,
 WOR
 North Plainfield, WEAM
 Paterson, WODA
 Red Bank, WJBI
 Trenton, WOAX
 Union City, WBMS

NEW MEXICO
 Albuquerque, KFLL, KFVV
 State College, KOB

NEW YORK
 Auburn, WKBR
 Bay Shore, WRST
 Broadway, WGSB
 Brooklyns, WARS, WBRC,
 WBBR, WBKN, WBRS,
 WRL, WLBE, WTRC
 Buffalo, WBBR, WGR,
 WKBW, WMAK, WPOX,
 WSVS
 Canastota, WLBU
 Canton, WCAD
 Cazenovia, WMAC
 Farmingdale, WLBU
 Flushing, WIBI

Freeport, WGBB
 Ithaca, WEAL, WLCI
 Jamaica, WMRJ
 Jamestown, WOCL
 Kingston, WDBZ
 Long Island City, WLBS
 Newburgh, WKBM
 New York, WBNY, WEAJ,
 WEBJ, WEBL, WGL,
 WHAR, WHN, WHNY,
 WJUG, WJY, WJZ,
 WKBO, WLWL, WMHA,
 WMSG, WNYC, WPCB,
 WRNY, WSDA
 Peekskill, WOKO
 Richmond Hill, WABC,
 WAOK, WGMU, WRMU
 Schenectady, WGY
 Syracuse, WFLB, WSYR
 Troy, WHAZ
 Utica, WIBX
 Woodhaven, WSOM
 Woodside, WBMC, WWRL

NORTH CAROLINA
 Asheville, WUNC
 Charlotte, WBT
 Greensboro, WNRC
 Raleigh, WRCO

NORTH DAKOTA
 Bismarck, KFVR
 Devils Lake, KDLR
 Fargo, WDAY, WPAK
 Grand Forks, KFJM
 Jamestown, KGEL
 Mandan, KGCU

OHIO
 Akron, WADC
 Ashland, WLBP
 Ashtabula, WJPW
 Bellefontaine, WHBD
 Boston, WSSH
 Canton, WHBC
 Cincinnati, WAAD, WFBF,
 WKRC, WSAI
 Cleveland, WJHK, WEAR,
 WHK, WJAY, WLBK,
 WTAM
 Columbus, WAIU, WCAH,
 WEAQ, WMAN
 Dayton, WSMK
 Hamilton, WMBK, WRK,
 WSRO
 Harrison, WLW
 Mansfield, WLVB
 Pomeroy, WSAZ
 Springfield, WCSO
 Steubenville, WBR
 Toledo, WABR, WTAL
 Wooster, WABW
 Yellow Springs, WRAV
 Youngstown, WKBN

OKLAHOMA
 Bristow, KVVO
 Chickasaw, KOCW
 Norman, WNAD
 Oklahoma City, KFJF,
 KFNR, KGCB, WKY
 Tulsa, WLAL

OREGON
 Astoria, KFJJ
 Corvallis, KOAC
 Medford, KMED
 Portland, KEX, KFEC,
 KFIF, KFJR, KGW,
 KROW, KTRB, KXL
 South Portland, KFVV,
 KGEH
 Sylvan, KOIN

PENNSYLVANIA
 Allentown, WCBA, WSAN
 Altoona, WFBG
 Danville, WKBY
 East Pittsburgh, KDKA
 Grove City, WSAJ
 Harrisburg, WABB, WBAK,
 WMB, WPRC
 Jeannette, WCM
 Johnstown, WHBP
 Kingston, WABF
 Lancaster, WGAL, WKJC
 Lewisburg, WJBU
 Monessen, WMBJ
 New Castle, WKBU
 Oil City, WHBA, WLWB
 Parkersburg, WQJA
 Philadelphia, WABQ, WABY,
 WCAU, WFI, WFKD,
 WHBW, WTAD, WBG,
 WIP, WLBA, WLIT,
 WNAT, WOO, WRAX
 Pittsburgh, KGV, WCAE,
 WJAS
 Reading, WRAW
 Scranton, WGR, WGAN
 State College, WPSA
 Wilkes-Barre, WBAX,
 WBRE

PORTO RICO
 San Juan, WKAQ

RHODE ISLAND
 Cranston, WDFW
 Newport, WMBA
 Olneyville, WCOT
 Pawtucket, WFCI
 Providence, WCBR, WCBS,
 WCVS, WEAN, WJAR,
 WLSI, WRAH

SOUTH CAROLINA
 Charleston, WBBY

SOUTH DAKOTA
 Brookings, KFDY, KGCR
 Dell Rapids, KGDA
 (Oldham, KGDY
 Rapid City, WCAT
 Sioux Falls, KSOO
 Vermillion, KUSD
 Yankton, WNAX

TENNESSEE
 Chattanooga, WDOD
 Knoxville, WFBC, WNOX
 Lawrenceburg, WOAN
 Memphis, WGBC, WHBQ,
 WMC
 Nashville, WBWA, WDAD,
 WLAC, WSM
 Tullahoma, WCFT
 White Haven, WREC

TEXAS
 Amarillo, KGRS, WDAG
 Austin, KUT
 Beaumont, KFDM
 Beeville, KFRB
 Brownsville, KWVG
 College Station, WTAU
 Dallas, KGDO, KRLD,
 WFAA, WRR
 Dublin, KFPL
 El Paso, KFHH, WDAH
 Fort Worth, KFJZ, KFQB,
 WBAP
 Galveston, KFLX, KFUL
 Greenville, KFPM
 Houston, KFVI, KFYI,
 KPRC
 San Antonio, KGCJ, KGDR,
 KGRC, KTAP, WCAR,
 WOAI
 San Benito, KFLU
 Texarkana, KFYO
 Waco, WJAD

UTAH
 Logan, KFND
 Ogden, KFUR
 Salt Lake City, KDYL,
 KFOO, KFUT, KSL

VERMONT
 Burlington, WCAZ
 Springfield, WQAE

VIRGINIA
 Arlington, NAA
 Norfolk, WBBW, WPAB
 WTAR
 Petersburg, WLBG
 Richmond, WBLB, WMBG
 WROA
 Roanoke, WDBJ
 Virginia Beach, WSEA

WASHINGTON
 Everett, KFBL
 Lacey, KGY
 Pullman, KWSC
 Seattle, KFOA, KFOU,
 KFQX, KGBS, KGCL,
 KCDI, KJR, KKP,
 KOMO, KPCB, KRSC,
 KTW, KUBJ, KVOS,
 KNRO
 Spokane, KFIO, KFPY
 KGA, KHO
 Tacoma, KMO, KVI
 Walla Walla, KOWW
 Yakima, KFIQ

WEST VIRGINIA
 Wheeling, WVVA

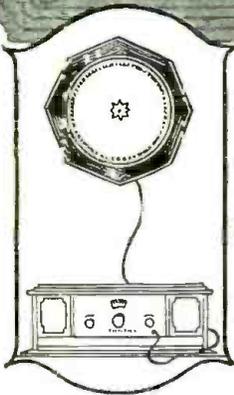
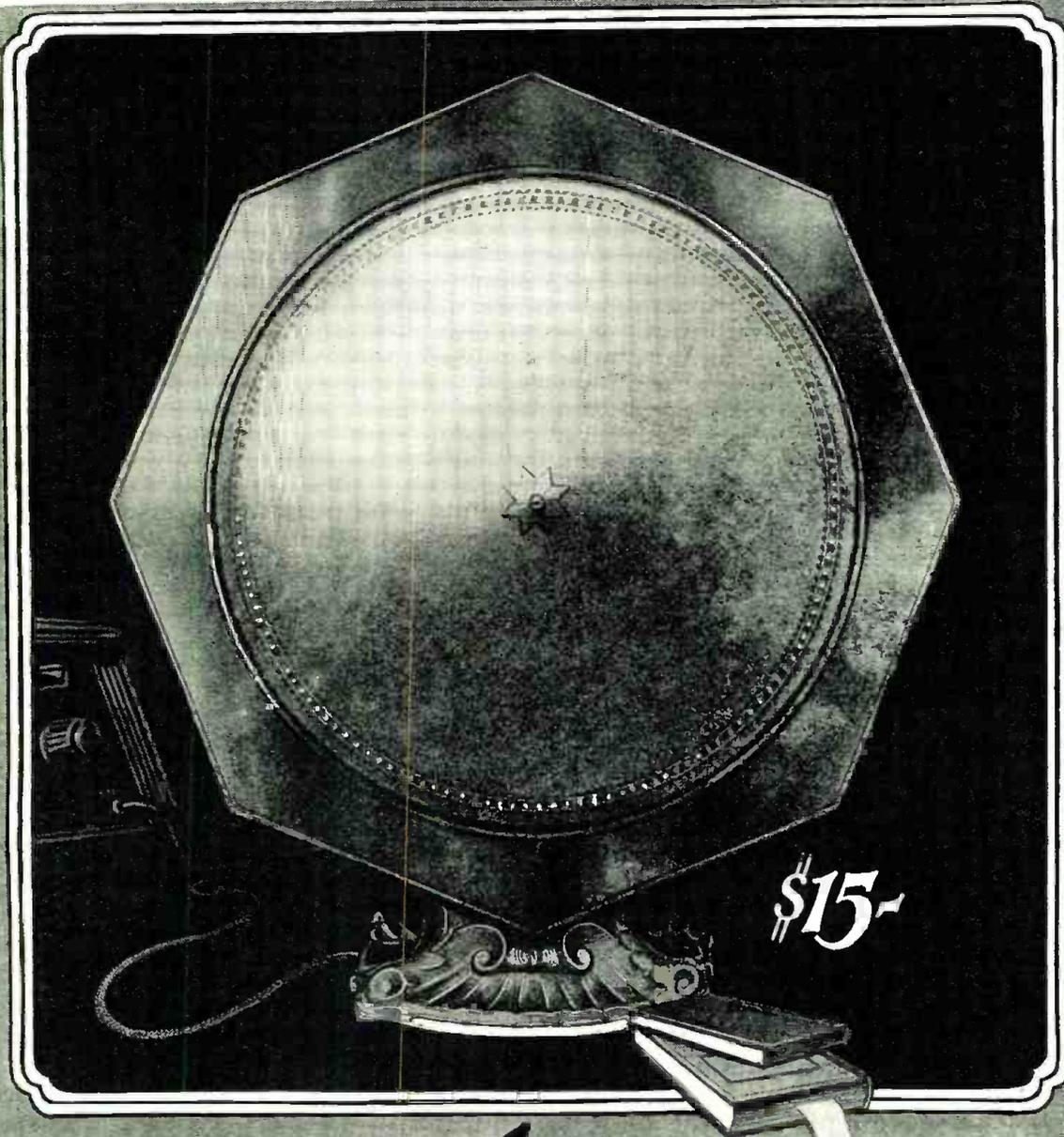
WISCONSIN
 Beloit, WBBW
 Camp Lake, WCLO
 Eau Claire, WTAQ
 Fond du Lac, KFIZ
 Kenosha, WKDR
 LaCrosse, WKBB
 Madison, WHA, WIBA
 Manitowoc, WQMT
 Marshfield, WGBR
 Milwaukee, WGVW, WHAD,
 WKAF, WSOE
 Omro, WJBR
 Oynette, WFTU
 Racine, WRRS
 Stevens Point, WLBL
 Superior, WEEB

WYOMING
 Laramie, KFBU

	Call	Wave	Power		Call	Wave	Power
COSTA RICA							
San Jose: Government. Under construction.....				Königswusterhausen	AFF	4000	10,000
CUBA				Witzleben		483.9	4000
Central Elia: Elia Sugar Co.....		300	500	Wolfs Bureau		252.5	
Salvador Rionda	7SR	350	500	Frieburg		577	1000
Cienfuegos: Jose Gaudix.....	6RY	260	200	Bremen: Nordische Rundfunk A. G. Relays Hamburg		400	700
Habana: Cuban Telephone Co.....	PWX	400	500	programs			
Bernardo Barrie	2BR	250	15	Breslau: Schlessische Funkstudie. Received at Rome.		522.6	4000
Frederick W. Borton	2BY	280	100	To be replaced by station with 10,000 watts input...		272.7	
El Pais	2EP	355	400	Cassel		283	300
Credito y Construction Co.....	2HP	235	100	Dortmund: Mitteldeutscher Rundfunk A. G. Relays			
Jose Lara	2LR	234	50	Leipzig programs		294.1	750
Mannel y Guillermo Salas.....	2MG	284	20	Dresden: Mitteldeutscher Rundfunk A. G. Relays Leip-		468.8	750
Mario Garcia Velez.....	2OK	380	100	zig programs		428.6	10,000
Columbia Radio & Cycle Co.....	2OL	225	100	Elberfeld		250	750
Raoul Karman	2OR	315	20	Frankfurt-on-the-Main: Sudwestdeutscher Rundfunkkleinst...		428.6	10,000
Roberto E. Ramirez.....	2TV	270	20	Hanover: Nordischer Rundfunk A. G. Relays Hamburg		250	750
Benito Vieta Ferro.....	2UF	285	10	Gleiwitz		428.6	10,000
Santiago: Alberto Ravelo.....	8BY	250	100	Hamburg: Nordischer Rundfunk A. G. Relays Hamburg			
Tuinucu: Frank H. Jones.....	6JK	272	100	programs		297	750
Frank H. Jones.....	6KW	340	100	Kassel: Sudwestdeutscher Rundfunkkleinst.....		272.7	750
CZECHOSLOVAKIA				Kiel		254.2	750
Bratislava: Tues. Fri.....	OKR	400	500	Königsberg: Ostmarken Rundfunk A. G.....		303	1000
Hrum: Radio Journal.....	OKB	441.2	2400	Launenberg: Rhineland		468.8	22,000
	OKB	521	480	Leipzig: Mitteldeutscher Rundfunk A. G.....		365.8	9000
Khely		1110	1000	Muenster: Same		241.9	1500
Koszice		300	2000	Munich: Deutsche Stunde in Bayern.....		535.7	1500
Prague: (Strasnice station).....				485		485	300
Radio Journal.....	OKP	348.9	5000	Norddeich	KAY	1800	
CANARY ISLANDS				Nuremberg: Relays Munich		329.7	750
La Laguna: Servando Ortoll Delmotte.....	EAI5	280	50	Stettin: Relays Berlin.....		252.1	750
Las Palmas: Canary Islands Radio Club.....		300	6	Stuttgart		379.7	4000
Club Radio Canarias.....		300	6	GREAT BRITAIN			
Teneriffe: Servando Ortoll Delmotte.....	EAR5	280	50	Aberdeen	2BD	500	1500
DANZIG				Bradford	2LS	254.2	
Danzig		272.7		Birmingham: Received at Antwerp, Brussels, Rome.....	5IT	491.8	1500
DENMARK				Bournemouth: Received at Antwerp, Teneriffe, Jeru-			
Copenhagen: Radioaadet		337	2000	salem	6RM	326.1	1500
Hjorring: Relay station. Government.....		335	250	Cardiff: Received at Antwerp and Rome.....	5WA	353	1500
Lyngby: Relay station. Government.....		2400		Chelmsford	2BR		
Odense: Relay station. Government.....		810	250	Darenty: Received throughout Europe, northern Af-			
Ilyvaug: Relay station. Government.....		1150	500	rica and Asia Minor	5XX	1600	25,000
Soro: Ministry of War. News and weather.....		1150	1500	Dundee	2DE	288.5	200
EGYPT				Edinburgh	2EH	294.1	200
Cairo	SRE	255		Glasgow	5SC	405.4	1500
ESTONIA				Hull	6KH	288.5	200
Tallinn		285.7		Leeds-Bradford	2LS	277.8	200
FINLAND				Liverpool	6LV	297	200
Bjorenborg: Nuoren Voiman Liiton Radioyhdistys. Daily,				London: Received at Teneriffe, Strasbourg, Brussels,			
general		254.2	200	Rome, Barcelona, Tunis.....	2LO	361.4	3000
Hango: Same		259.6	200	Manchester: Received at Rome.....	2ZY	384.6	1500
Helsingfors: Civil Guard.....		500	500	New Castle: Received at Brussels, Rome.....	5NO	312.5	1500
Mon, Wed, Fri. General.....		240	2000	Nottingham	5NG	275.2	1500
Helsinki: Same as Helsingfors.....				Plymouth	5PY	400	200
Jakobstad: Irregular		275	200	Poldhu	2YT		
Jyvaaskyla: N. V. L. Radioyhdistis. Irregular.....		297	200	Sheffield	6FL	272.7	200
Lahti: Three programs weekly.....		318	180	Stoke on Trent.....	6ST	288.5	200
Mikkeli: N. V. L. R.....		561	100	Swansea	5SX	288.5	200
Oulu		233	100	HAWAII			
Pietarsarki: Same as Jakobstad.....				Honolulu: Marion A. Mulrony.....	KGU	270	500
Pori: Same as Bjorenborg.....				HAITI			
Tampere: Same as Tammerfors.....				Port au Prince.....	IHK	361.2	1080
St. Michael: N. V. L. R.....		561	500	HUNGARY			
Tammerfors: N. V. L. R.....	3NB	368	250	Budapest: Menegetemi Radio Magyar Tavirati Iroda.			
Uleaborg		233	200	Broadcasts market reports and news.....	MTL	1050	400
FRANCE				ICELAND			
Agen: Department of Lot et Garonne.....	2BD	297	250	Reykjavik		333.3	700
Angers: Ministry of Posts, Telegraphs and Telephones.....		275.2	500	INDIA			
Bezler		95	100	Bombay: Bombay Presidency Radio Club.....	2FY	387	100
Harritz: Cote d'argent.....		200		Walter Rogers & Co.....	2AX	320	
Bordeaux: Ministry of Posts, Telephones and Telegraphs.....		238.1	500	Calcutta: Radio Club of Bengal.....	2BZ	800	500
Lafayette		396	1000	Owner not reported.....	5AF	425	1500
Cach		277.8	500	Karachi: Karachi Radio Club.....		425	40
Grenoble: Ministry of Posts, Telegraphs and Telephones.....		386	150	Madras: Crampton		220	120
Issy-les-Moulineux: Ministry of War.....	QGA	1800	500	Rangoon: Radio Club of Burma and Wireless Club of			
Lille		250		Burma. Broadcasts musical programs every Sun-		450	40
Lyon		291.3	500	day			
Dubanchet & Trolliet, Station Radio Lyon.....		291.3	2000	NORTH IRELAND			
Ministry of Posts, Telegraphs and Telephones, Station				Belfast	2BE	306.1	1500
La Doua, named for suburb in which located.....	YN	476.2	500	IRISH FREE STATE			
Marseilles: Ministry of Posts, Telegraph and Telephones.....		351	300	Dublin: Government	2RN	319.1	1500
Mont de Marsen		400	300	ITALY			
Montpellier: Radio Montpellier station.....		252.1	200	Milan	IMI	315.8	1200
Paris: Eiffel Tower station. Ministry of Posts, Tele-				Unione Radiofonica Italiana	1RC	320	1500
graphs and Telephones.....	FL	2650	5000	Naples: Unione Radiofonica Italiana.....	1NA	333.3	1500
Journal Petit Parisian	5NG	333	500	Rome: Unione Radiofonica Italiana. Broadcasts con-			
Petit Parisian. Reception reported at Rome Societ.....	FL	349.9	500	certs and news, 8:30 to 11 o'clock pm daily. Re-			
Francis Radioelectrique	8AJ	1780	100	ceptions reported at Antwerp, Jerusalem, Lille,			
Societe Francis Radioelectrique				Smyrna, Damascus, Barcelona, Tunis and Alex-			
Cie. Francis de Radiophonie. Reception reported at				andria. This is at present the station best re-			
Teneriffe, Jerusalem, Brussels, Rome, Teheran,				ceived throughout the Levant.			
Smyrna, Barcelona		1750	4000	JAVA			
Superior School of Ministry of Posts, Telegraphs and				Bandoeng: Vereeniging van Radio Amateurs voor			
Telephones. Reception reported at Rome.....		447.8	5000	Bandoeng en Omstreken.....	No call	310	30
Paris: Radio Paris.....		1750		Batavia: Bataviasche Radio Vereeniging.....	JFC	220	40
Ecole Superieure		477.8		Soerabaja: Two concerts weekly.....		90, 140	
Pic du Midi		350		JAPAN			
St. Etienne: Radio Club Forezien.....		220	50	Nagoya: Nagoya Radio Broadcasting Co. Broadcasts			
Strasbourg: Military station.....		200	15,000	daily 9 am to 9 pm; Sundays and holidays, 12			
Radio Club	8GF	222.2	1500	m to 9 pm. Program consists of music, weather			
Toulouse: LaRadio		389.0	2000	and market reports, etc.....	JOCK	360	1500
Ministry of Posts, Telegraphs and Telephones. Aero-				Osaka: Osaka Radio Broadcasting Co. Programs in			
drome station	MRD	260	1000	English and Japanese. 1500-watt static in-			
GERMANY				jected	JOBK	385	100
Berlin: Postal Authorities. Konigswusterhausen station.				Osaka Broadcasting station (Proj.).....	JIBK	385	1000
Relays Vox Haus programs. Reception reported at				Tokyo: Tokyo Radio Broadcasting Co. Programs in			
Rome, Constantinople, Bergen, Algiers.....	LP	1300	12,000	English and Japanese. 155-watt.....	JOAK	375	200
Postal Authorities. Vox Haus station.....		507	2250				
Magleburger Platz		566	2000				
Konigswusterhausen station	AFT	1300	1600				

	Call	Wave	Power		Call	Wave	Power
JUGOSLAVIA				SPAIN			
Agram (Zagreb)	.....	310	500	Barcelona: Radio Barcelona Station	EAJ1	280.4	1000
Belgrade	IFF	225.6	2000	Associated Nacional Radiodifusion	.....	.....	.....
KWANTUNG				Barcelona	EAJ13	277.8	1000
Dairen: Government Bureau of Communications em- ploys a commercial station. Daily programs broad- cast, consisting of music, educational and enter- tainment numbers	.....	390	200	Bilbao: Radio Carlton Station. Radio Club Vizcaya	EAJ9	434.8	1000
LATVIA				Radio Vizcaya Station. Don Armando de Otera	EAJ11	.....	.....
Riga	.....	526.3	2000	Vizcaya Radio Broadcasting Station, broadcasts mu- sic, provided by local talent, and considerable advertising from 12 to 12 pm daily	.....	294.1	2000
LITHUANIA				Cadiz: Don Francisco de la Liesca	EAJ3	344.8	550
Kovno	.....	219, 2000	15,000	Don Jan Iaborra	EAJ10	330	1000
LUXEMBURG				Carthagena: Don Enrique de Orbe	EAJ16	297	1000
Luxemburg	LOAA	217.4	250	Madrid	EAJ2	275.2	1000
MEXICO				Don Antonio Castilla	EAJ4	275.2	3000
Chihuahua: Federal Government State Capital station	CZF	310	250	Radio Iberica Station	EAJ6	577	1000
Guachajama: Federal Military Command	FAM	490	1000	Union Radio	EAJ7	375	6000
Radio Club	.....	280	10	Don Vicente Coyonecho, projected	EAJ12	.....	200
Mazatlan: Castillo Llanos	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, cig- arette factory	CYB	275	500	Malaga: Cia Iberica de Telecomunicacion	EAJ25	50-250	100
Miguel S. Castro, operated by Le High Life, news- paper	CYH	375	100	EAJ20	.....	254.2	.....
Raoul Azarraga, operated by Universal	CYL	400	500	Oviedo: Don Arburio Cima	EAJ19	201.3	100
Martinez y Zetina	CYO	425	100	Salamanca	EAJ22	204.1	500
El Excelsior—Parker	CYN	325	500	Saragossa	EAJ23	325	.....
Department of Education	CZE	350	500	San Sebastian: Don Sabino Ucelayeta	EAJ8	272.7	2000
Monterey: Roberto Reyes	CYM	275	100	Seville: Seville Radio Club	EAJ5	344.8	500
Constantino de Tarnava	CYS	311	250	Don Manuel Garcia Ballesta	EAJ17	2000	.....
Oaxaca: Frederico Zenilla	CYF	265	100	Don Jorge la Riva, projected	EAJ21	.....	1000
Puebla: Augustin del P. Zaenz	CYT	312	100	Valencia: Radio Corporation	EAJ14	400	500
Tampico: El Mundo. Suspended	.....	10	.....	Under construction	EAJ24	360	.....
Cipriano Sagon S en C	CYD	322	100	Zaragoza	EAJ23	566	.....
Local programs	CYZ	.....	20	STRAITS SETTLEMENTS			
Vera Cruz	CYD	.....	.....	Amateur Wireless Society of Malaya: 2-hour program broadcast each Sunday evening, and children's concert on Wednesdays. Received at Colombo, Ceylon	.....	270	100
Manuel Angel Fernandez, recently inaugurated for broadcasting advertising of an American product	CYY	548	100	SWEDEN			
Yucatan: Partida Socialista del Sureste	CYY	548	100	Drebo	SMTI	237	250
MOROCCO				Roden: Radiojanst	SASE	454.5	1000
Casablanca: Radio Club of Morocco. Omega station	CNO	250	500	Eskilstuna: Radio Club. Relays Stockholm programs 4 days each week, broadcasts local programs other days	SMTU	275.2	250
Casablanca	.....	306.4	3000	Falun: Radio Club. Relays Stockholm programs 4 days each week, broadcasts local programs other days	SMZK	400	1500
NETHERLANDS				Garle: Radio Club. Relays programs 4 days each week, broadcasts local programs other days	SMXF	204.1	250
Amsterdam	PCFF	2125	.....	Goteborg: Radiojanst	SASB	416.7	1000
Amsterdam	.....	760	.....	Helsinki: Radiojanst	SMYE	.....	.....
Antwerp	.....	508.5	.....	Jonkoping: Jonkoping Runradiostation. Relays Stock- holm programs 4 days each week, broadcasts local programs other days	SMZD	201.3	500
Bloemendall	.....	566	.....	Kalmar	SMSW	253	140
De Bilt	.....	1100	.....	Kalmar	SMSN	254.2	25
Hilversum: Nederlandsche Seintoellen Fabriek and Hilversum Dredaloez Ontroep. Reception reported at Telerau	HDO	1050	1000	Karlsborg: Radiojanst. Relays Stockholm programs 4 days each week, broadcasts local programs other days	SASF	1365	1000
Scheveningen-Haven	.....	1950	2500	Karlskrona: Relays Stockholm programs 4 days each week, broadcasts local programs other days	SMSM	201.3	240
NEW ZEALAND				Karlskrona: Karlstadt Runradiostation. Relays Stock- holm programs 4 days each week, broadcasts local programs other days	SMXG	221	250
Auckland: Radio Broadcasting Co. of New Zealand.	.....	.....	.....	Kristinehamn	SMTY	202.7	100
General, two hours daily	IYA	420	500	Linkoping: Radio Club. Relays Stockholm 4 days each week, local programs other days	SMYV	500	250
La Gloria Gramophone	IYB	260	50	Malmo: Radiojanst	SASC	260.9	500
Newcombe (Ltd.)	IYL	260	500	Norrkoping	SMYV	275.2	250
Christchurch	3AC	400	500	Orebro	SMTI	218	250
Dunedin: Otago University	4XO	140	.....	Osterlund	.....	720	1000
British Electrical & Engineering Co.	4YA	380	110	Saffle	SMTS	252.1	500
Radio Supply Co.	4YO	370	500	Stockholm: Radiojanst	SASA	454.5	1500
Gisborne: Gisborne Radio Co.	2YM	335	500	Sundsvall: Radiojanst	SASD	545.6	500
Wellington: Broadcastings (Ltd.)	2YB	275	15	Trollhattan	SMXQ	277.8	120
Dominion Radio Co.	2YK	295	60	Uddevalla	.....	294.1	.....
NORWAY				Umea: Relays Stockholm 4 days, local programs other days	.....	229	250
Oslo: Broadcasting Company A. S.	.....	461.1	1500	Uppsala	.....	315	250
Bergen: Bergen Broadcasters	.....	370.4	1500	Varborg	.....	297	100
Fredriksstad: Relays	.....	434.3	.....	SWITZERLAND			
Forsgrund: Relays Oslo	.....	434	700	Basle	IBB	1000	300
Bjirken: Relays Oslo	.....	445	50	Berne: Radio Berne Station. Radio Club of Berne	.....	411	1500
Tromsjoen	.....	243.9	.....	General Post and Telegraph Office	.....	302	1500
PARAGUAY				Geneva: Radio Broadcasting Society of Geneva. Broad- casts music and news	IB1	760	500
Asuncion: General, Friday	.....	.....	12	Lausanne: Champ de l'Air Station (Societe Romande de Radiotelephonie Lausanne)	IB2	850	600
PERU				Zurich: Hoengg Station. Radio Genossenschaft Zurich University. Reception reported at Antwerp, Brus- sels, Rome, Vienna	RGZ	500	1000
Lima: Peruvian Broadcasting Co. (Ltd.)	OAX	360	1500	TUNISIA			
POLAND				Carthage	.....	100	50
Lemberg: Under construction	.....	247.9	.....	Carthage	.....	1800	2000
Posen	.....	270.9	4000	Tunis: French Army. Two musical programs broad- cast each week	TVA-OCTU	1450	500
Warsaw	.....	400	1500	French Army. Two musical programs broadcast each week	OCTU	45	.....
PORTUGAL				TURKEY			
Lisbon: Grandes Armazenes de Chiado. Irregular	IAA	267.8	500	Stamboul. Station reported projected	.....	.....	.....
PHILIPPINES				URUGUAY			
Baguio	KZLY	359.9	500	Montevideo: Crandon Institute	.....	.....	500
Manila: I. Beck Dept. Store	KZIB	249.9	20	UNION OF SOUTH AFRICA			
	KZKZ	270.1	100	Cape Town: Cape Publicity Association	WAMG	400	500
	KZIR	222.1	500	Durban: Town Council	.....	400	1500
PORTO RICO				Grahamstown	.....	400	.....
San Juan: Radio Corp. of Porto Rico	WKAA	340.7	500	Johannesburg: Assn. Scientific and Tech. Societies	IB	450	500
RUSSIA (Now U. S. S. R.)				Cape Town: Cape Peninsula Broadcasting Assn. Broad- casts 54 hours per week, programs by paid orches- tra and local talent	.....	375	1200
SALVADOR				UNION OF SOVIET SOCIALIST REPUBLICS (formerly Russia)			
San Salvador: Division of Telephones and Telegraphs. Broadcasts Mon and Fri nights at 8:15	AQM	482	500	Kiev	.....	211.3	2000
SENEGAL				Leningrad	.....	1165	10,000
St. Louis: Senegal Radio Club. Projected	.....	300	100	Leningrad	.....	310	.....
VENEZUELA				Moscow: Central	RDW	1450	12,000
Caracas: Empress Venezolana de Radiotelefonias	AYRE	375	1000	Radio Paredatcha	420	6000

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- Scientific Headset 2.95
- Little Spitfire Headset 1.95

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

Right: C. P. Anderson, Director of Station WOS. Below: Jack Heiny, Announcer of WOS, Jefferson City, Mo.



Del-Mar Ramblers heard on Tuesday nights from WDBK, Cleveland, Ohio.



Wm. A. McCutcheon, Announcer and Studio Director of WOCL, Jamestown, N. Y.



M. Reed Bass, Announcer of WHDI, Minneapolis, Minn.



Above: F. R. Mueller, Program Director, WBES. Right: H. A. Van Eton, WBES, Washington, D.C.



Carroll R. Jones, Announcer WMAC, Cazenovia, N. Y.

Radio Celebrities



Major John J. Fanning, Announcer and Program Director of WNAC, Boston, Mass.



Right: Lawrence Helverson, Flutist, WCAL, Northfield, Minn. Left: Albert J. Erismax, Station Manager, WMAK, Buffalo, N. Y.



Prof. Toufic Moubaid, Syrian Oudist, WBBR, N. Y. City.



Left: Studio Staff of WFI, Philadelphia, Pa. Right: Harold Finke, Announcer and Director of WGBF, Evansville, Ind.





Right: Staff Artists of KMO, Tacoma, Wash. Above: Louise Brommer Philbrick, staff Soprano of KFKX, Hastings, Neb.

Paul Cowan, Organist of KMO, Tacoma, Wash.



Nellie Howland, Harpist of KFDM, Beaumont, Tex.



Bill Winder and his Winthrop Hotel Orchestra, KMO, Tacoma, Wash.



Above: Prof. Hayes M. Fuhr, Director of the Hastings College Conservatory of Music, heard over KFKX, Hastings, Neb. Below: "Fuel Oil Fanny," who conducts "Household Hints for Housewives" over KFDM, Beaumont, Tex., on Friday evenings.



Left: Mrs. Chas. Chinski, Soprano, Station KFDM. Above: J. L. Risinger, Assistant Announcer and Publicity Manager of KFDM, Beaumont, Tex. Right: Hobb R. Turner, Market Announcer for KFKX, Hastings, Neb.



Left: Joseph Powell, Baritone Soloist and Vocal Tenor, heard over KFDM, Above: Mrs. Ione Townes-Locke, Soprano Soloist of KFDM. Also conductor of Mixed Quartet. Right: J. W. Fulbright, Announcer of KFDM, Beaumont, Texas.





Announcers of Station KMOX, St. Louis, Mo.



Left: Dave Bitner, leader KMOX Orchestra. Right: Agnes Griffin, jazz Pianist, KMOX, St. Louis, Mo.



Saxophone Quartet of KMOX, St. Louis, Mo.



Jacquinet Jules, Organist and Harpist of KMOX, St. Louis, Mo.



Alice Moslin, Studio Director of KMOX, St. Louis, Mo.



Elizabeth Keith, violin Soloist of KFPW, Carterville, Mo.



Above: Betty Lutz, Hostess of WEAF. Right: Graham McNamee, famous Announcer of WEAF, N. Y. City.



Right: Schlerman's Colorado Orchestra heard over KOA. Above: Ralph Fresse, Announcer and Lyric Tenor at KOA, Denver, Colo.





Left: Merle Cullen, "The Singing Bellboy" of WLS. Above: Old Time Fiddlers of WLS, who play for National Barn Dance every Saturday night. Right: Dr. Hugh Macdonald, the "Country Doctor" of WLS, Chicago, Ill.



Left: Mrs. Ellen Rose Dickey, the "Friendly Neighbor" who conducts the "Homemaker's Hour" over WLS, Chicago, Ill.



Above: Elsie Mae Look, Organist of WLS, Chicago, Ill.



Ira L. (Shine) Morgan, Vocalist and Novelty Entertainer of WCBH, University P. O., Miss.



Above: Studio Ensemble consisting of Cecilia Arends, Violinist; Johanna Arends, Pianist and Ed Dempsey, Tenor, WBCN. Right: J. R. Foster, Announcer and Studio Manager of WBCN, Chicago.



Right: Richard C. Wells, Announcer of WHBF. Above: Joe Coyle, Vocalist and Director of WHBF, Rock Island, Ill.





String Quartet heard from WBAL, Baltimore, Md.



The Fitz Sisters, Geneva and Mary, who entertain every Friday night over WBAL, Baltimore, Md.



Above: Gustav Klemm, Conductor of WBAL, Concert Orchestra, Baltimore, Md.



Right: Helene Brocner, Cellist and member of the WBAL Trio, Baltimore, Md.



Frederick D. Weaver, Staff Organist of WBAL, Baltimore, Md.



Above: Ruth Margaret Tiley, Pianist of KOB, Right: Gladys Strickland, Soprano of KOB, State College, N. Mex.



Above: Edith Parks Cunningham, well-known Soprano of KGO, Oakland, Calif.



Above left: Milton J. Cross, Announcer of WJZ. Above right: Robt. D. Newton, Assistant Manager, WJZ and WJY, N. Y. City. Right: Edward B. Husing, Announcer of WJZ.



Right: Edward C. Fitch, Organist of WHAD, Milwaukee, Wis.



Left: Robt. E. Kauff, Announcer and News Crier, WHAD, Milwaukee, Wis. Above: Frances Anderson, popular Soprano heard over KGO, Oakland, Calif. Right: Myrtle Spangenberg, staff Soloist of WHAD, Milwaukee, Wis.





Left: Vivlan Lawrence, the Ukelele Girl of WCFL, Chicago, Ill.



Right: Edward N. Nockels, Manager of WCFL.



Margaret Wertz, Contralto, WCFL, Chicago, Ill.



Left: Franklin C. E. Lundquist, Musical Director and Manager of WCFL.



Right: Little Joe Warner, Character Singer heard over WCFL, Chicago, Ill.



Z. E. Bates, Jr., Sports Announcer of KFKZ, Kirksville, Mo.



Above: Walter C. Johnson, Chief Announcer of WTIC, Hartford, Conn.



Right: Laura C. Gaudet, Staff Pianist of WTIC.



Vella Cook, Contralto of WCFL, Chicago, Ill.



Above: Norman Manning, popular entertainer and Managing Director of KFWE, Hollywood, Calif.



Right: Burt McMurtie, Announcer and Director of WCAE, Pittsburgh, Pa.



Frank Moss, Musical Director of KFRC, San Francisco, Calif.



Harold Anderson, popular Piano-Accordionist of WBBM, Chicago.



At right: Theo. W. Schultz, Announcer of KFDY, Brookings, S. Dak.



Right: L. J. Seymour, Production Manager of WCCO, St. Paul, Minn. Below: Gold Medal Quartet composed of Ted Kline, Kenneth Johnson, Cal Scheibe and Nels Swenson, WCCO, Minneapolis, Minn.





Hal G. Nichols, Arranger and Program Arranger, KFON, Long Beach, Calif.



Left: Kathryn Fisher, Pianist of KFWA. Above: Charles Lockwood's Radio Boys, a regular feature of KFWA, Ogden, Utah.



Left: Chas. S. Haverstock, Chief Announcer of KOIL. Above: Muriel Mann, Organist of KOIL. Right: Hugh W. McGinn, heard over KOIL, Council Bluffs, Iowa.



Frances Mulholland, Violinist of KOIL, Council Bluffs, Iowa.



Left: Elsie Montgomery, Solo Celloist and member of Orchestra, KFON, Long Beach, Calif.



Right: Lon Chassy, Musical Director of New Arlington Hotel Orchestra, KTHS. Below: New Arlington Hotel Orchestra under direction of Lon Chassy, KTHS, Hot Springs, Ark.



Above: Frank W. Trotter, Announcer of KFOR. Right: Hugo A. Hahn, Entertainer and Soloist of KFOR, David City, Neb.





Marion Law, Blue Singer from the Congress Hotel Studio of KYW, Chicago, Ill.



Coon Sanders Original Nighthawks, playing from the Congress Hotel over Station KYW, Chicago, Ill.



Lucille Long, Contralto heard from Edison Studio of KYW, Chicago, Ill.



Eddie and Fannie Cavanaugh, "Gaelic Twins," who broadcast from the Congress Studio of KYW, Chicago, Ill.



Tom Sexton, Announcer and Assistant Manager of KFSD, San Diego, Calif.



Jeroslav Cimera, Trombone Soloist, KYW, Chicago, Ill.



Below: Edison String Trio composed of Sallie Menkes, Pianist, Audrey Call, Violinist and Lillian Rehberg, Cellist, KYW, Chicago.

Uncle Bob and six members of the "Curb is the Limit Club," KYW, Chicago, Ill.



Gladys Laidlaw, Soprano, KFSD, San Diego, Calif.



Right: Mary Christine Albia, Pianist, of KFI, Los Angeles, Calif.



Left: Marian Duell McDade, Pianist of Westinghouse Station KDKA. Above: The Little Symphony Orchestra of KDKA, Pittsburgh, Pa., with its million dollar instruments, Victor Saudek, Director.



Above: Betty Patrick, Soloist with the Patrick-Marsh Orchestra, as she sings her "blues" songs over KFI, Los Angeles, Calif. Right: Will Ganoway, Concert Pianist and KFI artist Saturday evenings.



Above: The Band heard regularly over WREO. Left: Roy E. Davis, Announcer and Program Director of WREO, Lansing, Mich. Right: Ralph W. Hobbs, one of the Lansing, Mich., pastors whose sermons are broadcasted over WREO.



"Slick" Merriam heard over KFAB, Lincoln, Neb.



Walter Logan, leader of Willard Symphony Orchestra at WTAM, Cleveland, Ohio.

"Cowbell Boys" of KFAB, Lincoln, Neb.



Right: Everett Jones, Director of Dance Orchestra heard over WTAM. Above: Ivan Francisci, leader String Ensemble, WTAM, Cleveland, Ohio.



"Master Six" Orchestra of KFAB, Lincoln, Neb.



Above: C. H. Dickerman, Announcer WEEI. Right: Walter E. Myers, Announcer of WEEI, Boston, Mass.



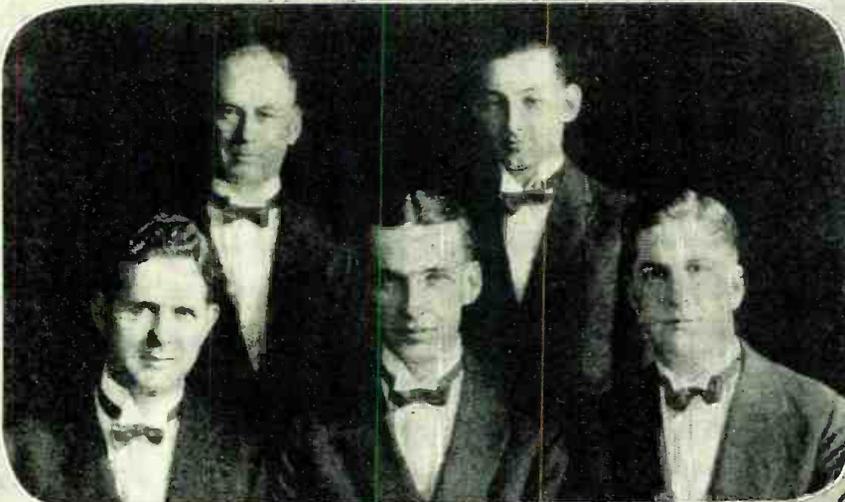
Above: Left to right, David Warnhoff, Announcer; Charles Magwood, Studio Manager and Elmer S. Pierce, Station Manager of WSVS. Left: Lela M. Sikes, Pianist and Contralto of WSVS, Buffalo, N. Y.



Above: P. B. Newcomer, Corretist and Conductor of Zion Band, Station WCBD. Left: Glen R. Sparrow, Tenor, WCBD, Zion, Ill.



Above: Edwin M. Soence, Chief Announcer of WPG. Left: Jean Wiener, Organist of WPG, Atlantic City, N. J.

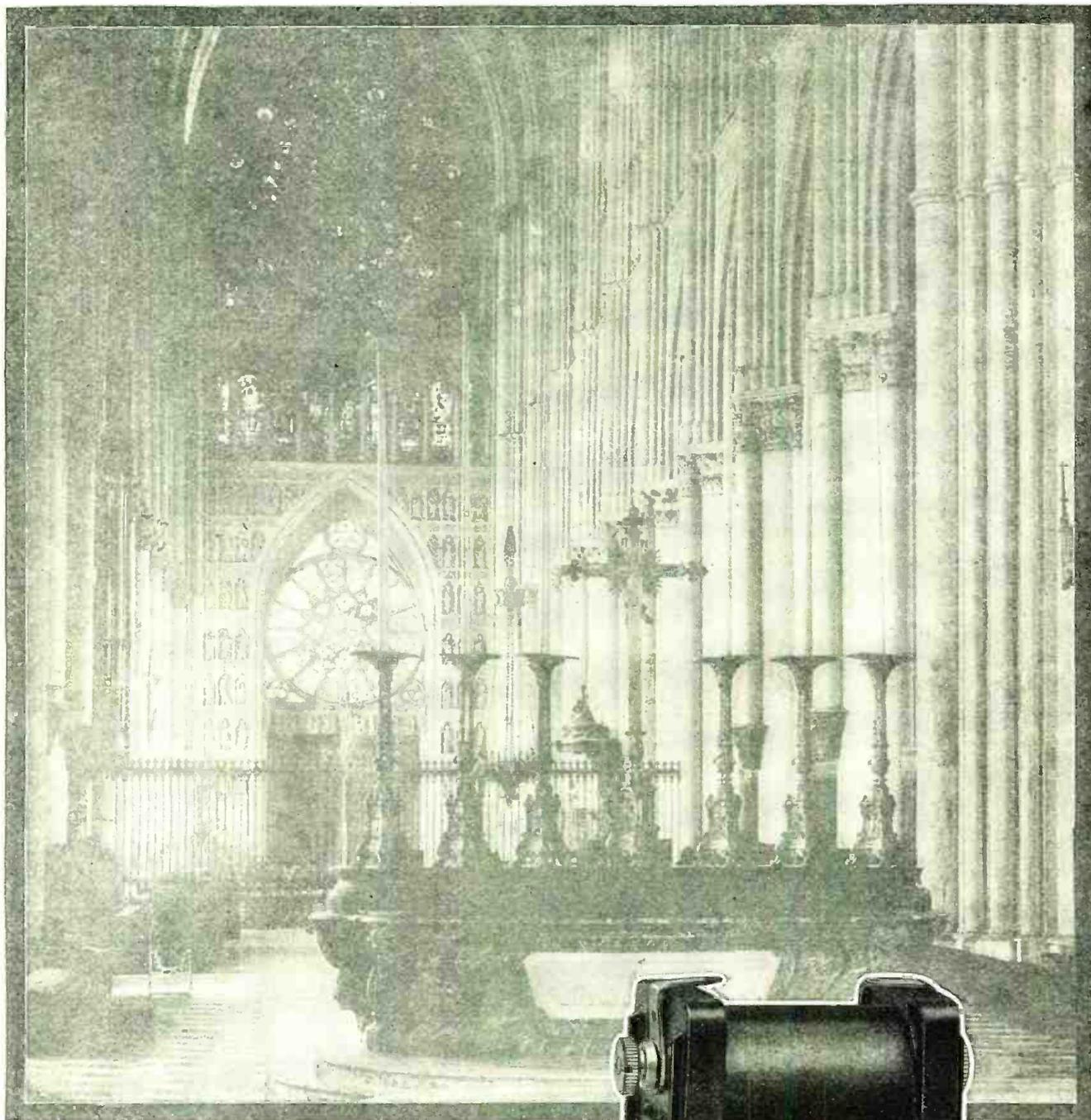


Right: C. B. Locke, Announcer WBAP. Below: Charles Croxton, Announcer and Soloist of WBAP, Ft. Worth, Tex.



At right: Leo Reisman and his Hotel Brunswick Dance Orchestra, an exclusive attraction of WBZ. Above: The Goldenaires Trumpeters, heard over WBZ, Springfield, Mass.



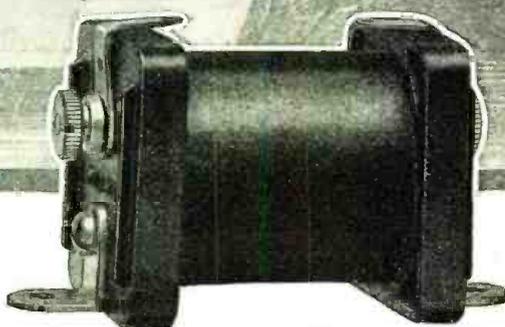


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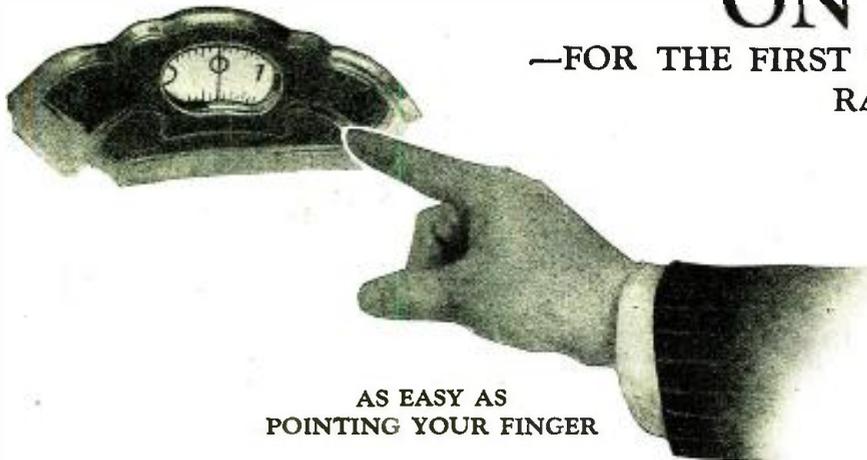
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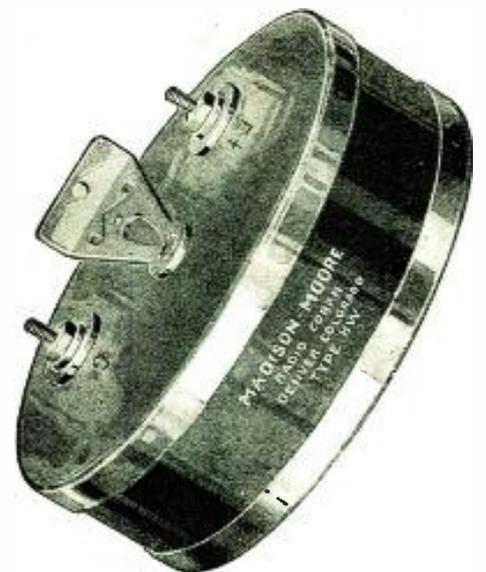
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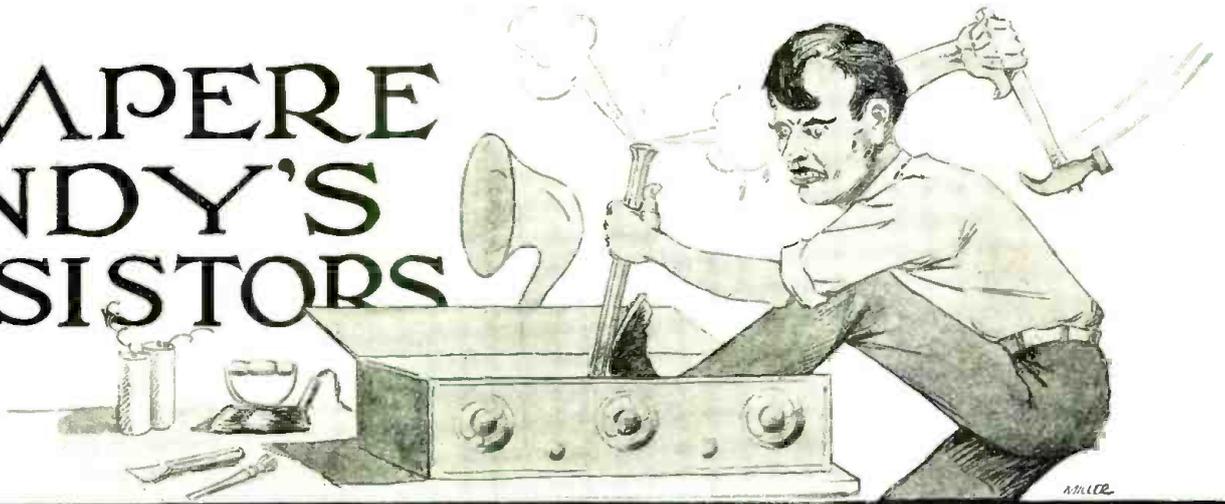


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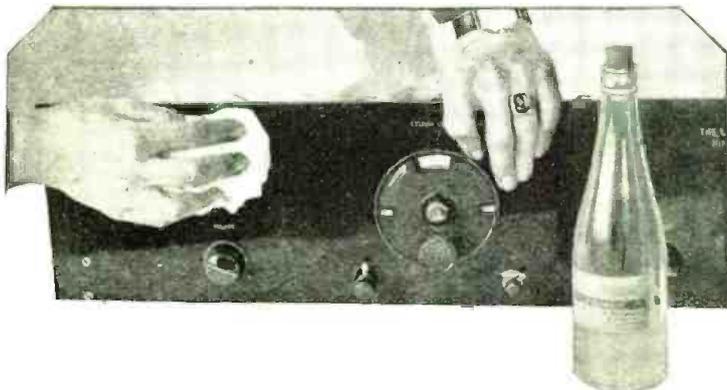


IN RESPONSE to many requests from our readers we are inaugurating a new section of THE CITIZEN'S RADIO CALL BOOK, known as "Ampere Andy's Assistors". This section will contain a wealth of illustrated information interesting to both the novice and experienced radio enthusiast. The information will consist largely of suggestions and methods which will materially increase the all-around efficiency of a receiver as well as illustrate the application of new apparatus. Suggestions from readers as to contents or improvements of the section will be greatly appreciated.



A Battery-less Speaker Tester

It is often desired to test the phones or loudspeaker when a battery is not available. A small piece of blotting paper is soaked in a salt water solution and a five-cent piece placed on one side of it and a penny on the other side. The phone or loudspeaker tips are then touched to the two coins, as shown in the photograph. When this is done a loud click will be heard, provided that the unit is sensitive. The two coins, nickel and copper, combined with the salt solution on the blotter form a miniature electric cell.



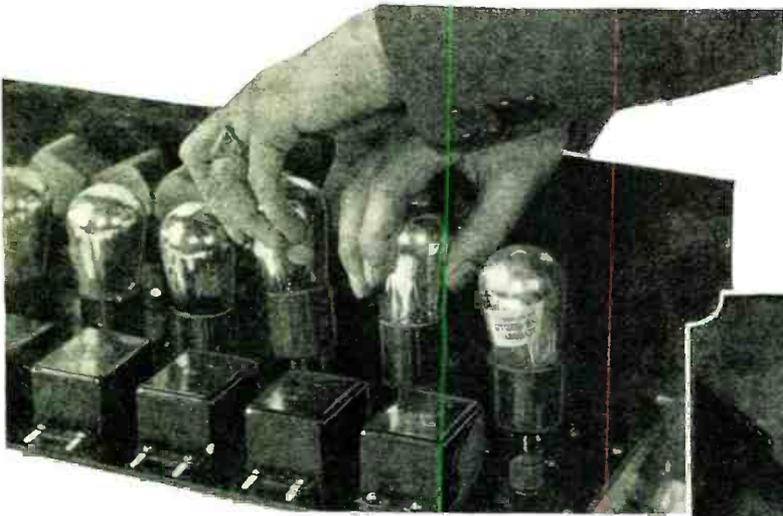
How to Re-Mark Your Dials.

Due to constant handling, the radio dials and engraved binding posts often become worn and darkened to such an extent that they are difficult to read and are unattractive in appearance. At very little expense and time they can be made to look nearly as good as new. By the use of some sharp pointed instrument remove all the filler present in the engraving. Purchase a jar of Chinese white and rub it into the engraving slots. Let dry for a few minutes and wipe off the surplus filler with a soft cloth and then polish.



Cleaning Panels.

The radio panel often becomes dirty and greasy, thus losing its polish and attractiveness. In cleaning panels where filled engraving is present the use of water as a cleaning agent is very unadvisable. Dampen a soft cloth with ordinary denatured wood or rubbing alcohol and rub lightly over the surface to be cleaned. This will remove all dirt and grease that may have accumulated. Dry the cleaned surface with another cloth. Alcohol will evaporate rapidly without damaging the panel or the engraving and will leave a high polish. Care should be taken that the alcohol does not come in contact with the cabinet as it will destroy the varnish unless immediately removed.



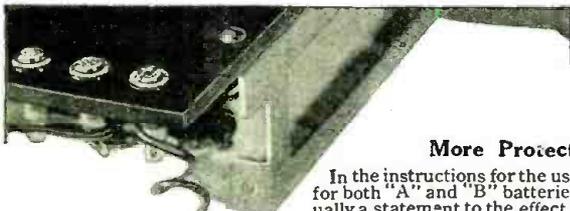
Switching Tubes for Efficiency.

There are times when the radio set loses efficiency due to the tubes that are in use. Very often a tube that is a good audio frequency amplifier is not a good detector, and likewise a good radio frequency amplifying tube is not suitable for use as a detector, etc. Often times by switching tubes a suitable combination may be found. Tune in a station and remove two tubes from their sockets, reverse them and observe if any improvement is noticeable in volume or quality. Repeat the operation with all tubes until the best results have been obtained. (See illustration above.)



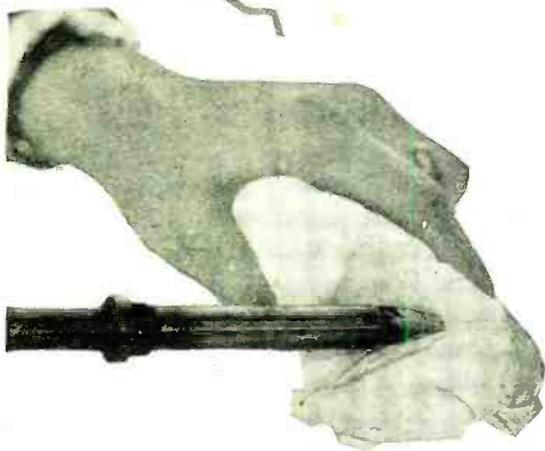
Testing "B" Batteries and "B" Battery Eliminators.

In the testing of "B" batteries and "B" eliminators care should be taken not to damage them or shorten their life of operation. "Shorting" terminals with a screwdriver or knife and watching the spark to determine the condition of the battery or eliminator will very shortly ruin either. The use of cheap pocket meters will have the same effect and should be avoided. Obtain a high resistance meter of a reliable make for testing which will insure accuracy and will not shorten the life or damage the battery or eliminator in any way. (See illustration below.)



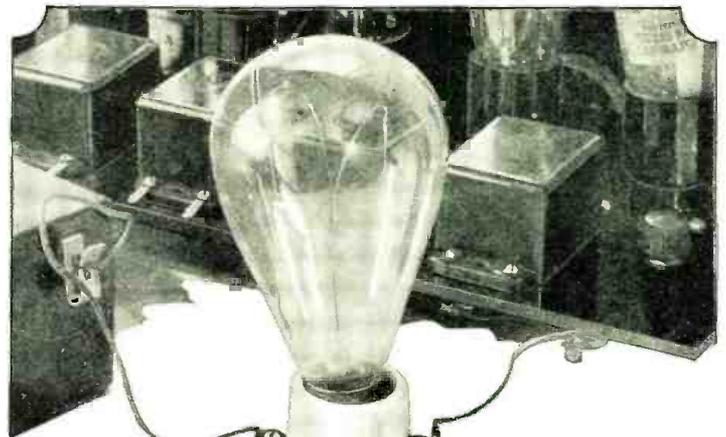
More Protection.

In the instructions for the use of chargers for both "A" and "B" batteries there is usually a statement to the effect that the batteries should be disconnected from the set while they are being charged. This caution is made in as much as a short circuit might occur through the grounded circuits of the receiver. The inconvenience of the disconnection each time batteries are charged may be quickly overcome by the insertion of a .5 mfd. by-pass condenser in the ground lead to the receiver. This insulates the receiver from the ground and prevents a possible short circuit and will not affect the reception.



Wiping the Soldering Iron.

By wiping the end of the soldering iron on an old woolen rag occasionally, it will be kept clean of residue and will allow the flow of solder to be more constant, and much more fusible.



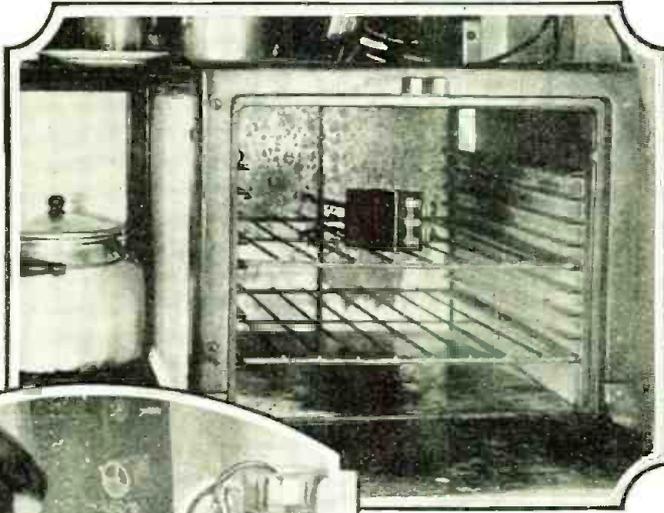
Filament Protection.

A great many radio fans have inclinations toward experimenting with different types of receivers and have, occasionally, burned out the filaments of the tubes due to carelessness or some trouble within the set.

This trouble may be eliminated by a very simple and positive method. A ten watt, one hundred and ten volt lamp connected between the "B" minus and the "A" minus post of the receiver, depending upon how the common lead is made, will prevent the filaments from burning out, if an error is made in connecting up the batteries or something is amiss within the receiver. The lamp will light, but the filaments of the tubes will not burn out.

Keep the Batteries Clean.

A great many times the "B" batteries are placed in a convenient corner unprotected and uncovered and left there in a state of neglect until they no longer are of use as a power supply. Dust accumulates on the tops of the batteries and when the weather is damp the dust absorbs the moisture and the high voltage present will leak from terminal to terminal gradually running down the battery. The batteries will give better service if they are periodically cleaned or kept in a dust-proof place.

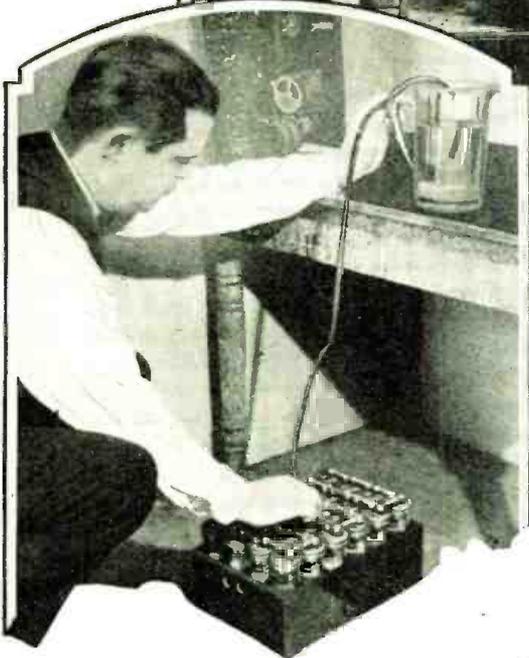


Stopping the Hum in Transformers.

Radio users are sometimes bothered by a constant hum from the power transformer that is used in the "B" battery eliminator supplying "B" potential to the receiver. The usual cause of this hum is due to the sealing compound working loose from around the edges of the laminations in the transformer core. When this happens the electro magnetic field set up in the laminations causes them to vibrate. This may be overcome by a simple treatment of baking the transformer in an oven, just enough to soften the sealing compound. Change the position of the case occasionally so that the compound will be distributed evenly. (See illustration on left.)

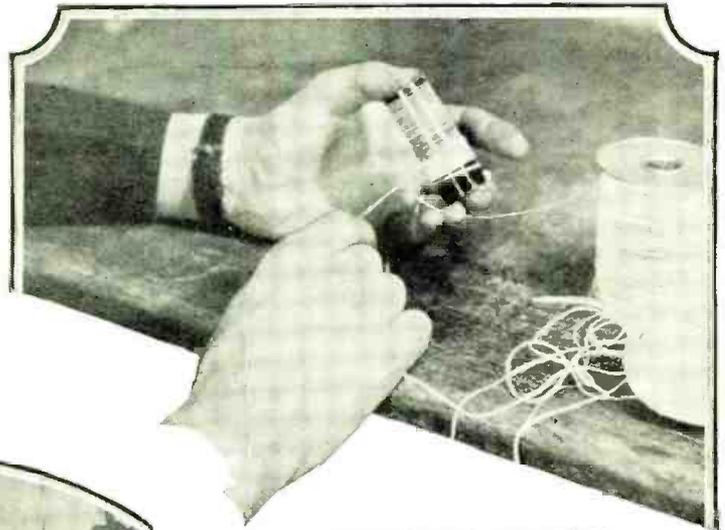
Winding Spaced Coils.

It is not as difficult as it may appear to wind a space wound coil, without a large outlay of equipment. Start the winding of the coil with wire and string or whatever may give the desired spacing. It is suggested that more tension be put upon the wire when winding than is ordinarily done. Fasten the completed end and unwind the string or thread, as it may be. A coat of colodion or rubber cement may be then applied to the finished coil which will firmly hold the spaced wiring in place. (See illustration below.)



Adding Water to the Storage "B" Battery.

Due to the great number of cells in a storage "B" battery it is a tedious job to bring the electrolyte to the correct level by adding water. A much quicker method than the usual eye dropper filler is to put the bottle of distilled water on a level above the batteries and place a rubber tube down into the water. A siphon action may then be obtained by drawing on the open end of the tube. Regulation of the flow of water may be obtained by pinching the tube. (See illustration above.)



Improving a Loudspeaker.

The loudspeaker that uses a metal horn will very often have a tinny sound that is annoying to the ear. Heat some paraffin and mix with some salt, add a little vinegar which will make it adhesive and spatter slowly over the surface of the horn. When the paraffin has dried and is hard apply a coat of flat black paint. (See illustration below.)



Filling Holes in Panels.

It is not unusual that the home constructor makes a mistake in the drilling of his bakelite panel, or changes some of the apparatus in his receiver which leaves undesirable holes detracting from the appearance of the receiver. By the use of black sealing wax such holes may be filled quite successfully and eliminate the need of buying a new panel. Lay the panel, face down, on a flat surface, such as a smooth board or a piece of steel, and heat the sealing wax with a match or soldering iron letting the hot wax drop into the hole to be filled. When the wax has hardened it will be found to be almost indistinguishable on the front of the panel. (See illustration above.)



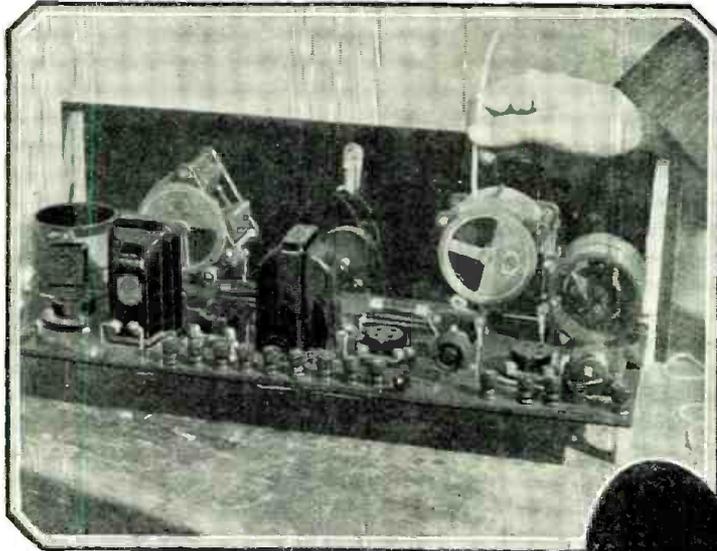
Cleaning a Hydrometer by a Simple Method.

After making a number of readings the glass barrel of the hydrometer becomes clouded, due to the accumulation of deposits from the electrolyte adhering to the inside surface of the glass. After a period of time it is very difficult to determine the reading on the float. A simple and effective method of cleaning the glass barrel is by inserting the nozzle of the hydrometer into a bottle of denatured alcohol, allowing the barrel to fill. Then expel the alcohol into the bottle again. It will then be found that the glass barrel is perfectly clear. The same alcohol may be used indefinitely. (See illustration on left.)



How to Remedy One Condenser Trouble.

One of the many troubles that periodically appear in the radio receiver, is due to the accumulation of dust between the plates of the variable tuning condensers. This will cause a scratching sound in the reproduction, if the accumulation is great enough. A decrease in volume may also be noticed. During damp weather the dust will absorb the moisture and form a conductive path between the plates. By running a pipe cleaner between the plates the moisture impregnated dust may be quite easily and quickly removed. (See illustration on right.)



Antenna Length Adjustment.

With a change from an old type receiver to a new type receiver it is sometimes necessary to use a shorter antenna than the one previously in use. When it is not convenient to install a new antenna a .00125 mfd. fixed condenser may be placed in the antenna lead to correct the dial reading of the first tuning condenser to correspond with the remaining dials. This will also sharpen the tuning of the receiver. Where a fixed condenser is not available a variable condenser may be substituted, varying the capacity until the correct value has been obtained.



Interference Filter.

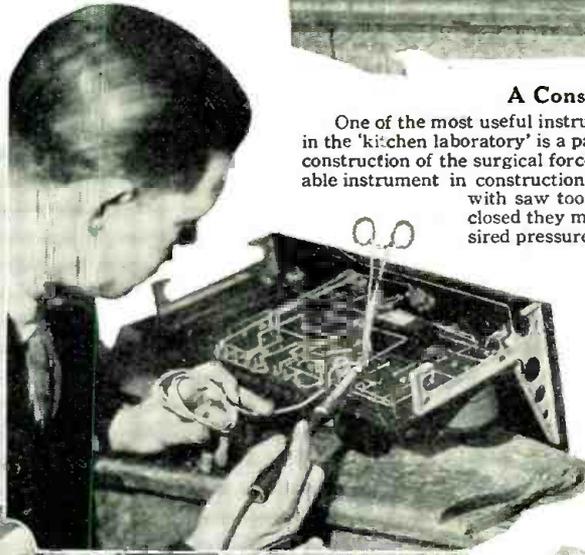
A great deal of very annoying interference, has as its source, electric motors that are used in oil burners, ice machines, motor generators and the like. This type of interference is caused by sparking at the brushes of the motors that are in use. The spark sets up a radio frequency current that travels through the power lines, radiating into the air and being picked up by the radio receiver.

By the use of various chokes and condensers formed into a filter, the radio frequency currents may be stopped from entering the power lines, at the point of origin. The Tobe Deutschmann Co., of Cambridge, Mass., manufactures a filter for this service that is compact and very effective. These filters are made for motors up to and including 500 K. W.



A Construction Hint.

One of the most useful instruments and one that is very seldom seen in the 'kitchen laboratory' is a pair of surgical forceps. The mechanical construction of the surgical forceps makes them a very helpful and valuable instrument in construction and repair work. They are provided with saw tooth catches whereby when the nibs are closed they may be locked in such position at any desired pressure. Two wires may be held together while soldering, etc. They are thin and light making possible working in a small space or regaining bolts, nuts, etc., that have been dropped into inaccessible places.



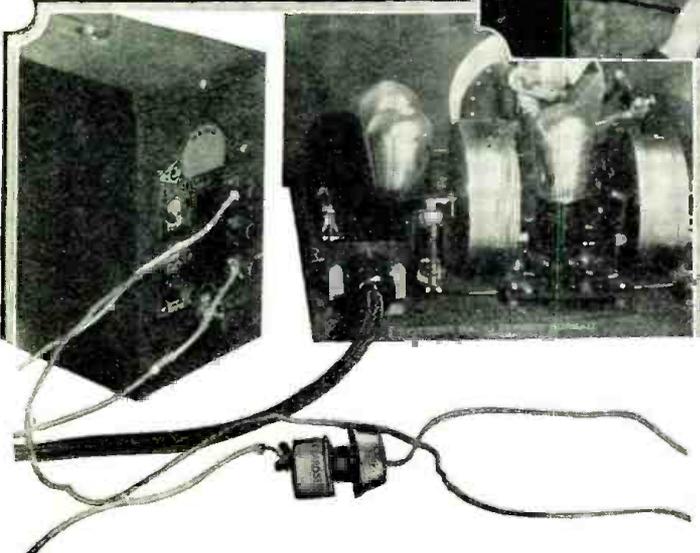
Care of "A" Battery Clips.

Due to the presence of the fumes from sulphuric acid electrolyte of the storage "A" battery the connecting clips will become corroded and if permitted to do so over a period of time the corrosion will form an insulation between the battery post and the clip allowing no current to pass, and will also eat the clip until it is entirely gone. The clips should be frequently removed and placed in a strong solution of baking soda (bicarbonate of soda) and water. This will remove the corrosion and neutralize any effects the acid may have on the clips. By boiling the clips in water the same results may be obtained. The battery posts should also be cleaned either by scraping or brushing with a wire brush.



Regulation of "B" Eliminator Output

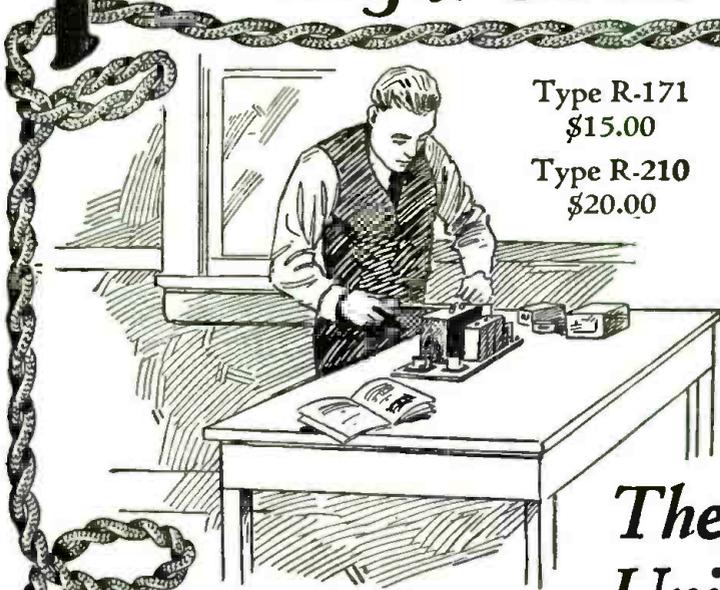
A great many of the present Super-Hetrodynes require a plate voltage of 22½ volts for the second detector. In cases where "B" battery eliminators are used that are not provided with a low voltage tap, a variable resistance may be inserted in the "B" supply line to reduce the voltage to the most desirable point. The Clarostat, as illustrated, is very well suited for this purpose, and may be adjusted to a very fine degree.



Power from the Light Circuit



Type R-171
\$15.00
Type R-210
\$20.00



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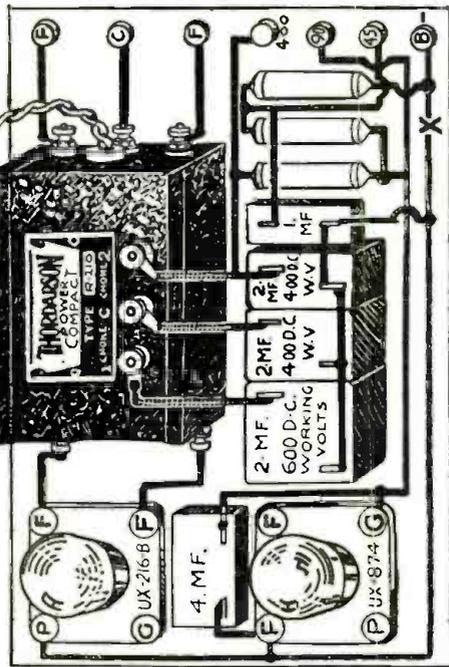
The Thordarson Power Compact is the complete foundation unit for power amplification. It contains: (1) a power supply transformer, (2) two filter choke coils of 30 henries, and (3) a power tube filament supply, tapped at the exact electrical center (an exclusive Thordarson feature), all in one compound filled case.

Two types of Power Compact are available: R-171 is designed for use with power tube UX-171 and Raytheon BH rectifier. Type R-210 is designed for use with power tube UX-210 and UX 216-B rectifier. Each type of compact supplies the proper values of current for maximum efficiency operation of its corresponding power tube.

Packed with each compact is a complete set of instructions which can easily be followed, even by the man with no radio experience.

Remember that when you buy a Thordarson product it is guaranteed and backed by over thirty years' manufacturing of reliable transformers.

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

The Camfield Super-Selective Nine

The Design of This Receiver Represents an Achievement in the Radio Art, Namely the Simultaneous Increasing of Selectivity, Sensitivity and Tone Quality

This Receiver Was Constructed and All Illustrations Made in the Laboratory of the Citizens Radio Call Book

DURING the past eight years the development of radio telephony has been so rapid that it has been exceedingly difficult to explain or determine the true value of the art as a form of entertainment. At the present time, however, every indication seems to be that radio telephony has been accepted as a permanent feature in the majority of households. In the early stages of development, broadcasting stations were few and the transmitted frequencies were widely separated. At that time radio fans were satisfied with almost any type of receiver regardless of appearance, efficiency, operation or cost and very little thought was given to the quality of reproduction obtained. As time went on, new developments made their appearance so rapidly and in such close proximity to each other, that it caused the entire field to remain in a more or less unsettled state. Gradually standardization took place and the radio fan gained more knowledge of the theoretical operation of his receiver, and broadcasting stations became more numerous, which consequently caused a demand for better receivers.

It was then realized that in order to compete with the changing conditions a receiver would have to be developed that would give accurate 10 kilocycle separation on all transmitted frequencies in the broadcast spectrum, if radio reception were to sustain the great popularity accorded it in the short period of time since its inauguration in the entertainment form. It was also seen that it would be necessary to improve the quality of reproduction to a point equal to that of various previously accepted forms of amusement. Broadcasting stations were remodeled and modulation made as perfect as possible with the existing equipment. Sound reverberation in studios was either greatly reduced or eliminated by the latest methods. The only solution for further perfection in the reproduction of the voice was in the receiver or in the apparatus used to convert electrical vibrations into sound vibrations.

A great many types of receivers have been developed and many of them put into extensive use, but it is doubtful whether more than three or four of them can qualify for satisfactory use under the present conditions.

Among the comparatively few types of receivers which have met with success are those using the Super-Heterodyne and the

Tuned Radio Frequency circuits. These two circuits have withstood the trials of time and have remained in the lead of successful receivers since they were first brought before the public. The logical reason for their great popularity is very probably due to their superiority over any other type of receiver produced up to the present time.

The most recent development in modern receivers that is worthy of considerable comment and attention, is the Camfield Super-Selective Nine. The operation of this receiver is exactly what the name implies—Super-Selectivity, a selectivity which has been heretofore unknown to the radio fan and the dream of most engineers. This quality has long been sought for and has been accomplished in a most unusual and unique way, by the combination of the two most successful circuits yet to be devised and the addition of a new unit which permits a degree of selectivity that is unsurpassed.

The circuit of the Camfield Super-Selective Nine is fundamentally a Super-Heterodyne, preceded by two stages of Tuned Radio Frequency amplification. The combination of these two circuits is quite logical and practical, but it was found necessary to incorporate new features and refine old ones in order to produce a receiver of unusually high merit. The Tuned Radio Frequency circuit is not a spectacularly selective one, but it is very sensitive and has a high gain factor per stage with a minimum amount of accompanying distortion. The Super-Heterodyne, on the other hand, is selective and fairly sensitive, but it has a low gain factor per

stage, which necessitates the use of a number of intermediate stages of amplification in order to obtain the desired amount of volume on distant stations. It is known that when a signal is amplified many times, it will become distorted from the original form. This is the condition which prevails in the average Super-Heterodyne when it is operated under full volume on distant stations. This, of course, is most undesirable.

Super-Heterodynes in the past have always been operated with the loop type of antenna as an energy pick-up medium. It is well known that as an energy pick-up device, the loop type antenna is very much inferior to the usual outside type of antenna. With this fact in mind, there were a great many attempts made to operate Super-Heterodynes on outside antennas, but inas-



Photo A. Phantom view of receiver installed in *Excello* console

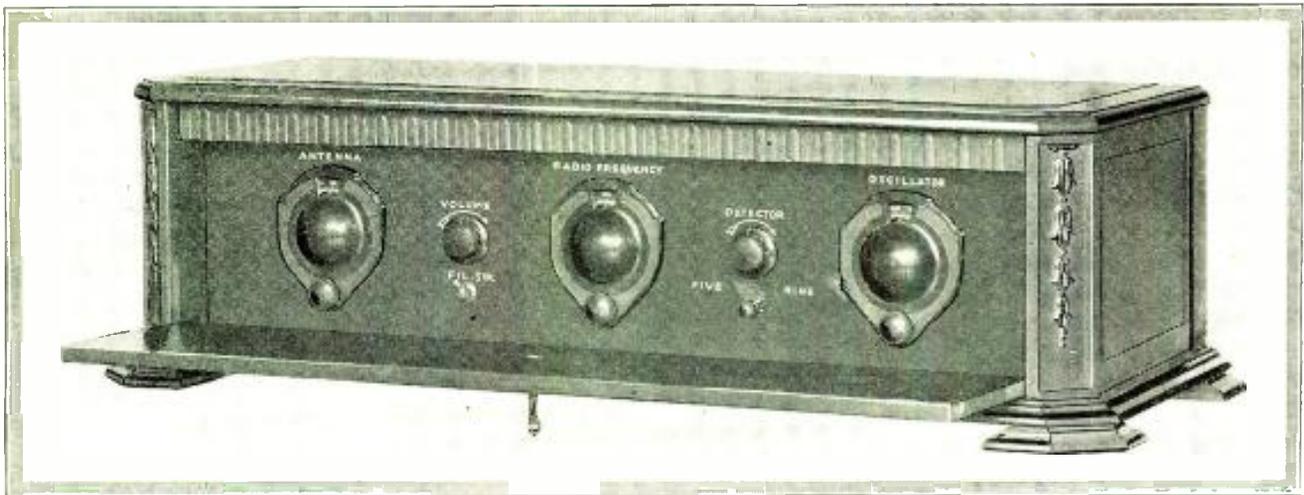


Photo B. Front view of receiver mounted in cabinet

much as the usual "Super" depends upon a single tuned stage for selectivity, the tuning was invariably broadened due to the greatly increased amount of energy being applied to the input circuits of the receiver.

In the circuit of the Camfield Super-Selective Nine, the old tuned stage transformer has been substituted by a unit called the "band pass filter." This makes possible the use of an outside antenna and two stages of tuned radio frequency amplification preceding the Super-Heterodyne, which permits better selectivity than in previous types of "Supers." The introduction of the "band pass filter" in the home constructors field is an important advancement and is worthy of some comment.

Fundamentally a filter consists of a tuned circuit, resonated at a specified frequency, the peak of which is in the center of the band of frequencies passed. The characteristic of a filter is generally given when a signal of fixed amplitude and variable frequency is impressed upon the input terminals and plotted against frequencies and the voltage at the output terminals. A filter is generally applied to high frequency amplifiers and may be constructed to serve one or both of two different purposes, (1) to prevent signals from all stations but the desired one from being amplified, and, therefore, reducing interference from other stations, and (2) to prevent strays, static, etc., from being amplified as much as they would otherwise be and thereby reducing interference by cause of conditions of the air.

In the design of this receiver, great care was taken that all parts incorporated were as efficient and as nearly correct as is possible, from an engineering standpoint. Special consideration

was given to the design of the circuit and the various constants used to make up the two stages of Tuned Radio Frequency and the first detector. It was found that in order to obtain satisfactory operation, it was necessary that oscillation be completely absent from the amplifiers.

In order that the method used for the suppression of oscillation in this receiver be understood, a brief explanation of the causes and remedies of oscillation will be made. Oscillation in a Tuned Radio Frequency amplifier is due to one or both of two things. These causes are interstage magnetic coupling between stages and coupling between the input and output circuits of the amplifier tubes.

Interstage magnetic coupling is due to the interlinking of fields of the Radio Frequency transformers. There are several methods by which this condition of coupling may be reduced to a minimum or eliminated. One of the methods which has been very popular in the past is to place the transformers on an angle, in respect to the horizontal. This method is satisfactory if but one frequency is to be tuned, but where a number of frequencies are tuned it is not entirely satisfactory inasmuch as the angle of zero coupling changes quite rapidly with the frequency tuned. Another method is by the use of some kind of a shielding arrangement. This may take the form of the partial shielding method wherein the Radio Frequency transformers, only, are shielded, or the total shielding method where the complete receiver is shielded. In this method each individual stage is shielded. It may be readily seen that in either of the shielding methods special tools would be necessary and the total cost of construction would

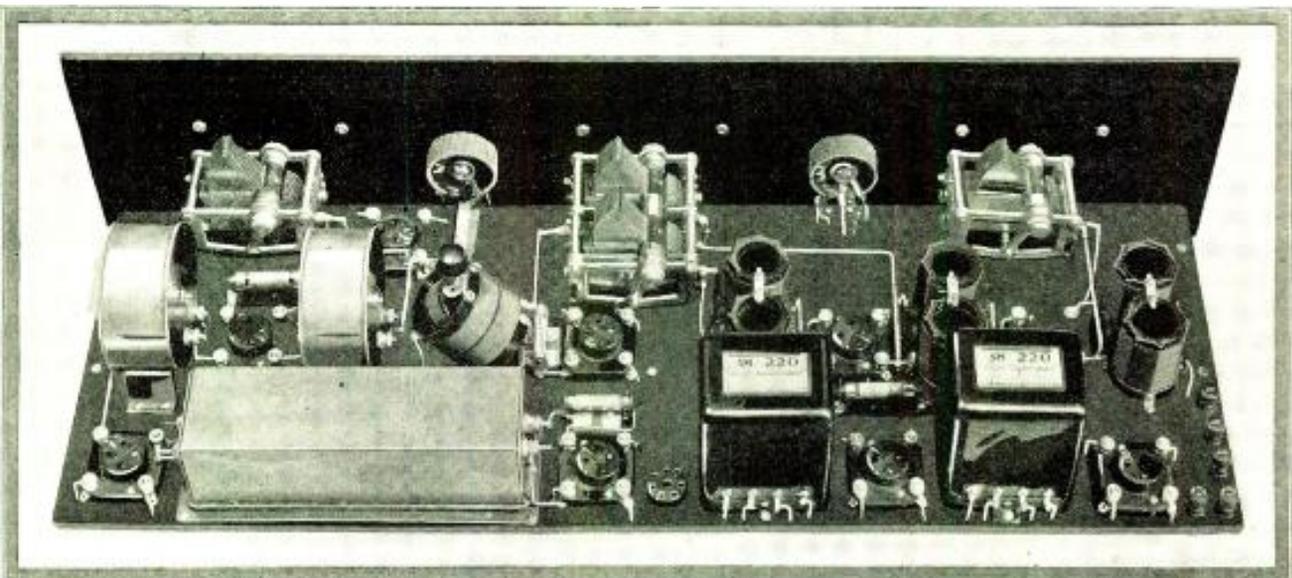


Photo C. Rear view of completed receiver

The audio frequency amplifier consists of two stages of transformer coupled amplification. These transformers are the well known Silver-Marshall make and are designed for use with the modern power tubes and cone speakers. They make use of an unusually large core with which the amplification curve is surprisingly flat, between 200 and 5000 cycles. From this fact it may be seen that clarity and volume may be had from the lowest bass to the highest treble.

One of the outstanding features of this receiver is the fact that it may be assembled in sections, i. e., if it is not possible to build the complete receiver all at one time, the parts of the Tuned Radio Frequency amplifier and the audio frequency amplifier may be purchased and built on the panel and sub-panel used for the complete receiver. When it is desired to complete the receiver, it is also necessary to add the Super-Heterodyne section, and this may be done with very little trouble and a very short interruption in the operation of the receiver. The receiver has been designed in this way so that the home constructor who cannot afford a high priced receiver may build it at intervals and yet have continuous operation.

In the schematic wiring diagram in Figure 4 in the secondary tuning circuit of the first detector will be noticed a jumper between the grid condenser and the tuned circuit. The purpose of this jumper is that when only the five tube section is built these two connections must be "shorted"; when the Super-Heterodyne section is used, these connections are connected to the pick-up coil of the oscillator.

There is a six spring jack switch placed on the panel, which is used to control the number of tubes in use. When the switch is turned to one position, the Tuned Radio Frequency and audio frequency section of the receiver only are in use. The receiver is then operated as a five tube set and may be used for local or semi-distant reception. By turning the switch in the opposite direction, all of the nine tubes are put into operation and a Super-Selective and Super-Sensitive circuit is put into use, which is capable of tuning through powerful local stations from coast to coast on a ten kilocycle separation of frequency.

Control of volume is accomplished by means of a 6-ohm rheostat in the filament circuits of the two stages of Tuned Radio Frequency and the first detector. A 400-ohm potentiometer is placed across the "A" battery. The divider arm of this potentiometer is connected to the grid returns of the radio frequency amplifiers and the first detector. This will act as a modifier or clarifier. Another 400-ohm potentiometer is placed in a similar circuit, with the divider arm connected to the grid returns of the intermediate frequency amplifiers. This potentiometer is mounted on the sub-panel and after once adjusted should not be changed.

LIST OF PARTS

These parts or their equivalent will give satisfactory results:

- 1—Camfield No. 251 .00025 Equaltune Variable Condenser
- 1—Camfield No. 351 .00035 Equaltune Variable Condenser

- 1—Camfield No. 352 .00035 Equaltune Variable Condensers (2 gang)
- 1—Camfield No. 22K Kit of 3 Camfield Duoformers
- 1—Camfield No. 620 Coupling Unit
- 1—Rusco No. 10KC Band Pass Filter
- 2—Rusco No. 95KC I. F. Transformers
- 1—Dubilier No. 601 .002 Fixed Condenser
- 1—Dubilier No. 601 .005 Fixed Condenser
- 2—Dubilier No. 601G .00025 Grid Condensers
- 2—Dubilier 2 Megohm Grid Leaks
- 1—Tobe 1/2 Mfd. Condenser
- 2—Silver-Marshall No. 220 Audio Transformers
- 1—Frost No. 806 6-Ohm Rheostat
- 2—Frost No. 824, 400-Ohm Potentiometers
- 3—Kurz-Kasch No. 592 Dials
- 9—Benjamin No. 9040 Sockets
- 3—Karas Brackets
- 1—Carter Midget Battery Switch
- 1—Carter No. 60 Jack Switch
- 5—Eby Binding Posts
- 1—Jones Type B. M. Multiplug (Sub-Panel)
- 2—Amperite No. 4-A
- 1—Micarta 7x30" Drilled and Engraved Panel
- 1—Micarta 10x29x3/16" Drilled Sub-Panel
- Miscellaneous lugs, wire, screws, etc.

The Camfield Super-Selective Nine Receiver is shown in photo "A" installed in a console with appropriate accessories. The console is manufactured by the Excello Products Co. of Chicago, Illinois. It is a well-made piece of furniture, being constructed entirely of solid walnut and is finished in a two-tone effect. The front is made up of butt walnut and produces a very pleasing appearance.

The "A" supply is obtained from a Willard "A" power unit, manufactured by the Willard Storage Battery Co. of Cleveland, Ohio. This device is a combination "A" storage battery and charger and plugs-in directly to the 110-volt A.C. supply. Two charging rates are provided, either one-half ampere per hour or two amperes per hour. In addition to this, wet "B" batteries may also be charged. Switches are provided on the front of the case by which the "A" unit may be either charged or connected to the receiver, the charging rate changed or "B" batteries charged. It is extremely well made and should last a lifetime.

"B" supply is obtained from a Kodol 10 B Transifier, manufactured by the Kodol Radio Corp. of Cincinnati, Ohio. This device is fully capable of supplying "B" battery potential to the receiver, without danger of overloading.

The speaker shown is the All-American Reproducer, manufactured by the All-American Radio Corp. of Chicago, Ill. It is able to give excellent tone quality and when used in conjunction with a good amplifier, will give entire satisfaction.

(Further information on any of the above described accessories may be obtained by writing direct to the manufacturers.)

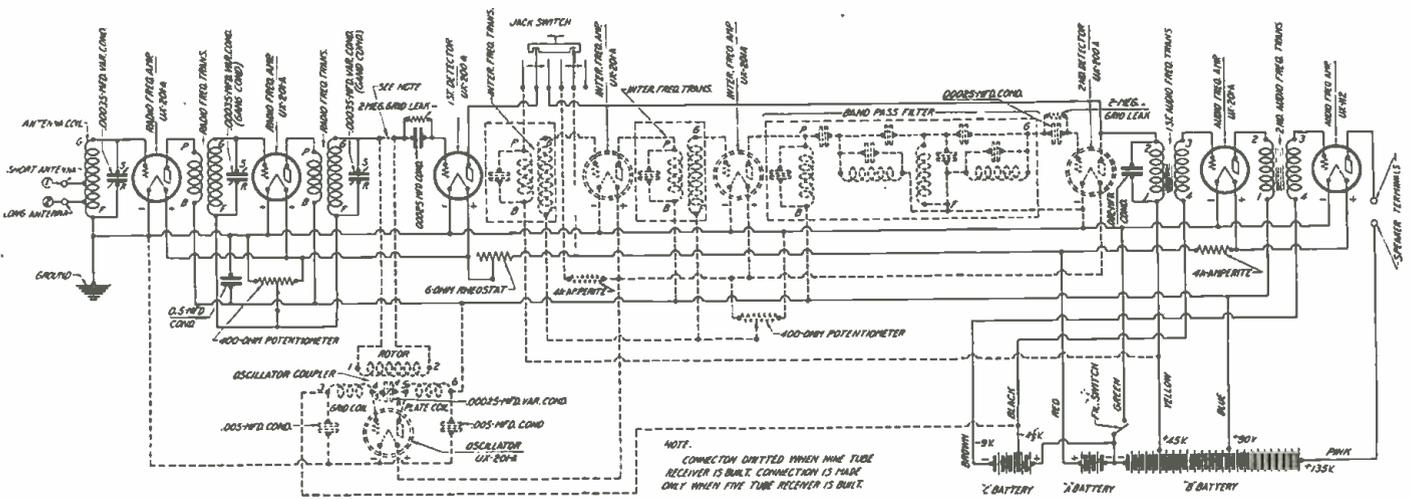


Fig. 4. Schematic diagram showing how receiver can be assembled for five or nine tubes

The Lodge "N" Receiver

This Receiver Is the American Adaption of One of Great Britain's Most Famous Circuits, Incorporating a New Type of Tube and Giving Results That Are Most Surprising

Construction and All Illustrations Were Made in the Laboratory of the Citizens Radio Call Book

AMONG the outstanding circuits, of real merit, is one which has gained considerable fame and popularity in Great Britain, and which has recently been brought to America. The circuit in itself is very much different from any that has been introduced to the home constructor up to the present time. The only changes that have been made in the adaption of this receiver to American use has been the substitution of American for English parts. The general outlay of the receiver is rather novel and simplicity has been developed to the utmost degree, as will be noted from the various photographs and drawings. The truly remarkable feature of the receiver is the surprising selectivity, volume and quality that may be obtained.

The adaption of the new Multivalve is quite unique and has several advantages over the conventional tube that is commonly used in this type of receiver. The Multivalve consists of three sets of elements (grid and plate) with a common filament, all of which are encased in a single glass shell. Since this type of tube is new to the home constructor, it may be well to go into some little detail as to just how to use it in the Lodge "N" Receiver. There are eight connections in all, from the Multivalve. Four are made in the usual way through the four prongs on the base of the tube. A standard UX type socket is used. The four remaining terminals are mounted on the bakelite ring moulded as part of the tube base.

In Figure 1 is a sketch of the Multivalve base mounted in a standard socket. The four outside terminals, are, of course, the four points of the socket. The four markings on the outside circle indicate the four connections mounted on the moulded ring of the tube base. Place the socket for the Multivalve in the position shown and the eight connections from the tube will be simple to make.

Notice further that the filament terminals on the socket are marked for plus and minus connections, and that plus and minus leads are indicated in

the schematic wiring diagram in Figure 3. In using this new type of tube, filament connections are important. Follow the schematic wiring diagram very closely. Since the tube has a common filament built in three sections, only one set of filament leads is necessary.

The Multivalve is essentially three tubes within one. It is, therefore, more adaptable to some types of receivers than the conventional 201-A or 199 type of tube. One common filament is used for the three sets of elements and consumes the same amount of current as one tube, which reduces the cost of operation quite materially. Since there are three tubes in the space of one, it is possible to make a very compact and yet very powerful receiver when the Multivalve is incorporated. Any number of combinations may be used, such as detector and two stages of audio frequency; three stages of audio frequency, one stage of radio frequency; detector and one stage of audio frequency, etc.

As will be seen from the schematic wiring diagram, the resistances controlling the filaments of the tubes are placed in the negative side of the filament line in both cases. This should be followed closely.

Notice carefully, in the schematic wiring diagram, the position of the two small variable condensers. These are highly important, and should they be misplaced, the receiver may not operate at all, or will not operate as it should.

A good sized, well constructed antenna is absolutely essential for the best operation of this receiver. An antenna system with an overall length of sixty feet has been found to give good reception. One gets greater volume, and better all-around reception with an antenna from eighty to one hundred feet long.

After the receiver is connected to batteries, antenna and ground, there is one adjustment which must be made before the set will operate correctly. This consists of getting the proper capacity balance between the two small variable condensers. This is a mat-



Photo A. The Lodge "N" Circuit Receiver is herewith shown as it appears when installed in a cabinet in conjunction with a table housing the necessary accessories for the proper operation of the receiver

ter of a very few minutes work, and once done need never be altered, provided the antenna is not altered or changed.

When the circuit is correctly balanced, there will be uniform sensitivity over the entire wave band and absolute freedom from oscillation in the circuit. Further, the circuit will not radiate. Stations will click or snap in sharply, each one occupying very little space on the dial.

In adjusting the two balancing condensers start by taking a long screwdriver and adjusting the small screw on the condenser connected to the antenna so that its capacity is at a maximum. This is done by turning it to the right as far as it will go. Do not attempt to force it beyond this point. The condenser connected to the ground should be adjusted to minimum capacity by turning the screw to the left.

Set the vernier dial, on the front panel, so that the condenser is nearly all the way in (maximum capacity). Now when the set is turned on, the tube should oscillate. This condition may

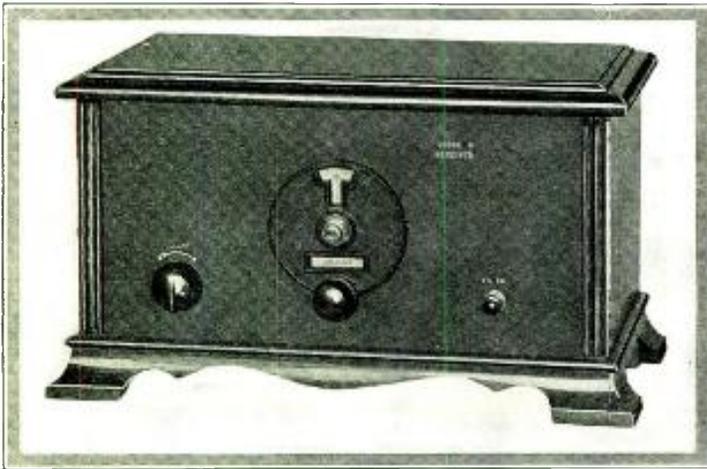


Photo "B". The Lodge "N" Receiver as it appears in a cabinet

be recognized either by tapping the stator plates of the variable condenser with a finger, when the characteristic click of the oscillating circuit will be heard, or by moving the condenser, that is, reducing the wavelength until a whistle is heard, which will occur, of course, as soon as the tuning control reaches the wavelength of any station within range. Turn down the adjusting screw on the balancing condenser, connected to the ground, until the circuit just stops oscillating. Then turn the tuning condenser over the entire scale of the dial and note whether the circuit comes into oscillation again on the low waves. If it does and it probably will, it means that the capacity of balancing condenser in the antenna is too great. Reduce this by turning the adjustment screw to the left slightly and repeat the operation. In other words, go back to the high wavelengths on the tuning condenser and readjust the ground condenser so that the circuit is just below the oscillation point, and try covering the wave band again. Repeat this procedure until the circuit is maintained just below the oscillation point over the entire wave band.

It will be noted in making these adjustments that increasing the antenna balancing condenser has a tendency to make the circuit oscillate more, while the ground balancing condenser has exactly the reverse action, that is, increasing its capacity stabilizes the circuit and stops it from oscillating. The whole secret of the adjustment is to strike the proper balance between these two. If the capacity in the antenna balancing condenser is too small, the circuit will have a tendency to oscillate on the high waves more than on the low waves, whereas if the antenna balancing condenser is adjusted for too great a capacity, that is, if the adjustment screw is turned down too far, the reverse will occur and the set will oscillate on the short wavelengths more than on the long waves. After these two condensers have been adjusted so that a balance is struck and the set is uniformly sensitive over the entire band, make a final adjustment with the ground condenser, screwing it down until the circuit is far enough below the point of oscillation so that no distortion occurs.

LIST OF PARTS

These parts or their equivalent will give satisfactory results:

- 1—Precision "N" Coil
- 1—Precision Antenna Coil
- 1—Precision Type "N" R. F. Choke Coil

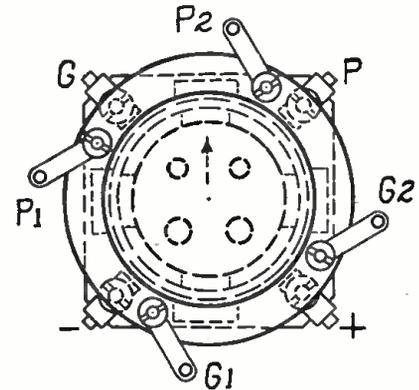


Figure One. Top view of multi-valve in socket showing location of various terminals. Note that "G," "P," "pos. fil." and "neg. fil." are on tube socket proper

- 1—Precision Type "N" Variable Condenser
- 1—Multivalve
- 2—XL Type G-10 Variodensers
- 12—XL Binding Posts
- 1—Electrad Type "L" 500,000-Ohm Royalty Resistance
- 1—Electrad Filament Switch
- 1—Electrad .00025 Grid Condenser
- 1—Amsco Double Mounting
- 1—Amsco .01 Fixed Condenser
- 1—Amsco 5-Megohm Grid Leak
- 1—Amsco .1-Megohm Resistor
- 1—Amsco .5-Megohm Resistor
- 2—Samson Audio Frequency Transformers
- 2—Bremer-Tully Cushion Sockets
- 1—Type 112 Amperite
- 1—Type 1A Amperite
- 1—Silver-Marshall Vernier Dial
- 1—7x14x3/16" Drilled and Engraved Formica Panel
- 1—7x13" Wood Baseboard
- 1—Terminal Strip
- 30—Ft. Belden Copper Tinned Wire
- 1—Ekko Ground Clamp
- 1—Pkge. Kester Solder
- 45—Kellogg Tinned Soldering Lugs

In Photo "A" is shown a front view of the completed receiver as it appears when mounted in a special Corbett Model "N" Cabinet placed on an Orchestration Console Model Speaker. The

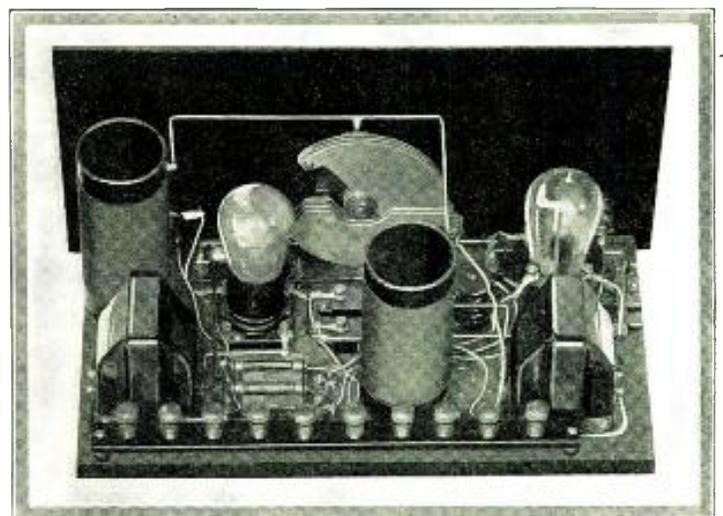


Photo "C." Rear view of the completed Lodge "N" Receiver

The "Phasatrol Five" Receiver

This Receiver Utilizes a New Method of Oscillation Control and Incorporates Many Features of Advanced Design

Construction and All Illustrations Made in the Laboratory of the
Citizens Radio Call Book

DESPITE the fact that the tuned radio frequency type of receiver is one of the most popular in use, there has been one unfavorable feature which has seriously prevented it from enjoying greater popularity. This obstruction appears in the form of oscillation in the radio frequency amplifying circuits. While the elimination of oscillation may seem to be a comparatively simple problem, it is a rather complicated process when the various causes are considered. It is true that oscillation may be eliminated quite readily by a number of very simple methods, such as the insertion of a series of damping resistances in the grid circuits of the radio frequency amplifiers, or the reduction of the plate load (primary turns) until such a point is reached where the coupling is loose enough so that the feed-back is insufficient to cause the amplifier to break into violent sustained oscillation. Although these and various other methods will eliminate oscillation, there is a very noticeable loss involved where the majority of such methods are employed. This form of oscillation control, commonly known as loss stabilization, obviates the need of highly efficient apparatus in a receiver using such a system. One of the principal causes of oscillation in a radio frequency amplifier is inter-stage magnetic coupling caused by the interlinking of magnetic fields of the various stages of radio frequency amplification. This cause of oscillation may be reduced or eliminated by several methods which are being used at the present time. By the use of metallic shielding around all or part of the receiver, inter-stage coupling may be reduced to a very minute quantity. This method is very satisfactory and accomplishes the desired results, but has the disadvantage of being more or less complicated and difficult to construct due to the fact that special tools and materials are required. It is, therefore, not especially popular with the home constructor. Another method is the use of solenoid transformers inclined at a specified angle, in respect to the horizontal, to obtain zero coupling. This method is successful for one frequency but is more or less unstable, since the angle of zero coupling changes with the frequency tuned. A third method which is very popular

and extremely simple, is the use of radio frequency transformers having a very confined field, which prevents any interlinking of fields which would stimulate oscillation.

This later type of radio frequency transformer may be made in many different shapes or forms, either supported or self-supporting. The radio frequency transformers that are incorporated in the "Phasatrol Five" are self-supporting, have a confined field, and are one of the most efficient transformers of this type.

The selectivity of this receiver is obtained by means of two tuned stages of capacity and inductive coupled radio frequency amplification. The ratio of inductance to capacity is fairly high, which in connection with the efficient radio frequency transformers permits a high selectivity factor. In view of the fact that oscillation in the radio frequency amplifiers has a great effect upon the signal passed from the detector tube to the audio frequency amplifiers, the two stages of tuned radio frequency are balanced against oscillation. When a balanced condition exists, the side bands are very much improved and the overall distortion of the receiver is reduced to a minimum and the quality is very much improved. The device that is used for balancing is a newly developed unit which is called the Phasatrol. This unit consists of a non-inductive resistance and a capacity, and is placed in the circuit as illustrated in the schematic wiring diagram in Figure 4. The function of the Phasatrol is to shift the phase of the alternating voltage in the plate circuits of the radio frequency amplifiers. In this manner regeneration with attendant oscillation over certain wave bands is eliminated and a condition of balance is obtained.

The three .00035 mfd. Cardwell variable condensers, used to tune the two stages of radio frequency and detector, are a new design in the straight frequency line type. The straight frequency line characteristic is obtained by means of wedge shaped plates die-cast in one piece. The use of this style of plate permits a much smaller operating space than the usual straight frequency line type of condenser. Since the plates are semi-circular and not of an eccentric shape, greater selectivity with the use of this type of condenser may



Photo A. View showing receiver installed in console with accessories



Photo B. Phasatrol receiver installed in cabinet

be had, inasmuch as the transmitted frequencies are separated evenly over the entire scale of the dial.

The audio frequency amplifier of the receiver consists of two stages of transformer coupled amplification, using the R-200 Thordarson transformers. These transformers are particularly adapted to both the cone and horn type of loud speaker and give a frequency response that will cover the entire musical scale.

Frost type No. 530 UX sockets are used throughout the receiver and are of the solid Bakelite type, which makes a very rigid job. Engraved Eby binding posts are provided for the connection to the antenna, loudspeaker and the "C" battery. A Yaxley cable connector is used to make all "A" and "B" battery connections to the receiver. The use of this method provides a quick and simple method of connecting and disconnecting the batteries from the receiver. A UX-112 power tube is used in the last stage of audio frequency amplification, the filament of which is controlled by a type 112 Amperite. The 201-A tube in the first stage of audio frequency is controlled by a Type 1-A Amperite. The detector and the two stages of radio frequency are controlled by rheostats mounted on the front panel. An Electrad 1 mfd. by-pass condenser is placed across the "A" and "B" batteries for the purpose of preventing radio frequencies from feeding through the batteries into the audio amplifier where they would cause squeals and distortion. An Electrad .002 mfd. fixed condenser is placed across the primary of the first audio frequency transformer to by-pass any radio frequency currents that may have

passed through the detector tube.

No difficulties should be experienced in assembling and wiring the Phasatrol Five receiver if it is done in a systematic manner. The various illustrations appearing herewith, both in photographic and line-drawing form, will prove of considerable assistance to the experimenter in constructing the receiver. It is best to first assemble the parts on a sub-panel and make all the necessary connections before mounting the front panel in place.

Begin the assembly by mounting the cable connector plug, the Amperite mountings, the 1 mfd. by-pass condenser and the two Phasatrol units on the bottom side of the sub-panel. Next mount the sub-panel on the two Benjamin sub-panel brackets and fasten the audio transformers into place. The seven engraved Eby binding posts are next secured into place along the rear edge of the sub-panel. It is advisable at this time to wire the receiver as far as possible without the radio frequency transformers in place. After all possible wiring has been completed, the radio frequency transformers may be fastened into place. Care should be exercised in mounting them, and during the remaining construction of the receiver, that the windings are not injured in any way. The coils are of an entirely self-supporting character, which necessitates a more or less fragile construction.

The front panel is next assembled, the three variable condensers, the two rheostats and the filament switch being mounted in their respective holes. The panel is then placed against the sub-panel brackets and securely fastened into place by the four

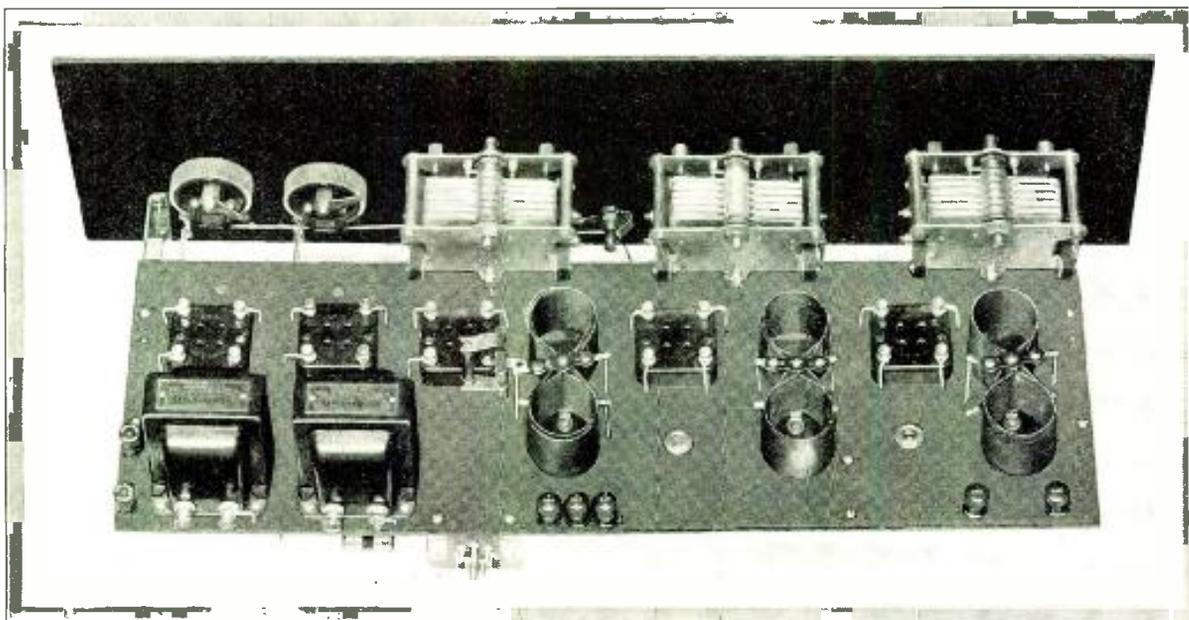


Photo C. Rear view of receiver out of cabinet. Note absence of unsightly wiring

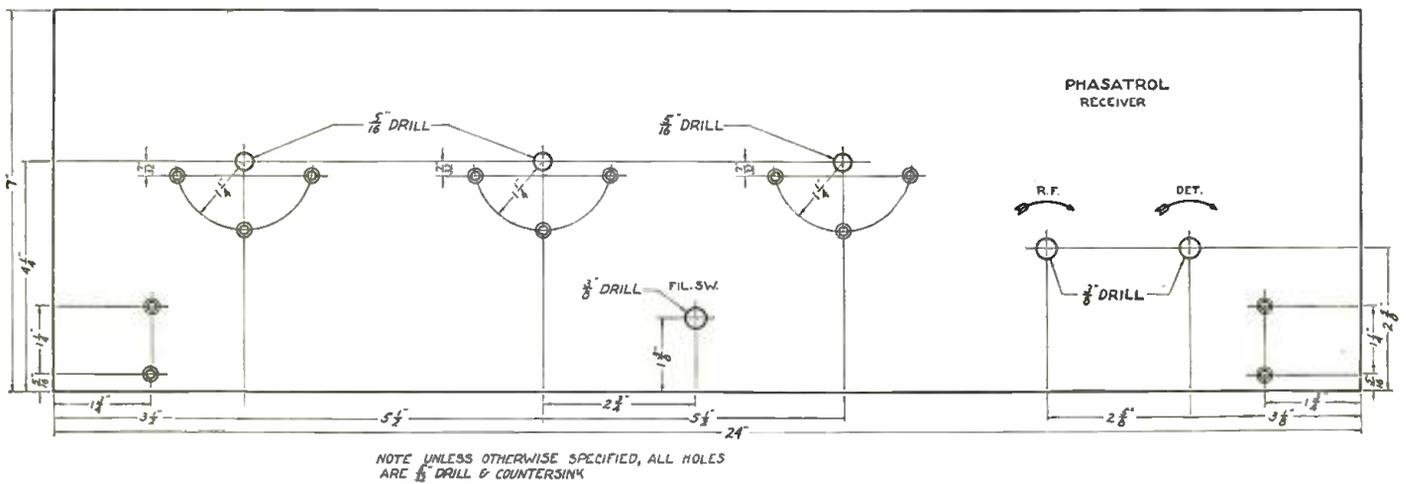


Fig. 1. Panel layout

flat head machine screws. At this point of the construction, the receiver should be carefully checked against the large graphic illustration appearing in Figure 3. Make those corrections where necessary and then connect the "A" battery alone to the receiver and test each socket with a single tube and note whether the filament of the tube is burning and is controlled by the proper rheostat or resistor. If the filaments of the tubes appear to be connected properly, try connecting the "A" battery to all other terminals of the cable connector exclusive of the proper ones and note whether any of the tubes light. If none of them do, it is safe to connect the "B" batteries to the receiver, since the foregoing test is a positive indication that no "B" battery connection is made to any of the filament terminals of the tubes.

After the receiver has been completed and connected to the batteries and antenna, it is ready for testing and adjustment. Before tuning in a station turn the adjusting screw on each Phasatrol gently, in a clockwise direction, as far as it will go. Then tune in a station, preferably a local station on a low wavelength, and adjust the Phasatrols by slowly turning the set screws in a counter-clockwise direction until maximum signal strength without oscillation is obtained. After the initial adjustment the Phasatrols will need no further attention.

LIST OF PARTS

These parts or any reasonable substitute will give satisfactory results:

- 1—24x 7x3/16-inch Drilled and Engraved Formica Panel

- 1—7x21x3/16-inch Drilled Formica Sub-Panel
- 3—Cardwell Type 192E .00035 mfd. Variable Condensers
- 1—Electrad .002 mfd. Fixed Condenser
- 1—Electrad 1 mfd. By-pass Condenser
- 1—Electrad .00025 mfd. Grid Condenser
- 1—Electrad 10-ohm Rheostat
- 1—Electrad 25-ohm Rheostat
- 2—Electrad Phasatrol Units
- 1—Electrad Filament Switch
- 1—Electrad 2-megohm Grid Leak
- 2—Thordarson R-200 Audio Transformers
- 1—No. 1-A Amperite and Mounting
- 1—No. 112 Amperite and Mounting
- 5—Frost Sockets
- 5—Eby Engraved Binding Posts
- 2—Benjamin Sub-panel Brackets
- 3—National Dials
- 3—Bodine Radio Frequency Transformers
- 1—Yaxley No. 660 Cable Connector
- 50 Kellogg Tinned Soldering Lugs
- 35 Feet Belden Tinned 12-gauge Copper Wire
- 1 Roll Kester Solder

The completed receiver appears in Photo A installed in a console with appropriate accessories. The console illustrated is a product of the Charlotte Furniture Company of Charlotte, Mich.

(Continued on Page 233)

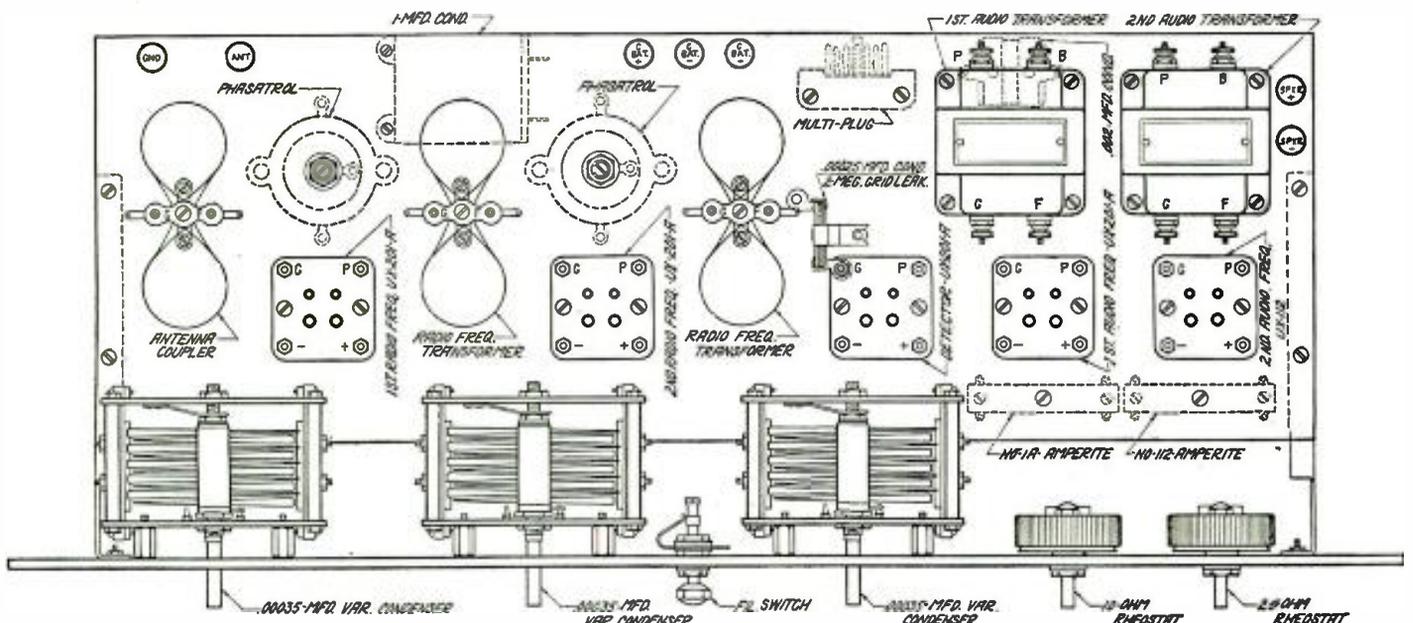


Fig. 2. Baseboard layout, showing location of all parts

Distance and Quality Combined in Citizens Super Eight

Operator Afforded Flexibility Through Regenerative Loop and Method of Peaking Intermediates. Set Will Log Easily

This Receiver Was Designed, Built and All Illustrations Made in the Laboratory of the Citizens Radio Call Book

CONGESTED broadcast conditions of today have practically forced set builders into the construction of a superheterodyne if distant reception is to be assured without a degree of interference which on other types of receivers would be quite disagreeable. Bigger and better audio transformers, and the use of the newer types of power tubes such as the 171, permit a far greater proportion of quality reception than has been possible hitherto.

More than ever, in the construction of a super, selection of the component parts requires a clear conception of the work to which the receiver is to be put. Likewise the assembly and the wiring of the set should call forth the builder's greatest care. A well designed and wisely built super is seldom torn apart, since its capabilities will be in keeping with broadcasting allocations for many years to come.

In the Citizens Super Eight, designed and built in the laboratory of this magazine, flexibility of operation has been made one of the predominating features and one which appeals to all users of superheterodynes. The oscillator coil, for example, is of the plug-in type, so that by merely changing coils any desired range of frequencies may be covered. A second departure from most supers lies in the use of a variable condenser, .0001 to .0005 mfd., in parallel to the secondary of the first filter coil, allowing the operator to peak that particular filter to any value, within limits, which he desires for sharpness or broadness of the received signal. This arrangement will be particularly welcomed by listeners within the metropolitan sections of this country where twenty or more locals hold forth each night.

Before going into the details of the receiver we will refer the reader to the following photographs and diagrams with which he should acquaint himself before the actual construction of the set is begun. Photograph A shows the Citizens Super Eight housed

in its console. Photograph B shows the front view of the receiver in its cabinet. Photograph C is a rear view of the completed job. Figure 1 is the suggested panel layout and Figure 2 is the baseboard arrangement. The graphic illustration is shown in Figure 3, while the schematic circuit is given in Figure 4. Experienced set

builders will require only the last diagram, the schematic, while those less adept at reading symbols will find complete details contained in the previous diagrams and pictures.

Reading of the schematic circuit will disclose all the features embodied in this latest type of super. Regeneration is provided in the center tapped loop through a .000045 mfd. midget condenser. Rectification in the first detector is by means of a bias applied to its grid, this value being $4\frac{1}{2}$ volts. Tuning of the loop circuit involves the use of a double rotor condenser which precludes the slightest possibility of body capacity. The same holds true for the tuning of the oscillator, where another double rotor condenser is used. Both of these are .0005 mfd. The oscillator itself is composed of three windings. The rotor, terminals 1 and 2, is the pickup coil supplying energy from the oscillator circuit to the grid circuit of the first detector for mixing with the incoming signal. The grid coil is fixed, shown as terminals 3 and 4, as is the plate coil numbered 5 and 6. The coil tuning capacity is directly across from grid to plate of the oscillator tube. Grid bias to the extent of a volt and a half is applied to the grid return of the grid coil which serves to keep the plate current of the oscillator down to a low value. The same volt and a half negative bias suffices for the grid returns of the first iron core intermediate, first air core filter and the second iron core intermediate. Bias for the last filter,



Photo A. This illustration shows how the Citizens Super Eight can be installed in a console

on account of the condenser and grid leak method of rectification, is to the positive of the A battery. The peaking condenser shown across the secondary of the first filter is placed on the baseboard,

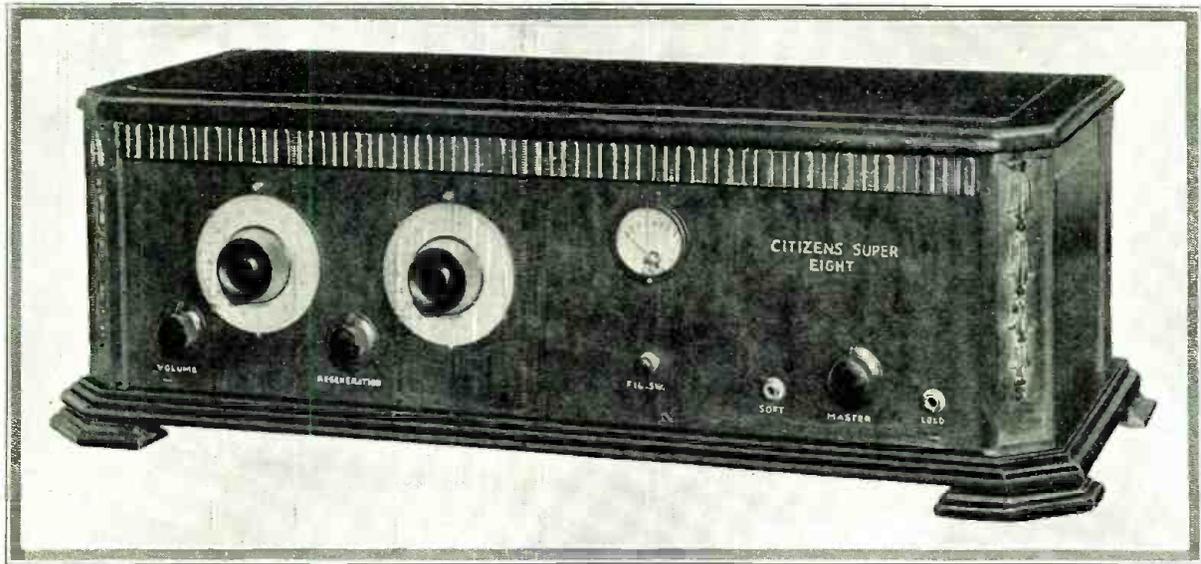


Photo B. Front view of receiver mounted in a Fritts cabinet

since once its proper value has been determined it is not likely the operator will change it. This condenser is adjusted with a wooden rod sharpened to a screwdriver edge, and its adjustment should be made while the set is in operation. The regenerative midget for the loop circuit, however, is placed on the front panel where it is accessible to the listener for helping to bring in distant stations.

Filament control has been simplified considerably by the combination of fixed resistances and rheostats. Looking at the schematic, Figure 4, it will be seen the first, second, fifth and sixth tubes are controlled by the 10-ohm rheostat. The third and fourth tubes are governed by the 30-ohm rheostat. The UX112 and the UX171 are each supplied with a half ampere resistor, while a master 25-ohm variable resistance is placed in series with the 10 and 30-ohm rheostats to limit their range.

The audio transformers are of the newest design, embodying a great deal more iron and copper than previous models and giving quality amplification over a much flatter curve than generally encountered. On account of the power tube used in the last stage an output transformer is required to keep the d.c. component of the plate circuit from the magnet windings of the loud

speaker. Jacks are suggested for the first and last stages, the former for use when the family has retired and headphones may be desired, and the latter for greatest volume with the loud speaker.

Plate potential of 45 volts is applied to the oscillator, all intermediates and the detector stage. The first audio and the second audio are given the full 135 volts. A separate C battery for biasing the grid of the 112 and that of the 171 is provided, the former taking from $4\frac{1}{2}$ to 9 volts, whereas the bias for the 171 grid should be about 22 to 27 volts.

Several by-pass capacities have been used. Terminal 6 of the oscillator coil is by-passed to negative A with a .006 mfd. Grid returns of the 45 kilocycle intermediates have a .0025 mfd. by-pass. By-pass condensers are used for the high potential lines, one-half mfd. across the positive 45 and negative, and one mfd. across the positive 135 volts and the negative.

Multi-plug connections for the filament and plate batteries are adopted for facility of operation. The loop terminals and those of the two separate C batteries are binding posts located as shown in the graphic illustration.

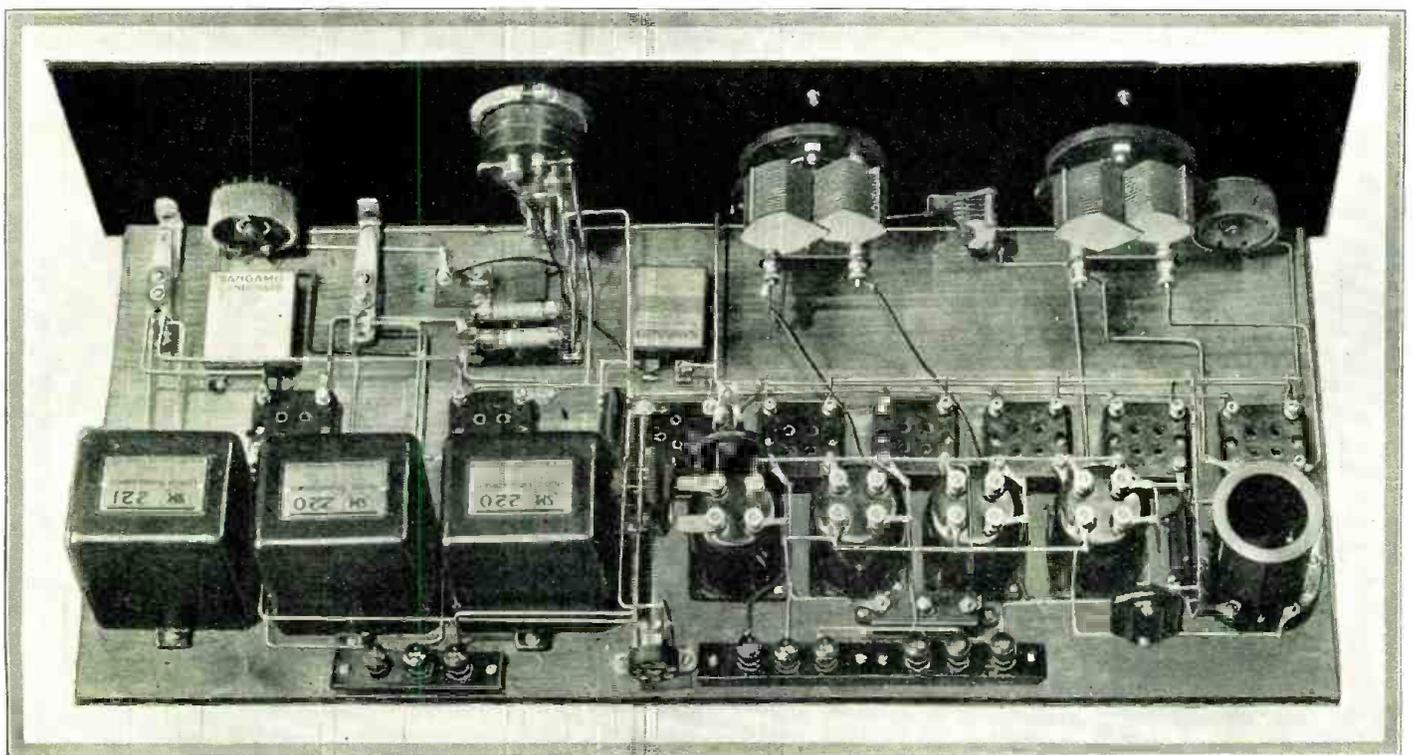


Photo C. Rear view of completely wired receiver, showing arrangement of parts and wiring

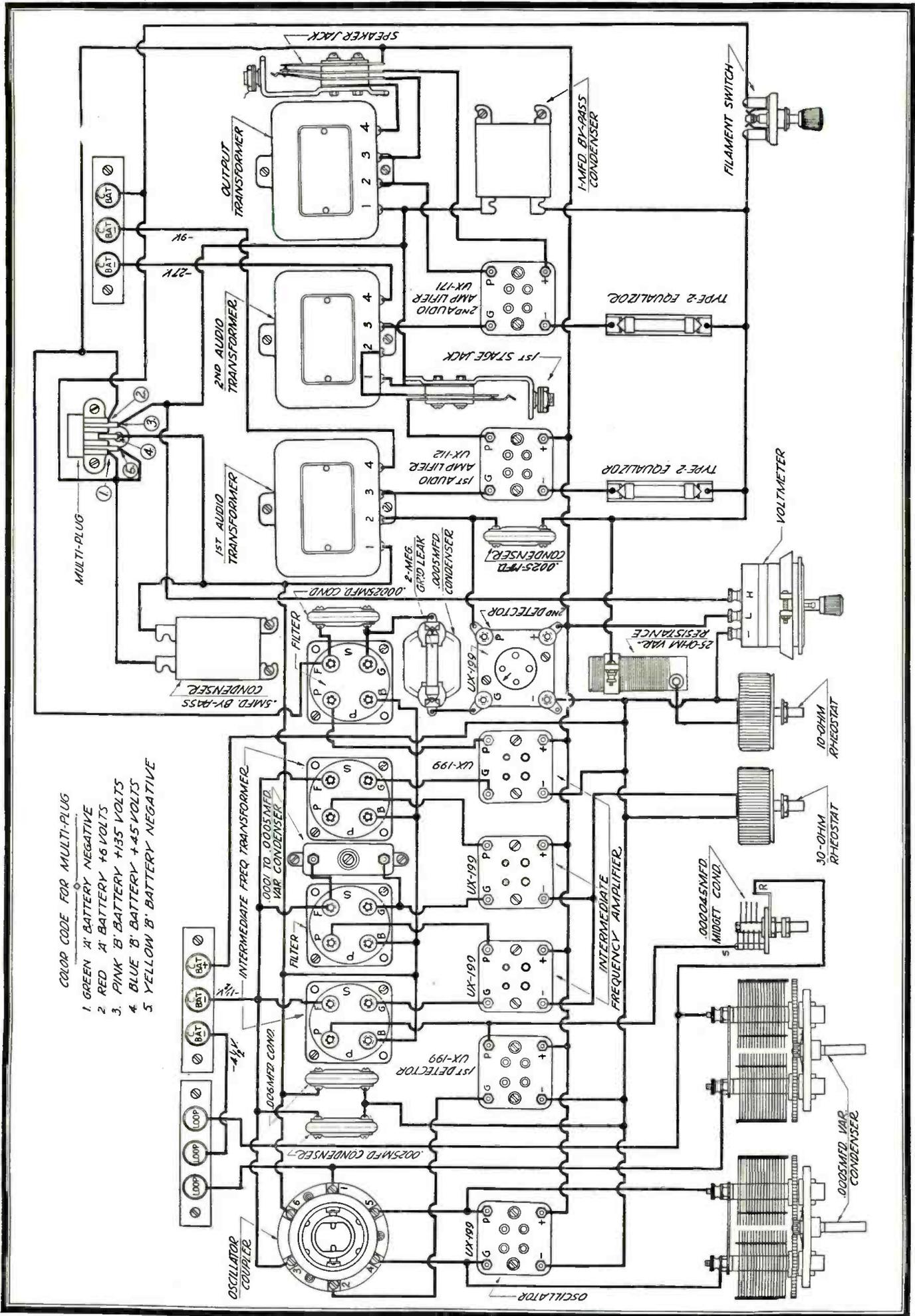


Figure Three. Graphic wiring diagram of receiver

An Impedance Coupled Super-Heterodyne Receiver

Here Is a New Departure in Super-Heterodyne Design Utilizing Impedance Coupling Throughout. A New Method of Obtaining Super-Selectivity Is Employed by Which the Peak Frequency of the Intermediate Frequency Filter May Be Altered so That Maximum Efficiency Is Realized Regardless of Local Conditions

All Illustrations of This Receiver Were Prepared in the Laboratory of the Citizens Radio Call Book

ALTHOUGH the Super-Heterodyne has long been considered the most sensitive and selective of the receivers in common use for broadcast reception today, it has several drawbacks which seriously detract from its value.

Chief among these are the distortion introduced by the principle of transformer coupling of intermediate frequencies and the instability of those circuits.

The distortion is largely due to the use of a number of stages of intermediate frequency amplification, which are necessary to obtain a fair signal which may be amplified to reasonable volume by the radio amplifier. Due to the fact that the gain per stage in a transformer coupled intermediate frequency amplifier is necessarily low, it is apparent that a number of stages are required to get such a signal. In addition to the small gain per stage, distortion of the signal is usually present, which, of course, is amplified by succeeding stages and becomes quite objectionable. This distortion is clearly demonstrated by the high noise level present in the average Super-Heterodyne receiver of today.

The inherent characteristics of impedance coupling, when used for intermediate frequency amplification, are such that distortion is practically negligible and a much higher gain per stage permissible. This naturally allows a much stronger signal, with a minimum of distortion, to be delivered to the audio amplifier.

Instability of the intermediate frequency circuits in a transformer coupled Super-Heterodyne is a very common characteristic. Various methods are employed to prevent oscillation in these circuits, but the method used is usually one where a loss is introduced or the efficiency

of the system seriously interfered with. Invariably the form of oscillation control is such that the all-around results obtained from a receiver using a means of oscillation control are far from satisfactory.

The Impedance Coupled Super-Heterodyne, in its original trials, was found to retain all the sensitiveness which marks a good Super-Heterodyne. In fact, the output of the set may be increased to the point where the "noise level" is easily reached. Obviously this is the limit to which any set can have its sensitivity usefully increased. In the intermediate filter, which will be described to more extent, we find an excellent control of the selectivity of the set. When a loop is used, local stations disappear within a fraction of a degree each side of the resonant point. Even on a long antenna it has been found possible to work distance within a very few meters of the local stations. For those who live in the large metropolitan districts, this advantage needs no stressing.

However, the chief advantage of this new Super-Heterodyne lies in the simplicity and ease with which the set may be constructed and operated, due to the impedance coupled intermediate frequency amplifier. Since increased stability is obtained with this type of amplifier, there is no need of a potentiometer. The tubes are operated with a negative bias, which allows the use of a much higher plate voltage resulting in a gain in amplification. It will be noted that the elimination of the potentiometer brings the necessary controls down to three—two tuning controls and a volume control.

Similar to the well known impedance coupled audio amplifiers, the impedance coupled in-



Photo A. Phantom view of receiver placed in console with accessories

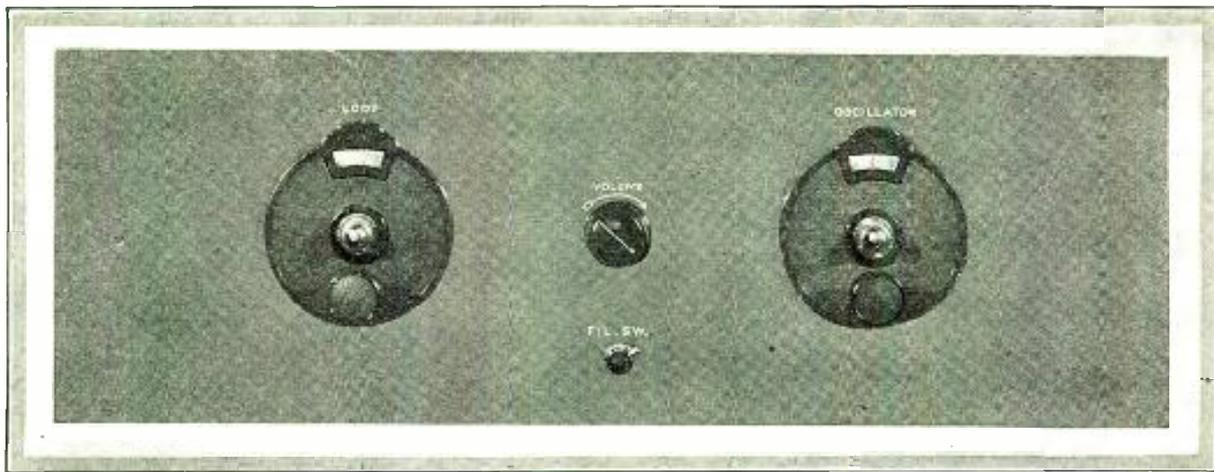


Photo B. View of front panel

intermediate frequency amplifier gives an equal gain to all frequencies. Therefore, in order to obtain the necessary selectivity, use is made of a tuned transformer having essentially the same effect as a "band pass filter." This device allows for the passage of a certain band of frequencies and stops all the rest. In the Super-Heterodyne it is necessary to pass at least ten kilocycles in order to give the necessary high notes for good reproduction. More than this will only decrease the selectivity. The filter consists of two coils tuned to the proper frequency by means of fixed condensers. A band of from forty to fifty kilocycles has worked very well, although it is not necessary to hold to these particular lines. The frequency at which the amplifier works is controlled by the size of the fixed condensers across the filter.

Any good audio amplifier may be used with this set, but it is advisable to use only the best. For this reason the second detector feeds directly into an impedance coupled stage employing a grid impedance rather than a grid leak. This latter has the advantage of offering a comparatively low resistance path to the direct current and a high impedance to the voice frequencies. The impedance stage is followed by a stage of three to one transformer coupled feeding into a UX-171 power tube for the output. Of course, if the builder of this set wants even more volume, an additional stage of audio can be added, but it is doubtful if such would ever be the case.

Let us go back now, follow the circuit through step by step, and see just what apparatus is employed and why. Starting at the beginning, it will be noticed that a loop is used. The volume and sensitivity obtained with this "Super" is sufficient without

the use of an outside antenna. On the other hand, if a short antenna is desired, it may be connected to the first detector by means of a double coil coupler. This latter practice is not advised due to the increase in the static and noise level.

An important feature is the regeneration used in the loop circuit. The nidget condenser connects the plate of the first detector with one side of the loop, giving a means of controlling the amount of regeneration used.

From the loop, the radio frequencies are fed into the first detector. Although 201-A tubes may be used as detectors, it is strongly advisable to use the 200-A type since a noticeable improvement in the sensitivity and quality will be found. This is due to a large extent to the fact that the 200-A is a plate rectifier and does not give the distortion obtained through the use of the grid current for rectification. Of course, the grid leak must be returned to the negative side of the filament. The plate circuit of the detector contains an 85 millihenry choke, which serves as a barrier and prevents the radio frequencies from entering the intermediate amplifier.

Associated with the first detector is the oscillator which is to supply a frequency to beat with the incoming signal and produce the intermediate frequency. In this particular circuit the tuned plate type of oscillator has been employed. This has the advantage of the more commonly used Hartley circuit, in that the tuning condenser is not "high" to ground. A shunt feed is used with a radio frequency choke on the battery lead to prevent unnecessary coupling through the battery. A .1 mfd. condenser is used to couple the plate to the oscillating circuit. By tying in the plate as shown in the diagram rather than at the end

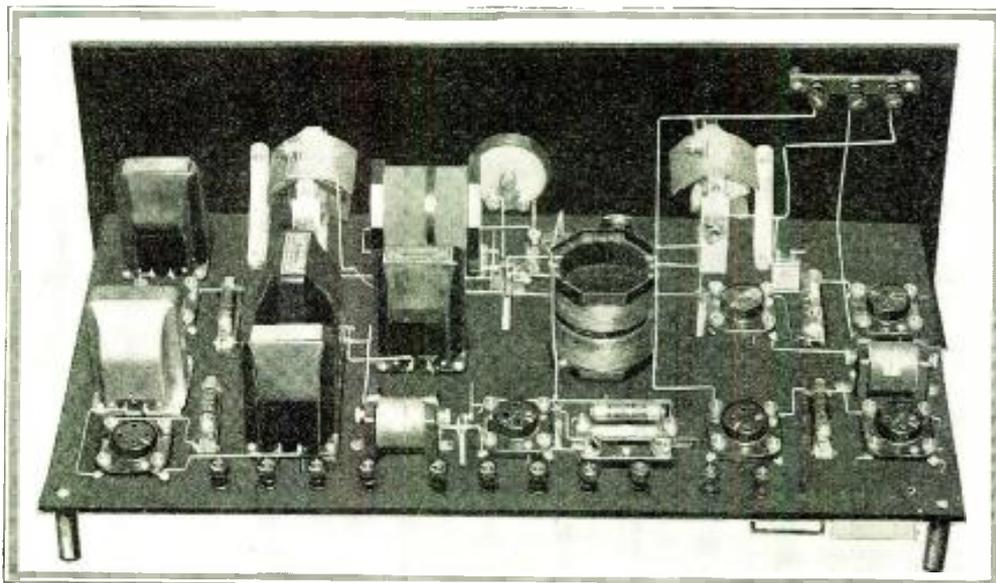


Photo C. Rear view of completed receiver

of the coil, a greater tuning range can be obtained with any given condenser. Plug-in coils have been used in the oscillator, making it possible to cover any desired range in frequencies. One coil easily covers the entire broadcast band.

The usual method of coupling the oscillator to the first detector is by means of a pick-up coil placed in the grid circuit of the detector and in an inductive relation to the oscillating circuit. In this set, however, direct connection has been made through the grid leak of the detector. It will be noticed that the leak goes directly from the grid of the detector to the oscillating circuit. A 2 megohm leak has been found to give about the correct coupling.

Turning now to the most interesting part of the receiver, the intermediate frequency amplifier, the extreme simplicity is at once noticeable. With three stages employing 201-A tubes, ample sensitivity will be obtained. The output of the first detector feeds into a 500 millihenry coupling choke. The low distributed capacity of the chokes is what makes the amplifier a success. Between the coupling choke and the "B" battery, another choke is placed to prevent the intermediate frequencies from reaching the battery and producing a howl. Of course, this necessitates a by-pass condenser back to the filament, which in this case is a .1 mfd. It should always be remembered that

a curve which will pass the correct frequencies with equal facility, it is necessary to have the inductances of the two coils held to very close standards. The choice of the frequency at which the intermediate amplifier is to work depends on the size of the two fixed condensers which tune the filter. .001 mfd. condensers will pass a band from 40 to 50 kilocycles when used with the Samson filter. The coils are designed to go with this size of condenser and although good results may be obtained with other sizes, it is recommended that the original design be followed. The two fixed condensers shunted across the coils of the filter should be held to one-half of one per cent of each other in value. A slight variation from this will cause a comparatively large variation in the peak of the curve. Thus it is evident that the filter is a precise, though its circuit may appear very simple.

A 500 millihenry choke is placed in the "B" battery lead of the filter to insure its smooth operation. As mentioned above, this takes the .1 mfd. by-pass condenser to the filament necessary. Since the operation of the filter depends on its magnetic properties, it is important to keep all metal objects or parts from the immediate vicinity, more especially from the ends of the coils. If it is necessary to have some metal close to the coils, it should be placed symmetrically to both coils so that the

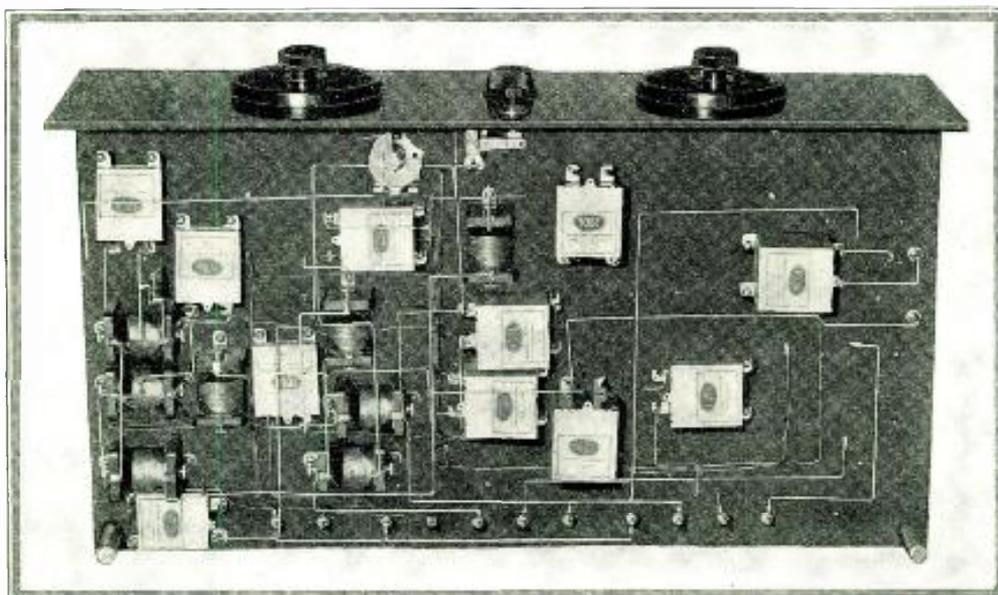


Photo D. Bottom view of completed receiver

wherever a choke is used to prevent a certain frequency from passing, it is also necessary to have a by-pass to offer a low impedance path.

The coupling condensers have been made large, .1 mfd., in order to assure the full value of the amplifier being realized. Condensers as small as .002 mfd. have been used successfully, however. 500 millihenry chokes are also used as grid leaks, or more properly, grid impedances. The leads from the grid impedances are connected together and by-passed with a 2 mfd. condenser. The condenser is very important in the amplifier, if it is to remain stable. As has been mentioned before, the tubes are operated with a negative bias, $4\frac{1}{2}$ volts giving good results with 201A's. In the same way as the grid chokes, the plate chokes are connected together and by-passed with a 2 mfd. condenser.

To prevent overloading the second detector, it has been decided to control the volume in the intermediate amplifier. The grid impedance in the second stage has been substituted by a 200,000 ohm variable resistance of the Centralab type. Thus the second detector and audio amplifier are always working at good signal strength, but do not overload on the local stations.

The tuned transformer furnishes that very necessary feature—selectivity. Although it fundamentally consists of two mutually coupled tuned circuits, its design is more or less complicated and its construction still more difficult. In order to obtain

same effect will be felt by each coil. In this way the curve may be changed in height, but will keep its original form.

The second detector, like the first, uses a UX 200-A tube employing plate detection. In the plate circuit a .002 mfd. condenser is placed to by-pass the intermediate frequencies and a radio frequency choke is used to prevent them from entering the audio amplifier. The .001 mfd. condenser used in the ordinary receiver is not large enough to easily pass the low frequencies found in the intermediate amplifier.

In the audio amplifier there are two points of interest which have not been already mentioned. First, an output impedance has been placed in the "B" battery lead of the detector to prevent any audio frequencies from reaching the battery. At least 4 mfd. of condenser should be used to insure all the low notes getting through to the succeeding audio stages. Much of the good gained through expensive apparatus in other parts of the set can be lost by using too small a by-pass condenser. Secondly, since a UX 171 tube is to be used in the output circuit, it will be necessary to prevent the direct current from entering the speaker and perhaps damaging it. For this purpose another output impedance carries the direct current from the battery while the audio frequencies pass through a 4 mfd. condenser to the speaker.

The filaments of the tubes are controlled by ballasts, the two detectors being placed on one, the oscillator and intermediate

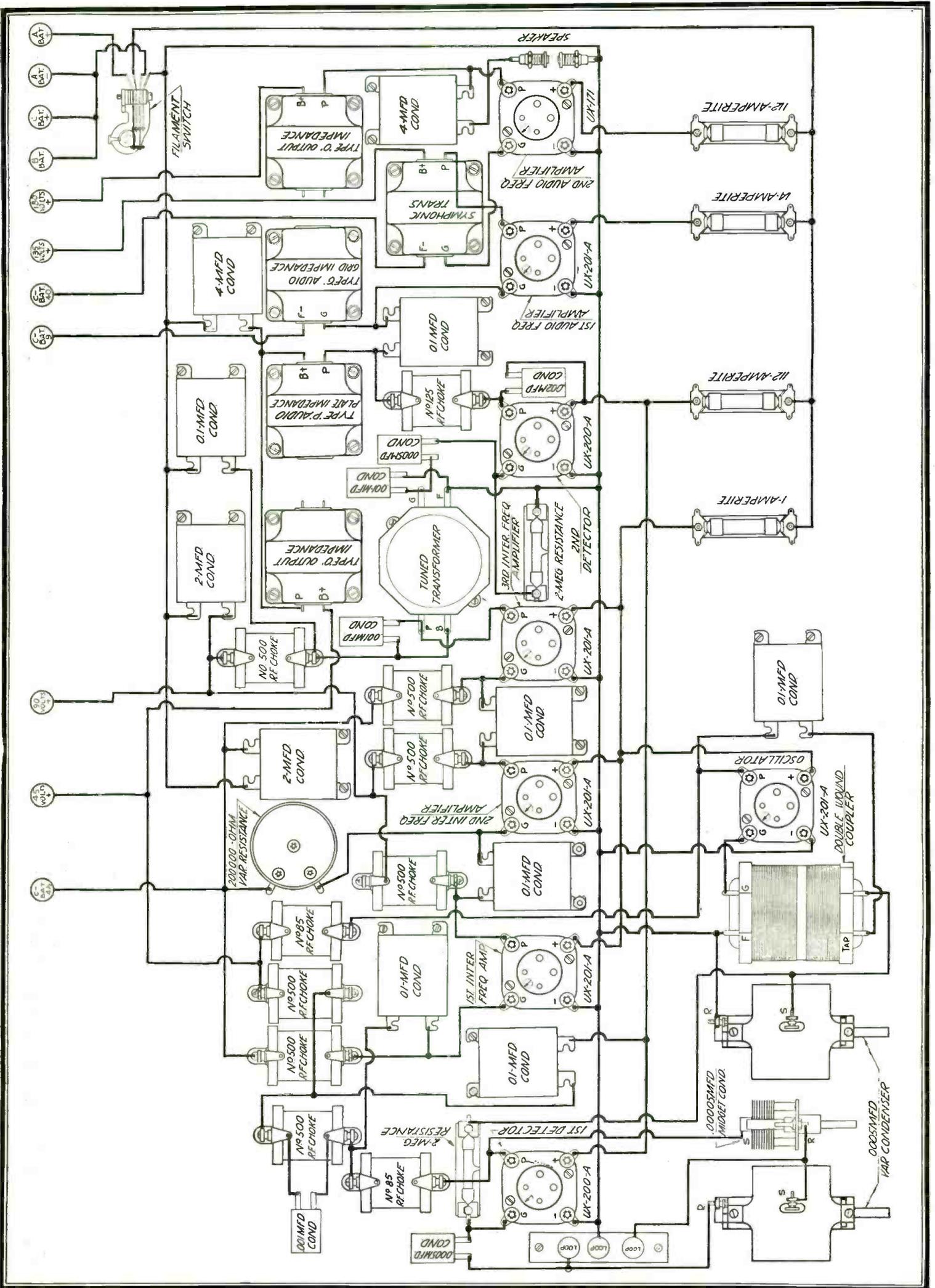


Figure One. Graphic illustration of wiring diagram

amplifiers on one, and each of the audio tubes on a separate one. It is strongly recommended that a double pole "A" battery switch be used to disconnect the "A" battery from the set when not in use. Since by-pass condensers are directly across the "B" battery, a break down would mean the running down of the battery. With the switch placed as shown in the diagram, the latter would be impossible to occur.

LIST OF PARTS

These Parts or Their Equivalent Will Give Satisfactory Results

- 2—Samson Type 67 .0005 mfd. Variable Condensers
- 1—Samson Type 31 Double Rotor Coupler
- 2—Samson Type O Output Impedances
- 1—Samson Type P Plate Impedance
- 1—Samson Type G Impedance
- 7—Samson Type 500 Radio Frequency Chokes
- 1—Samson Type 125 Radio Frequency Choke
- 2—Samson Type 85 Radio Frequency Chokes
- 1—Samson Tuned Transformer
- 1—Samson Symphonic Audio Transformer
- 2—Samson Universal Vernier Dials
- 2—Tobe-Deutschmann Type 204 4 mfd. Precision Condensers
- 2—Tobe-Deutschmann Type 202 2 mfd. Precision Condensers
- 7—Tobe-Deutschmann Type 210 0.1 mfd. Precision Condensers
- 2—Tobe-Deutschmann 2 megohm Vacuum Tipon Grid Leaks
- 2—Tobe-Deutschmann .001 mfd. Tiny Tobe Fixed Condensers (Paired for Tuned Transformer)
- 1—Tobe-Deutschmann .001 mfd. Tiny Tobe Fixed Condenser
- 2—Tobe-Deutschmann .0005 mfd. Tiny Tobe Fixed Condensers
- 1—Tobe-Deutschmann .002 mfd. Tiny Tobe Condenser
- 8—Benjamin Type 9040 Cushion Sockets
- 1—Centralab 200,000 ohm Variable Resistance
- 1—Hammarlund 50 mmfd. Midget Variable Condenser
- 1—Fiat Loop
- 1—Yaxley Type 740 Double Circuit Switch
- 2—Yaxley Pup Jacks
- 14—Eby Engraved Binding Posts
- 1—Type 1-A Amperite

- 2—Type 112 Amperites
- 1—Type 1 Amperite
- 1—8x24x $\frac{3}{8}$ " Drilled and Engraved Formica Panel
- 1—12x23x $\frac{3}{8}$ " Drilled Formica Sub-Panel
- 2—Sub-panel supporting Brackets
- 2—Mounting Posts for Sub-panel
- 80—Feet Belden Tinned 12 Gauge Copper Wire
- 100—Kellogg Tinned Soldering Lugs
- 1—Can Kester Radio Solder
- Miscellaneous screws, nuts, etc.

The large photographic illustration appearing herewith shows the Impedance Coupled Super-Heterodyne installed in a console with the necessary accessories for proper operation. The console illustrated is the type 20 manufactured by the Charlotte Furniture Co. of Charlotte, Michigan. It is manufactured entirely from walnut lumber and is carefully hand finished and lacquered. An exceptionally large space is provided at the bottom of the console for the storage of accessories.

"A" supply is obtained from a Willard 100 Ampere hour storage battery, manufactured by the Willard Storage Battery Co. of Cleveland, Ohio. "B" supply is obtained from a Majestic Master "B" eliminator, manufactured by the Grigsby-Grunow-Hinds Co. of Chicago, Illinois. This unit uses the Raytheon tube for rectification purposes and is so designed, that it will amply supply the large load imposed by the Impedance Coupled Super-Heterodyne without danger of over-loading.

The speaker, the Acme K-1, is a double cone free edge reproducer, manufactured by the Acme Apparatus Co. of Cambridge, Massachusetts. The loop is known as the Fiat Loop and is manufactured by the Radio Appliance Corporation of Chicago. It is exceptionally well made, the framework being fabricated from genuine walnut, upon which is carefully wound the silk-covered wire constituting the loop.

A Johnson trickle charger, manufactured by the Johnson Motor Products Co. of Chicago, keeps the "B" battery at full charge at all times.

The use of a Yaxley automatic relay in conjunction with the accessories installed in this receiver makes the operation of the "B" eliminator and charger entirely automatic. All power units are controlled by a flip of the filament switch in the receiver itself, the current actuating each accessory being turned on and off automatically.

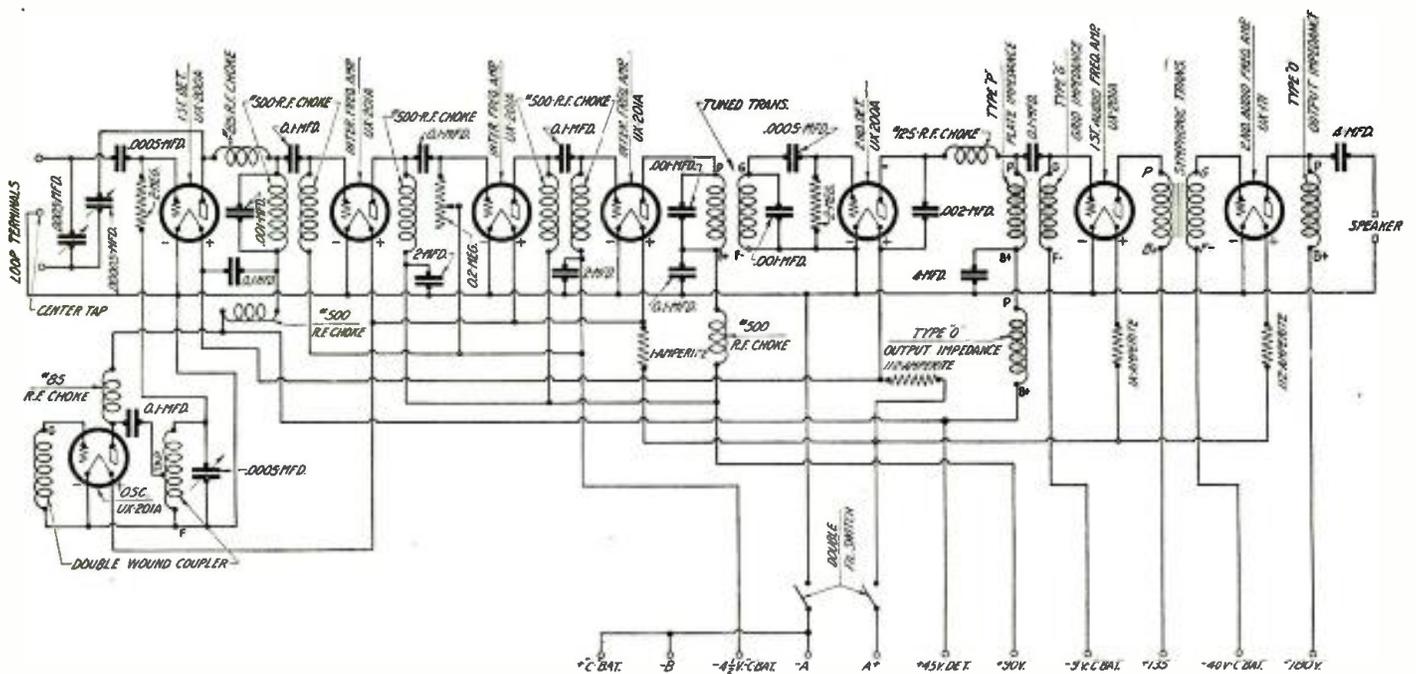


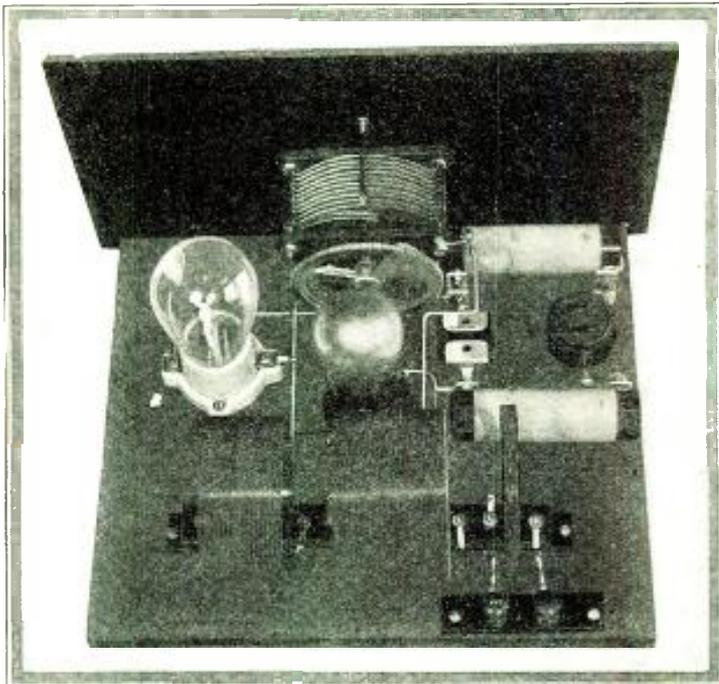
Figure Two. Schematic wiring diagram of completed receiver

A Self Modulated Oscillator

This Oscillator Operates Without Batteries and Will Be Found to Be of Great Value to the Amateur Experimenter

Construction and All Illustrations Made in the Laboratory of
The Citizens Radio Call Book

THE usefulness of apparatus in the amateur experimenter's laboratory is rather limited and, therefore, the purchase of precision laboratory equipment is unwarranted and is beyond the means of most experimenters. With this point of view in mind the herewith described oscillator has been designed in order that a fairly accurate piece of apparatus may be had at a very moderate cost and the operation of which does not require any additional 'A' or 'B' batteries. The adapta-



Rear view of oscillator

bility of this oscillator has a very wide range and should be a valuable asset to most amateur experimenters. The construction is very simple and may be made either from the specified parts or from spare parts that may have accumulated from discarded receivers, etc. Care should be taken that the connections are made as indicated in Figure 3, otherwise the oscillator may not be entirely satisfactory or stable in operation.

In Figure 1, is a schematic wiring diagram of the complete oscillator. The power source of 110 volts, A. C. is applied to the terminals 'P'. The filament of the UX 201 A is heated and the plate supply is obtained, from this source. The line voltage of 110 volts is reduced to the required five volts, for the filament of the tube, by means of a 25 watt lamp in series with it. In case 220 volts should be used the series lamp should be 50 watts. Radio frequency chokes and a .002 by-pass condenser is provided in the supply leads to prevent any radio frequency currents from feeding into the power lines which would be a source of interference. If direct current is to be the source of supply care should be taken that the positive side of the line be connected to the plate of the tube (X_1). It will be noticed that the grid return is connected to the opposite side of the 110 volt line from the plate return. The reason for connecting the grid return in this way is that the end of the filament to which it is connected is

negative at the time the plate of the tube is positive and this is the only time that plate current is flowing. When a UX 201 A is used the total plate current, as measured by a D. C. milliammeter, is less than two milliamperes. The rectified plate current is a series of impulses and because 60 cycles a second is an audible frequency, the frequency of oscillation is modulated so that an audible signal is produced in a receiving set that is coupled to it.

In Figure 2 is shown a rough calibration chart for the oscillator as made for the original laboratory model. The calibration will change slightly with different makes of apparatus or slight discrepancies in the coils or variable condenser used. It is, therefore, advisable to check the calibration to assure accuracy. This may be done in the following manner. Select some station on the low waves and tune to resonance on the receiver. Adjust the oscillator to exact resonance with the received signal and note the dial reading and the wave length of the station. The next point to be calibrated should be about fifty meters above the first station and repeat the operation. This should be done, at fifty meter intervals, over the entire broadcast waveband, after which a curve may be plotted, in respect to wave length and dial setting, in the same manner as is illustrated in Figure 2. Any intermediate wave lengths may be determined by the point of intersection of the curve with the vertical line indicating the desired wave length. Care should be taken that the dial is securely fastened to the shaft of the condenser as any slipping will destroy the value of the curve.

Suggested uses for the calibrated oscillator are as follows: If it is desired to receive a station where the dial reading of the station has not been logged, the oscillator may be adjusted to the wave length of the transmitting station and resonance obtained in the receiver at which point the station should be received, provided that the oscillator is calibrated accurately and the transmitting station is on the wave length tuned to. In case it is desired to know the wave length of a transmitting station the station is tuned in on the receiver and the oscillator tuned to resonance with the transmitting station and the calibration curve referred to for the wave length. If it is desired to calibrate a receiver for wave lengths, the operation of calibrating the oscillator is just reversed with the receiver as the object of the

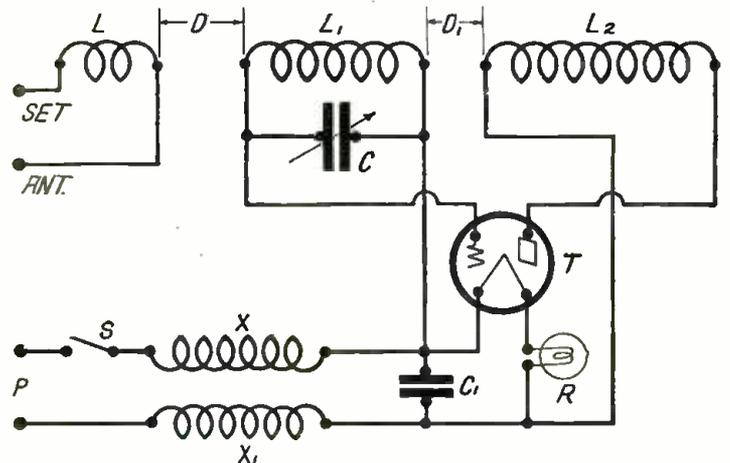


Fig. 1. Schematic wiring diagram of Self Modulated Oscillator

calibration, and a similar curve made for the receiver. The oscillator is also very useful in the neutralizing of neutrodynes and other types of balanced receivers. If it is found that the energy transfer from the oscillator is too great when it is direct coupled to the receiver it may be disconnected from the receiver and placed at some point remote to it so that the amount of energy transfer is sufficient to give a sharp null point. After the re-

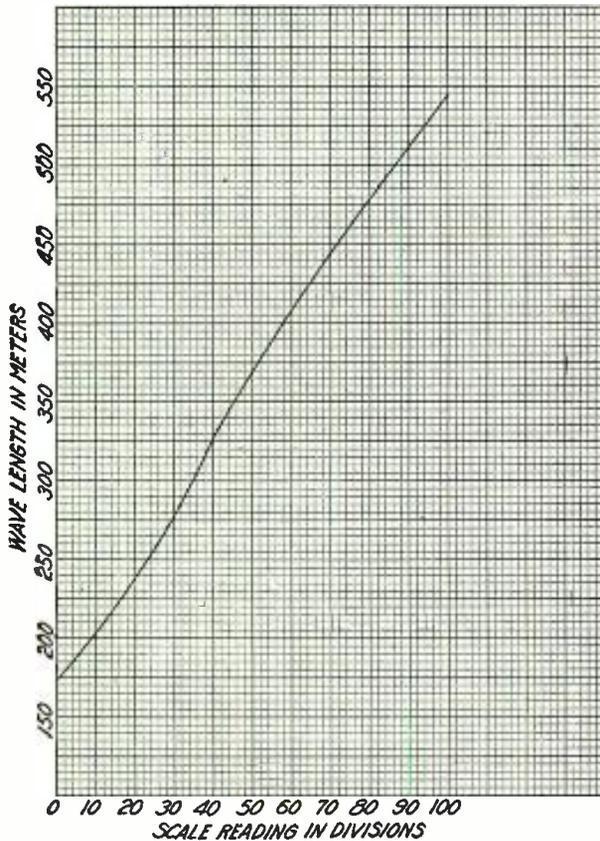


Fig. 2. Calibration chart

ceiver has been balanced or neutralized, the oscillator may be placed a little closer to the receiver making the signal louder and may be used as a check on the first adjustment.

In the schematic wiring diagram in Figure 1 there are indicated alphabetical substitutions of the various components which are used to make up the specifications of the oscillator. It is quite necessary that these specifications are very closely followed if satisfactory results are to be obtained. In case it is found necessary to substitute parts other than specified care should be taken that the values of the substituted parts are identical with the specified parts.

The following table gives the equivalents of these values:

- L—7 Turns
- L₁—56 Turns
- L₂—44 Turns
- D—1½ Inches
- D₁—1 Inch
- C—.00035 Mfd.
- C₁—.002 Mfd.
- X—Radio Frequency Choke
- X₁—Radio Frequency Choke
- S—Filament Switch
- T—UX-201-A
- R—25W—110 Volt Lamp
- P—110-Volts, 60 Cycles

The switch "S", as indicated above, is optional and may be found to be very convenient if the oscillator is to be used to a very great extent, inasmuch as the house current may be permanently connected. 60 cycles has been specified inasmuch as the

majority of alternating circuits are operated at this frequency. There are, however, a few districts in which frequencies other than 60 cycles are used. This oscillator will operate quite satisfactorily on any frequency, the only difference being a change in the audible note.

In case the specified radio frequency chokes are not obtainable it is quite simple to construct these chokes and may be done in the following manner: Procure two pieces of bakelite tubing each being 3¾ inches long and 1 inch outside diameter. The thickness of the tubing should be about ¼-inch. Drill one hole at each end, about ¼-inch from the end, with a No. 30 drill. Insert a 6/32 machine screw from the inside, and wrap one end of a No. 22 DCC wire around the protruding end of the machine screw. Place a solder lug on top of the wire and fasten by tightening a nut on the machine screw. Now wind on as many turns as it possible, fastening the other end in a similar manner.

In the assembling and wiring of the inductances L, L₁, and L₂ care should be taken that the direction of winding is the same on all three units.

If the oscillator is to be used to any great extent it should be housed in some kind of a cabinet, in such a manner that dust will not accumulate between the plates of the variable tuning condenser. A collection of dust between the plates will throw the oscillator out of calibration.

LIST OF PARTS

- 1—General Radio Type 247-P .00035 mfd. Geared Variable Condenser
- 1—General Radio Type 310 Dial and Indicator.
- 6—General Radio Type 274-J Jacks
- 6—General Radio Type 274-P Contact Plugs
- 1—General Radio Type 349 Socket
- 2—R E L Radio Frequency Chokes.
- 6—Inches Hammarlund Broadcast Inductance
- 1—Dubilier Type 601 .002 Fixed Condenser
- 1—Wall Receptacle

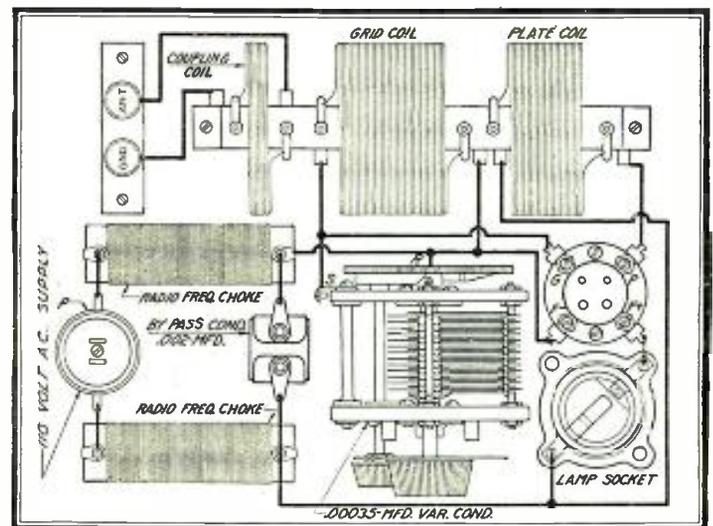


Fig. 3. Graphic illustration showing connections.

- 1—25 Watt, 110 Volt Lamp
- 1—Magnus Convenience Outlet Tap
- 2—Eby Binding Posts
- 1—7x12x3/16-inch Formica Drilled and Engraved Panel
- 1—11x9½-inch Wood Baseboard
- 1—5x1x3/16-inch Bakelite Terminal Strip
- 2—7x¾x½-inch Bakelite Strips
- 1—8x¾x3/16-inch Bakelite Strip
- Wire, Solder, Screws, Nuts Etc.

The Victoreen Universal

The Latest Design of This Receiver Combines New Refinements
With a Simplified and Harmonious Panel Arrangement

This Receiver Was Designed and All Illustrations Made in the Laboratory
of The Citizens Radio Call Book

THE principles of the Super-Heterodyne circuit are acknowledged by radio engineers as embodying the most advanced design in radio development, and is undoubtedly the peer of all receivers.

With chaos in the air, a congestion caused by several times as many broadcasting stations as there is actually room for, it takes a pretty smart receiver to "cut them out" or "go out after them," which is what the DX "Hounds" want.

The success of this receiver, which is also the basic factor in the success of the Super-Heterodyne circuit, may be found in the selection and use of the proper intermediate frequency transformers. The design of these transformers is of air core construction, built over a two-inch air core, which permits a minimum of wire to be used to obtain the proper inductance. These transformers are peaked to 3400 meters or 88 kilocycles. Moreover, by a special adjustment made at the factory they overcome inter-stage oscillation. No other adjustments are necessary, nor is it essential to select tubes with approximately the same characteristics before the set will function properly. The transformers are all sealed at the factory.

The Victoreen Universal Circuit consists of an oscillator, first and second detector, three stages of intermediate frequency amplification, and two of audio frequency amplification. Note from the diagrams the symmetrical arrangement of the parts, the accessibility of all connections, and the shortness of the leads. This receiver is made for use with either storage or dry batteries, as well as ABC elimination. For storage battery tubes, Victoreen No. 170 R. F. transformers are recommended; for dry battery tubes the 171 transformers. There is also provision for use of a power tube in the last stage. The Victoreen audio control unit was designed to allow a minimum number of controls on the panel. It consists of three 30-ohm rheostats mounted on a bakelite base and placed inside on the baseboard to regulate the second detector and the two audio stages. If a power tube is used, the unit is

furnished with two 30-ohm and one 10-ohm rheostat. When once set they require no further attention.

This season there has been a great demand for simplified tuning controls. The obstacle which must be overcome in a single dial control unit is the difference in capacities between the lower and higher wavelengths, and this cannot be accurately done without providing means for compensation.

The Victoreen Master Control Unit consists of two .0005 variable condensers, mounted on an aluminum back plate, controlled by a rack and gear uniformly over the entire wavelength. Now, (and this is mighty important) by means of a compensator attached at one end of the panel, on the antenna or loop condenser, an adjustment is provided up to 20 degrees with a 360 degree Vernier motion, to allow for any variation in capacities between the lower or higher wavelengths.

In constructing this receiver the baseboard may easily be laid out by referring to Figure Three. On the panel the only critical holes to be drilled are the mountings of the Master control unit, which are 11½ inches apart, center to center.

When the parts are all mounted and the wiring is started, consult Figure One, as it gives a point to point description by which connections can easily be checked.

The only warning needed here is a caution to see that all soldered connections are firm and secure.

In tuning the receiver turn each dial slowly until a station is found. Rotate each dial until you are in the middle of the signal, then by turning the compensator knob slowly the station can be brought in at its highest signal strength.

Increase in volume is accomplished by turning the potentiometer arm toward the negative terminal of the potentiometer. Re-adjust the rheostats and potentiometer to bring

in the signal to its best advantage, but keep the voltmeter at its rated voltage or slightly less by means of the Master rheostat. To obtain maximum volume, selectivity and distance, set the potentiometer at its maximum volume point, which should be



Photo A. Phantom view of receiver mounted in a console

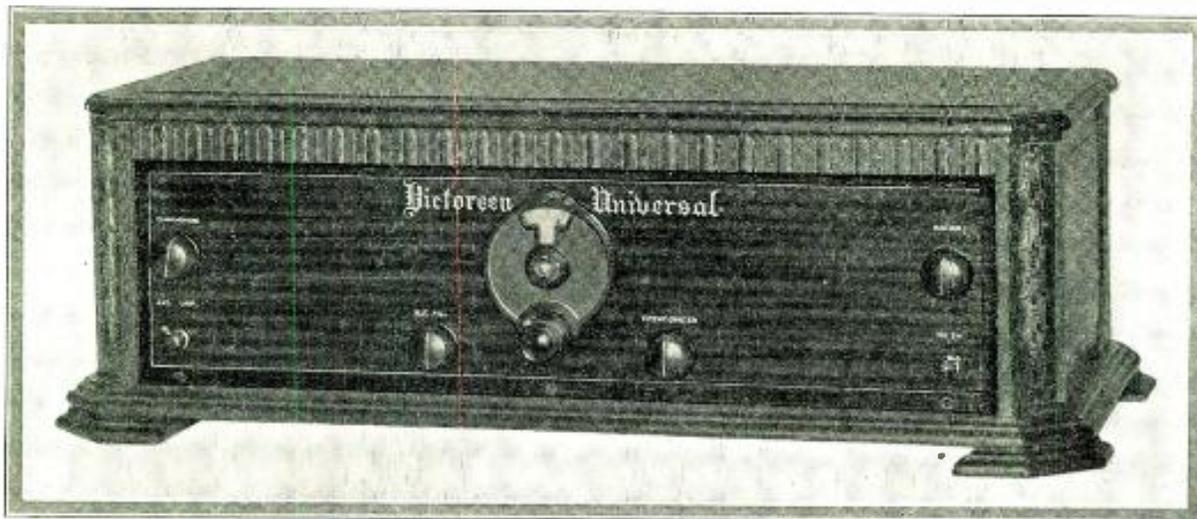


Photo B. Front view of receiver in cabinet

about two-thirds toward the negative. Then control the volume with the R. F. rheostat.

The circuit is designed to be used with either outside antenna or loop. A loop is recommended in congested districts where a large number of locals are broadcasting. You will find a loop gives ample distance reception, with greater freedom from interference. For going out after DX, an outside aerial should be used and it does not require more than fifty feet of wire including lead in. A longer aerial than this may prove to be an undesirable collector of interference.

Regardless of the care that may be taken in the manufacture of the individual parts, there is always a chance of damage in transit. Before you assemble any of the transformers or condensers in your receiver test them out with a battery and voltmeter to be sure that there are no open circuits in the transformers or any short circuits in the condensers.

The sockets should be mounted with the "P" and "G" terminals towards the rear of the receiver and the filament positive and negative terminals towards the front panel side of the baseboard.

No trouble should be experienced in mounting the parts in their respective locations and connecting them in the proper manner. The various photographs and the baseboard layout will show the exact location of parts and help considerably in making a neat job of wiring. When the receiver is completely wired it is best to carefully check the wiring against the large graphic illustration. Make those corrections which are necessary and then connect the "A" battery and test out one tube in each socket before

connecting the "B" batteries. If each tube lights and is controlled by the proper rheostats, it is safe to connect the "B" batteries. Then again go over the receiver as before, one tube in a socket, and when you are sure everything is O.K. light up all tubes with both "A" and "B" batteries connected. Then plug in the speaker and connect the loop to its proper terminals. The potentiometer arm should be about three-quarters of the way toward the negative side.

The Victoreen Universal Receiver differs little in operation from other super-heterodyne receivers. Careful tuning is a prime requisite, since it is an extremely selective receiver and the operator will "skip" over the stations if care is not used. To tune the receiver proceed as follows: With all tubes burning turn the master control slowly one degree at a time. For each setting of this dial, turn the vernier slowly in either direction. If no station is heard, advance the master up one or two degrees and repeat the movement of the vernier. Continue this procedure until signals are heard. Then carefully rotate the master control until the maximum strength of signal is obtained, at which time the vernier is also adjusted for maximum signal strength. Sometimes the strength of the signal can be improved by changing the tubes around until the best results are obtained. Like any other receiver, this one has its own little peculiarities which must be understood before the very best results can be expected. For antenna operation a single wire 50 feet long, including lead-in, will give excellent reception. The use of an antenna somewhat broadens tuning, and the shorter the antenna the better.

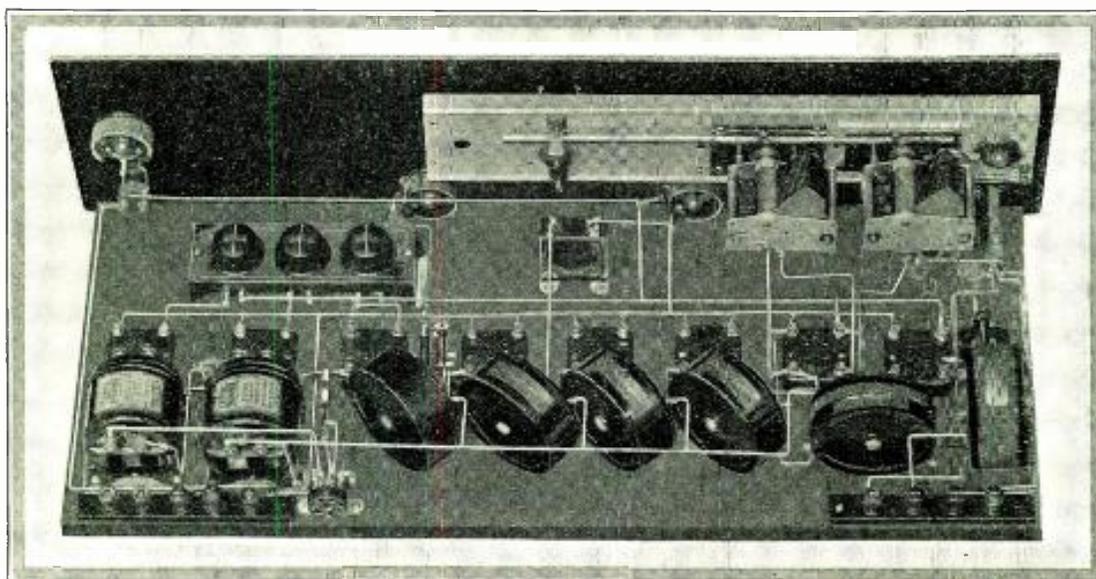


Photo C. Looking at completely wired receiver from rear showing arrangement of parts and master control

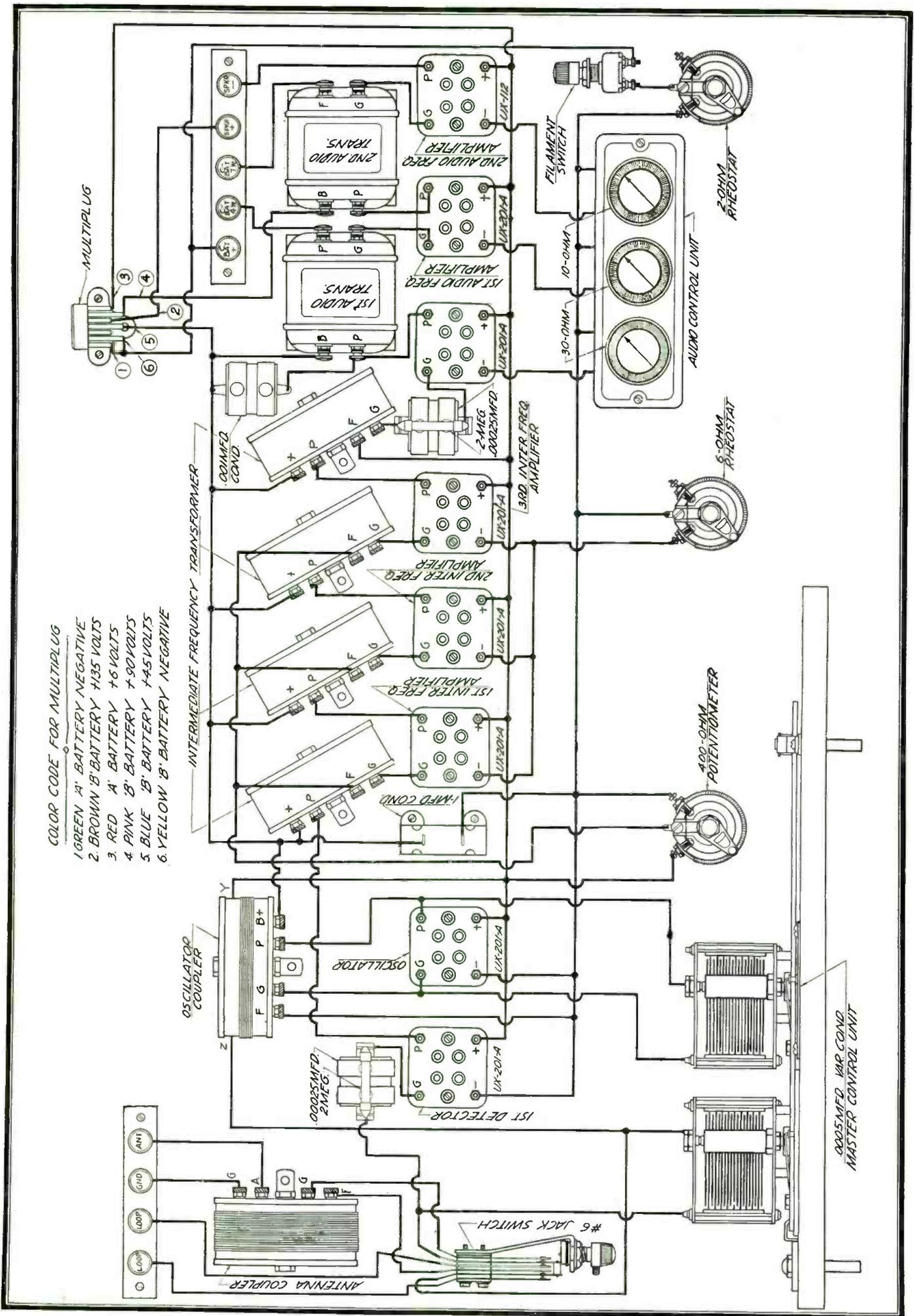


Fig. 1. Pictorial wiring diagram showing all connections

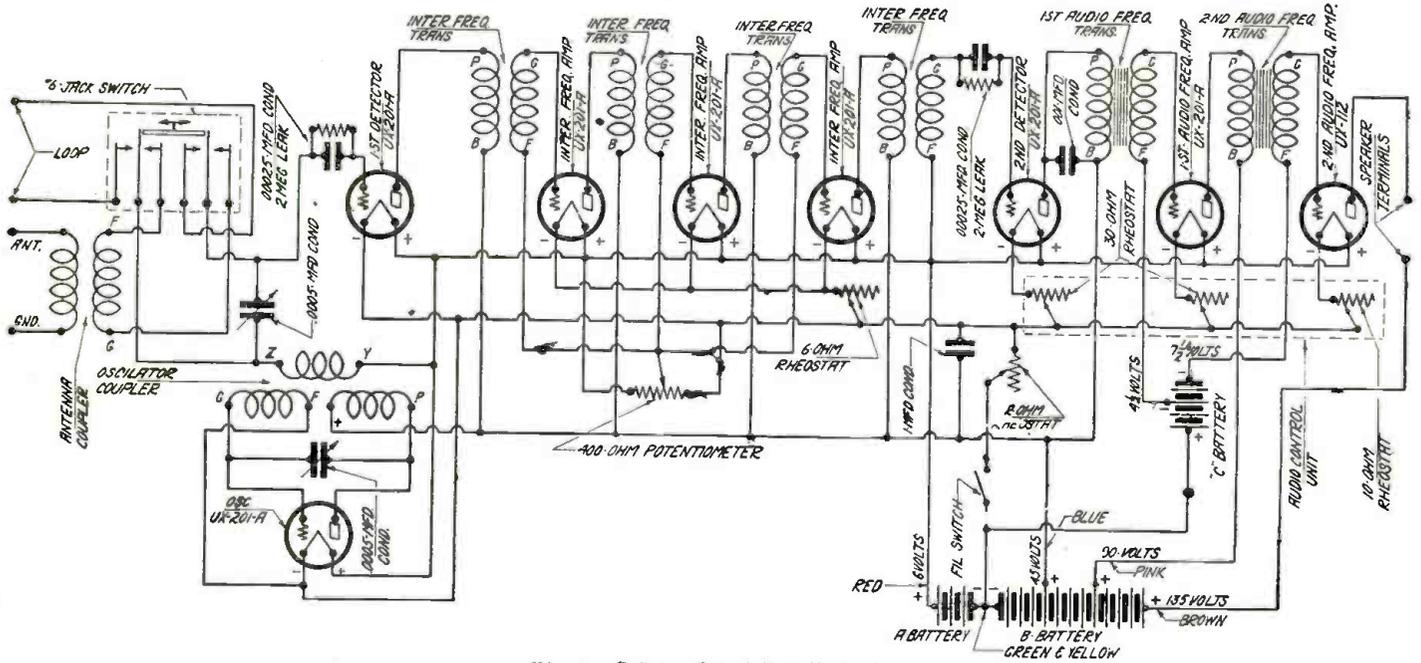


Fig. 2. Schematic wiring diagram

LIST OF PARTS

These parts or any reasonable substitute will give satisfactory results:

- 1—Victoreen Master Control
- 4—Victoreen Intermediate Transformers No. 170
- 1—Victoreen Audio Control Unit
- 1—Victoreen No. 6 6-Ohm Rheostat
- 1—Victoreen No. 2 2-Ohm Rheostat
- 1—Victoreen No. 160 Antenna Coupler
- 1—Victoreen No. 400 400-Ohm Potentiometer
- 1—Victoreen No. 150 Oscillator Coupler
- 1—Electrad .001 mfd. Fixed Condenser
- 1—Electrad 1 mfd. Condenser
- 2—Electrad .00025 mfd. Grid Condensers
- 2—Electrad 2 Megohm Grid Leaks
- 2—Karas Audio Transformers
- 8—Frost No. 530 Sockets
- 1—7x26x3/16" Lignole Drilled and Engraved Panel
- 1—Wood Baseboard 10-1/2x25x1/2 inches
- 1—Formica Strip 6x3/4x3/16 inches
- 1—Formica Strip 5x3/4x3/16 inches
- 1—Carter Filament Switch

- 1—Carter No. 60 Jack Switch
- 10—Eby Engraved Binding Posts
- 1—Jones Type BM Multiplug
- 1—National Type B Dial
- 50—Ft. Belden Tinned Copper Wire
- 1—Fiat Loop
- 1—Package Kester Solder

Photo A shows the completely wired receiver mounted in an Excello R-22 Console manufactured by the Excello Products Corporation, Cicero, Illinois. The speaker suggested for use with this receiver is known as the Meistersinger and is a free edge cone type manufactured by the Tower Manufacturing Corporation, Boston, Massachusetts. A Willard 100 ampere hour storage battery supplies the necessary A voltage and a "Little Giant" B eliminator manufactured by the Webster Company, Chicago, Illinois, is recommended by the B battery voltage. A Fiat Console Loop of Colonial design is also recommended and is manufactured by the Radio Appliance Corporation, Chicago, Illinois.

Photo B shows the completely assembled receiver mounted in a Corbett Cabinet.

(Any further information regarding these suggested accessories can be obtained by writing direct to the manufacturers.)

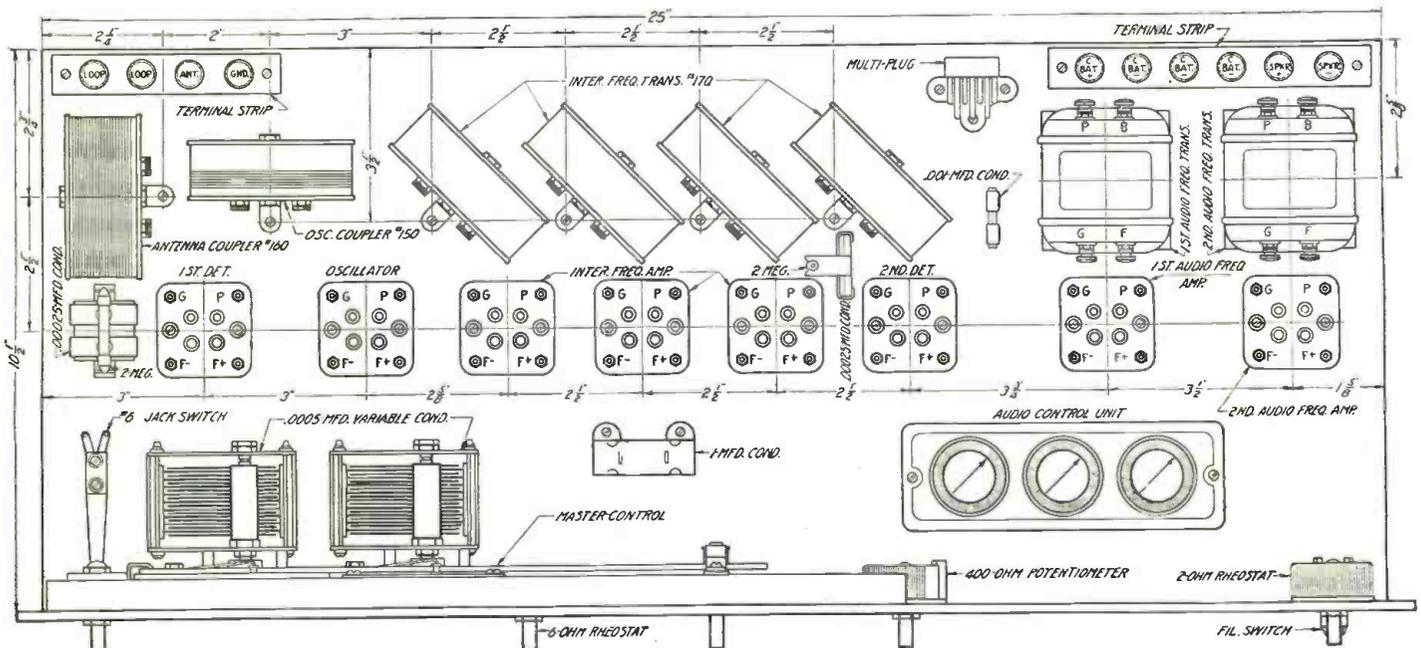


Fig. 3. Baseboard layout

A Shielded Localized Control Receiver

A Unique Receiver Incorporating Shielding and the Simplicity of Control Demanded by Modern Day Practice

This Receiver Was Designed and All Illustrations Made in the Laboratory of the Citizens Radio Call Book

THE general trend of the home constructor, in the design and physical construction of his radio receiver, is to follow the constructional ideas of the leading manufacturers. This action is but a natural one inasmuch as the manufacturers are equipped to produce the means of more efficient receivers in a way that is not usually accessible to the home building radio fan, due to the huge investment required in the research and development of new methods and systems. On account of this fact, the receiver with a factory-built appearance, operating efficiently with the demands of the time, finds great favor in the home construction field.

In the preliminary design of a receiver there are several factors which must be considered according to their relative merit, in order that the resulting receiver may be operated at the greatest point of efficiency possible for the type of circuit used.

In considering a circuit to be used in the receiver, there are a great many standards from which a selection may be made. All circuits are good, bad, or indifferent and extraordinary claims are made for all. At the present time the tuned radio frequency circuit enjoys a popularity unknown to other circuits and for this reason may be considered as one of the most efficient circuits available at the present time. The reason for this great popularity is due to the ease of construction, stability of operation and low cost of maintenance. This is characteristic of a properly constructed tuned radio frequency circuit.

The subject of "regulation of oscillation" is a very broad one and may be considered from various angles without any definite solution being obtained as to the most practical and efficient method of doing so. One of the common causes of oscillation in a radio frequency amplifier is due to inter-stage magnetic coupling between successive stages. There are several methods by which this coupling may be eliminated or reduced to a minimum. One of the most common methods used to control inter-stage magnetic coupling is by the use of various shaped transformers, such as: torroids, spiderwebs, basketweaves, etc. When this method of control is employed inter-stage coupling may be reduced considerably but with a distinct sacrifice of the over-all operating efficiency of the receiver. The most recent method of eliminating inter-stage magnetic coupling and undoubtedly the most satisfactory one is by the use of partial or total shielding of the radio frequency amplifiers. In the total shielding method the tuning units are each contained in a separate shielded compartment. This method is very satisfactory and has been adopted, almost universally, by manufacturers of quality apparatus. The only disadvantage to this method of shielding, in regard to the home constructor, is that it is difficult and expensive for the average lay-

man to construct and incorporate in his receiver. In the case of the partially shielded receiver, where the radio frequency transformers only are shielded, it is a comparatively simple constructional problem for the layman to build a highly efficient receiver using this method of shielding.

There are several theoretical advantages to the shielding of radio frequency amplifiers which may be enumerated here, to the advantage of the home constructor. Inter-stage magnetic coupling is caused, primarily, by the inter-linking of the fields of the radio frequency transformers. A common solution is to place the transformers at a specified angle, in respect to the horizontal. This method is only satisfactory in low gain amplifiers since it has the disadvantage of causing high gain amplifiers to break into violent oscillation. This is due to the fact that the angle of zero coupling changes with the frequency tuned. By the use of transformers having a confined field angular setting problems are eliminated and the inter-stage magnetic coupling is materially reduced but is accompanied by an increase in radio frequency resistance, which will materially reduce the over-all amplification of the receiver. By the use of shielded transformers the highly efficient solenoid type transformer may be utilized to great advantage without danger of inter-linking fields causing oscillation. The magnetic flux from the field surrounding the transformer is intercepted, and carried to the ground, by the shield surrounding the transformer. A greater gain factor, per stage, may also be used when shielding is utilized inasmuch as one cause of oscillation is eliminated thereby permitting a greater plate load (primary turns) to be used. It also might be mentioned here that as the efficiency



Photo A. Receiver installed in console

of the shielding is increased a greater gain per stage may be used.

The ideal control system would consist of one tuning dial, volume control and a filament switch. Although this ideal system has been realized on various of the existing types of receivers it is self-evident that when three or more condensers are tracked together and controlled by one dial there will be sufficient discrepancy in the best of condensers to disturb the point of resonance in a sharply tuned receiver, at various settings of the dial. This condition will invariably appear even though the radio frequency transformers are matched. The only possible solution for such a system is to broaden the tuning to such an extent that the signal will be heard even though the various circuits are not in perfect resonance. It will be readily seen that by the use of this method the selectivity of the receiver will be noticeably reduced. It will also be seen that a system, whereby all tuning condensers could be rotated independently of each other and yet be controlled by one hand, would be very superior to the usual single control

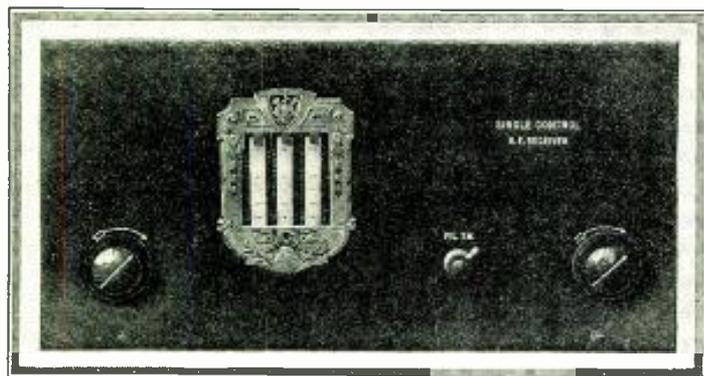


Photo B. Panel view of receiver

method. The use of this method makes it possible to retain ample selectivity without an elaborate and expensive calibrating and compensating tracking system.

The average home constructor does not have an over-abundant supply of equipment in his "kitchen laboratory" and therefore caters to the receiver that may be constructed in the shortest time with the least possible effort expended in doing so. The receiver described in this article has been designed with three views in mind: The minimum number of controls possible, and yet retaining the necessary selectivity for the present broadcast condition; a circuit arrangement consisting of high-grade apparatus consistent with modern engineering, and the placement of parts such that the building of the receiver may be done in a simple and comprehensive manner by the most inexperienced constructor. This receiver, when properly constructed, should give excellent results when compared to the average factory-built receiver on the market at the present time.

If the following wiring instructions are followed very carefully the constructor should find no difficulty in the assembly of his receiver, in an extremely short time.

The Truphonic Catacomb Assembly used in this receiver, consists of three stages of Truphonic amplification and an output unit built into the can. These are imbedded in wax and leads from them are provided by means of the small spiral wires that come up through the printed template.

To get at the interior of the Truphonic assembly, remove all of the nine screws that screw through the top of the assembly. There will then be three pieces, the can and its contents covered by the printed template, a socket strip and the covering for the socket strip.

The procedure of wiring is as follows: Connect 2 and D-1 together and ground D-3 to the side of the can. D-2 may be cut off altogether. Ground F-1 to the side of the can and connect F-2 to F-1; also connect F-3 to F-1. Connect the two wires to the loud speaker jacks at the left.

The audio amplification is now ready to be wired up to the socket strip. Lay the strip from the template so that No. 15 on the socket strip comes to the right and No. 12 to the left. No. 1 is the positive A battery. Splice a length of flexible rubber-covered wire to the short wire protruding from No. 1 and connect it to one side of the filament switch. Care should be taken in insulating the splice after it has been completed. The other terminal of the switch has connected to it another length of rubber-covered wire which is threaded back into the catacomb assembly. Bring this up through the third eyelet from the right of the back row. All these back eyelets are the positive A battery contacts of the sockets and are already connected together with the rubber-covered wire.

Connect 2 on the template to 2 on the socket strip. Do not solder these connections until all are made. Simply insert the wire from the under side of the socket strip and pull all the way through the eyelet. Likewise, 3 to 3, 4 to 4, 5 to 5 (use a piece of spaghetti here and wherever else required), 6 to 6, 7 to 7, and 8 to 8.

This takes care of all of the audio frequency connections, but do not solder these connections yet.

The negative filament connections are next connected. For this circuit the two radio frequency tubes are put on one rheostat and the three audio and detector tubes are put on another rheostat. Therefore connect the two F-5's together and bring a wire from the left-hand F-5 out through one of the eyelets in the side of the can, allowing sufficient length to reach the 10-ohm rheostat. This controls the filament of the radio frequency tubes. By connecting together the four F-4's and bringing a wire out through the second one from the right, through the side of the can to the 6-ohm rheostat, the audio frequency and the detector tubes are taken care of. One side of each rheostat should be grounded to the condenser chassis.

The connections from the grid and plate contacts of the radio frequency tubes and detector tubes are now made. The best procedure is to cut off five pieces of wire about six inches in length. Run these through the side of the can opposite the Nos. 12, 11, 14, 13, and 15, bringing these wires through the eyelets mentioned. At this point the wires in the socket strip can finally be tightened up and soldered. Pull all the wires through the eyelets until they are tight, then one by one drop some solder on the eyelet and the wire, making a neat, flat job. Then cut off the remaining wire. There are now only the connections to be made from the Truphonic Catacomb to the tuning end of the receiver. Pull wire No. 18 through the nearest hole in the side of the can.

The radio frequency end of the receiver is the next to be connected up. The Welty Shielded Transformers are connected to the receiver by means of a standard tube base that is on the bottom of the coil. Standard UX type sockets are used for mounting the transformers and simplifies mounting problems to a minimum. One of the wires of the secondary of the transformers (F-1) is grounded to the shielding. The F negative is also grounded to the condenser chassis which should be grounded to the can of the Truphonic Catacomb. This is most easily accomplished by connecting a wire from D-3 in the Truphonic to a convenient point on the condenser chassis.

In the wiring of the tuning end of the receiver, No. 9 on the first transformer is the antenna wire and is connected to the antenna binding post. No. 10 is the ground wire and should be connected to the binding post that is provided for it. No. 10 should also be connected to a ground such as the frame of the condenser. No. 11 from the Truphonic is connected to the stator of the first condenser and also to No. 11 on the first transformer. Connect No. 18 from the Truphonic to No. 18 on the second and third transformers. Connect wire No. 12 from the Truphonic to No. 12 on the second transformer. Wire No. 13 is connected from the Truphonic to the stator of the second condenser and to 13 of the second transformer. Wire No. 15 from the Truphonic should be attached to one side of a .00025 grid condenser and grid leak, the other point of the grid condenser connects to the stator of the third condenser and No. 15 of the third transformer.

Place the socket strip cover over the can and socket strip, being

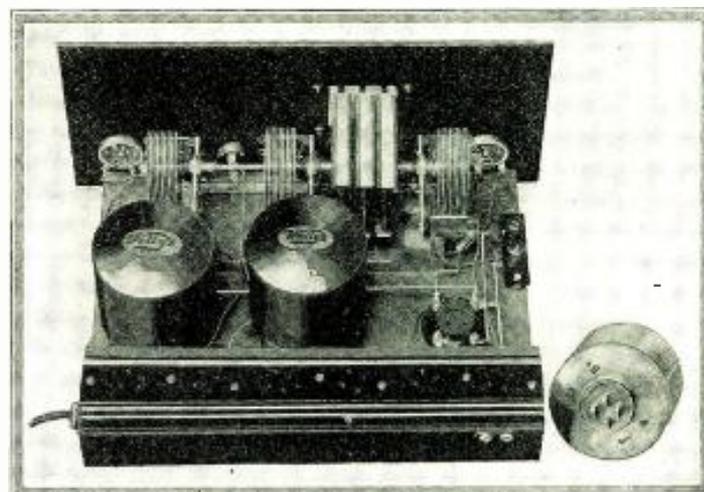


Photo C. Rear view of receiver. Note the unusual compactness in the arrangement of parts

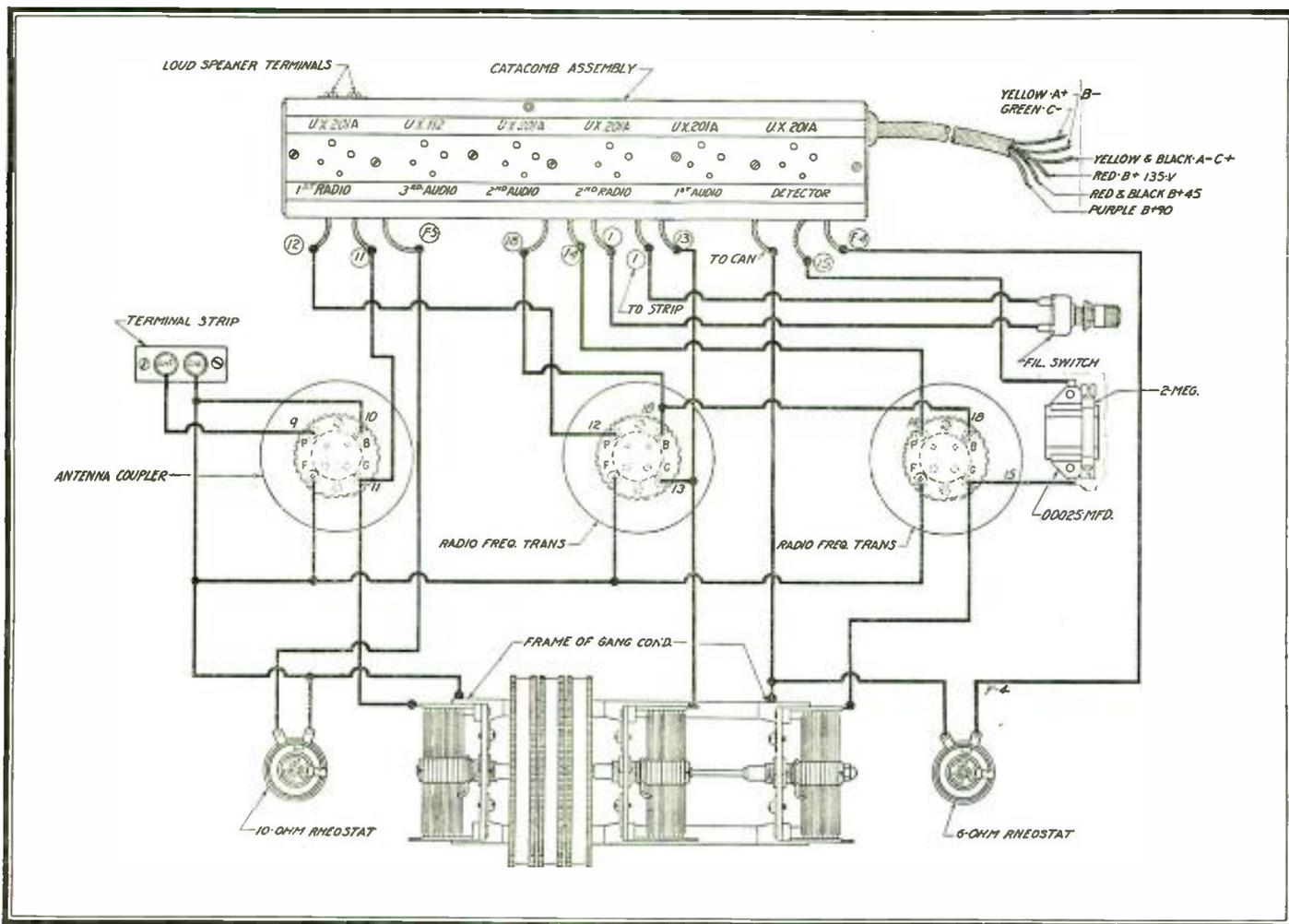


Figure One. Graphic wiring diagram

careful to have the large holes over the corresponding large holes in the socket strip.

LIST OF PARTS

These parts or their equivalent will give satisfactory results:

- 1—Alden Localized Control .000375 Condenser
- 3—Welty R. F. Transformers with Sockets
- 1—Alden Truphonic Catacomb Assembly
- 1—Carter 10-Ohm Rheostat
- 1—Carter 6-Ohm Rheostat
- 1—Carter Filament Switch
- 1—7x14x3/16" Drilled and Engraved Formica Panel
- 1—11x13" Wood Baseboard
- 1—Formica Terminal Strip 2½x¾x3/16"
- 2—Eby Engraved Binding Posts
- 25—Feet Belden Rubber-Covered Flexible Wire
- 10—Feet Belden No. 12 Ga. Tinned Copper Wire
- 1—Dubilier 2-Megohm Grid Leak
- 1—Dubilier Type 640 .00025 Mid. Grid Leak Condenser
- 24—Kellogg Tinned Solder Lugs
- 1—Package Kester Solder
- 1—Ekko Ground Clamp

Photo A shows the Single Control Receiver installed in a console, a product of the United Cabinet Works of Chicago, Ill., and is exceptionally well made, being constructed throughout of a high grade of solid and plywood lumber. The whole is beautifully finished in dark mahogany and will harmonize to a very satisfactory degree with any furniture. This console has a number of unique features, chief among which is the fact that it has an added utility exclusive of being a container for the radio receiver

and accessories. The console appears to be a writing desk. Ample space is provided on either side of the receiver itself for writing materials, while the drop front makes an excellent place upon which to write. Sufficient room is provided in the lower compartment for the storage of the average number of accessories essential to the proper operation of the receiver. The console has a built-in Utah Free Edge Speaker which is concealed behind the ornamental grille.

(Further information on any of the above described accessories may be obtained by writing direct to the manufacturers.)

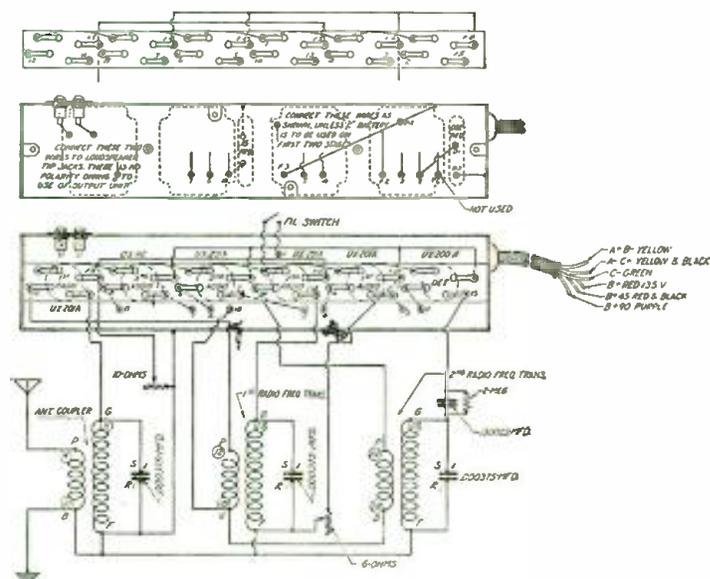


Figure Two. Schematic wiring diagram

The Melo-Heald Superheterodyne Receiver

Here Is an Eleven-Tube Circuit Having Plenty of Available Power That Is Easily Constructed

This Receiver Was Designed and All Illustrations Made in the Laboratory of the Citizens Radio Call Book

HOW to attain the desired increase in range, power, selectivity and sensitivity in radio reception has always been the problem that confronted the radio enthusiast in his desire to forge to the front ranks of the art. The difficulties of unavoidable interference, the great increase in high-power broadcasting "locals," and the conflicting and intricate elements that enter into the illimitable methods of tricking and freaking a circuit to avoid these disconcerting problems, as evidenced by the broad range of superheterodyne circuits known to the radio public today and their unquestioned superior popularity, are all factors that have kept the really ambitious set owner still seeking.

It has been the ambition of the designers of this circuit to introduce to the public an ideal superheterodyne. The supreme test of a receiver of this kind is its ability to cut through local interference without discordance and get distant stations in exact reproduction at a whisper or full crescendo with the same delightful clearness as rendered by the artists at the broadcasting station.

A front view of the receiver mounted in a cabinet is shown in Photo B. A Lignole inlaid panel has been specified giving a very pleasant appearance. Kurz-Kasch walnut dials match very nicely in this layout. Two Jewell meters are used in connection with this receiver; one a milliammeter with a 0-100 milliamperes range and the other a voltmeter having two scales which will show the condition of the A and B batteries at all times. A modifier is provided which consists of a 400-ohm potentiometer, the center point of which is connected to the "F" binding posts of the intermediate frequency transformers.

The filaments and the oscillator and two detector tubes are controlled by a 6-ohm fixed variable resistance mounted in a vertical position on the baseboard. This adjustment is not critical and once the correct value is found can remain in a fixed position as long as the filament voltage does not vary. The filaments of the intermediate frequency amplifying tubes are controlled by a



Photo "A"—Front view of receiver mounted in console with accessories. Lower compartment shows suggested arrangement for "A" battery, charger, "B" eliminator and automatic relay

Yaxley 2-ohm heavy duty rheostat. The first and second audio frequency amplifying tubes are controlled by a type 2 Elkey equalizer and the power tube is individually controlled by the same type resistor.

The oscillator and tuning condensers consist of two Hammarlund .0005 mfd. variable condensers. Regeneration is obtained with the use of a .000032 mfd. Hammarlund variable condenser. The volume control consists of a Frost 200,000 ohm variable resistance shunted across the secondary of the second audio frequency transformer with the middle point connected to the grid of the second audio frequency amplifying tube. The maximum value of this variable resistance may be increased to 500,000 ohms if desired.

Photo C shows a rear view of the completely assembled receiver. Pay particular attention to the simplicity of wiring and the neatness of the layout. A Yaxley plug is provided to make the necessary connections to the A and B batteries and a color scheme for these connections is shown in Figure 3. Three small terminal strips provide convenient mountings for the necessary binding posts.

The designer of the intermediate frequency transformers used in this circuit was governed by the definite idea that the proper way to improve a superheterodyne was to perfect as much as possible the individual units. The coupling device used in this circuit was de-

signed with strict adherence to well grounded fundamentals of radio frequency transformer design.

The intermediate frequency transformers are peaked at 125 kilocycles, which is accomplished by an inductance change and not by any form of capacity adjustment, thereby creating a stability making it possible to use five stages and still carry the potentiometer almost two volts negative. The object of this is at once seen by the fact that the value of the shunting resistance caused by the grid to filament impedance is raised to a high amount by this extreme negative bias. The result of this of course is to sharpen the resonance curve of each stage to a point

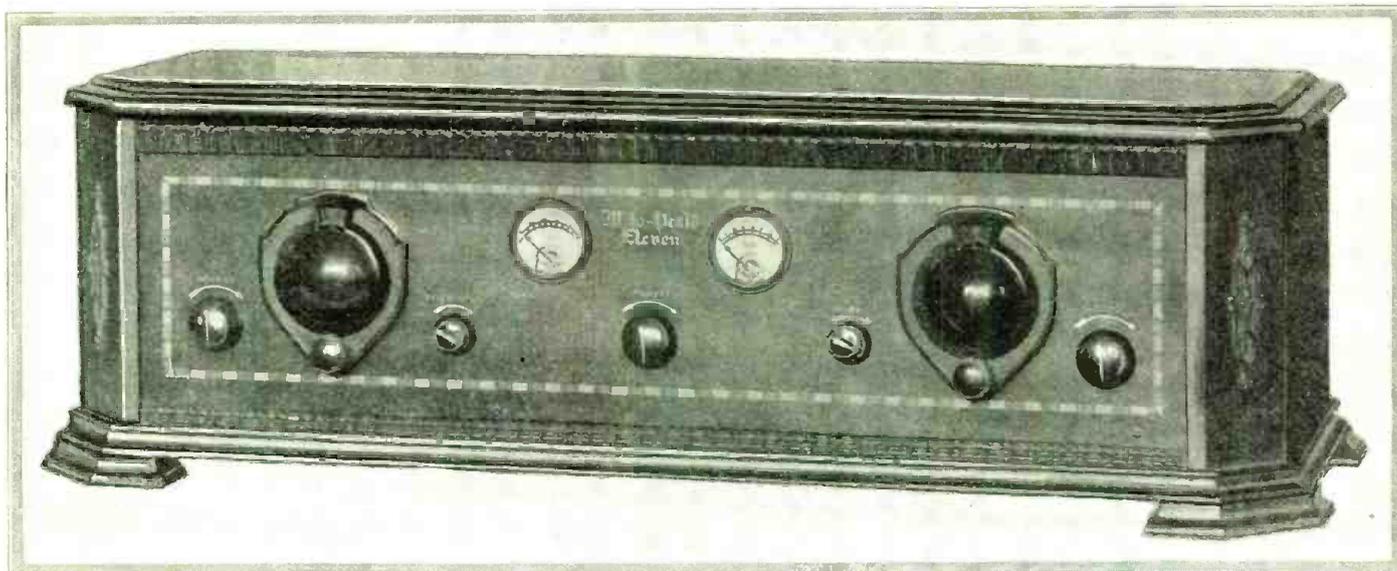


Photo "B"—Front view of receiver mounted in cabinet

where ten kilocycle separation between local and distant stations may be accomplished. The B battery consumption with 48 volts on the intermediates and oscillator and 100 volts on the audio amplifier is less than 40 milliamperes. There is another outstanding quality of this intermediate amplifier made possible again by correct transformer design and that is the fact that the intermediate amplifiers do not depend upon a very critical setting of the potentiometer. It is possible to tune from 200 to 550 meters without adjustment of the potentiometer. It may be placed in the best operating position and left there for all reception.

It was recognized that a poorly designed oscillator will emit quantities of undesirable harmonics. Much, if not all, of this emission may be eliminated by removing the pickup coil from inductive relationship to the plate coil of the oscillator proper. It was also known that closer approach to a sine wave form was had when the undesirable condition of both grid oscillation and plate oscillation acting on the pickup coil was stopped. These two factors caused the design of a link mixing system which accomplished just what has been set forth above. The result is a system which is selective without being critical and which does nothing to distort the quality of the received signal.

We have had a great many requests from readers stating that

in the construction of a receiver of this kind the specifications regarding the home construction of certain parts is desirable. If the experimenter desires to use an antenna coupler and operate the set with an antenna, the following instructions should be followed:

Wind 49 turns of No. 24 double cotton covered wire on a 3-inch tube. Taps to be taken out at the eleventh turn, fourteenth turn, nineteenth turn, twentieth turn and the twenty-fifth turn. The end of the coil next to the taps goes to the loop binding post which is connected to the first detector tube grid. The twenty-fifth tap goes to the loop binding post which is connected to the filament and the other end of the coil (the forty-ninth turn) is connected to the loop binding post which goes to the midget regeneration condenser. The taps at the eleventh turn, the fourteenth turn, the nineteenth turn and the twentieth turn are for the antenna. The coupling may be varied by changing the tap to which the antenna is connected. The maximum coupling is had when the antenna is connected to the eleventh turn and the minimum when it is connected to the twentieth turn. The ground is connected to the twenty-fifth turn. No changes need to be made in the set proper, as the loop condenser is already connected in such a manner that it will tune the coupler.

If this set appears to tune broadly, the first thing that should

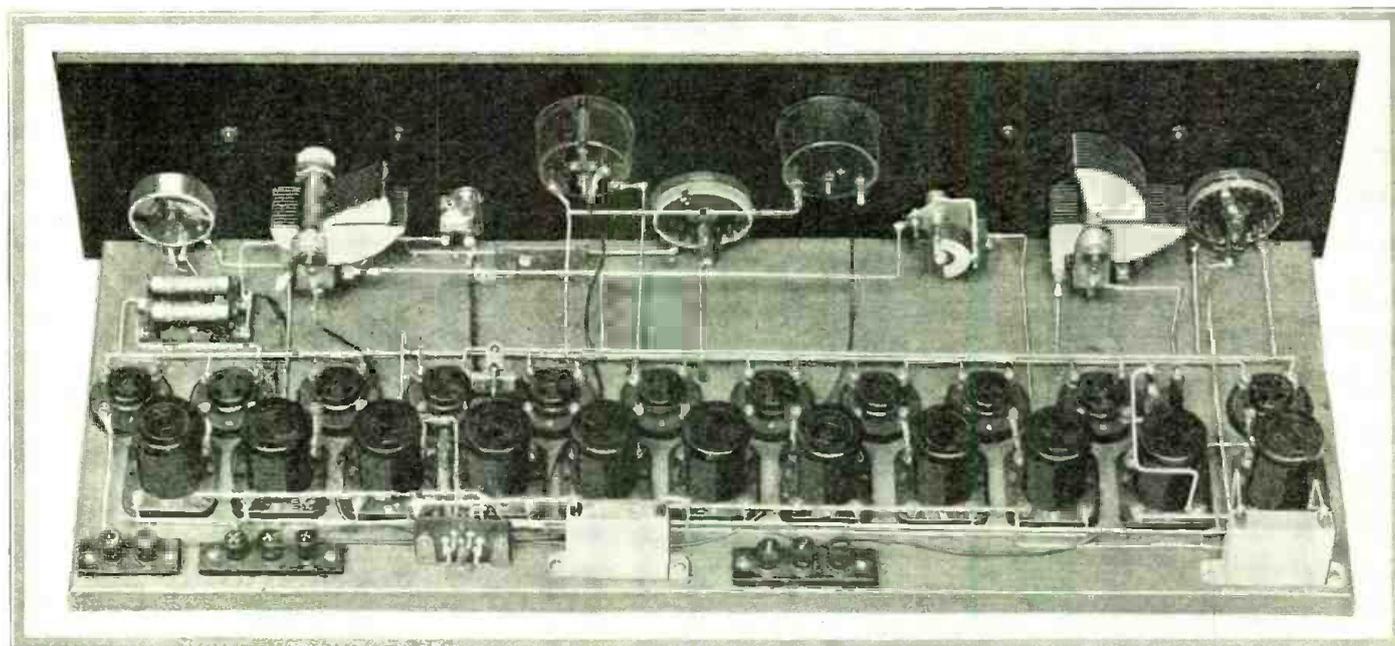


Photo "C"—Rear view of completely assembled receiver
Note simple and neat arrangement of parts

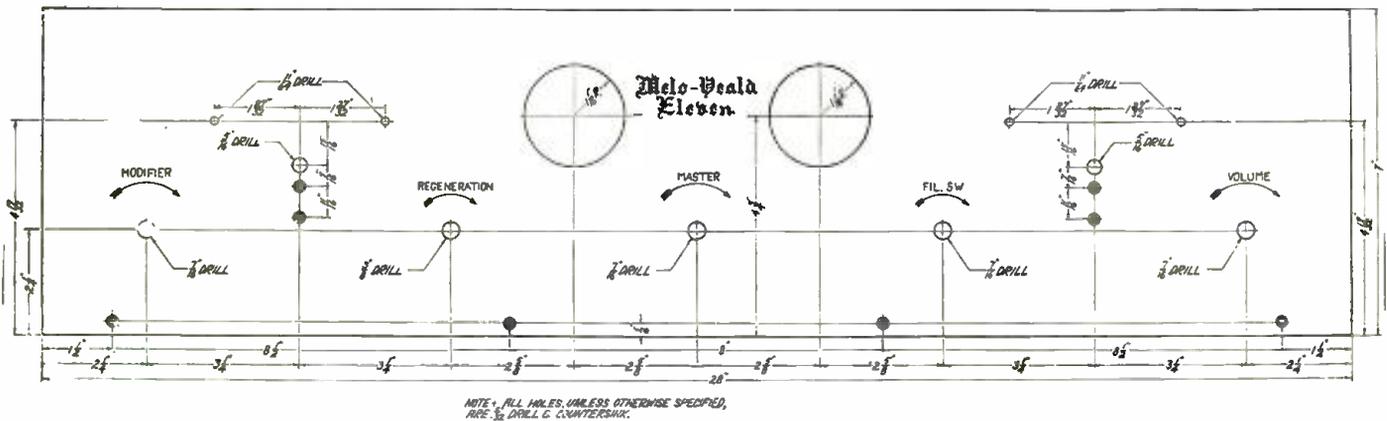


Fig. 1—Panel layout showing suggested engraving and size of holes

be done is to ascertain just how broadly it is tuning. That is, note the kilocycle separation that can be had between local and distant stations. The number of dial divisions swept by either condenser is not a criterion of selectivity. What determines selectivity is the separation which can be had between local and distant stations, or between two distant stations. Of course, much depends upon the locality in which the receiver is operated, but even in the most exacting localities of Chicago it is possible to receive at least six out of town stations during week nights, and depending upon the locality, this number will vary from six to twenty or more.

The intermediate amplifiers must be maintained in a state of efficient operation and the loop circuit must have sufficient regeneration to render it adequately sharp. The tubes must not be defective and should be properly placed in the receiver for maximum efficiency. In investigating the selectivity of your receiver, both oscillator and loop dials must be handled carefully and correctly. They should be varied only a small amount at a time and after such incremental change has been made, care should be exercised that no station was overlooked.

A good way of searching for a distant station which is close to an interfering local is as follows: Determine the settings for maximum volume for that local station. This can best be done by turning the potentiometer away from the critical position in the direction that reduces the volume without distorting the signal (toward the positive side) and turning the loop regeneration knob toward the critical point. After the settings of the loop and oscillator dials at which the local station is at a maximum are determined, the loop should be rotated until a position is found where the reception from the local station is a minimum. Then put the intermediate amplifiers in a state of efficient operation by advancing the potentiometer knob (turning the knob

toward the critical point or negative side) until they break into oscillation and then retard the potentiometer just off this critical point. The loop regeneration knob should be advanced until the first detector tube is thrown into oscillation and then should be retarded just off this critical point. This is then the most efficient operating condition of the set. During these operations the volume control should be set for maximum. Then the two dials should be rotated slowly and simultaneously until the distant station is received. It may be noticed that a distant station will be received within the same range on the dial as is ordinarily covered by the local station, but this should in no way cause the operator anxiety because he will notice that once the distant station is received the local will not be heard until the distant station stops sending. The receiver should be operating with 48 volts on the intermediates and oscillator during this process. It is sometimes found when extreme selectivity is demanded that slightly better results will obtain when 24 volts are used on the intermediates and oscillator.

It should be readily possible to throw the first detector tube into oscillation by advancing the loop regeneration knob. In case it is not, the loop should be examined to see that it is not defective. The regeneration condenser should be investigated to see that its maximum capacity is at least that specified (.000032 mfd.). Another first detector tube should be tried. It should be determined that the couplers 120 and 160 are correctly placed and wired. It should be noted if the lead from the grid condenser to the first detector tube is as short as it is possible to make it. It should be determined if the grid condenser is defective and of the proper value (.00025 mfd.), and if the grid leak is defective and of the proper value (4 megohm). In case illuminated dials are used, it should be noticed if the connections to the lamps on the dials are correctly made and that they do

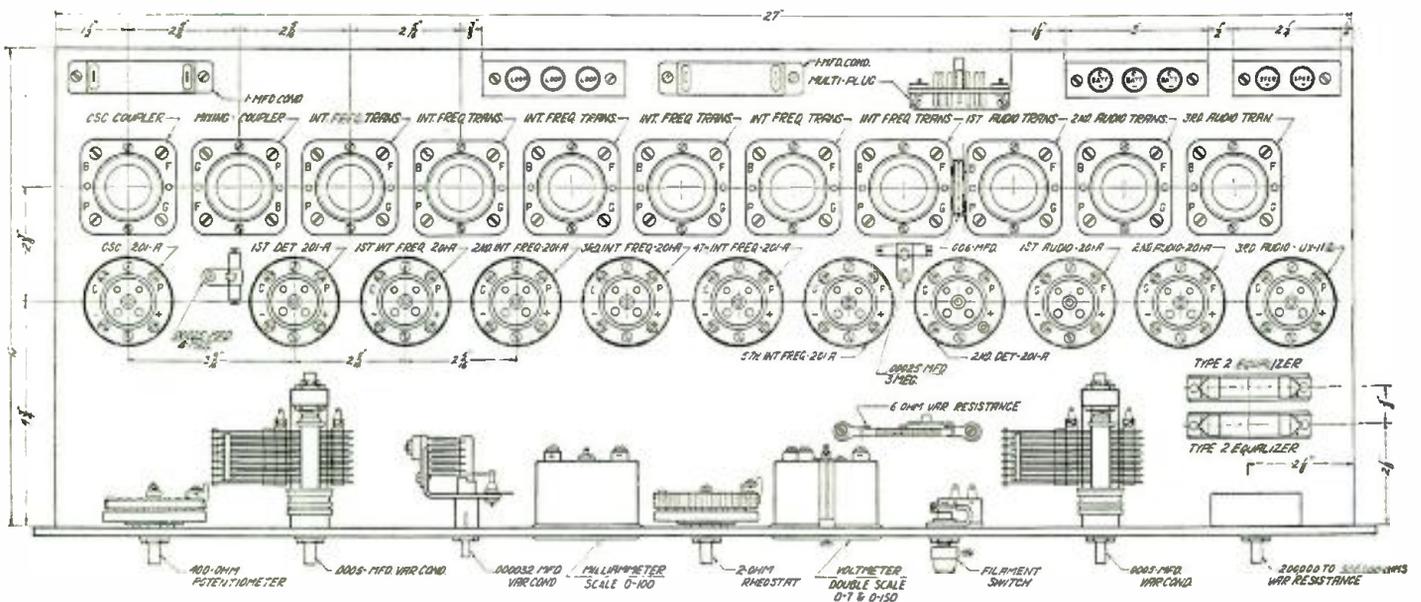


Fig. 2—Baseboard layout giving exact dimensions for placing of all parts before starting wiring

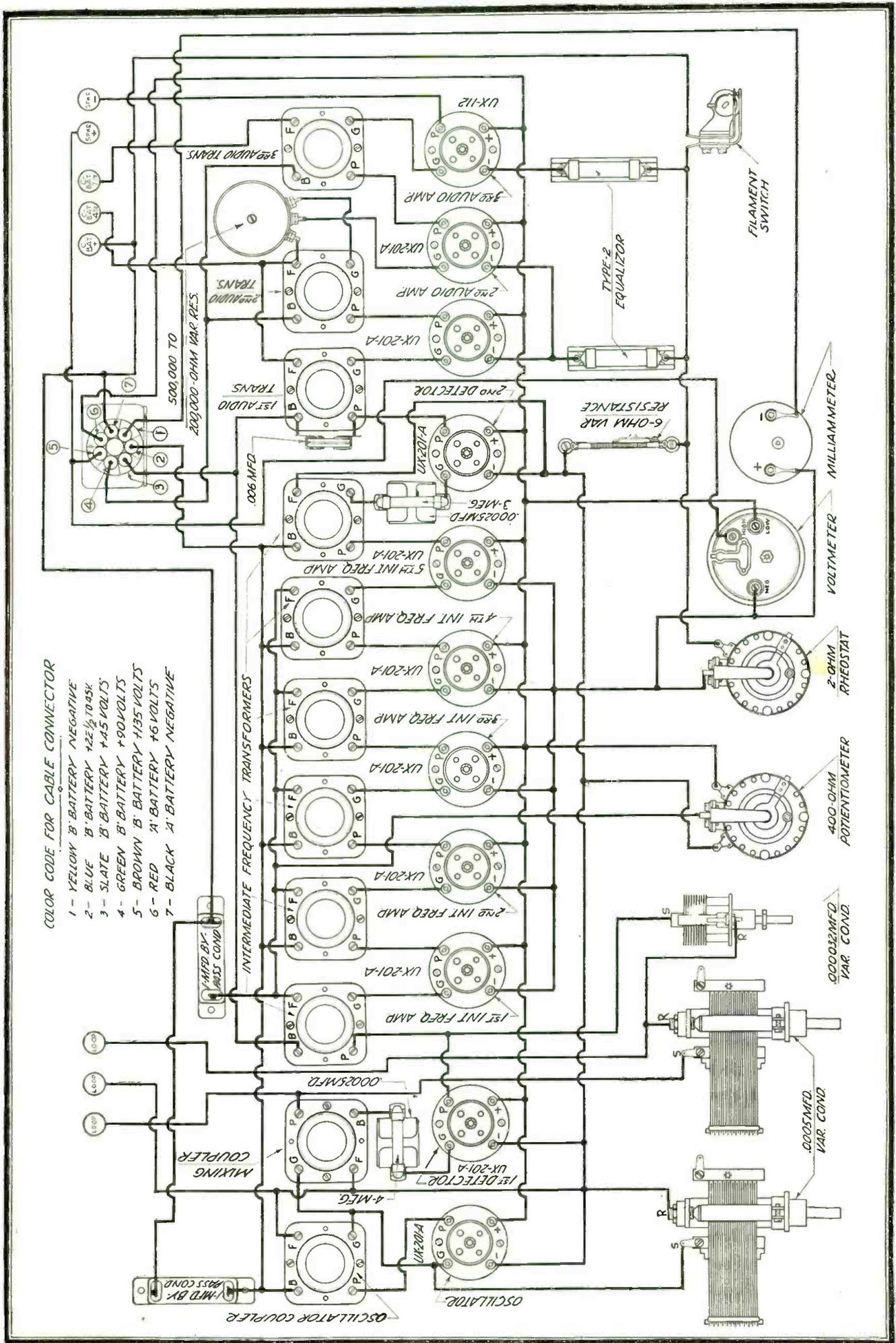


Fig. 3.—Graphic illustration showing every lead in entire receiver. Check this carefully against completed receiver

not short circuit a portion of the loop.

It would also be well to determine if the oscillator is working properly. Place a finger on the grid terminal of the oscillator socket and a finger on the filament terminal. Then note the milliammeter reading. This reading should be approximately 8 milliamperes less than when the fingers are removed. If this change is not seen, the wiring of the oscillator should be carefully checked and the couplers 160 and 120 should be checked with a meter, or otherwise, to determine that they are not open. The tube should also be tested to be certain that it is not defective.

It should be determined whether or not the intermediate amplifiers can be readily thrown into a state of oscillation when the potentiometer is advanced toward the negative side. These tests are all to be made when 48 volts are used on the intermediates, detectors and oscillators. The intermediate amplifier should oscillate when the potentiometer arm is from two-thirds to seven-eighths of the distance from positive to negative. This depends much on the kind and quality of tubes used. In case the intermediates do not oscillate readily, the following points should be considered:

Are the fixed condensers defective? Is the potentiometer open? Are there any of the intermediate transformers open? Are the plates of the intermediate amplifiers receiving 40 to 48 volts potential? Are the filaments of the tubes being operated at a five-volt potential? Are any of the tubes defective? Is the connection from the grid condenser of the second detector tube to the grid terminal of the socket as short as possible? Is the grid condenser of the second detector tube defective? Is it of the proper value (.00025 mfd.)? Is the grid leak defective and is it of the proper value (3 megohm)? Is the radio frequency by-pass condenser defective and is it of the proper value (.006 mfd.)? Is there any dust, soldering flux or other foreign matter accumulated on the tops of the transformers or between the terminals of the sockets?

LIST OF PARTS

These parts or their equivalent will give satisfactory results:

- 1—160 Oscillating Melocoupler
- 1—120 Mixing Melocoupler
- 6—135 Long Wave Meloformers
- 3—Multistage Meloformers
- 11—Na-Ald UX Cushion Sockets
- 2—Dubilier 601G .00025 MF Condensers
- 1—Dubilier 601 .006 MF Condenser
- 2—Dubilier 907 1 MF Condensers
- 1—Dubilier 3 Meg. Grid Leak
- 1—Dubilier 4 Meg. Grid Leak
- 8—Eby Binding Posts
- 1—Yaxley 400 Ohm Potentiometer
- 1—Yaxley No. 10 Filament Switch
- 1—Yaxley 2-Ohm Rheostat
- 1—Yaxley 6-Ohm Fixed Variable Resistance
- 1—Yaxley 660 Cable Connector
- 2—Hammarlund .0005 MF Midline Variable Condensers 1
- 1—Hammarlund .000032 MF MC9 Midget Condenser
- 1—Jewell 135 0-100 Milliammeter
- 1—Jewell 135B Double Scale Voltmeter

- 2—Elkay Type 2 Equalizers
- 1—Frost No. 892 200,000 Ohm Variable Resistance
- 1—Lignole 7x30 Drilled and Engraved Panel
- 1—10x27-inch Baseboard
- 3—Formica Terminal Strips
- 2—Kurz-Kasch No. 592 Walnut Dials
- 50 Feet Belden No. 12 Wire
- 100 Kellogg Soldering Lugs
- 10—UX 201A Radiotrons
- 1—UX 112 or 177 Radiotrons
- 1 Package Kester Solder
- 1—Ekko Ground Clamp

Photograph "A" shows the Melo-Heald Eleven installed in a console with appropriate accessories. The console is the Model R-22 manufactured by the Excello Products Corporation of Chicago. The cabinet is made entirely of walnut and is finished in a two-tone effect with matched wood door panels of Butt Walnut. An added feature of the Excello console is the leaf upon which the "A" battery rests. The leaf may be pulled forward, which allows easy filling and testing of the "A" battery.

A 100-ampere hour, 6-volt Willard storage battery is used to supply the necessary "A" current. A convenient carrying strap is provided, as well as Fahenstock clips for terminals.

The "B" supply is obtained by the use of a Sterling "B" Power Unit, which is capable of delivering up to 60 milliamperes without overloading. The unit uses the celebrated Raytheon tube for rectification purposes and has two variable voltages. The charger shown is also manufactured by the Sterling Mfg. Company of Cleveland, and is so constructed that it is capable of either charging "A" or "B" batteries. The charger uses a two Ampere Tungar bulb. A switch is provided, by which either "A" or "B" charging is obtained.

A Sterling automatic radio power control switch is used to secure automatic control of eliminator and charger. It plugs directly into a light socket and is connected in series with the receiver and the "A" battery. The charger and "B" eliminator are also plugged into it. It has the faculty of automatically cutting off the trickle charger and turning on the "A" battery and "B" eliminator when the receiver is in operation, and turning off the "B" eliminator and connecting the charger to the "A" battery when the receiver is not in operation.

The speaker shown is a product of the H. G. Saal Company of Chicago. It is the new Scientific Saal Eccentric Cone and is capable of reproducing both high and low notes to a very faithful degree, due to its unique construction. An Ideal loop, manufactured by the Ideal Products Company of Chicago, is used as a pick-up device for the Melo-Heald Eleven. The loop is exceptionally well made and has a very pleasing appearance. It is moderate in price and is capable of performing in a manner equal to that of the higher priced loops.

The Melo-Heald Eleven is shown in Photograph "B" installed in a Model C Corbett chest. It is manufactured by the Corbett Cabinet Mfg. Company of St. Mary's, Pennsylvania, and is made entirely of walnut and has a beautiful lacquered finish.

(If any further information is desired regarding accessories shown, kindly write the manufacturer direct.)

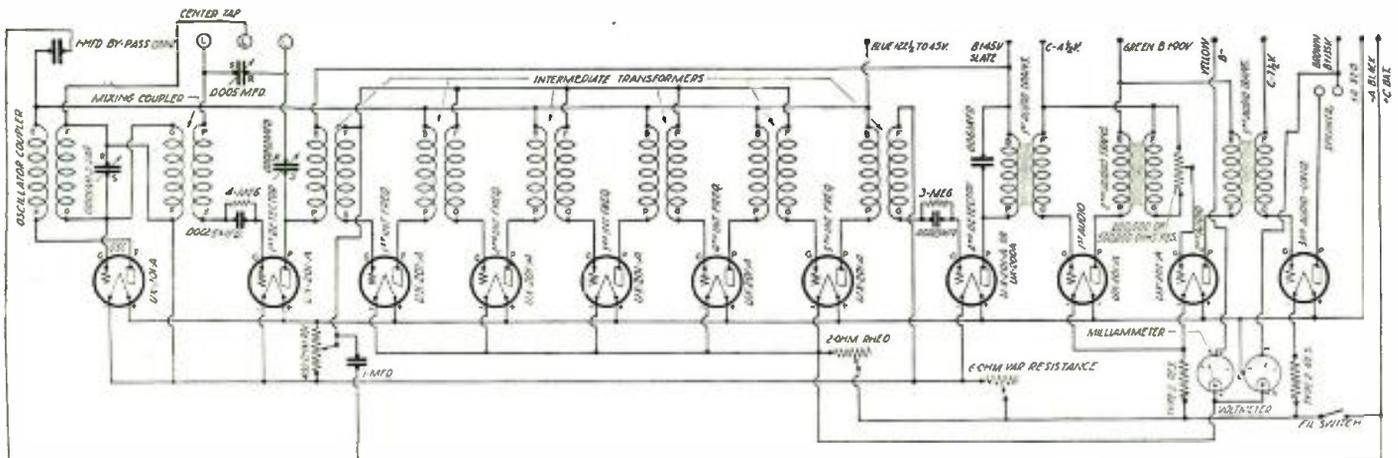


Fig. 4—Schematic wiring diagram for the advanced experimenter

Further Notes on the Completely Shielded Six Tube Neutralized Receiver

Herewith is Given Additional Information on the Theoretical and Practical Operation of This Excellent Receiver

MANY of our readers have expressed a desire in their correspondence, that additional information be given on the theoretical and practical phases of the Completely Shielded Six Tube Neutralized Receiver. In connection with these requests, considerable time has been given to research and experimentation. While the theoretical and constructional details contained in the original description, which appeared in the December, 1926, issue of THE CITIZENS RADIO CALL BOOK, were very complete, the additional research and experimentation have made it possible to cover some of the more important features in an exhaustive manner.

The Six Tube Shielded Neutrodyne Receiver has been designed with the aim of introducing to the public a receiver having a higher degree of amplification and selectivity than the usual single stage systems, and of such nature that it can be constructed with no more difficulty than these earlier models.

It may be interesting, in behalf of those who contemplate the construction of such a receiver, to briefly review the theoretical factors affecting the operation of neutralized amplifiers.

It is essential to first define the term "neutralization" before proceeding. Many receivers which employ new and unique methods of giving stable results are said to be "neutralized." The majority of such receivers, however, are not in reality neutralized in the strict engineering sense. True neutralization in a radio frequency amplifier is defined as the total elimination by means of the circuit network, of all traces of reaction or regeneration currents which exist by virtue of the capacity coupling within the vacuum tube, as well as various other extraneous couplings.

A simple analogy giving a physical conception of the neutralization of mechanical forces will help the layman to form a better understanding of the electrical phenomena. Such an analogy is shown in Figure 1.

A pendulum consisting of a rod, R, and a weight, W, is suspended from the pivot, P, so as to swing freely. Two strings are fastened at the point O, enabling the pendulum rod to be pulled in either the direction M or N. In the diagram these strings, OM and ON, can be used to represent mechanical forces in the directions M and N respectively. If the string ON is pulled and then suddenly released, the pendulum will first swing in the direction of the arc B, reverse

direction, and swing through the arc A. Another reversal will occur and the same cycle of events repeated until the motion (mechanical oscillation) dies out. Obviously the pendulum may be started on its oscillatory course in the opposite direction by pulling and releasing string OM. Now, let us imagine that the lines, OM and ON, in the diagram represent the relative magnitude of the forces pulling in opposite direction at the point O, and assume both forces to be pulling at the same time. Let us further assume both forces to be pulling ON, to be reduced to ON₁, and that the force OM remains

the same. Since OM is of greater magnitude than ON₁, we may expect the pendulum to be displaced through the arc, A. However, if OM is reduced to OM₁ and ON₁ is increased to the original magnitude, ON, the pendulum will be displaced through the arc B. It is now conceivable that if OM and ON are made of equal magnitude, the pull in the direction B will be equal to and opposite to the pull in the direction A. The resultant of these two equal forces, OM and ON, regardless of their magnitude, is therefore, zero, and no displacement of the pendulum is produced. We have, therefore, a complete neutralization of mechanical forces.

We see from this that when we have a body with a force acting upon it so as to cause it to move, the motion may be prevented if a second force of equal and opposite nature is caused to act upon the body.

A fundamental amplifying circuit is shown in Figure 2. In this diagram a source of radio signal energy is indicated at S, which may be either the output of a preceding amplifier or an antenna system. The coil-condenser circuit, LC, is used to pick up voltage from the source. The maximum voltage is induced in the circuit LC, when it is tuned to resonance with the frequency of the source. The elec-

trical force set up, due to L and C, is represented by the voltage, E_g, which is directly applied to the grid and filament of the vacuum tube. This potential, operating on the grid element of the tube, tends to control the electron stream from filament to the plate in such a manner that an alternating electrical voltage is set up in the plate circuit having the same general wave form as the voltage E_g, but increased by an amount depending upon the amplifying factor of the vacuum tube used. Let us designate the amplifying factor of the vacuum tube as M_v. Then the voltage operating across the coil L₁ is equal to M_v times the voltage, E_g. This is indicated in Figure 2.



Photo A: View Showing Receiver Mounted in Console

Thus, we see that the vacuum tube is inherently a voltage amplifying device. It might seem to the layman that if one tube could be made to amplify a small voltage impulse as much as ten times (which is a reasonable amplification factor), it would seemingly follow that by the use of a number of tubes in series, a tremendous amplification of voltage could be obtained in geometric ratios. In order to accomplish results of this kind, however, it was found essential to give consideration to the most effective means of coupling the adjacent tubes. Various coupling networks were developed, which comprised combinations of inductance, capacity and resistance. The superiority of inductive coupling over other types was soon realized, but unfortunately, when it was carried out to the highest degree of efficiency, other detrimental factors came into play. It was found that the use of optimum inductive coupling resulted in putting the tube and circuit in the state of violent self-oscillation.

This is more clearly understood by referring to Figure 2. The inductive coupling is obtained at L_1 and L_2 . When the small primary (a), is used at L_1 , it is found difficult to induce sufficient electrical energy into L_2 in order to make the following grid voltage E_{G1} sufficiently greater than E_G . Obviously, in practice, the voltage E_{G1} should be at least two times the voltage E_G and preferably from five to ten times. Reasonable amplification demands this order of voltage increase.

If we increase the primary L_1 , as, for example, by the use of the primary (b), consisting of more turns, we find that the whole system

undesirable.

We find that the magnitude of the regenerated energy depends upon the amount of counter-electromotive force built up in the inductive load L_1 , which happens to be in the plate circuit. So, by making this load extremely small, as would be the case in using primary (a), the regenerated energy can be reduced to the point where no fear of oscillation need be held. We must keep in mind, however, that an abundance of energy must be transferred from one tube of an amplifying system to the following tube. This requires that the coupling between these tubes be of an efficient nature, and it is at this point that we realize that a mere reduction in inductive load (primary turns), to limit the regenerated energy so that oscillation is not present is far from being a legitimate solution. It happens when the load is held to such a degree, it is not of sufficient size to

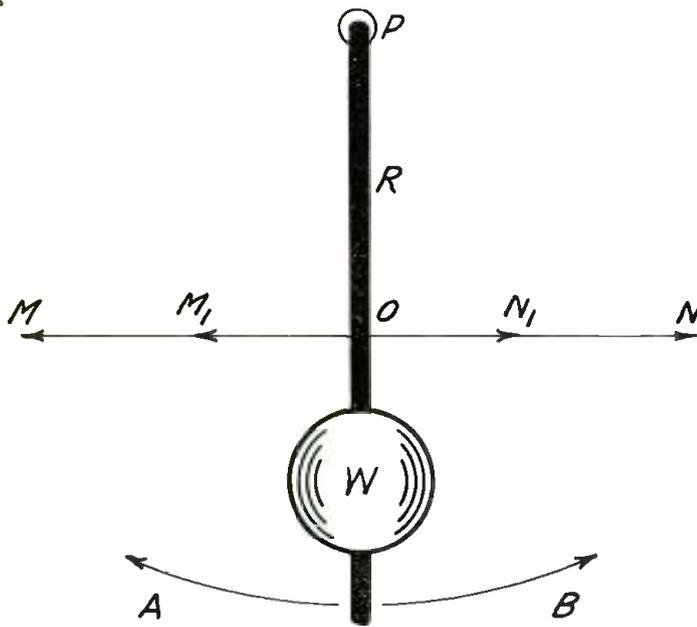


Figure One: Mechanical analogy of neutralization

goes onto an oscillatory state. This is entirely undesirable for any telephonic reception, since the oscillating conditions tends to mask or interfere with the telephonic modulation present.

An investigation of the cause of this trouble revealed that the inductive load (primary L_1), which had to be used in the plate or output circuit of the vacuum tube in order to obtain coupling to the following input circuit, built up within itself a counter-electromotive force, as would be expected in any similar alternating current device. This counter-electromotive force, operating in the plate circuit, is free to actuate the capacity from grid to plate in the vacuum tube (indicated by C_{G2} , resulting in a second electrical force being developed in the circuit LC. This new force in the circuit LC, tends to reinforce the original electrical force produced by the radio signal energy. The natural result of such a phenomenon is the increase in the intensity of the original signal impulse, and we have what is termed a regenerative condition.

It so happens that when this regenerated energy is increased in magnitude to a certain point, the electrical force acting upon the circuit LC, becomes large enough to throw the circuit and tube into a state of sustained oscillation. As previously mentioned, this is very

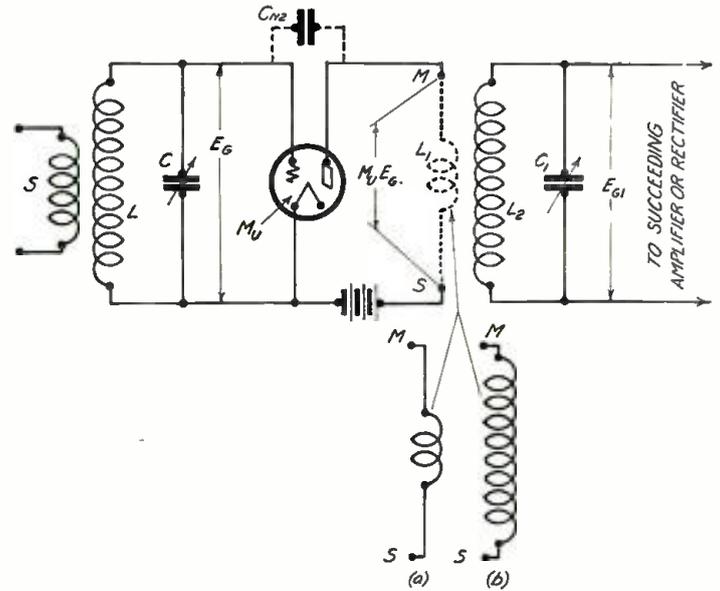


Figure Two

transfer energy of a worth-while magnitude to the input circuit L_1 , C_{G1} of the following amplifying tube.

Oscillation is in no way a criterion from which we may judge or predict the merit of an amplifier. Obviously, we may have the amplifying circuit of Figure 2 just below the oscillating point, but this is no indication that a suitable amount of energy will be transferred to the following amplifier. In fact, with the amplifying circuit held to critical regeneration, the second voltage E_{G1} may be even less than the voltage E_G . This condition may easily exist when the coupling between L_1 and L_2 is of a low value.

As we increase the load so as to approach a condition of ample transfer, the vacuum tube quite readily goes into the oscillatory state. It is evident, however, that while the origin of the trouble seems to lie in the primary load, the actual connecting link or medium through which the electrical force acts upon the input circuit LC is the capacity C_{G2} . This capacity is an electrical quality which depends upon the geometric construction of the tube and cannot be eliminated without also eliminating the elements of the tube, which, of course, would hardly be in the way of a solution. (This statement applies to the usual three-element type of tube.)

Returning again to our mechanical analogy, we see that in this basic amplifying circuit we have an undesirable electrical force originating in the inductive load L_1 , which acts through the grid-plate capacity, tending to produce an electrical motion in the circuit LC. It has been stated that if this electrical motion is of sufficient intensity, the electrical circuit, LC, may be acted upon by a force sufficient to drive the entire network into oscillation. In our mechanical analogy we can similarly produce a prolonged mechanical oscillation of the pendulum by causing a substantial force to act in either the direction OM or ON. Apparently, in our electrical system, in order to prevent the effect of this force originating in L_1 , we should devise a circuit arrangement whereby an equal and opposite electrical

force is made to act upon LC. The two electrical forces might, therefore, be made to neutralize each other, and regardless of the magnitude of the load L_1 , any effect which it might tend to have upon LC could be eliminated.

A well-known circuit arrangement for producing neutralization is shown in Figure 3. An additional coil L_N and a small condenser C_N , have been added to the basic amplifying circuit of Figure 2. The

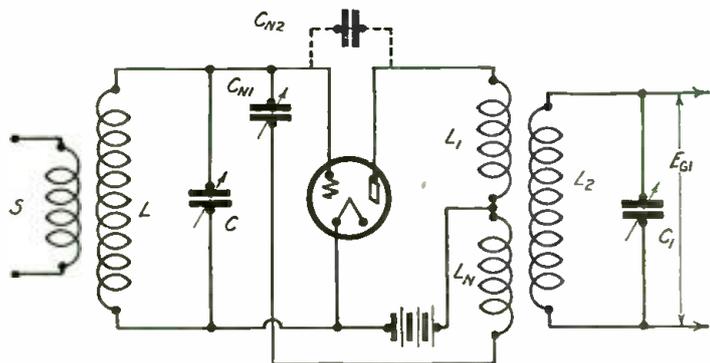


Figure Three: A well known neutralization network making possible a high degree of stable amplification

coil L_N is closely associated with the coil L_1 , so that the voltage operating in L_1 will also appear in L_N . The capacity C_N is made small and variable and approximately the same size as the natural capacity of the tube C_{N2} . The coil L_N is so disposed that the voltage built up in its acts through C_N upon the circuit LC in exactly a reversed direction to the normal voltage reacting from L_1 . This gives us the much desired balancing force in the input circuit, LC, to compensate for the undesirable elements found in the basic amplifying circuit.

Such a network is termed a "bridge" in electrical parlance. The "bridge" of the arrangement of the Figure 3 is drawn out schematically in Figure 4. Here we may better visualize the nature of the origin and the balancing of the electrical forces. The normal voltage, operating in the plate circuit load, L_1 , due to a radio signal at some instant of time, will produce a current flow, i_2 . The arrows indicate that this current, i_2 , originating by virtue of the voltage operating in L_1 , will continue to flow through C_{N2} , LC, and return. At the same instant of time a similar current is produced in L_N . The direction of the current is indicated by the arrows, i_1 . It is seen that the arrows representing i_1 and i_2 are going in opposite direction in the circuit LC. If C_N is adjusted in the proper manner the current i_1 can be made equal to i_2 and their combined presence in LC will produce a condition of balance or neutralization.

This is the condition so much needed, since it is now possible to make the primary load, L_1 , of any size which may be required to induce a high voltage into the second circuit, L_2 , C_1 . Carrying out this principle to a high degree will make it possible for the voltage E_{G1} to be as much as fifteen times as great as the original voltage impulse E_G . It is only in a few commercial receivers that this voltage amplification is approached however.

If the original impulse E_G is of the order of .001 volt (1 millivolt), the second tube in the series, which depends upon E_{G1} for its operation, will receive 15 millivolts, assuming the amplifying increase to be fifteen times.

In the event the second tube and its circuit are also capable of an amplification of fifteen times, the input to the third tube of the system will obviously be fifteen times 15 millivolts, or 225 millivolts. We thus see the tremendous amplification which may be obtained at radio frequencies by the use of carefully designed neutralization circuits.

The amplification factor of a vacuum tube depends upon the physical construction of the tube itself. The various factors which influence this are the areas inclosed by the grid and plate, the number of wires in the grid structure, as well as the distances between filament and the grid and the grid and the plate. Average tubes used in radio receiving give voltage amplifications of approximately 8 to 10 times.

This does not mean that every radio amplifier in a receiving system will give an amplification equivalent to the amplifying factor of the vacuum tube. The amplification factor of a radio amplifier is the result of the combined amplification of the tube and its respective coupling transformer. Assuming the vacuum tube to have an amplification factor of 8 and the coupling transformer an amplification of 2, a voltage input to the tube would, therefore, be amplified 16 times before reaching the second tube in the amplifier system. It would, indeed, be fortunate for many amplifying systems if the coupling transformer had an amplification of unity; such a condition making the amplification of the stage equal to that of the tube. In fact, a great many radio receivers use coupling transformers which have an equivalent voltage amplification less than unity. Under conditions of this kind the amplification of the stage is actually less than the amplification of the tube.

The amplification factor of the tube is usually designated by the Greek symbol " μ ," while radio parlance usually refers to the amplification of a unit stage as the "gain per stage." In the diagrams which we have used it is the ratio of voltage E_{G1} to E_G .

Throughout the review which we have thus far given, we have relied upon the use of inductive coupling between the primary L_1 and the secondary L_2 for voltage transfer between the amplifying tubes. A special modification of this arrangement has been devised in the Shielded Six-Tube Neutralized Receiver. The fundamental circuit of each amplifier stage as used in this receiver is shown in Figure 5. It will be noticed that the primary winding L_1 has been eliminated entirely and the autotransformer principle resorted to. Rather than the use of a separate primary, this arrangement make possible the use of a portion of the secondary in its place. This is carried out by tapping the secondary at a suitable point, such as P, and connecting back to the preceding plate through a blocking condenser such as CB. The plate potential is applied through the R. F. choke as indicated. The operation of this part of the circuit is easily understood. The radio frequency voltage, which is developed in the plate circuit by a signal, flows through the capacity CB and the lower part of the

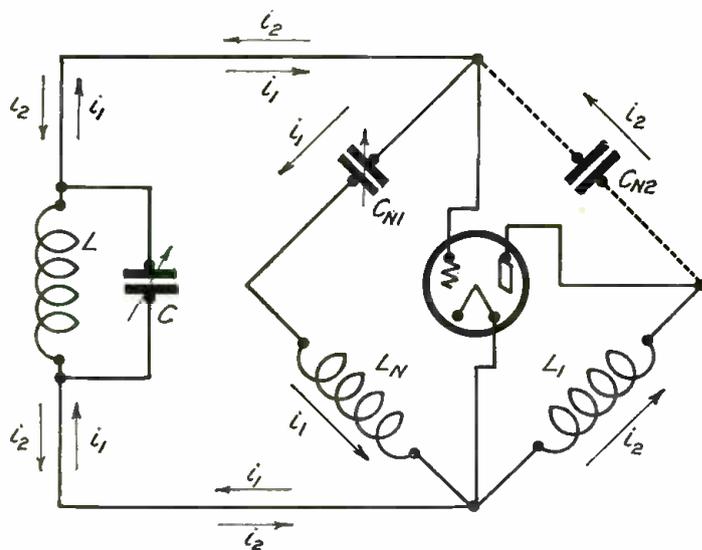


Figure Four: Circuit diagram of neutralization network illustrating how a balance or neutralization of electrical forces is attained by the arrangement of Figure Three

secondary (P and F), by virtue of the low impedance of this path. The R. F. choke, however, has a very high impedance to the radio voltage and prevents radio frequency current from flowing from the plate directly into the battery. The R. F. choke permits the application of voltage to the plate of the amplifying tube.

The location of the tap "P" is of great importance and has a very noticeable effect upon the amplifying character of the entire receiver. It also directly affects the relative selectivity of the system. In the transformers used in the Shielded Six-Tube Neutralized Receiver, the tap "P" has been carefully located. For those who are more experimentally inclined and care to go deeper into the technicalities, particularly as regards the location of the primary tap, they are referred to a paper

published in the Bell System Technical Journal of April, 1924, by Messrs. Friis and Jensen, entitled "High Frequency Amplifiers."

The circuit arrangement as shown in Figure 5 can be reduced to the same schematic bridge illustrated in Figure 4.

A schematic diagram of the transformer arrangement is shown in Figure 6. The transformer secondary is machine wound and carefully spaced to reduce distributed capacity. Each transformer is also individually tested so as to insure uniformity in inductance. This is important, as will be pointed out, inasmuch as the alignment of the successive circuits depends upon the use of coils and condensers having constant values.

The process of alignment, as this is called, should be carried out before the front panel is assembled. The link motion is first attached to the three condensers of the last three tuned circuits when the condensers are set at maximum capacity. A temporary knob is placed on the projecting shaft of the detector input condenser and the entire link motion, including the three condensers, rotated until a signal is heard. It is assumed that the separate condenser on the input to the first radio amplifier is also adjusted to the same signal. At this point the set screws on the link motion for the second and third condensers in the system are loosened, so as to permit these condensers to be individually rotated. The link motion is not removed from these condenser shafts, however. The condensers are individually rotated by the use of long nose pliers, grasping the rear projection of the shaft inside the shield compartment. This rotation is only of a very limited order and is merely carried out in order to make sure that proper alignment is present. Each condenser is carefully rotated through a small distance until maximum signal strength is obtained. Before tightening the two set screws mentioned it is also advisable to slightly readjust the fourth or detector input condenser until a maximum signal audibility is had. The set screws in the link motion are then tightened and the entire set returned to another station. In the event a reasonable audibility is not encountered from the second station, it may be advisable to repeat

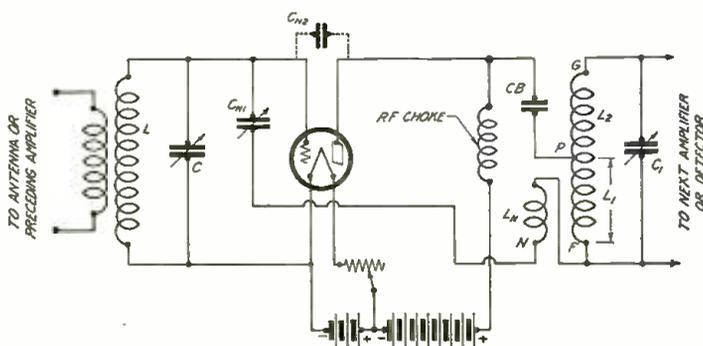


Figure Five

the above procedure to make positive that none of the condensers in the systems are out of step.

It will be noted that the rotor plates of the condensers used are "shaped," that is, they are slightly rounded at one end. For this reason it is evident that a major correction in capacity cannot be carried out by changing the angular setting of an individual condenser. If this were done, the circuits will become progressively out of alignment, as they are rotated from the point at which the correction is made. The neutralizing circuits consisting of the condenser C_N and the inductance L_N , it will be noted, are in shunt to the first, second and third tuning circuits. These circuits are, therefore, loaded to an extent depending upon the values of C_N and L_N . This will tend to make a difference between the second and third tuning circuits and the detector input tuning circuit, but it will be noted that a small capacity is provided in shunt to the latter circuit to make its loading equal to the other circuits. If this were not done, a major correction in the angular setting of the fourth condenser would be required and the resulting condition of progressive out-of-alignment would ensue.

The radio frequency transformers originally specified, in the constructional details, in the December, 1926, issue of the CITIZENS RADIO CALL BOOK, have been replaced by transformers whose mechanical design and construction are of a more rigid and sturdy char-

acter. The new design of transformers are of the solenoid type with windings on a bakelite tube. Appropriate mounting brackets and soldering lugs are provided in such a manner that an extremely rugged construction is obtained. This allows the transformer to be handled extensively during the actual assembly and wiring and effectively prevents any damage occurring to the windings themselves or to their geometric shape. The great difficulty experienced by the

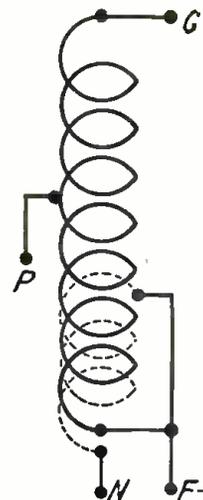


Figure Six

average constructor of this receiver, due to the fragile construction of the original self-supporting transformer, is thereby obviated. While a difference in technical opinion exists as to the comparative efficiency of each of the two types of transformers, actual experiments disclose that no appreciable difference, in the actual performance of the receiver, is discernible between a receiver using the old type transformer and one using the new type. Incidentally, the new transformer mounts in the same holes as were used for the older model.

In order to obtain proper neutralization, it was found necessary to provide a balancing condenser whose range of capacity was below that of the original type used in the first model of the Shielded Six-Tube Neutralized Receiver. In this connection, the three Model "G-1" XL balancing condensers (capacity 20 to 100 mmfd.) have been replaced by three Model "N" XL balancing condensers (1.8 to 20 mmfd.) In addition to the change in capacity of balancing condensers, it was found advantageous to bring the antenna to the tap of the first radio frequency transformer instead of to the end of the primary winding.

To be in keeping with complete shielding of the receiver it is suggested that Continental Shielded Tubes be used throughout the receiver. By the use of these tubes the overall shielding efficiency of the receiver will be increased.

The Six-Tube Neutralized Receiver is herewith shown installed in a console with appropriate accessories. The console is an excellent piece of workmanship and is manufactured by the Charlotte Furniture Co. of Charlotte, Michigan. The entire front of the console is made of butt walnut with the grain carefully matched.

A Willard 100-ampere-hour battery, the product of the Willard Storage Battery Co. of Cleveland, Ohio, supplies the necessary current for the filaments of the tubes.

An Acme "B" Eliminator using the celebrated Raytheon rectifying tube is used to supply the necessary "B" potential, while an Acme K-1 double free edge cone is used as a reproducer. Both of the last mentioned items are manufactured by the Acme Apparatus Co. of Cambridge, Massachusetts.

The charger is one manufactured by the Kodol Radio Corp. of Cincinnati and is known as the Silite Trickle Charger. A Yaxley relay is used in conjunction with the charger, eliminator and receiver, and makes the entire installation automatic in control. The charger and eliminator are controlled entirely from the filament switch of the receiver.

(Further information on any of the above described accessories may be obtained by writing direct to the manufacturers).

World's Record Super Nine

Extra Stage of Intermediate Frequency Greatly Improves
This Popular Receiver

All Illustrations and Construction Data Prepared in the
Laboratory of the Citizens Radio Call Book

OUR readers will recall the construction article showing how to build the World's Record Super that appeared in the December issue of this publication. Owing to the popularity of this circuit and the excellent results that have been obtained by radio fans who have constructed same, we are offering herewith a revised model adding an additional stage of intermediate frequency amplification.

This addition increases the volume and selectivity of the receiver to a marked degree. A 10 kilocycle separation between stations will be obtained without impairing the quality. This selectivity was demonstrated on local stations here in Chicago as well as distant stations. For examples: KOIL, located at Council Bluffs, Iowa, and transmitting on a wavelength of 305.9 meters, was received through station WGN, the Chicago *Tribune*, transmitting on 302.8 meters and KDKA, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., transmitting on 309 meters while the receiver was being operated in close proximity of WGN.

This circuit first came to the public's attention about two years ago when it at that time established the world's record for long distance reception which was verified by broadcasting stations in various periodicals all over the country. Programs were received from a distance of over 8000 miles using a loop and it was interesting to note that there was reserve amplification available which permitted the reception of signals below the "noise levels." This was a remarkable performance from a receiver having only two tuning controls.

We invite attention to the fact that in this new model WX-12 tubes replace the UX-201A tubes in the intermediate frequency amplifier. The grid to filament capacity of these tubes is considerably lower than the 201A tubes, making it possible to add another stage of intermediate frequency amplification without any undue tendency towards oscillation when the tubes are operated at their normal filament and plate voltages. The filaments of the four WX-12 tubes are connected in series and controlled by a 25-ohm rheostat. This arrangement

also reduces "A" battery consumption, as the filament of the four WX-12 tubes will draw just about as much current as one UX-201A tube. This reduces the total battery consumption in the nine-tube receiver to where it is actually less than that consumed by the eight-tube receiver described in our last issue.

For the best results, it is essential that the intermediate iron core transformers be peaked to the same frequency as the filter transformers, and also an important detail is that the two filter

transformers tune to exactly the same frequency. If all of the transformers do not match the amplification will be greatly reduced and the receiver will lose selectivity. The transformers used in this circuit are carefully matched with a condenser placed on the inside of the transformer housing.

A 6-volt bias is used on the second detector in place of the conventional grid condenser and grid leak method. A 4-volt bias is supplied through the pick-up coil of the first detector, this coil being connected to the center lead of the loop. This makes the receiver more efficient and provides a proper bias on the detectors which considerably sharpens the loop tuning.

A bias of three volts is used on the four WX-12 tubes in the intermediate frequency stages. If the experimenter desires to use $4\frac{1}{2}$ volts this may improve the reception which can be best determined by trial. The first stage of audio frequency amplification has a bias of $4\frac{1}{2}$ to 6 volts on the grid and the second stage uses $27\frac{1}{2}$ volts.

It will be noted that the first detector and oscillator uses $22\frac{1}{2}$ volts "B" battery while the second detector is operated on $67\frac{1}{2}$ volts. The intermediate and first audio stages use 90 volts on the plates while the last stage has 135 volts on the plate of the UX-171 tube.

Photo B shows a rear view of the completely assembled receiver. Notice the neat layout and the ease with which this receiver can be assembled. A graphic illustration showing each and every connection is shown in Figure 1, while for the more advanced experimenter we are submitting the same circuit in schematic diagram form as shown



Photo A. Phantom view of receiver installed in
Fritts console

in Figure 2.

LIST OF PARTS

These parts or their equivalent will give satisfactory results:

- 2—Remler .0005 Mfd. Variable Condensers
- 1—Micamold .002 Mfd. Fixed Condenser
- 2—Sangamo 1 Mfd. By-pass Condensers
- 2—Thordarson R200 Audio Transformers
- 3—Scott No. 400 Selectone Transformers
- 2—Scott No. 410 Selectone Transformers
- 1—Qualitone Loop
- 1—Carter Imp 25-Ohm Rheostat
- 1—Carter Midget 6-Ohm Rheostat

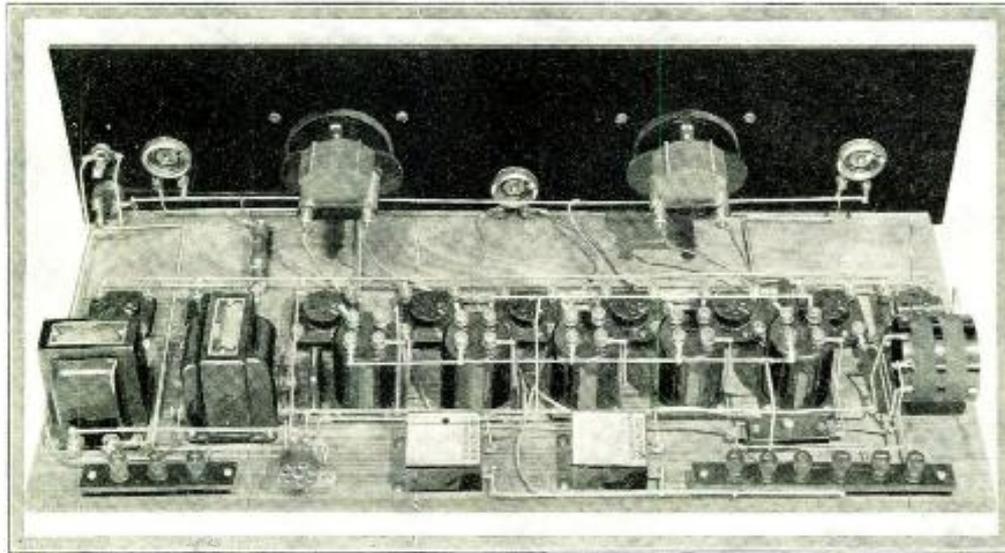


Photo "B"—Rear view of receiver showing arrangement of parts on baseboard

- 1—Carter Battery Switch
- 1—Carter No. 1 Midget Jack
- 1—Carter H $1\frac{1}{3}$ -Ohm Fixed Resistance
- 2—Carter 500,000 Variable Resistances
- 1—Thor Oscillator Coupler
- 2—Kurz-Kasch No. 590 200-0 Dials
- 9—Benjamin No. 9040 Sockets
- 1—Formica Drilled and Engraved Panel 7x26"
- 1—Wooden Baseboard $10\frac{1}{2} \times 25 \times \frac{1}{2}$ "
- 9—Eby Marked Binding Posts
- 1—Jones BM Multiplug
- 1—XL Model N Balancing Condenser
- 2—Terminal Strips $3 \times \frac{3}{4} \times \frac{3}{16}$ "
- 6 Doz. Kellogg Lugs
- 50 Ft. No. 12 Round Bus Wire
- 1 Package Kester Radio Solder

Photo A shows the receiver completely assembled, mounted in a Fritts Consolette. The "A" filament potential is supplied by a Willard 100 ampere hour 6-volt storage battery while the "B" potential is supplied by a "B" power unit manufactured by the Bremer-Tully Manufacturing Company, Chicago, Illinois. This device has a capacity of 150 volts at 60 milliamperes which is amply sufficient for a receiver of this nature using a power tube. The charger shown is the Balkite "J" manufactured by the Fansteel Products Company, North Chicago, Illinois, and the automatic relay is manufactured by the Jewell Electrical Instrument Company, Chicago, Illinois. The loop illustrated is known as the "Qualitone" and is manufactured by the Duro Metal Products Company, Chicago, Illinois. The cone speaker shown is of the free edge type $17\frac{1}{2}$ inches high and is manufactured by the Utah Radio Products Company, Chicago, Illinois.

The assembly of this receiver is quite simple and may be done in a comprehensive and systematic manner in a surprisingly short period of time. Before attempting to assemble the receiver, the photograph in photo "B" should be studied in order that the

general arrangement of parts be thoroughly understood.

The first parts to be mounted should be the binding post strips and the two Sangamo by-pass condensers, which are placed on the extreme back edge of the baseboard.

The intermediate frequency transformers, oscillator coupler, audio frequency transformers and tube sockets should be placed upon the baseboard, but not fastened down, and arranged in such a manner that the layout will be symmetrical and as short leads as is possible used to make the various necessary connections. It might be well to caution the constructor at this point not to place the tube sockets close enough to the front of the baseboard that when a tube is inserted in the socket, that they will be touching

the two tuning condensers.

After a logical layout has been determined, the parts should be put in their proper positions and with a sharp pointed instrument pierce the surface of the baseboard through the mounting holes of the various parts to such an extent that they may be recognized as such. With a small drill, drill a shallow hole in the wooden baseboard. The parts may be now fastened down quite easily and readily.

The first parts to be wired should be the intermediate frequency amplifiers. Place solder lugs on all terminal posts and make the connection with No. 12 round bus bar, making them as short as possible especially the grid and plate leads. Rosin core solder should be used and care taken that the joint is a solder joint and not a rosin joint. This may be assured by the use of a very hot iron.

As will be noticed in the schematic wiring diagram, the filaments of the four intermediate frequency amplifying tubes are in series. These connections may be made merely by soldering together the adjoining lugs. The remaining filament circuits may now be wired. The connections required for the audio frequency amplifier and the oscillator coupler should next be made. The filament may be assembled at this point and fastened to the sub-base, at which time the interlinking connections between instruments on the panel and the sub-base may be made.

Care should be taken when bare wires are used that they are well spaced in order that they may not come in contact with each other, as the results might be quite disastrous to tubes or batteries.

The volume of this set is controlled by two 500,000 ohm variable resistance units. This arrangement permits perfect control of the input to the detector tube, as well as the audio output, preventing the detector and audio stages from becoming overloaded and consequently producing distortion when receiving local stations. The two detector tubes and oscillator are controlled by a 6-ohm rheostat.

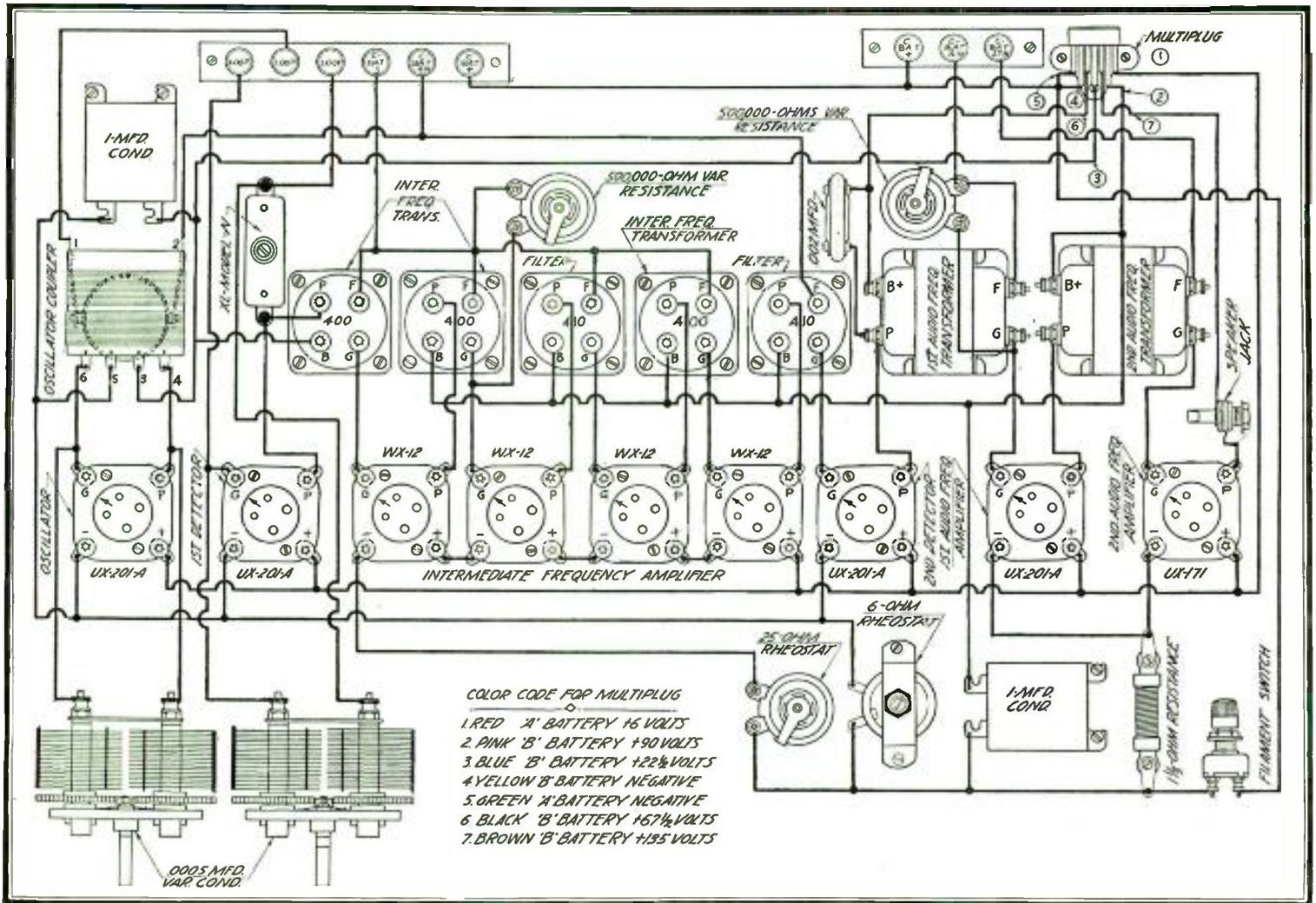


Figure 1—Pictorial wiring diagram showing all connections

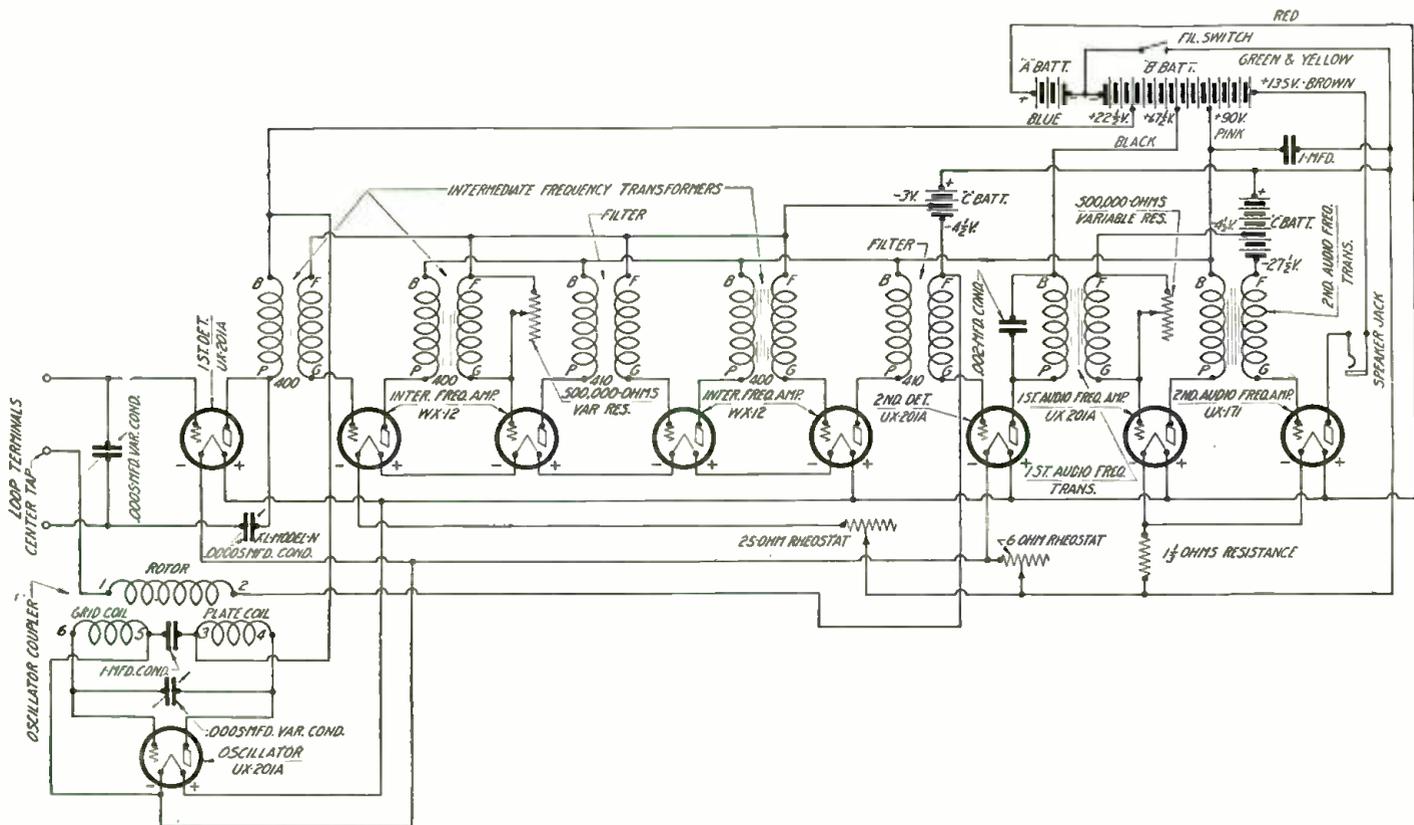


Figure 2—Schematic wiring diagram for the more advanced experimenter

A Compact "B" Supply With Voltage Regulator Tube

This Eliminator Uses Automatic Voltage Regulation Which Assures Consistency of Voltage Output

Construction and All Illustrations Made in the Laboratory of The Citizens Radio Call Book

IN various issues of this publication, there has been described several very satisfactory B supply units. It would therefore seem that nothing new could be expected from this field, inasmuch as such satisfactory reports have been received from the builders of these units. This new B supply unit is extremely interesting as it incorporates features which have been absent in the type described in foregoing issues.

In the specifications for the previous B units variable resistances were used to regulate the various output voltages. This was found to result in certain limitations, i.e., if the B unit was turned on, there would be no load on the unit and as a result a very high voltage would be built up to 200 or 300 volts, which would put an unnecessary strain on the filter condensers and the low voltage by-pass condensers used in the receiver. Another very common condition was that when the unit was used on a receiver using seven or eight tubes the voltage would fall, say to 100 volts. This condition may or may not have a very serious effect, but inasmuch as the current drawn by the receiver does not remain at a fixed value, but fluctuates in proportion to the intensity of the receiver signal, there would be, of course, a change in the applied voltage, which causes a peculiar type of distortion known as "tagging." This condition is very noticeable on a strong signal.

Concomitant with this condition where the output voltage of the eliminator varied as the current drawn from it by the receiver varied, was a condition known as "motorboating." This made itself manifest in a receiver by a continuous "putting" noise, either when a signal was being received or when the receiver was simply turned on ready for operation.

This B supply unit which is not subject to the aforementioned drawbacks will deliver, practically constant output voltage regardless of the current drawn by the receiver. This unit consists of a high voltage power transformer which delivers 200 volts to each plate of a UX 213 full-wave rectifying tube. The rectified pulsating current is supplied to a filter consisting of a total of 7 microfarads of capacity and 49 henries of inductance. The filter inductance consists of two windings connected in

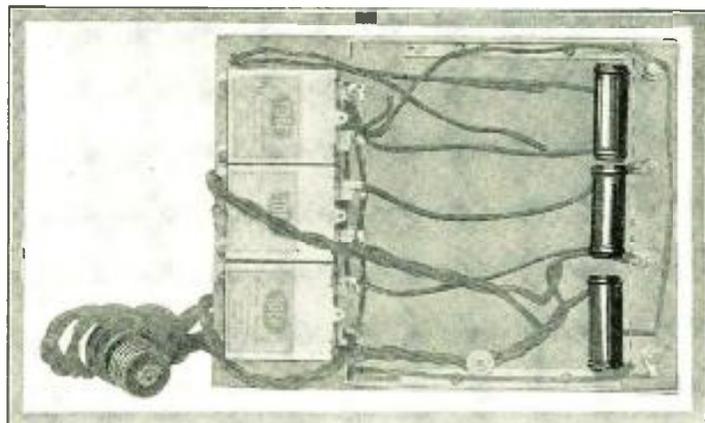


Photo B. Bottom view of completed unit

opposition to each other in such a fashion that the mutual inductance of the two together with the 2 microfarad condenser of the filter provides a circuit resonant to 120 cycles, which is the frequency of the principal hum component found in the rectified direct current delivered by the full-wave rectifier tube. (Rectifying devices act as frequency changers; thus the 60-cycle current when rectified has a 120-cycle pulsation due to the rectifier action.)

Across the output of this filter is connected one 1,500, one 4,000 and one 6,000-ohm resistance in series. Two additional 1-mfd. condensers are connected across the 4,000 and the 6,000-ohm resistances. These serve as voltage regulators and also provide additional filtration. Connected across the 4,000 and 6,000-ohm resistances is a UX 874 voltage regulator or glow tube. This tube has an unusual property in that it serves to maintain the voltage across its terminals at a constant value regardless of the current drain on the circuit between the ranges of zero and 45 milliamperes.

As an example, on the 180-volt tap of the unit the voltage variations with current drains of from zero to 20 milliamperes is less than 5 per cent as compared to many times this percentage with an ordinary B supply unit. The voltage variation across the 45-volt tap with normal detector currents is less than 3 per cent, in the case of the largest super-heterodyne it will probably not run over 10 to 15 per cent.

This exceptionally good regulation has been obtained through careful design of the unit and through the use of the glow tube. As an example, the filter system employed has a very low D. C. resistance, considerably less than 400 ohms (as compared to the average 700 to 900 found in the usual eliminator). The internal resistance of the power transformer has been kept at a very low value and an extremely large size amply proportioned core employed in order that the voltage regulation of the transformer itself may be practically perfect. The net result of the selection of transformer and choke with very low internal resistance is exceptionally good voltage regulation, particularly when coupled with the use of a UX 874 glow tube. The filter condensers selected have also been very carefully checked and are rated at considerably over the working voltage to which they are sub-

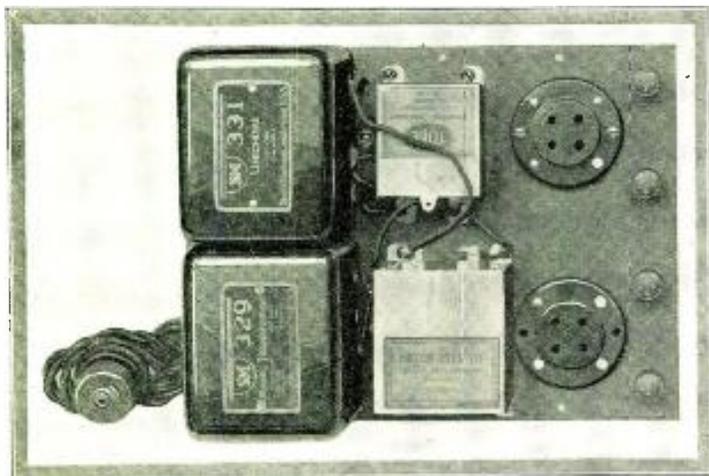


Photo A. Top view of completed unit

jected. As a further precaution, not only for these condensers but for the low voltage by-pass condensers, found in receivers, the B unit has been so designed that the output voltage can never rise above 180 volts. An additional precaution lies in the switch formed by two contacts on the glow tube base. Thus, if the glow tube is removed, all power is taken off the unit. If the

The use of the unit is simplicity itself. The "minus" post is connected to the "minus B" post of a receiver. The "plus 45" post goes to the "plus detector" post of the receiver; and the "plus 90" post of the B unit goes to the "plus 90" post of the receiver. The remaining or "plus 180" post of the B unit connects to the "power amplifier" post of the receiver. If a UX 112 tube is used in the last audio stage, the C bias should be 9 to 11 volts (this is not critical). If a UX 171 power tube is used, the C bias should be 40 to 45 volts. This bias had best be provided by small batteries since this is the most economical method.

Once the unit has been connected as above, the owner may be absolutely sure that it will deliver exactly its rated voltages to a receiver (within a few per cent) and there need never be any fear in his mind of damaging his tubes as might be the case with a B unit provided with adjustable resistances. (B units containing resistances will generally deliver from 100 to 200 volts on the detector and RF amplifier taps, and as the user always turns the voltage control knobs in as far as possible in order to obtain strong signals, the life of the detector and RF amplifier tubes is very materially reduced. This source of trouble is entirely absent, as are practically all other known sources of B supply troubles, with the unit described herewith.)

LIST OF PARTS

- 1—Radiotron UX 213 rectifier tube.
- 1—Radiotron UX 874 Voltage Regulator Tube.
- 1—Silver-Marshall Type 331 Unichoke.
- 1—Silver-Marshall Power Transformer.

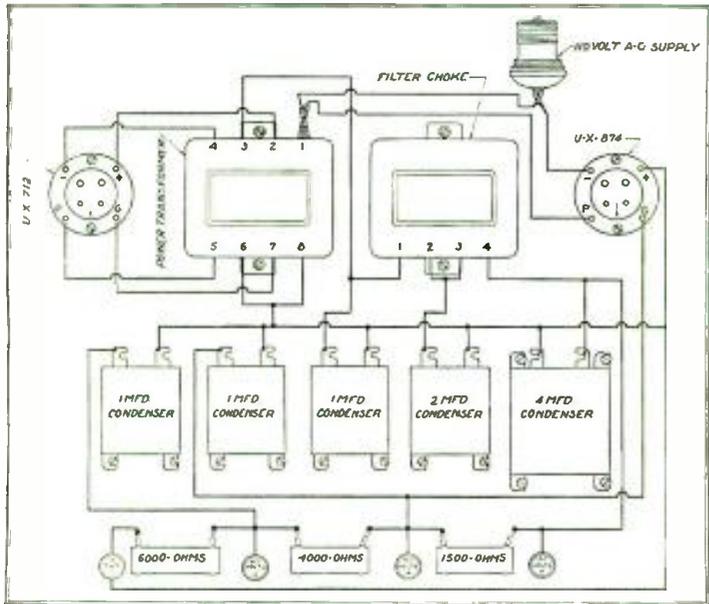


Fig. 1. Graphic illustration

rectifier tube is removed, the power is applied to the transformer only. Should the tubes be interchanged, the unit simply will not function and no damage results. From a standpoint of safety, the unit is exceptional, for the operator may place his fingers across the high voltage terminals and experience nothing more than a slight tingle. However, this procedure is inadvisable.

The assembly is extremely simple. The bakelite base should first be drilled in accordance with Figure 4. The power transformer and Unichoke should be mounted at the rear as shown in Photo A. On the under-side of the base, directly beneath these two units hang the three 1-mfd. condensers. On top of the sub-base, between the tubes and transformer and choke, are placed the 4-mfd. and 2-mfd. condensers. To the front of these are two tube sockets, the one for the glow tube, the other for the rectifier tube. In front of these are the binding posts. The three Mountford resistors are fastened directly to the binding post screws on the under side of the base. The terminal screws are removed from the tube sockets and wires pushed up through holes in the sub-base directly into the threaded terminals of the sockets, to which they are soldered. The various leads for the instruments are pulled through holes in the base. The mounting brackets serve to hold the base sufficiently high to protect the voltage divider resistances and the 1-mfd. condensers beneath it. One side of the cord from the power transformer is cut. One end of the cut goes to the "P" terminal of the glow tube socket and the other end to the minus terminal of the glow tube socket. Thus when the glow tube is removed power is automatically cut off and when it is inserted power is applied to the transformer. In operation the unit may be turned on and off by means of the separate attachment plug found at the end of the cord supplied with the power transformer.

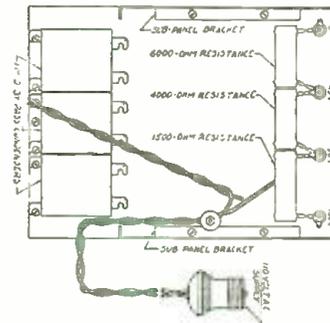


Fig. 3. Bottom view allocating parts

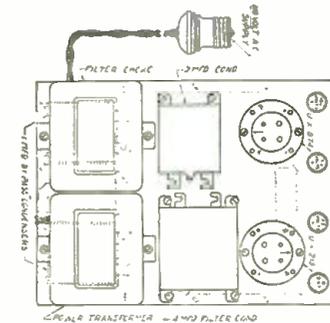


Fig. 4. Top view allocating parts

- 2—Silver-Marshall Type 511 Tube Sockets.
- 1—Pair Silver-Marshall Type 540 Mounting Brackets.
- 1—Tobe 4 mfd. Condenser.
- 1—Tobe 2 mfd. Condenser.
- 3—Tobe 1 mfd. Condensers.
- 1—Mountford 6000-ohm Resistance, 10 m.a.
- 1—Mountford 4000-ohm Resistance, 10 m.a.
- 1—Mountford 1500-ohm Resistance, 50 m.a.
- 4—Engraved Eby Binding Posts.
- 1—Micarta Panel, 6 1/2 x 8 1/2 x 3/16 inches.
- 20—6/32 x 3/4 R. H. Machine Screws
- 20—6/32 Hexagonal Brass Nuts
- 15—Kellogg Tinned Soldering Lugs
- 40 Feet Belden Rubber Covered Flexible Wire
- 1 Roll Kester Radio Solder

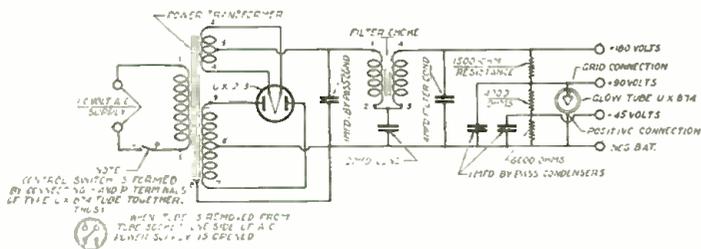


Fig. 2. Schematic wiring diagram of completed unit

A 30 K. C. Super-Heterodyne Receiver

This Receiver Is Extremely Simple to Construct and in Which Quality and Selectivity Predominate

Construction and All Illustrations Made in the Laboratory of the Citizens Radio Call Book

THERE have been many articles written on the Super-Heterodyne and a great many Super-Heterodynes have been made commercially possible and placed before the public. The great majority of these receivers, however, have been more or less difficult for the novice to construct in such a manner that the best results might be obtained. With this fact in mind, this receiver has been designed to meet the demands of the home constructors who have not had sufficient experience to construct the more complicated receivers, and yet have a receiver which has the same possibilities as the more intricately constructed receiver. The layout of this receiver is extremely simple and when constructed properly should give excellent results.

The receiver to be described consists of eight tubes, which are, namely, first detector, oscillator, three intermediate frequency amplifiers, second detector and two audio frequency amplifiers.

The intermediate frequency amplifiers of any Super-Heterodyne are of such a critical nature that great care must be taken in their design. The type 271 General Radio intermediate frequency transformers used in this receiver have been given every consideration by their designers and are a product which displays a great deal of engineering forethought. The tuning range of these transformers is from 7000 to 12,000 meters, with a peak frequency of 10,000 meters. The transformer is shielded both electrostatically and electromagnetically, making it possible to use several of these transformers with very little distance separating each stage. The whole unit is enclosed in an attractively japanned metal case, fitted with convenient mounting holes and terminal posts.

In this type of circuit, amplification at the peak frequency of the intermediate frequency transformers is desirable. It is also desirable that this amplification be over as narrow a wave band as practical to work. In order to accomplish this, a tuned filter or filter transformer should be provided in the output stage. The filter transformer used in that part of the circuit in

this receiver provides the necessary tuning to enable the intermediate frequency transformers to be used at their peak frequency.

The audio frequency of the receiver consists of two stages of transformer coupled amplification. In the first stage of amplification a Type 285-D General Radio transformer is used.

In order to improve both the upper and lower ends of the amplification curves, the design of the transformers must be such that they will have a high inductance and at the same time have

a low value of distributed capacity. This has been accomplished in the type 285-L transformer used in the second stage of amplification by the use of a large core made from a very high quality of selected steel and by a careful selection of coil turns. This transformer has a two to one ratio. A UX 112 power tube is used in the last stage of audio frequency amplification, which will deliver an abundance of undistorted power to the loud speaker.

A 12-ohm rheostat is used to control the three intermediate frequency stages and a 25-ohm rheostat used to control the filament of the oscillator. A type 112 Amperite keeps the filament of the last tube at its most efficient point. The first stage of audio frequency is controlled by a type 1-A Amperite.

The first and second detector is operated from a fixed variable resistance of 10 ohms. A 400-ohm potentiometer is placed across the "A" battery, and the divider arm making connection with the grid returns of the three intermediate frequency amplifiers, which is used as a modifier. Regeneration in the loop circuit is accomplished by means of a .000015 mfd. midget condenser, which is mounted on the panel.

A Jewell pattern No. 135 double range voltmeter is mounted on the panel, the high side of which is connected across the "B" battery, the low side of which is connected on the three intermediate frequency amplifiers. This meter may be of great value to the

operator to determine the condition of his batteries and the temperature at which he is operating the filaments of his tubes. A Jones multi-plug connector is supplied, which permits the bat-



Photo A. View suggested installation in console with accessories

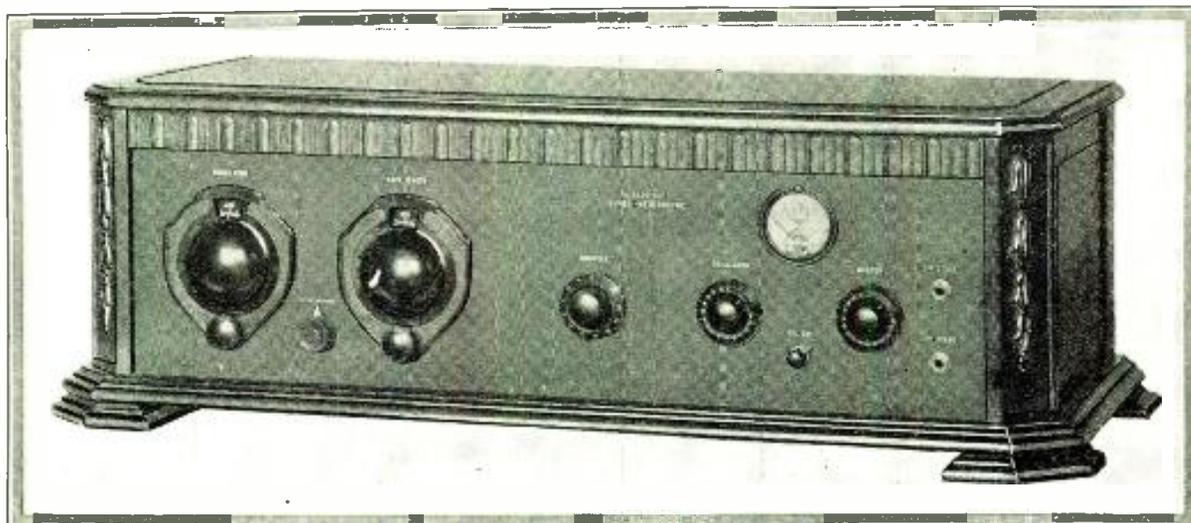


Photo B. Front view of receiver

teries to be connected or disconnected quite readily.

LIST OF PARTS

These parts of any reasonable substitute will produce satisfactory results:

- 1—General Radio 247-N .00035 Variable Condenser
- 1—General Radio 247-F .0005 Variable Condenser
- 2—General Radio 236 1/2 mfd. Condensers
- 1—General Radio 368 15 mmf. Midget Condenser
- 1—General Radio 285-D Audio Transformer
- 1—General Radio 285-L Audio Transiormer
- 3—General Radio 271 Intermediate Transformers
- 1—General Radio 331 Filter
- 1—General Radio 301-12-ohm Rheostat
- 1—General Radio 301-25-ohm Rheostat
- 1—General Radio 214-A 400-ohm Potentiometer
- 8—General Radio No. 349 Sockets
- 1—Dubilier 601 .002 mfd. Fixed Condenser
- 2—Dubilier 601 .005 mfd. Fixed Condensers
- 2—Dubilier 601-G .00025 Grid Condensers
- 1—Yaxley 10-ohm Variable Resistance
- 1—Yaxley No. 2 Jack
- 1—Yaxley No. 3 Jack
- 1—112 Amperite
- 1—1-A Amperite
- 1—Jewell 135-B Voltmeter
- 1—Camfield 620 Oscillator Coupler
- 3—Kurz-Kasch Rheostat Dials

- 2—Kurz-Kasch 592 Vernier Dials
- 1—Qualitone Loop
- 1—Wood Baseboard
- 1—Cutler-Hammer Filament Switch
- 6—Eby Binding Posts
- 2—Lynch 2-megohm Leaks
- 1—7x26-inch Radion Drilled and Engraved Panel
- 2—Radion Terminal Strips
- 50 Ft. Belden No. 12 Wire
- 1—Jones B. M. Multi-Plug and Cable

Photo "A" shows the 30 K. C. receiver installed in an Excello R-22 console, manufactured by the Excello Products Co. of Chicago, Illinois. Genuine walnut is used throughout in its construction. The doors are of butt walnut and the whole console finished in a beautiful two-tone effect. A Willard "A" power unit supplies the necessary "A" power for the proper operation of the circuit. This unit is unique in that the battery is always kept at full charge by an automatic trickle charger actuated when the receiver is not operating. In the event that the battery depreciates to a great extent, a 2-Ampere Hour "Booster" charge may be applied, which will speedily bring the battery to full charge. The "B" supply is obtained from a Williard "B" power unit. Variable voltages are available with this device, which is fully capable of supplying the necessary "B" voltage to the 30 K. C. Super-Heterodyne without any danger of overloading. Both of these products are manufactured by the Willard Storage Battery Co. of Cleveland, Ohio.

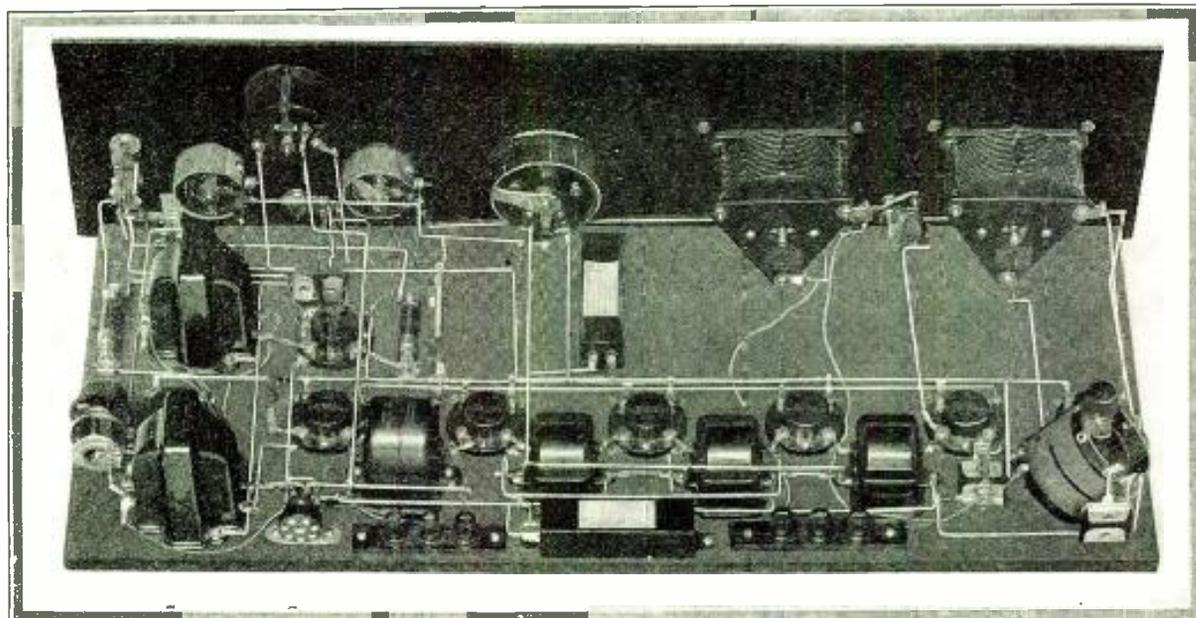


Photo C. Rear view of completely wired receiver

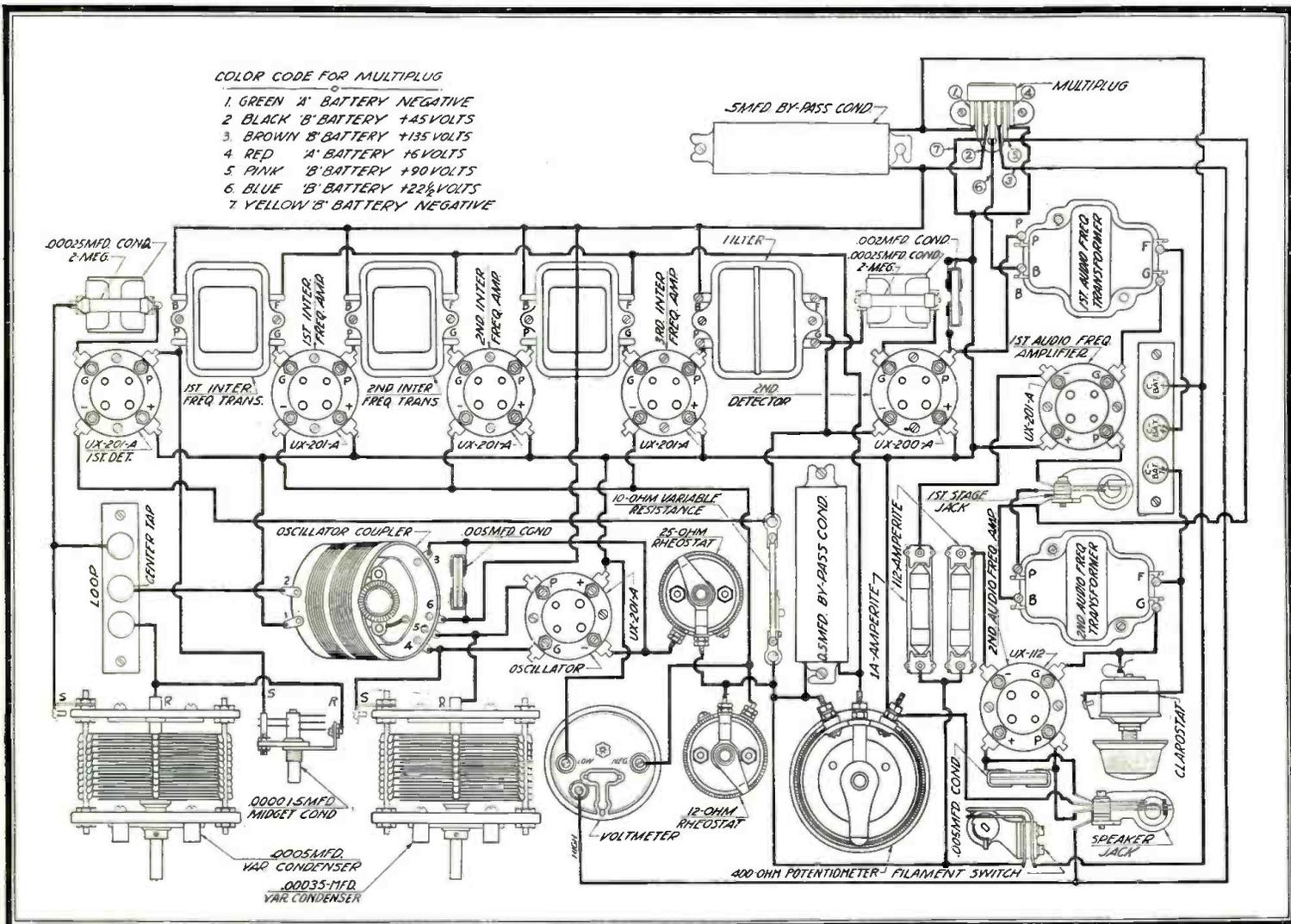


Fig. 1. Graphic illustration

The speaker shown is a product of the Duro Metal Products Co. of Chicago, Illinois, and is known as the Troubadour. It is capable of very excellent reproduction and operates in a satisfactory manner with this receiver. The Qualitone loop is also a product of the Duro Metal Products Co. and has the unique feature of being collapsible. A compensating device is provided by which the wire constituting the loop may be drawn taut in the event that it becomes loose through use. A new device, manufactured by the Amsco Products Co. of New York City, is

used in conjunction with the speaker. It is known as the Orthophone and acts in the capacity of a tone filter. It couples the speaker to the audio amplifier of the receiver and prevents direct current from passing through the speaker, thereby eliminating the possibility of injury to the winding in the magnets.

The 30 K. C. Super-Heterodyne receiver is shown installed in Photo "B" in a Fritts cabinet, a product of the D. H. Fritts & Co., Chicago, Illinois. It is constructed entirely of walnut and has a very excellent hand-rubbed finish.

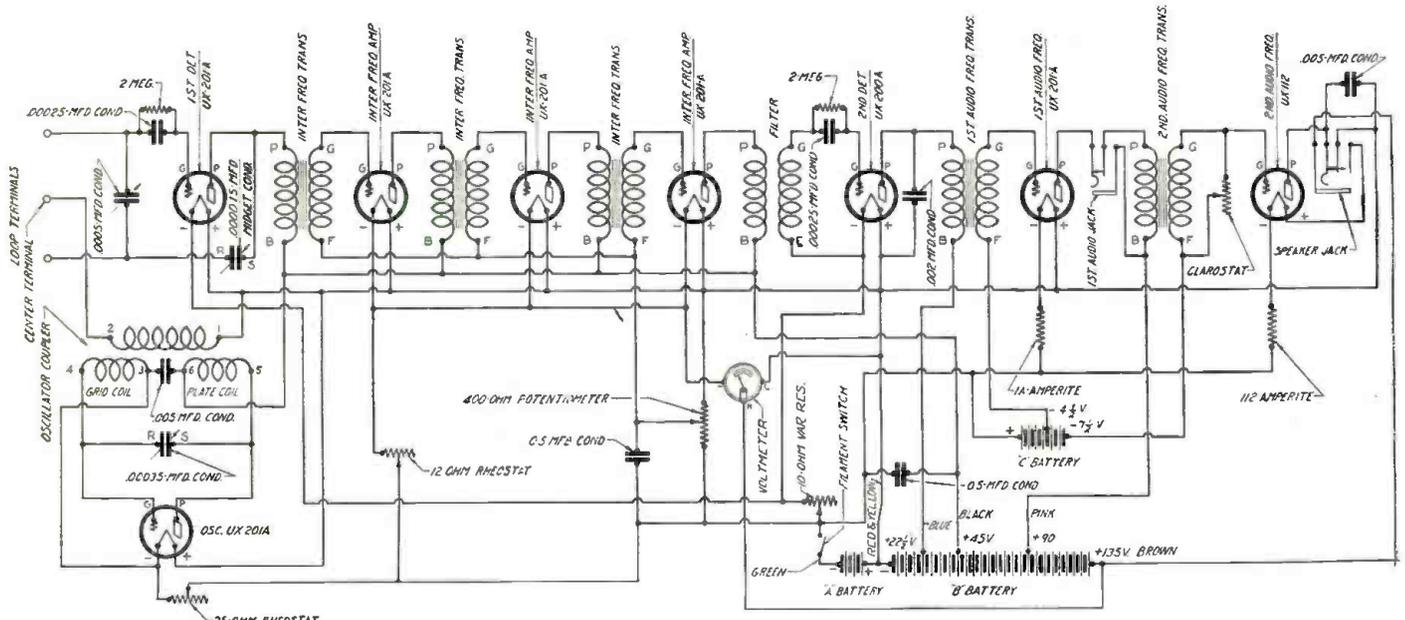


Fig. 2. Schematic wiring diagram

The Improved Browning-Drake Receiver

This Design Is the Culmination of Considerable Effort to Determine
the Most Suitable Layout for This Type of Receiver

Constructional Data and All Illustrations Prepared in the Laboratory of the
Citizens Radio Call Book

DURING the past year various receivers have been placed before the public, each bearing the name of Browning-Drake and consisting of the fundamental circuit, originally introduced to the public in 1924, of one stage of tuned radio frequency amplification, balanced by some method, with a regenerative detector. Naturally there has been a grave question in the minds of set builders as to which receiver to build, as all differed materially in the mechanical layout of parts and in the type of audio frequency amplification used. In view of the fact that some of these receivers have not been entirely satisfactory from the home constructor's point of view, and because there have been a few slight changes which the radio fans may be interested in, the constructional data will be given on a set which has been experimented with for the past few months.

The specifications which were adhered to in the design of the new receiver were, first, a set which the average layman could construct with an assurance that it would operate properly; second, the parts for the complete receiver must not be too expensive; third, the set must be capable of receiving distant stations with good volume, the tone quality must be as nearly perfect as possible, and the selectivity sufficient to cope with broadcasting conditions in all parts of the country. These conditions were set down, since the designers were interested, primarily, in endeavoring to make some small contribution to the radio industry in describing a receiver which the average home constructor could afford to build and which could give entire satisfaction.

The receiver to be described uses the same fundamental circuit which has proven to be most effective under the conditions before named. In fact, for distance work and quality, it is extremely hard to build a receiver which surpasses one efficient stage of tuned radio frequency amplification, balanced by some method, coupled with a regenerative detector. The selectivity also is extremely good when the operator of the set becomes accustomed to tuning it and provided, of course, that he is not located under the antenna of some powerful broadcasting station.

In the laboratory work on the receiver it was discovered that the great majority of radio frequency transformers that are on the market, have a very large capacity coupling between primary and secondary of the transformer in which the primary was wound in a single layer underneath the secondary. This is detrimental

to maximum efficiency. Consequently, this was minimized by winding a primary of small wire in a groove at the low potential end of the secondary. In the type of transformer, which utilizes two tubes for the primary and secondary windings, the wire on the inner tube acts as one plate of the condenser, while the wire on the outer tube acts as the second plate. The dielectric between the two consists of the tubing on which the coil is wound. The balancing system recommended is changed slightly from former

receivers, a disc being used in proximity to the first or antenna transformer. This method has several advantages: first, it gives a more perfect balance over the wave band; second, the connections are more convenient and are shorter than the method previously employed.

A UX 199 tube is used as before for the radio frequency amplifier, as its characteristics are more suitable for the conditions to be met than any tube that is available on the open market. The coils and the condensers used in this receiver are the very latest design, the coils being wound with enameled wire spaced one-half its diameter, a spacing which reduces their resistance to a minimum. New National Condensers are used, as their characteristics are extremely good; they have a very low minimum capacity and sufficient insulation so that their high frequency resistance is very low. Thus, they contribute a great deal to the sharp tuning of the receiver.

The audio frequency amplifier consists of three stages of impedance coupled amplification. The units being incorporated are National Impedafomers. An output choke or tone filter is placed in the plate circuit of the last tube, which protects the loud speaker from the high voltage used on the last tube. It also has a tendency to "iron out" any ripples that may appear from "B" battery or "B" battery eliminator sources. This system of audio frequency amplification is very well adapted to the better grades of cone type speakers. A radio frequency choke is also placed in the audio amplifier for the purpose of keeping the radio frequency current out of the audio amplifier, which would otherwise have a tendency to "motor-boat" on a "B" substitute. A condenser is also connected from the plate of the first audio frequency tube to the negative filament, which by-passes any radio frequency current which passes the choke.

In the construction of the receiver be sure that the leads carrying radio frequency currents are as short as possible. An example:

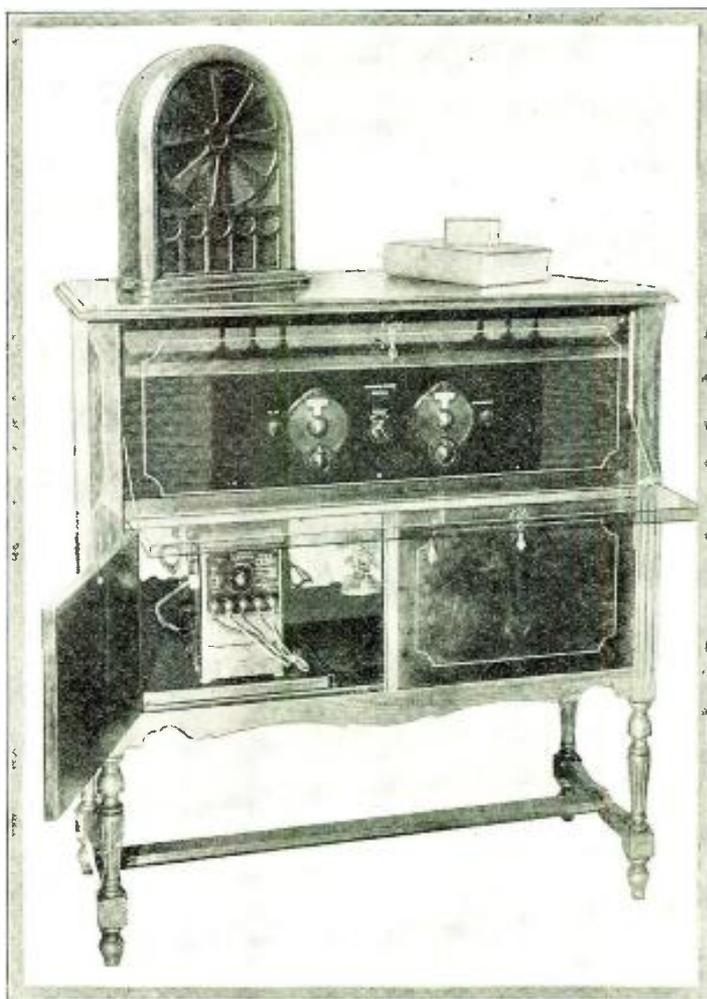


Photo A. View showing new Browning-Drake installed
in a console

the connections between the stator plates of the first variable condenser and the grid of the amplifier tube should be made as direct as possible. This also applies to the connection between the plate of the radio frequency amplifier tube and the primary of the radio frequency transformer and the connection between the stator plates of the second condenser and the grid leak and condenser. These are the most important connections in the entire receiver. Care should be taken to see that the ends of the wire on the two tuning coils are scraped and well tinned. This will insure good

selected for the balancing purpose be of a low wavelength. This will insure that the receiver will remain in a balanced condition over the entire broadcast spectrum.

Photo A shows the Browning-Drake receiver installed in a console with the necessary accessories for the proper operation of the circuit. The console is made by the Excello Products Co. of Cicero, Ill., and is exceptionally well made, ample space being provided for the receiver and all necessary accessories.

The speaker shown is one manufactured by the All American Radio Corporation of Chicago, Ill. It is known as the All American Reproducer and is capable of very excellent reproduction. The outer compartment is beautifully grained to imitate the natural wood. The "A" and "B" potential is obtained from a Model 15 Kodak "A" and "B" Transformer. This unit is able to efficiently supply up to $2\frac{1}{4}$ amperes "A" current without overloading. It also supplies up to 150 volts "B" potential at 60 milliamperes drain. A standard $2\frac{1}{2}$ -ampere charging bulb is used in conjunction with the "A" power unit, while a standard UX-213 full wave rectifier is used for the "B" supply. The unit plugs directly into the 110-volt A.C. socket.

LIST OF PARTS

These parts or their equivalent will give satisfactory results:

- 1—Browning-Drake Kit
- 1—Yaxley 30-ohm Rheostat
- 1—Yaxley No. 60 Battery Switch

- 1—Browning-Drake 33-ohm Fixed Resistance
- 3—Tiny Tobe .001 mfd. Fixed Condensers
- 1—Tiny Tobe .00007 mfd. Fixed Condenser
- 1—Tobe 1 MF. By-Pass Condenser
- 1—Precise .0001 mfd. Variable Condenser
- 1—Amsco Resistance Coupled Amplifier Unit
- 2—Amsco .25-megohm Resistances
- 1—Amperite No. 5A.
- 1—Yaxley No. 660 Cable Connector
- 2—National Type C Vernier Dials
- 1—National First Stage Impedafomer
- 1—National Second Stage Impedafomer
- 1—National Tone Filter
- 5—Benjamin UX Cushion Sockets

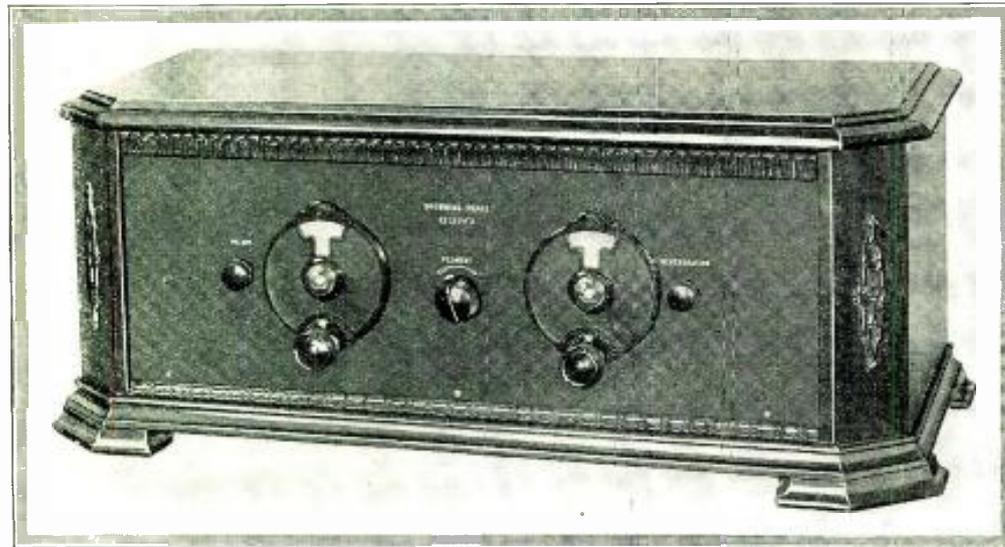


Photo "B." View showing Browning-Drake Receiver in Corbett cabinet

connections between the condensers and the transformers, which is very essential, as they carry more radio frequency currents than any of the other connections. These should also be as direct as possible.

In the wiring it is advisable to make all high potential connections first, that is, put on the grid and plate leads. The filaments should be the last to be wired. In case a solder is used that has a rosin flux, care should be taken to have the soldering iron very hot, otherwise the rosin will fuse but the solder won't, leaving a poor connection. If acid or paste fluxes are used, it is suggested that all connections be wiped clean with alcohol after soldering, thus removing any excess paste or acid, which would cause corrosion in a short time.

This receiver is intended for operation with the "A" type tube, except the radio frequency amplifier, which should always use a UX-199 tube. This tube has been chosen as the high frequency amplifier, as it has a small grid to plate capacity and is, therefore, easier to balance. This, together with its other characteristics, makes it adaptable for this purpose. A resistance of 33 ohms in series with its filament reduces the 5 volts, which is across the filaments of the other tubes, to 3 volts. The 30-ohm rheostat is solely a volume control and may be turned completely on when maximum strength is required, without any danger of damage to the amplifier tube.

Tune in a local station by means of the two dials and then turn off the rheostat. Probably the local station will still be audible or can be made so by adjusting the tickler coil and the second tuning condenser. Turn the balancing disc to such a position that no signal or minimum signal is heard. When this condition has been reached, the receiver is in a state of balance. In the balancing of the receiver it is quite preferable that the station

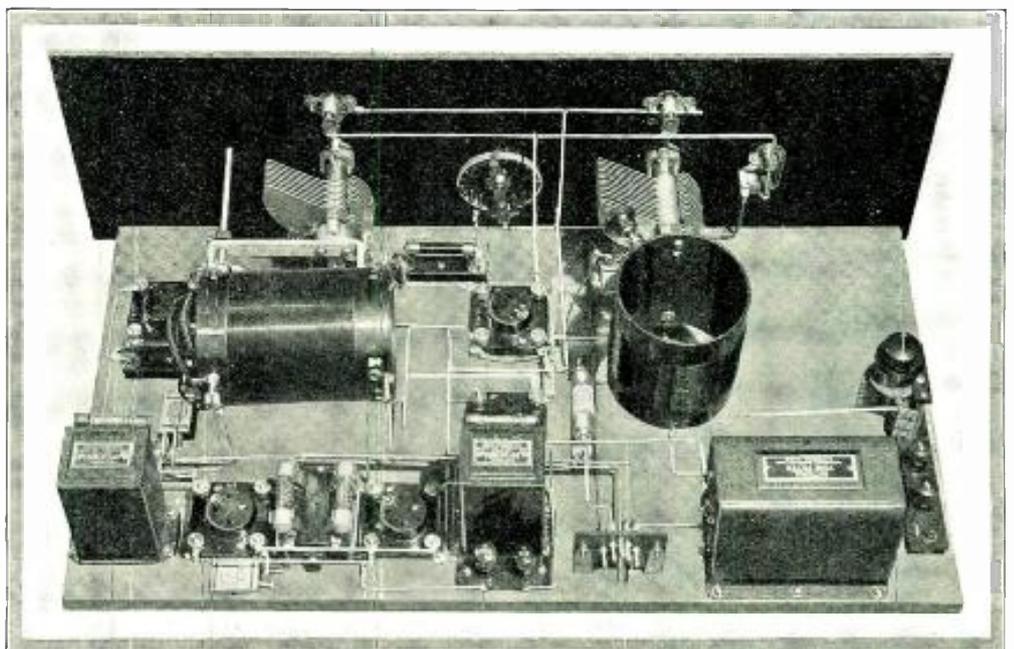


Photo "C." Rear view of completed receiver

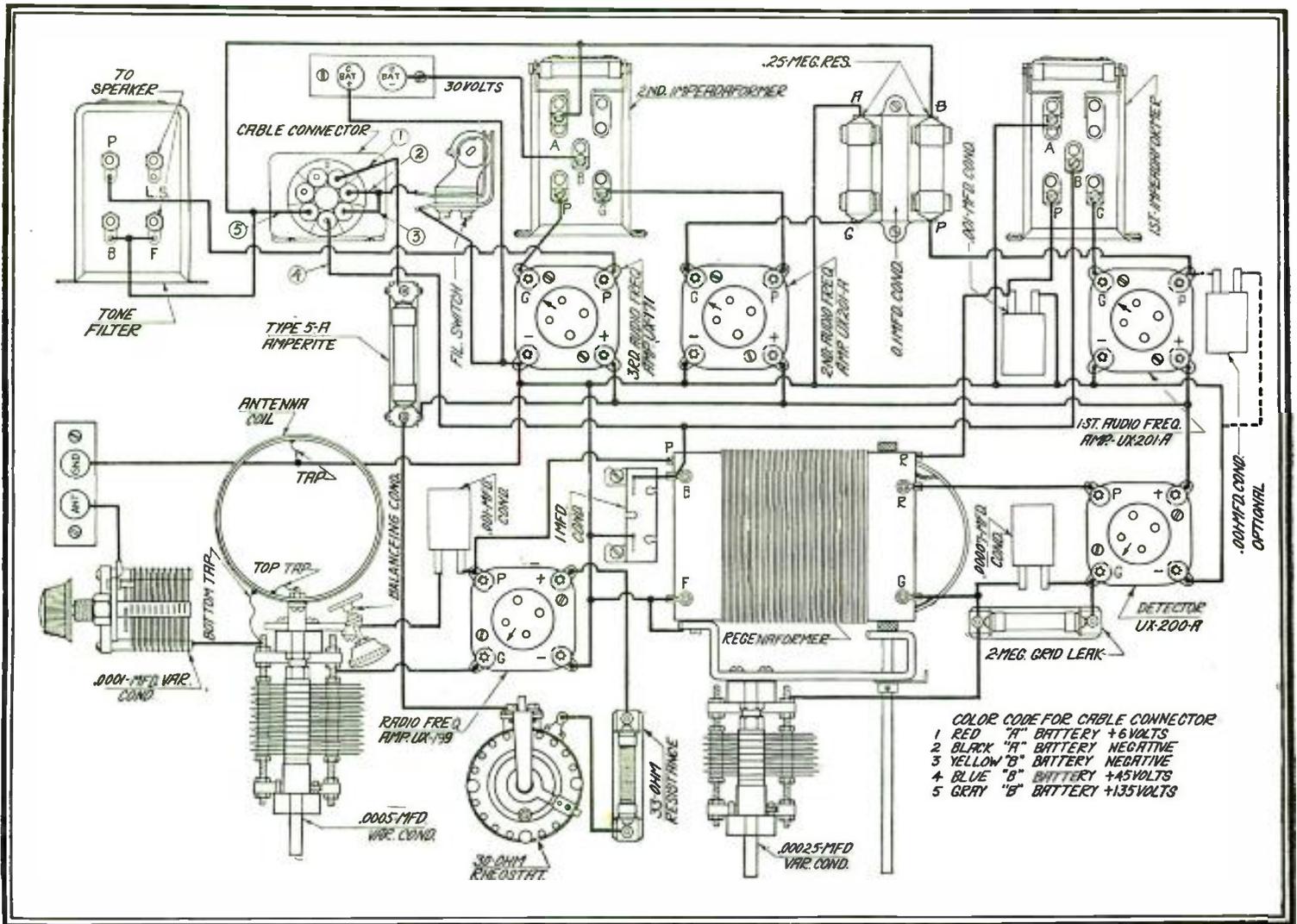


Figure One. Graphic wiring diagram

- 1—Micarta 7x21-inch Drilled and Engraved Panel
- 2—Micarta Terminal Strips
- 1—Wooden Baseboard, 10½x25 inches
- 1—Lynch 2-megohm Grid Leak

- 4—Eby Engraved Binding Posts
- 1 Package Kester Solder
- 1—Ekko Ground Clamp
- 30 Feet Belden Copper Tinned Wire

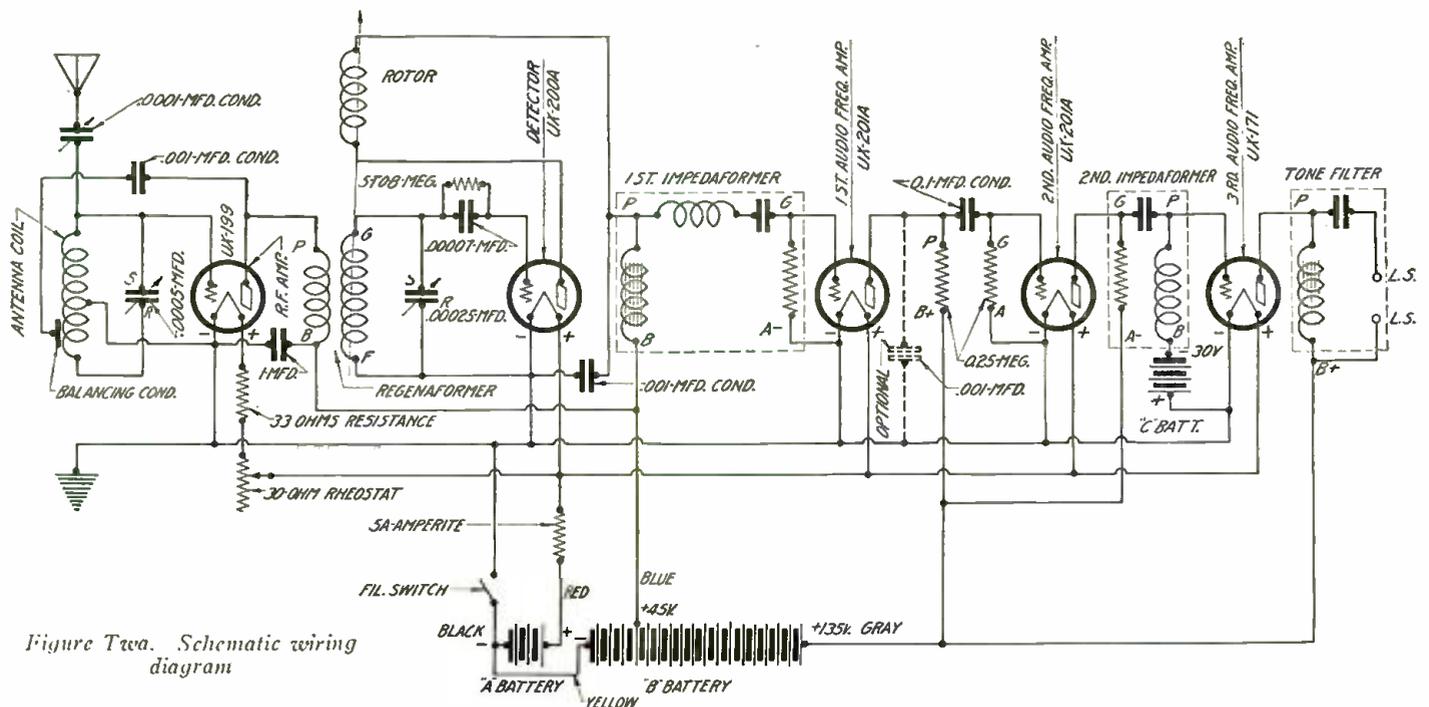


Figure Two. Schematic wiring diagram

A 100 K. C. Super-Heterodyne Receiver

A Receiver Composed of Matched Parts, the Maintenance of Which is Surprisingly Low

Construction and All Illustrations Made in the Laboratory of the Citizens Radio Call Book

THE success of any Super-Heterodyne receiver is dependent upon the design and quality of construction of the intermediate frequency transformers and filters. In receivers where the intermediate frequency transformers and filters have been slighted, even in minute details, the utmost in perfect reception can not be obtained. The receiver being described has been designed with this thought foremost in mind and the resulting device is an achievement of credit to the designers. There are several features which have usually been neglected in the design of "Supers," which have been given considerable attention, thus developing a noticeable improvement in reception. This has resulted in a receiver that leans toward a state of perfection in this type of circuit. The various components which have been used to make up the completed receiver have been selected from a standpoint of efficiency and quality rather than from one of cost. The arrangement of parts is quite symmetrical, which makes a very good looking receiver, and which makes very short radio frequency leads so highly essential in radio frequency amplification. The receiver is also very easily constructed and may be completed in a remarkably short period of time even by the most inexperienced constructors.

It has been found that 100 kilo-cycles is a very satisfactory frequency for good amplification throughout the broadcast spectrum, and with this as a basis, the intermediate frequency transformers and filters were formulated and perfected to a remarkable degree. It was also found that better quality was obtained from a transformer which utilized an air core. This is due to the sluggishness of an iron core at high frequencies. The ratio of the transformers has been determined at two to one, as a value of maximum amplification with minimum distortion. A method of stagger winding has been developed, which makes possible a perfect matching of units which is so essential in attaining maximum efficiency in an intermediate frequency amplifier. Matched fixed condensers are placed

across the secondary of the transformers and filters, which assures an accurate peak frequency throughout the amplifier. The transformers are dry wound and sealed in a moulded bakelite case, which is a positive protection against moisture saturation which would change the peak frequency and throw the amplifier out of resonance.

The variable condensers which are used in the tuning circuits of a Super-Heterodyne receiver are of great importance, inasmuch as a great deal of the selectivity is due to the inherent characteristics of the condenser in use. The two tuning condensers used in this receiver each have a capacitance of .0005

mfd. They are of the straight frequency line type and are constructed entirely of brass. Both the plates and the frame are die stamped and firmly braced to insure absolutely perfect alignment. Stator and rotor plates are soldered at every point of contact. The rotor has a wide copper pigtail connection, which is soldered at both ends. These condensers distribute the wavelengths evenly over the complete scale of the dials so that there is no crowding at any point.

The audio frequency section of the receiver consists of two stages of transformer coupled amplification. The transformers incorporated are the Ferranti AF-3. The merits of these transformers are worthy of some comment.

Sound is caused by rapid vibrations of air particles. The pitch of a note is fixed by the number of vibrations per second, i.e., frequency. Instrumental notes have pitch frequencies of from 25 to 3,500, but actually no note is simple vibration of one frequency but a combination of vibrations at frequencies which have a simple relation to one another. The lowest, called the fundamental, gives the pitch, while the others, called the harmonics, give tone or quality and cause the sound of one instrument to differ from that of another through producing a note of the same pitch. The frequency of the harmonics may be as high as 10,000 per second, and thus musical vibrations have a frequency range from 25

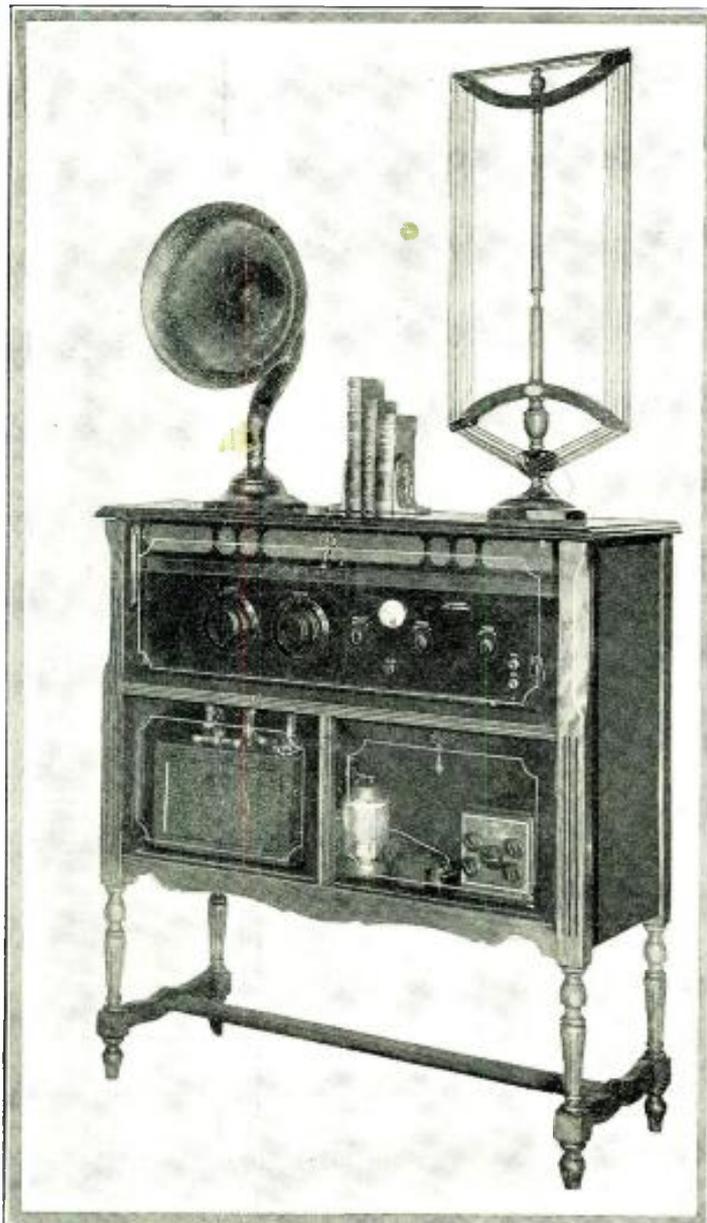


Photo A. The above illustration is a suggestion as to how this receiver can be mounted in a console with appropriate accessories

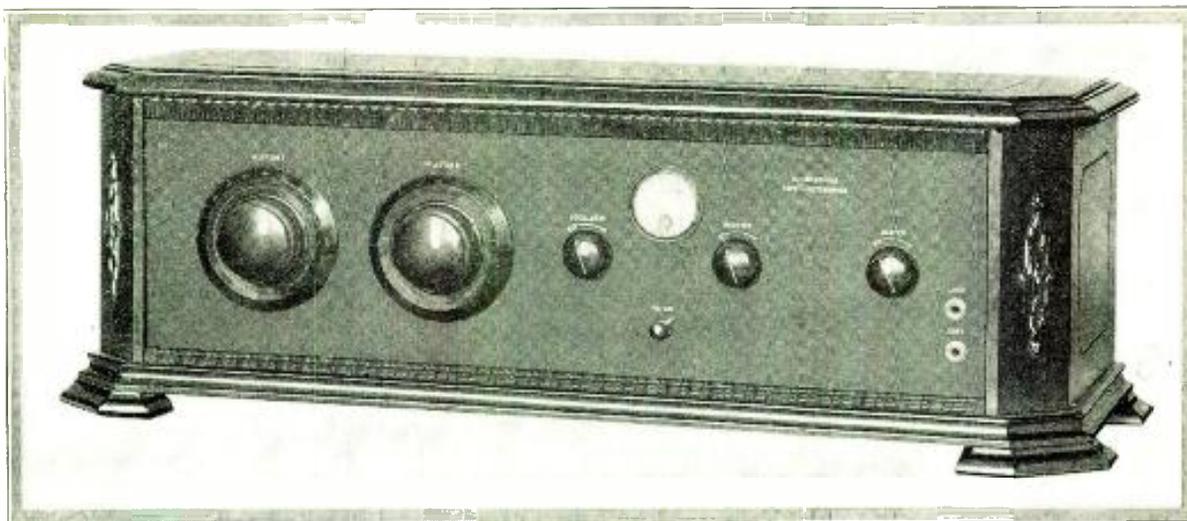


Photo B. Front view of receiver mounted in cabinet

to 10,000. A perfect transformer would amplify equally well over the entire range. At a frequency as low as 50 cycles, the amplification ratio of the Ferranti AF-3 transformer is slightly above 26. The effect of maintaining this high ratio over the lower frequency range is to bring out clearly the low tones of the organ, the bass orchestral instruments, kettle drums and the male speaking voice and other tones of low pitch. A by-pass condenser is incorporated in the transformer to insure that only the correct capacity shall be used. Since a by-pass condenser of the correct capacity is permanently fixed in the transformer, no other by-pass condenser should be connected across the primary terminals of the transformer, nor should any additional condenser or resistance be connected across the secondary terminals.

LIST OF PARTS

These Parts or Any Reasonable Substitute Will Produce Satisfactory Results

- 2—Karas .0005 mfd. Variable Condensers
- 4—Micamold .0001 mfd. Fixed Condensers
- 2—Micamold .00025 mfd. Fixed Condensers
- 1—Micamold .0025 mfd. Fixed Condenser
- 1—Micamold .0015 mfd. Fixed Condenser
- 2—Micamold 2 Megohm Grid Leaks
- 2—Sangamo 1 mfd. Condensers
- 2—Ferranti Audio Transformers, Type AF-3
- 3—Klantz Intermediate Transformers
- 1—Klantz Filter Transformer

- 1—Fiat Loop
- 8—Silver-Marshall Sockets
- 2—Yaxley 6 ohm Rheostats
- 1—Yaxley 400 ohm Potentiometer
- 1—Yaxley No. 10 Filament Switch
- 1—Yaxley No. 2-A Jack
- 1—Yaxley No. 3 Jack
- 1—Yaxley Cable Connector
- 1—Amptrol No. 1-A
- 1—Amptrol No. 112
- 1—Weston Model 506-0-8 Voltmeter
- 1—Camfield No. 620 Coupler
- 1—Radion Drilled and Engraved 7x26x3/16-inch Panel
- 1—Wood Baseboard, 25x10x1/2 inches
- 5—Eby Binding Posts
- 1—Package Kester Radio Solder
- Miscellaneous Lugs, Wire, Screws, etc.

Photo "A" shows the 100 K. C. Super-Heterodyne receiver installed in a console with the necessary accessories for efficient operation. The Excello Products, Inc., Cicero, Illinois, are the manufacturers of the Excello console in which the receiver and accessories are installed. This model is known as the R-22. A carefully hand-rubbed and lacquered finish, in two-tone effect, is applied, which gives the console an exceedingly pleasing appearance. This piece of furniture has ample room in the lower compartments for the average number of accessories required for any receiver. A sliding leaf is provided, upon which the "A" storage battery rests. This allows the storage battery to

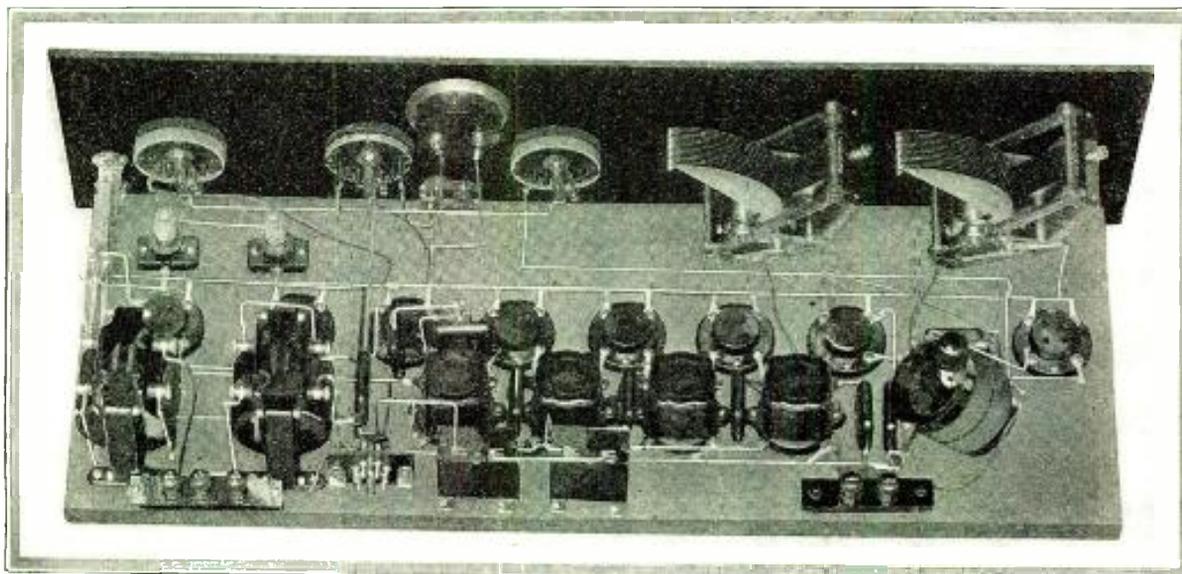


Photo C. Rear view of completely wired receiver

A Complete Plug-in Power Amplifier

A Combination Power Amplifier and "B" Supply Unit Making Possible an Unlimited Amount of Undistorted Volume

Construction and All Illustrations Made in the Laboratory of the Citizens Radio Call Book

THE ever increasing demand for better quality in the reproduction of voice transmitted by radio telephony has furnished the initiative for manufacturers to build apparatus to satisfy the demands of the radio buying public. A great deal of time has been devoted to the problem of increasing the quality of radio reception and the results of this research have been very gratifying both to the manufacturer and to the public. The reproduction that is possible from some of the new apparatus developed, is quite surprising and in some cases almost startling in its likeness to the original.

The introduction of the UX 210 power amplifying tube has meant much in the advancement of quality reproduction. The standard UX 201A type of tube has a maximum undistorted power output of .015 watts when operating at the normal 90 volts on the plate. The maximum undistorted power output of the UX 210 power tube is much greater, in fact, it is 1.54 watts, which is more than 100 times the output of the ordinary amplifying tube. It may quite readily be seen from this that the amplifier using the power tube will give much better volume and much better reproduction.

It is quite natural that power tubes would require considerable more current to operate them than the smaller tubes would. Batteries of the correct voltage and current capacity would be so costly, bulky and inconvenient that their use would be prohibitive. Fortunately, the filament of the UX 210 power tube may be satisfactorily operated on alternating current, while the plate current may be also supplied from the house current through the proper use of a power transformer, rectifier and filter system.

The Power Amplifier and "B" supply unit described herewith has been designed to meet these necessities.

The Power Supply Transformer is designed to supply 400 volts to the plate of the power tube, being rectified through a UX 216-B half wave rectifying tube. The transformer also supplies the filament current for the rectifying tube. Two choke coils having a current capacity of 80 milliamperes for the filter circuit are also contained in this unit. A 7½-volt filament supply for the UX 210 power tube is also incorporated in the unit. This filament supply is tapped at the exact electrical center, for grid return.

The power compact contains in itself the greater part of the necessary power supply. All terminals are carefully located for the greatest ease of connection. The choke coil leads are located at the top of the compact, convenient to the filter condensers. The filament leads for both the rectifier and the power amplifier tubes are at the base, near the sockets. With the elimination or rather the concentration of parts within one case, the Power Compact greatly reduces the amount of space required for the complete unit.

In addition to serving as a power amplifier, the complete assembly also eliminates all "B" batteries. The standard arrangement provides 45 volts for the plate of the detector tube and 90 volts for all amplifier tubes.

Due to line surges in the input circuit, and due to the varying current drain, which would noticeably change the output voltage of the unit, there has been incorporated a voltage regulator, or, as it is sometimes called, a glow tube. The function of this tube is to keep the output voltage at a constant value regardless of the current drain. By the use of this tube, the efficiency of the unit is greatly increased.

The filter and by-pass condensers which are incorporated in this unit are the product of the John E. Fast Company and are condensers of considerable merit. The space occupied by these

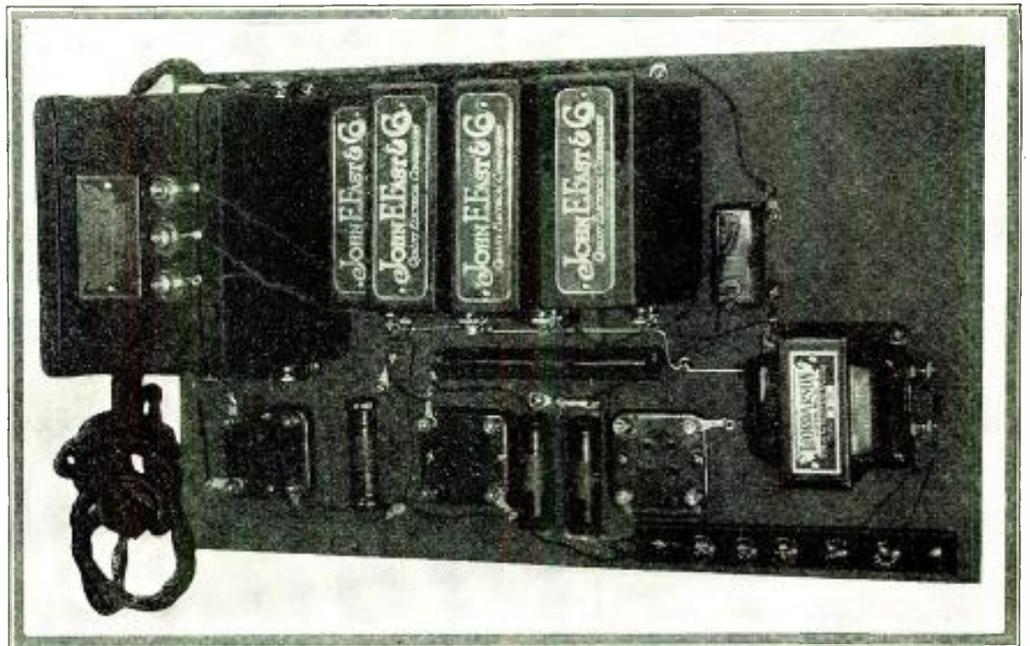


Photo A. View of power amplifier mounted on baseboard

condensers is very small. These condensers will also stand considerable overload at high voltages. The resistors are by Mountford, the outstanding features of which are that the resistance will not change with time, due to heating. The power dissipation is unusually high for this type and size of resistor.

The connection from the receiver to the power amplifier tube is made by means of an old tube base. The glass should be broken and wires, etc., removed from the bakelite shell. A wire is then run through to the grid prong and soldered. Either a wooden block is made to keep it in place or sealing wax poured around it, filling the base. The base is then placed in the last tube socket and the wire connected to the grid binding post of the power amplifier tube socket. An output transformer is used in the output of the power amplifier, which protects the loudspeaker from the high voltages used on the plate of the tube.

LIST OF PARTS

These parts or any reasonable substitute will produce satisfactory results:

- 1—Thordarson R-210 Power Compact
- 1—Thordarson R-76 Output Transformer
- 3—Frost No. 530 Sockets
- 1—Mountford 8,000-Ohm Resistor
- 2—Mountford 10,000-Ohm Resistors
- 1—Mountford 1,000-Ohm Resistor

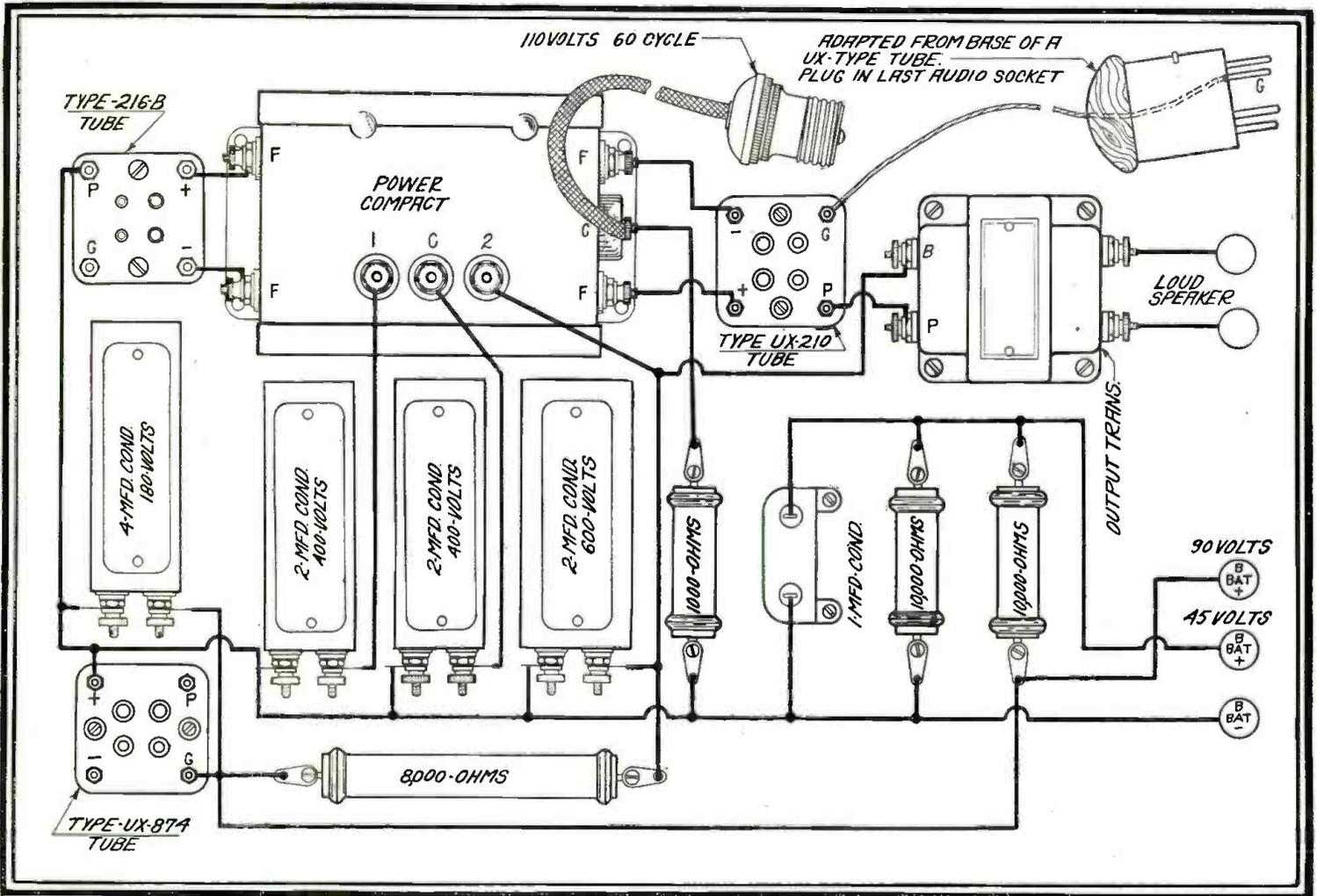


Fig. 1. Pictorial wiring diagram showing all connections

- 1—Fast 4-Mfd. 180-Volt Filter Condenser
- 1—Fast 2-Mfd. 600-Volt Filter Condenser
- 2—Fast 2-Mfd. 400-Volt Filter Condensers
- 1—Fast 1-Mfd. By-pass Condenser
- 1— $\frac{3}{4} \times 5\frac{1}{2} \times 3/16$ -in. Formica Terminal Strip
- 5—Eby Engraved Binding Posts
- 1— 9×15 -in. Wood Baseboard

- 1—UX 210 Power Tube
- 1—UX 216-B Rectifying Tube
- 1—UX 874 Voltage Regulator
- 1 Package Kester Radio Solder
- 30 Kellogg Tinned Soldering Lugs
- 40 Feet No. 12 Gauge Tinned Belden Copper Wire
- Miscellaneous Screws, Wire, etc.

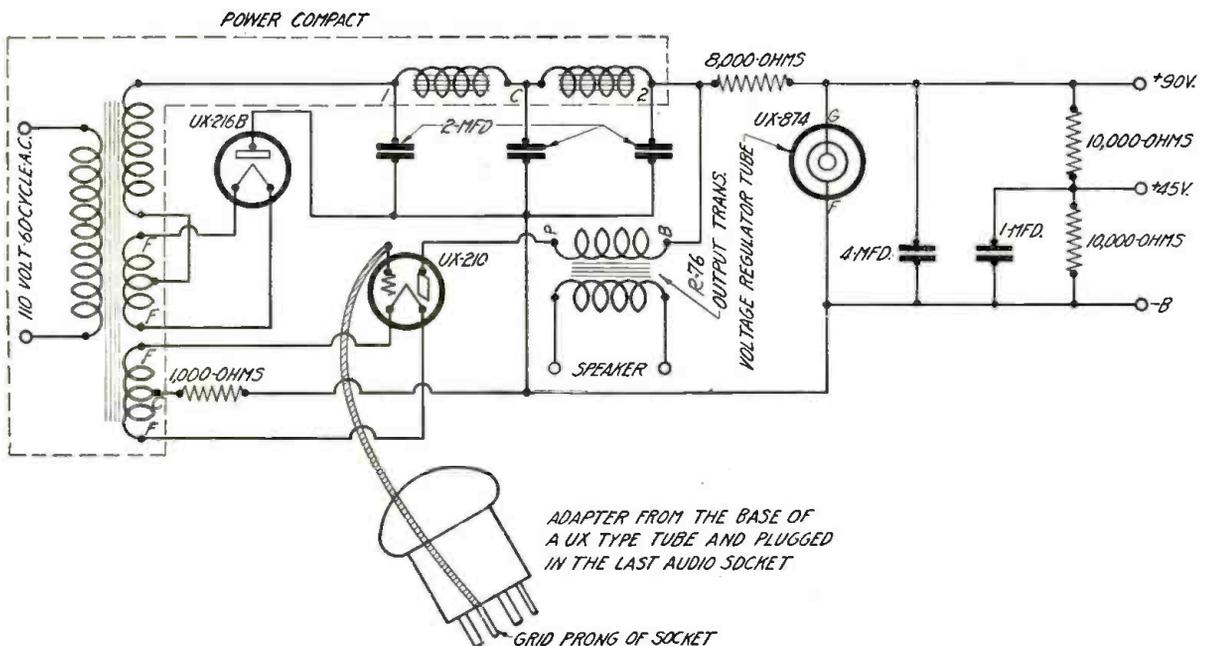


Fig. 2. Schematic wiring diagram

The Improved Model N-27 "Nine in Line"

Here Is a New Model Showing Improvements on a
Very Popular Circuit

This Receiver Was Designed and All Illustrations Made in the Laboratory
of The Citizens Radio Call Book

EVERY radio fan is anxious to set distance records with his receiver and unfortunately the possibilities have grown much smaller during the last few months on account of the endless multiplication of broadcasting stations. Few receivers are able to satisfy the amateur's demand in these days and owners of many excellent manufactured sets dream of times when the air was not as crowded, when large cities had only three broadcasters, when there was only one station to one wavelength. Radio art tried to keep up with the situation but failed in most cases. As things stand, we may have to contend with the number of stations now on the air for some time to come.

One of the few receivers to secure full success despite the confused conditions was published in the September and December issues of this magazine and the response on the side of discriminating set builders was so great that it fully justified the expectations of our laboratory. However, there has been room left for further improvements and the present receiver contains several very important features.

The first completed set was operated shortly after Christmas, and the results obtained within the first few weeks of January were so convincing that we decided to benefit the readers with this construction. Records were beaten with this model January 10, 1927, in Valparaiso, Indiana, where the following Pacific Coast stations were picked up within a few hours and verified: KFOA, KFI, KGO, KNRC, KFON, KFWO, KYA, KPO, KXX, KFSI, KFWI, KFBC and KFAD, the two latter ones having an output of only 100 watts. The set was also operated in New York City, where it has broken through the local barrage of signals and brought in far West stations at 8 p. m. with volume equal to local stations on an average receiver. Selectivity is carried to the point where clean ten kilocycle separation in the vicinity of local stations is made possible without sacrifice of tone quality or difficulties in tuning.

The appearance of the receiver is similar to the one described in the September issue. The typical line-up of nine tubes with eight transformer units is again made use of. The arrangement of the tubes from left to right are, first detector, four intermediate frequency, second detector, oscillator and two audio. The transformers line-up as follows from the left: Two untuned iron core, one tuned air core, one untuned iron core, one tuned air core, one audio, one radio frequency choke unit and one audio. The internal construction of the H.210 iron core transformers has been changed to the impedance of the 201A tubes and use made of the higher amplification factor of these tubes.

A one ohm resistance strip has been inserted in series with the six ohm rheostat controlling the filament of the intermediate frequency tubes, thus allowing a maximum of five volts on these filaments. All grid returns of these tubes are biased with minus six to seven and one-half volts of "C" Battery, resulting in a "B" Battery drain of only four and one-half milliamperes for the entire intermediate frequency amplifier. A "B" Battery voltage of 90 to 112½ volts is recommended. The plates of the first detector and oscillator work on a potential of 22½ volts and this low voltage in the oscillator means a further reduction of "B" Battery consumption, so that a block of dry "B" Batteries will assure economical operation and outlast batteries of a four tube receiver. The second detector plate potential is 67½ volts.

The audio frequency amplifier has been changed for the 171 tube. In order to obtain the right grid bias for this tube, a 22½ volt battery is connected in series with the six volt "C" Battery biasing the intermediate frequency and first audio grids. The output is filtered through an impedance unit and the Stromberg-Carlson output filter was selected for this purpose. The short speaker cord of this latter unit is connected to the speaker jacks on the sub-panel, while the loud speaker cord is attached to the

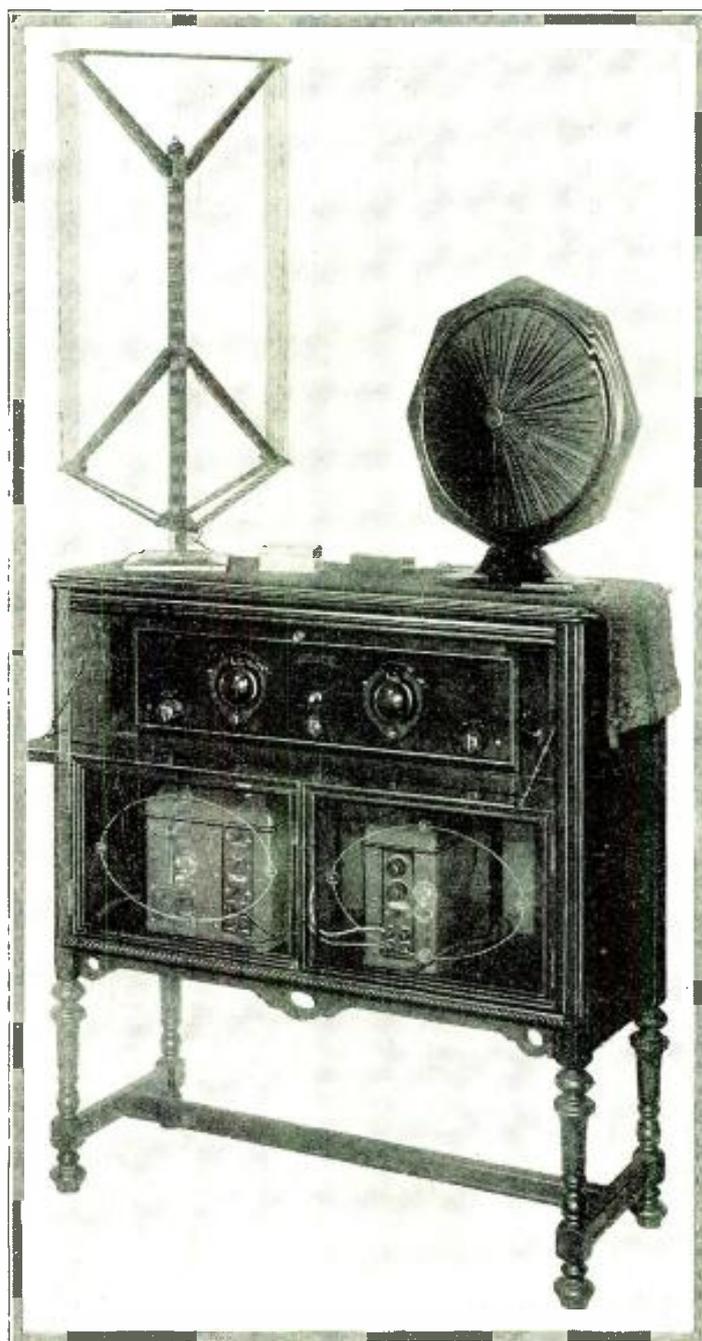


Photo A. Phantom view of receiver installed in a console
with suggested accessories

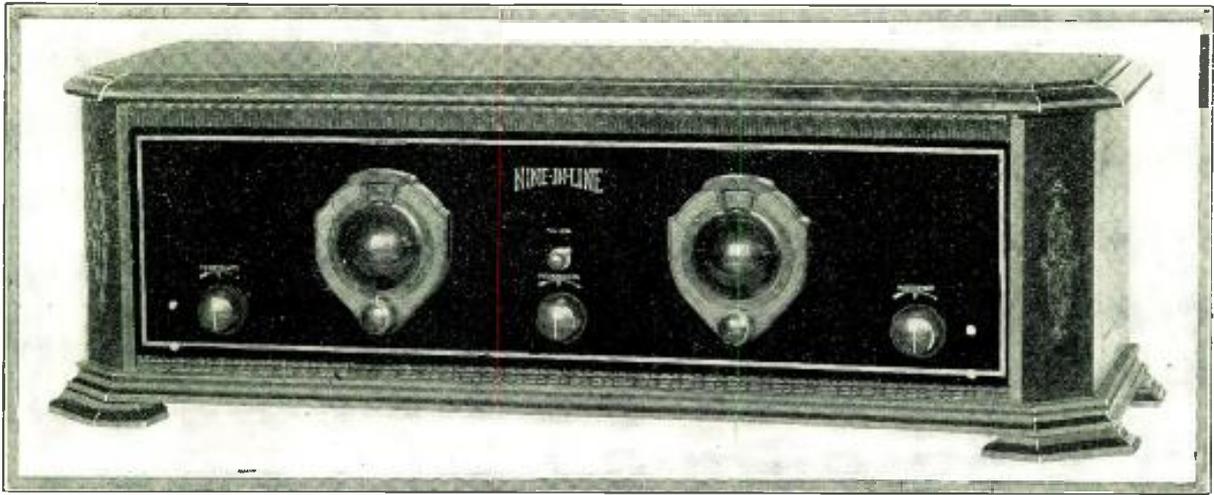


Photo B. Front view showing nine in line mounted in cabinet

output jacks of the filter.

LIST OF PARTS

These parts or any reasonable substitute will give satisfactory results:

- 3—H. F. L. No. H.210 Transformers
- 2—H. F. L. No. H.215 Transformers
- 2—H. F. L. No. F.320 Transformers
- 1—H. F. L. No. L.425-R. F. Choke Unit
- 1—H. F. L. No. L.430 R. F. Transformer
- 9—Benjamin Sub-panel Mounting Sockets No. 9044
- 2—Benjamin No. 9082 Condensers
- 1 Pr. Benjamin No. 8629 Brackets
- 2—Kurz-Kasch Vernier Dials
- 1—Chelton .000045 Midget Condenser
- 2—Muter 1 Mfd. By-pass Condensers
- 1—Muter .0005 Mica Condenser
- 2—Muter .002 Mica Condensers
- 1—Yaxley Filament Switch
- 1—Yaxley $\frac{3}{4}$ -Amp Filament Resistance
- 1—Yaxley 1-Amp Filament Resistance
- 1—Yaxley Battery Cable, complete
- 2—Yaxley 6-Ohm Rheostats
- 5—Yaxley Pup Jacks
- 1—7x26-in. Celeron Front Panel
- 1—7x24-in. Celeron Base Panel
- 1—C. R. L. 200,000-Ohm Variable Resistance
- 1—Corbett 26-in. Cabinet
- 1—Qualitone Loop
- 1 Pkg. Kester Solder
- 50 Ft. Belden No. 12 Copper Tinned Wire

Photo "A" shows the completed receiver installed in a Char-

lotte No. 20 Console, manufactured by the Charlotte Furniture Co., Charlotte, Michigan. Willard "A" and "B" power units are also provided, which can be plugged into any convenient wall socket, supplying "A" and "B" Battery voltages. These units are supplied with switching devices and have sufficient voltage for use with power tubes. The speaker shown is known as the new Sonochorde, manufactured by Boudette Mfg. Co., Chelsea, Massachusetts. The loop is known as the "Qualitone" and is manufactured by the Duro Metal Products Co., Chicago, Illinois. Photo "B" shows the receiver mounted in a Corbett 26-in. cabinet.

The audio filter recommended for use with this receiver is manufactured by the Stromberg-Carlson Telephone Mfg. Co., Rochester, New York, and is designed for use with any high quality cone type loud speaker. The use of this filter eliminates practically all of the higher harmonics, which cause a rattling noise in the cone speaker and which arise from distortion in the output tube due to overload or to inadequate power provisions in the receiver itself.

(Further information regarding these products can be obtained by writing to the manufacturers direct.)

It may be well to review a few of the high points in Super-Heterodyne construction in order that this receiver may be appreciated.

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 multi-stage 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 one per cent. The untuned stages in this case act merely as

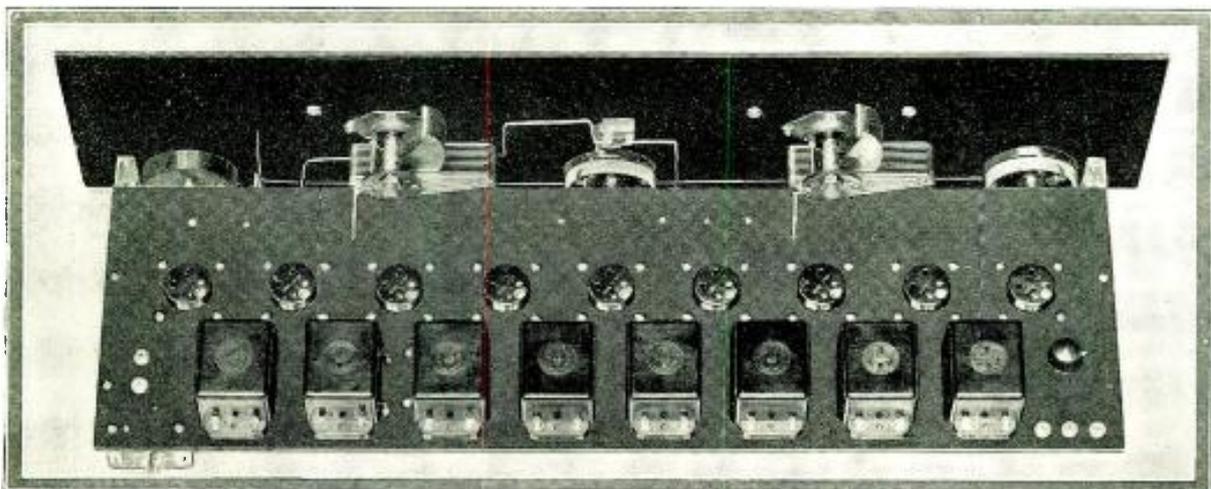


Photo C. Rear view looking at top of subpanel

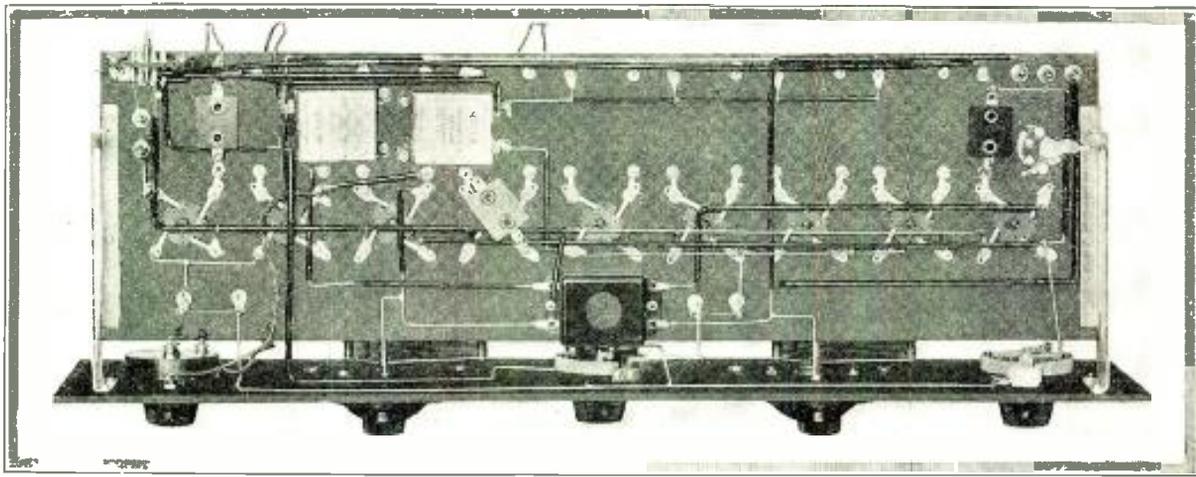
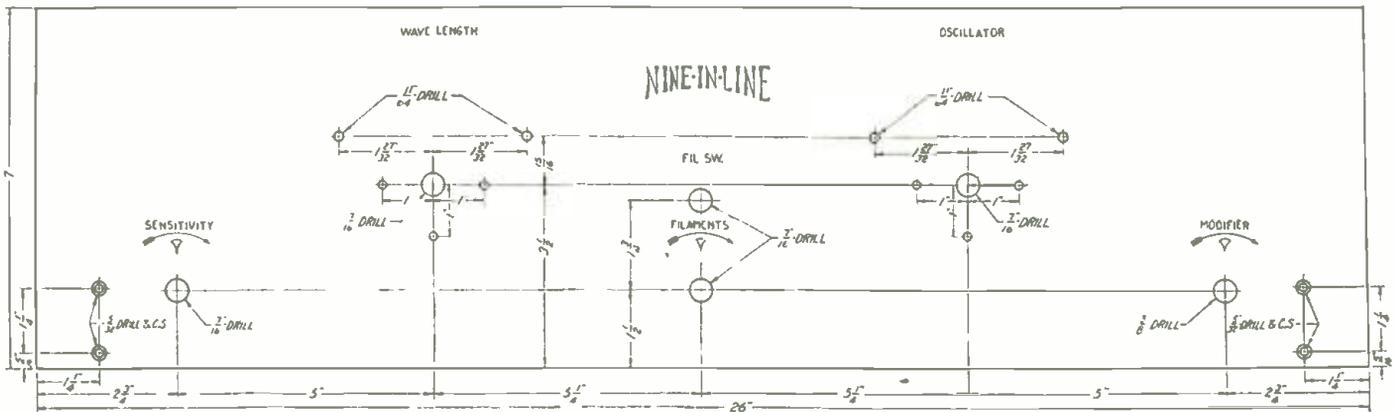


Photo D. Bottom view showing arrangement of parts on bottom of subpanel

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.

will enter the first tuned stage on a very broad band, which, if passed through a filter, will sharpen it considerably. An addition stage of amplification with another filter will deliver a pure signal with maximum intensity to the detector.



NOTE:
ALL HOLES UNLESS OTHERWISE SPECIFIED ARE 1/32\"/>

Fig. 1. Panel layout

An untuned intermediate frequency transformer of this design will have a uniform amplification 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

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

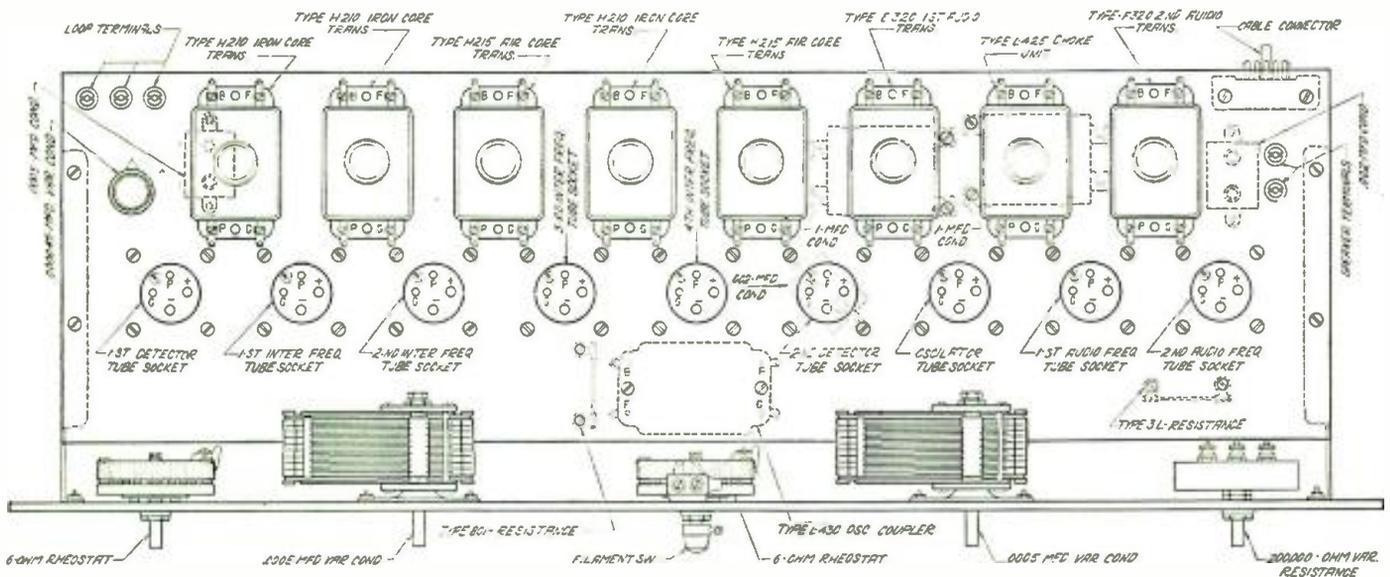
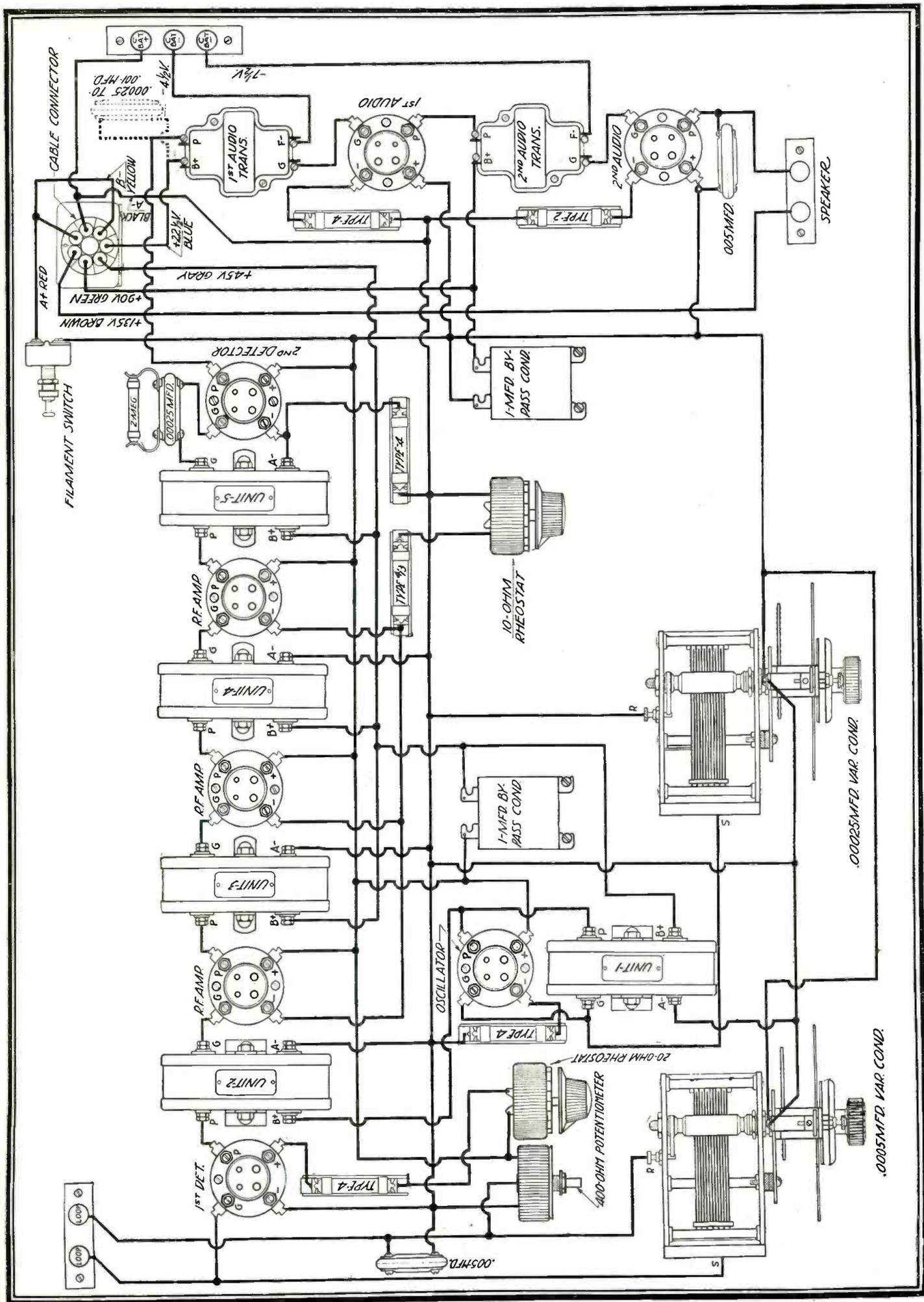
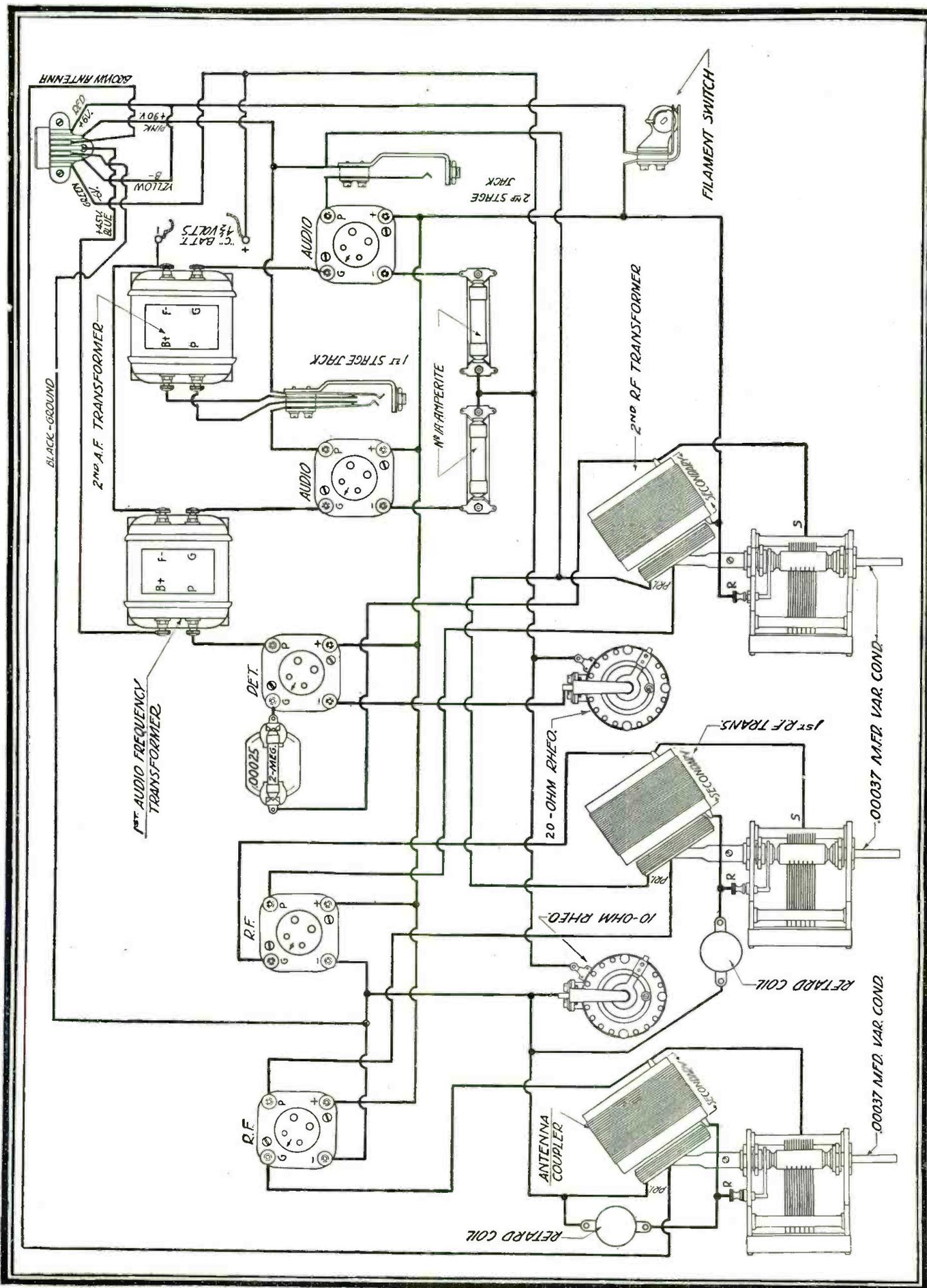


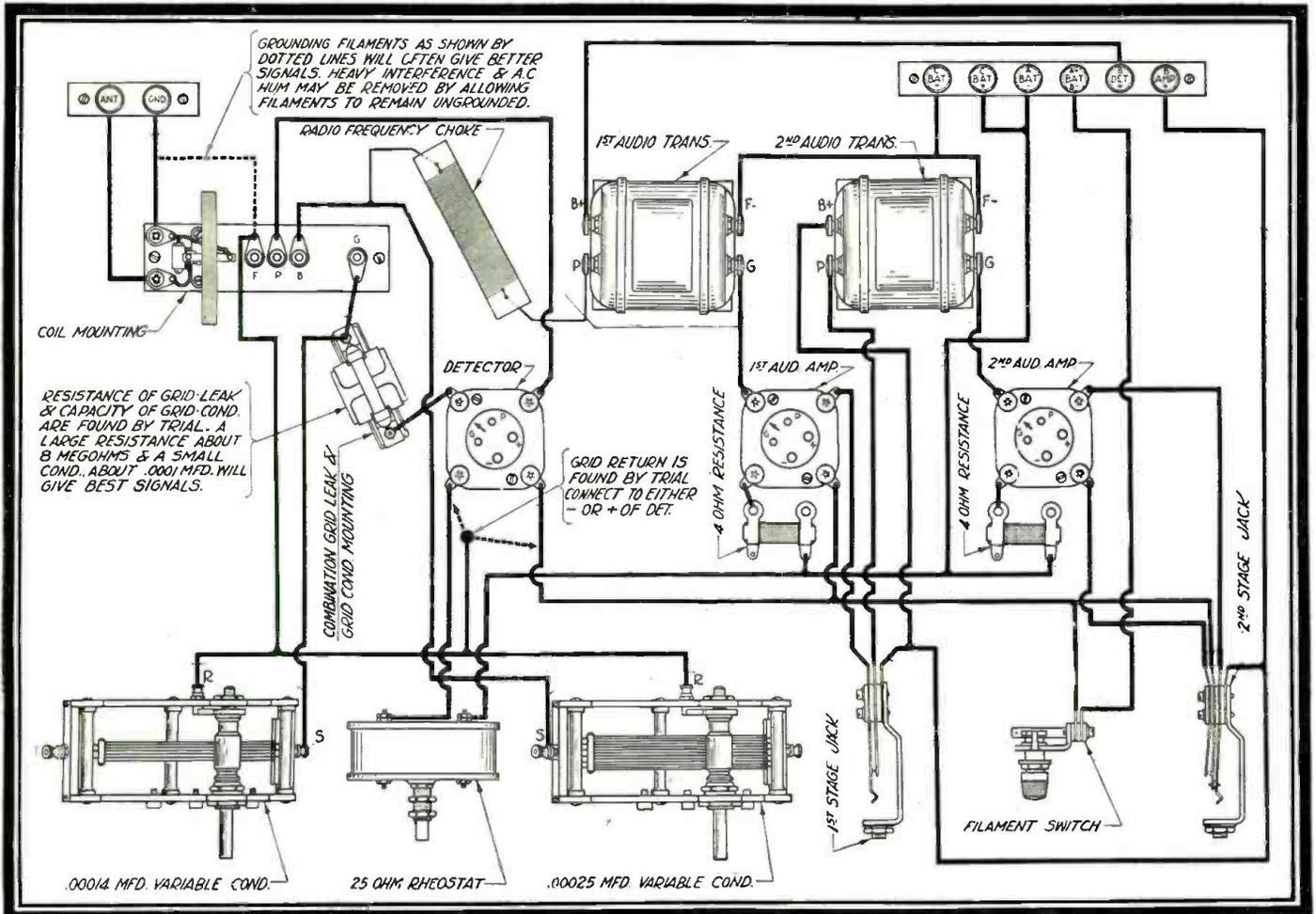
Fig. 2. Template showing arrangement of parts on subpanel



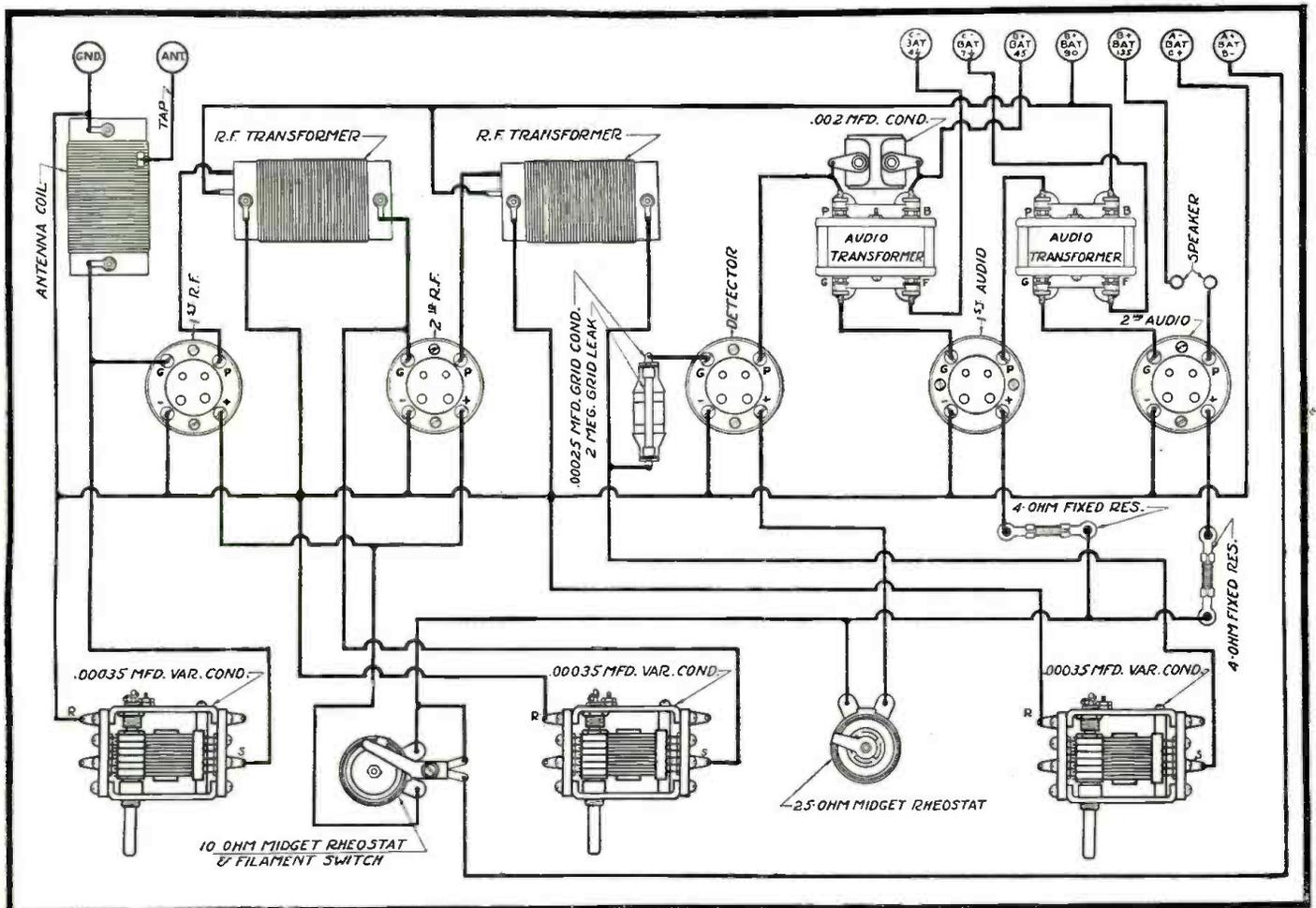
A graphic illustration of improved Madison-Moore one-spot receiver



Karas Equamatic Five-Tube Receiver

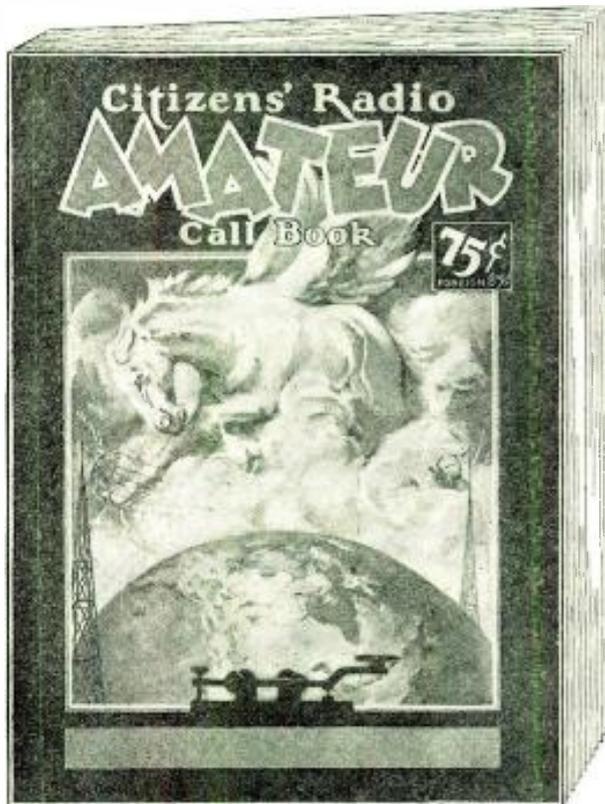


A 15 to 550-Meter Receiver Using a System of Interchangeable Coils



An Inexpensive Five-Tube Tuned Radio Frequency Receiver

**Amateurs
in
More Than
50
Countries
!**



**New
Amateur
Book
Just Out
!**

The MARCH number of the CITIZENS RADIO AMATEUR CALL BOOK is the largest, most complete, and most accurate list of all Amateur Transmitting Stations of the WORLD that has ever been published.

It contains the Official IARU list of International Intermediates, the "R" Audibility signals, new "Q" signals, accented foreign letters, and announces a subscription prize contest, with THIRTY prizes that are worth working for. Commercial land and ship stations are also listed.

Use the blank below and start off with the new MARCH issue.

Citizens Radio AMATEUR Call Book
508 So. Dearborn Street, Chicago

Date.....192.....

Please enter my subscription to the CITIZENS RADIO AMATEUR CALL BOOK. Enclosed please find \$2.00 in full payment (U. S. and Canada \$2.00, Foreign \$2.25).

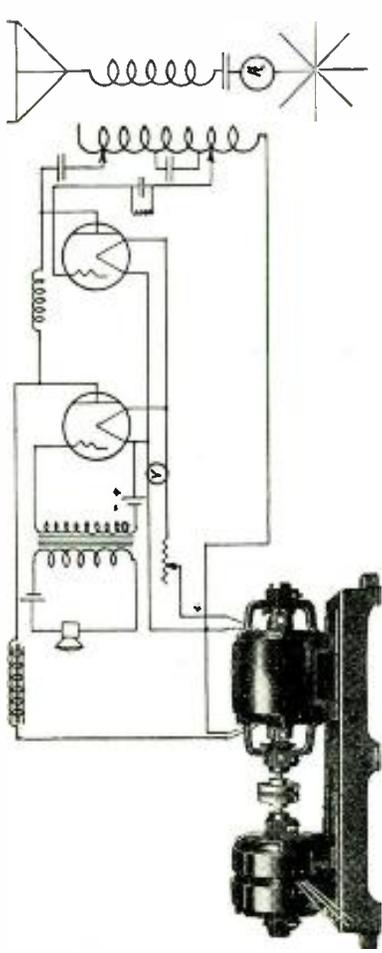
Published March first, September first and December first—three times yearly.

Name.....

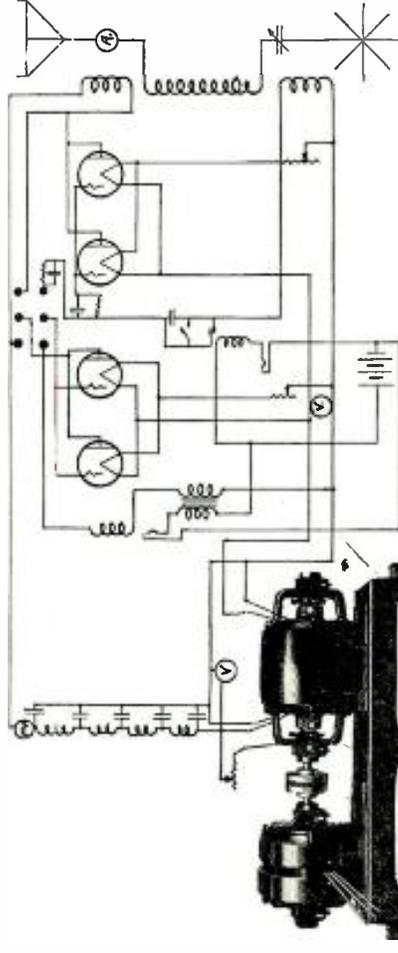
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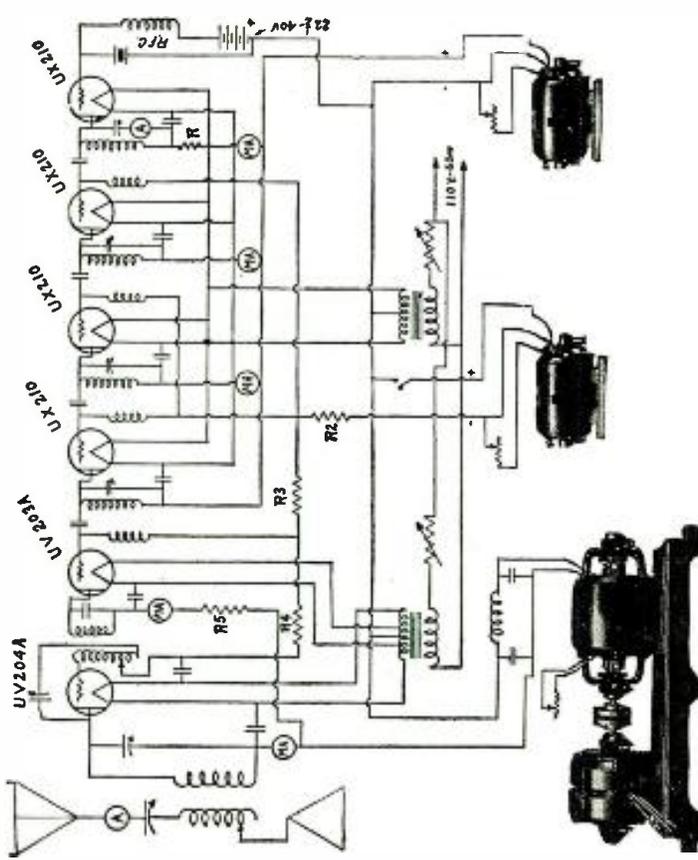


Item 35. Two unit four bearing set. Furnished with ring oiled or ball bearings. Motor to suit local supply. This "ESCO" set delivers 1000 volts, 300 watts for plate supply and 12 volts, 150 watts for filament supply. This set driving two 50 watters will make a good consistent station.



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 Equamatic Receiver

(See Diagram on Page 145)

A MOST recent advancement in tuned radio frequency control has been the Equamatic Receiver. It is one of the outstanding developments of the year and judging from the considerable interest it has aroused, it will, no doubt, enjoy the popularity accorded the various excellent circuits which have appeared from time to time during the last few years.

The fundamental object of the Equamatic System is to provide a synchronous variation of the percentage of coupling in the radio frequency transformers and the tuning element, in such a manner that the point of most efficient operation will automatically and simultaneously be reached at any frequency within the range of the receiver. An adjustable compensating coupler, for controlling the transfer of energy between the primary and secondary windings of the radio frequency transformers, at a frequency varied by the tuning element, is provided, so that any variation in reception conditions or characteristics of the apparatus in use, may be compensated for by adjusting the coupler to the proper value.

By virtue of the electrical characteristics of a tuned radio frequency transformer, incorporating fixed windings and percentage of coupling, the resistance or impedance to alternating current varies approximately directly with the frequency tuned. Inasmuch as the transfer of energy between the primary and secondary windings is in direct proportion to the impedance of the circuit, it is conceivable that a greater inductance, to compensate for a decrease in impedance, is required in a primary winding to tune to 600 meters, than is required to tune to 200 meters. It will be seen that in order to obtain a maximum 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.

In this receiver the primary and secondary windings of the radio frequency transformers are so completely variable, with respect to each other and the axis of the tuning condenser shaft, that almost any degree of coupling and rate of variation is obtainable by making adjustments of the primary and secondary windings. When these adjustments are once made the variation of the percentage of coupling is provided automatically by the turning of the condenser shaft when tuning.

The correct rate of variation of the percentage of coupling may only be secured when the transformer is used with a straight frequency line condenser.

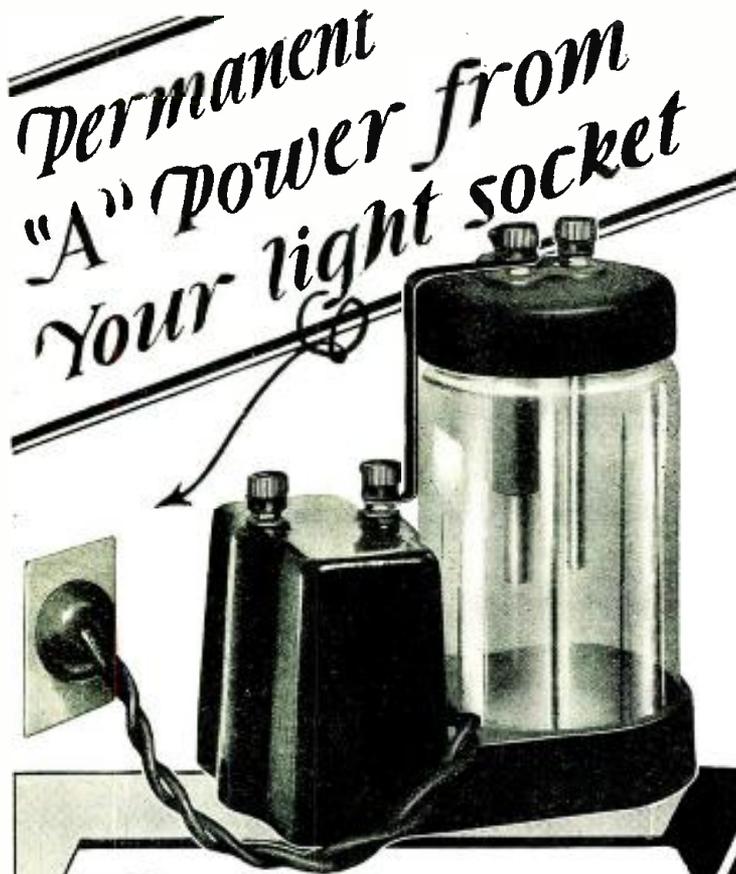
List of Parts

- 1—7x28x3/16 in. Drilled and Engraved Formica Front Panel.
- 1—6x27x3/16 in. Drilled Formica Sub-panel.
- 3—Karas Equamatic Radio Frequency Transformers.
- 3—Karas Orthometric Extended Shaft .00037 Mfd. Condensers.
- 3—Karas Micrometric Vernier Dials.
- 2—Karas Harmonic Audio Transformers.
- 2—Karas Equamatic Retard Coils.
- 3—Karas Equamatic Sub-panel Brackets.
- 1—Yaxley 10-ohm Air-Cooled Rheostat.



How the Equamatic Receiver appears when installed in a console with accessories

- 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 Clips.
- 1—Lynch 2-megohm Grid Leak.
- 2—No. 1-A Amperites.
- 1—National Carbon 4½ Volt "C" Battery.
- 1—Jones Multi-plug with 8-foot Battery Cable.
- 5—Benjamin UX Cushion Sockets.
- 12—No. 6-32x¾ in. Oval Head Brass Machine Screws.
- 12—No. 6-32x¼ in. Round Head Brass Machine Screws.
- 1—Package Kester Radio Solder.
- 30—Feet Belden No. 12 Tinned Copper Wire.
- 24—Kellogg Tinned Soldering Lug.



JOHNSON NEUTRAL SOLUTION Trickle Charger

Forget you have an "A" battery—eliminate the bother of having your battery charged. Hook on a Johnson trickle charger, plug it into the light socket, and forget it. It delivers a constant .6 Ampere charging rate as long as the battery is below normal—yet it cannot overcharge. Johnson Trickle Chargers do not lose their efficiency nor does their charging rate decrease with age.

Neutral Solution	The neutral solution in the Johnson charger is harmless to rugs and clothing and entirely odorless. This eliminates a serious and expensive annoyance.
Silence	The Johnson Charger does not have to be disconnected when set is in operation. It is absolutely silent—no hum—giving 24 hours a day charging efficiency.
Short Proof	No danger from short circuits, as the coil cover, jar cap, and base are made of molded rubber, assuring perfect insulation.
Electrodes Will Not Corrode	The electrodes used in the Johnson Charger will be found to be entirely free from scale or corrosion even after months of use, insuring extremely long life.

Built to Last

Johnson Trickle Chargers have had the advantage of intensive research work and are constructed of the finest materials obtainable. There is nothing to wear out—nothing to stop this permanent source of "A" power.

Ask your dealer, but play safe and be sure it is a Johnson Neutral Solution Trickle Charger.



Johnson
MOTOR PRODUCTS CO
308 N. Sheldon St., Chicago

Since the general trend appears to be toward the installation of receivers in consoles, we are illustrating in the accompanying photograph the Equamatic receiver installed in a console with suggested appropriate accessories.

A 28-in. Corbett cabinet, manufactured by the Corbett Cabinet Works, of St. Marys, Pennsylvania, contains the receiver proper. The cabinet is constructed entirely of straight grain walnut and is finished in a two-tone effect. The Southern Toy Co., of Hickory, North Carolina, manufactures the radio table housing the accessories. The table is exceptionally well built of solid lumber and is finished in dark mahogany.

"A" supply is obtained from a combination of the "A" Box Filter and a 2 ampere hour Westinghouse Rectigon Charger. The "A" Box Filter replaces in a very efficient manner the ordinary 6-volt storage battery usually required for the proper filament supply. The charger is hooked directly to the "A" Box Filter and is used while the set is in operation. The purpose of the "A" Box is to smooth out the pulsations coming from the charger, so that a pure D. C. current is delivered to the filaments of the tubes. The only care required is that of a periodic filling with water, of the chamber in the filter.

The speaker used with this installation is a new model of the Tower Mfg. Co. of Boston and is known as the Meistersinger. It has the unique advantage of being applicable to either wall or console use.

A Raytheon "B" supply is used, which is manufactured by the General Radio Company of Cambridge, Massachusetts. A handy switch on the front of the metal housing containing the eliminator turns the unit on and off.

(Further information on any of the above described accessories may be obtained by writing direct to the manufacturers.)

A 15 to 550 Meter Receiver Using Interchangeable Coils

(See Diagram on Page 146)

A GREAT many of the radio fans have a desire for a receiver with which they may be able to receive the broadcasting being done on the short wavelengths, as well as be able to receive signals on the more extensively used longer waves.

In order to accomplish this desire, it is necessary to break away from the usual line of design in broadcast receivers. The most logical and satisfactory method has been found to be in the use of interchangeable coils.

The circuit consists of a regenerative detector, which is the "fixed tickler" type being controlled by a variable condenser, and two stages of transformer coupled audio frequency. The two stages of audio frequency permit a loud speaker to be used on nearly all signals in preference to the head phones.

It has been found that a radio frequency choke is necessary in the lead between the tickler and audio frequency transformer. This choke may be made by the constructor in the following manner: Procure a piece of Bakelite tubing $\frac{3}{4}$ -in. outside diameter and $3\frac{1}{2}$ -in. long. Drill two holes in each end of the tube wall about $\frac{3}{4}$ -in. apart and about $1/32$ -in. in diameter. Fasten one end of a No. 28 DCC wire through the two holes, allowing about 6 in. to protrude through the two holes. Wind 200 turns around the tube and secure the other end in a manner similar to the opposite end. A $\frac{1}{2}$ -pound spool of No. 28 DCC wire is sufficient.

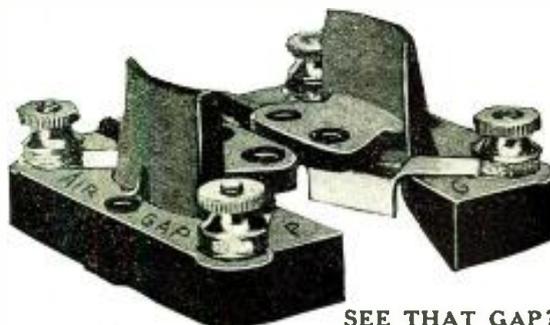
It will be found that by making the grid return on the detector interchangeable, from positive to negative filament, the correct position may quite readily be determined by the quality of signals received. The filaments may or may not be grounded. In some cases a great deal of AC hum is noticed when the filaments are grounded and interference is sometimes also noticed. This may be determined by experiment after the receiver has been completed.

After assembling the receiver, carefully check over the wiring, correct mistakes if any have been made, and then connect the

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

The AIRGAP SOCKET

"It gets that last mile"



SEE THAT GAP?

The Airgap, in the short time since its introduction, heads the list on sheer merit, as a socket of highest efficiency in electrical and mechanical perfection. It is the only socket which is ever selected with so many good reasons given for its being selected and recommended.

WHAT OTHERS SAY:

R. B. LAB. RECEIVER

Designed by Laboratory Staff, **RADIO BROADCAST**
 "Because they introduce a minimum of grid-plate capacity and aid in preventing objectionable feedback, is the reason Mr. John B. Breunann, Tech. Ed., **RADIO BROADCAST** gives (in November issue) for selecting AIRGAPS for this new highly efficient 4-tube receiver."

THE FENWAY

Leo Fenway, designer and builder of this 9-tube Superhet when it was first introduced, wrote in **New York Sun**: "THE SUCCESS OF THE FENWAY DEPENDS UPON (1) that stage of radio frequency with regeneration; (2) those tin or colbor cans; and (3) THOSE AIRGAP SOCKETS."

LYNCH DELUXE RECEIVER

Arthur H. Lynch, former Tech. Editor, **RADIO BROADCAST** Laboratory, wrote **RADIO WORLD**, January 1, 1927

"It is rare indeed when one finds combined in a single unit the paramount of both mechanical and electrical design. The AIRGAP socket well deserves a place in this receiver in which we have gone to so much trouble to see that only the best possible of parts are used."

THE BERNARD SIX

Selected by Herman Bernard, Technical Ed., **RADIO WORLD**, for this circuit on account of its low grid-plate capacity.

Q. S. T.—SEPTEMBER, 1926

"As the path between plate and grid is broken by an air gap, the resistance path between these elements of the tube are virtually governed by the internal structure of the tube, plus the resistance across the base of the tube itself."

POPULAR RADIO—January, 1927

"A SOCKET TO INCREASE THE EFFICIENCY OF YOUR AMPLIFIER" (AIRGAP)
 "When used in radio-frequency circuits a decided improvement will be noted in the amplification obtained in each stage."

JOHN F. RIDER

Article—"STRIVING FOR 100% QUALITY"—**N. Y. SUN**, December 11, 1926
 "The gap between the plate and grid terminals reduces the capacity between these two terminals on the socket to practically zero. Since the normal capacity is approximately 2 micromicro farads, the reduction in total grid to plate capacity (filament ungrounded) of the tube when in this socket is reduced approximately 1-1 per cent, a value sufficient to cause oscillation at the higher frequencies, especially in unneutralized tuned radio frequency receivers. In other neutralized receivers this reduction in capacity permits the use of a greater value of inductance, with least tendency toward instability. In addition, the leakage path between grid and filament is increased to the extent where it is entirely negligible. From all angles the socket is an excellent item."

"I never appreciated the difference a socket could make in a set until I tried the new AIRGAP. I now use them exclusive of all others."

C. W. DOWN, Superhet Expert, New York City

"We think your socket is one of the best sockets on the market today. I have been interested and experimenting with radio for the past 18 years, and I think I know a good piece of radio goods when I see it, and I want to say again it is one of the best, if not the best, on the market."

F. E. C., Rad. Dept., C., P. & R. Co., Cushing, Okla.

R. P. CLARKSON, Editor of Radio Tech. Data Sheets, **New York Sun**
 "The construction of the AIRGAP socket decreases the ratio of charge to voltage between grid and plate, decreases the undesired tube capacity, makes the tube easier to control. It is undoubtedly essential for real amplification in any R. F. or regenerative set."

"I have used your old style AIRGAPS in a number of sets with extreme satisfaction, but I really believe that the new U. X. Universal is way ahead of the old one."
 J. S. C., New York City.

"I am very pleased with these as I find them very good in reception."

F. J. B., Philadelphia, Pa.

"I have had very good results using your AIRGAP SOCKETS."

E. G. L., Washington, D. C.

The Gap Makes the Difference

Never in the history of Radio has a socket received such approval by experts and fans who know. After substituting AIRGAPS they are willing to admit that they were fooled on the AIRGAP, not believing it would make the difference it did after substituting them in a set.

Millions have been spent by tube manufacturers to produce tubes with a minimum grid-plate capacity, so essential, particularly in circuits using tuned radio frequency or regeneration.

When you use a socket without the gap, you neutralize any advantage gained by the use of these efficient tubes, providing an easy path over the socket body, THROUGH AND OVER WHICH (with the dust, lint and moisture collected thereon) add to this capacity, cause high frequency losses, intercoupling and undesirable feedback.

The gap has the effect of omitting the socket entirely; it creates a higher resistance path between grid-plate terminals, decreasing high frequency losses, preventing feedback and intercoupling through and over the socket body, making the circuit more easy to stabilize and control, preventing feedback and intercoupling, causes your set to go into oscillation more smoothly and not "spill" over until maximum results are obtained. Clarity and volume will be improved to surprising degree.

You will easily detect the difference, which will surprise you.

Send 10c stamps or coin (cost of mailing) for "Life Size Blueprint Constructional Data on R. B. Lab. Receiver."

Dealers and Jobbers
 Meet the demands of the fans. Write us or send order at usual discount.

READ WHAT OTHERS SAY

AIRGAP PRODUCTS CO.

Campbell Street,

Newark, N. J.

If your dealer has not stocked AIRGAPS, use this coupon and order direct postpaid at 60c each. Try them at our expense.

AIRGAP PRODUCTS CO.,
 15 Campbell St., Newark, N. J.

Please send me at once.....AIRGAP Universal Standard Sockets at 60c ea. Enclosed

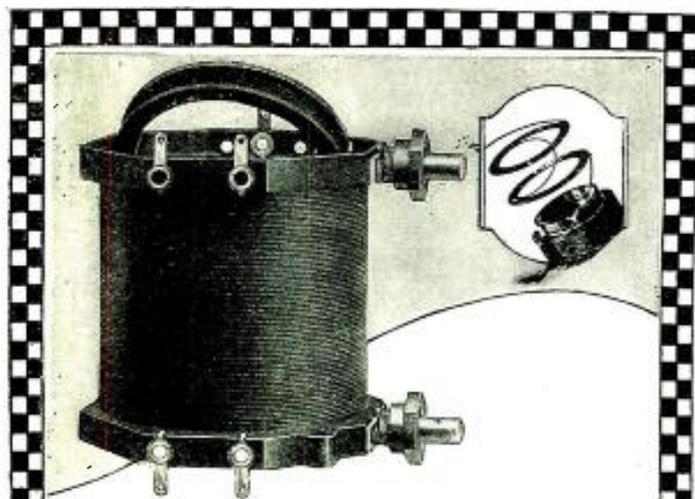
find \$..... for same, or send them Parcel Post C. O. D. and I will pay Postman when received. It is understood that you will refund purchase price if I am not entirely satisfied and return them within 10 days.

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

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A Universal, Supremely Efficient Coil for short or long wave lengths

Whether you want complete coils for high or low frequency (short or long wave length) work—

or

wish quick changes per plug-in method—

or

want to mount a coil in any position—

or

if you desire one or two rotors—

you will find a standard Samson Form or Complete Coil for your purpose.

The Samson Electric Company has ready for delivery for those who desire to wind their own:

Coil Form, bare.....	\$.75
Coil Form, bare, with plug for mounting....	\$1.50
Jack Block.....	\$1.00
Single Rotor Coupler, bare.....	\$1.25
Double Rotor Coupler, bare.....	\$2.00

And for those who wish complete units:

Band Filter.....	\$12.00
Fixed Coupler.....	\$2.00
Split Stator Coupler.....	\$3.50
Single Rotor Coupler.....	\$3.25
Double Rotor Coupler.....	\$5.00
Antenna Coil.....	\$1.85
Double Wound Coupler.....	\$2.50

Our book — "Audio Amplification" — already accepted as a manual of audio design by many radio engineers—contains much original information of greatest practical value to those interested in bettering the quality of their reproduction. Sent upon receipt of 25 cents.

SAMSON ELECTRIC COMPANY
Manufacturers Since 1882
Sales Offices in
Thirty Leading Cities
Main Offices at
Canton, Mass.
Factories:
Canton and Watertown

batteries to the receiver. Insert the third largest coil, disconnect the antenna and with a flexible lead make grid return of detector tube positive or negative and try various combinations of grid leaks and grid condensers. This procedure is almost absolutely necessary, as tubes vary and short wave receivers are prone to go into oscillation with a bang or howl instead of the conventional hiss. About .0001 mfd. and 8 megohms will probably be found to be the best. However, if howling is encountered, the capacity must be raised and the grid leak lowered. Sometimes changing the detector grid return will clear the trouble.

When the best grid return, grid condenser and grid leak have been found, check all of the coils and make certain the receiver can be made to oscillate smoothly from maximum to minimum on all wavelengths with the antenna and ground connected. For the best results, the antenna should have a maximum length of not more than 50 feet including the lead-in. If dead spots are encountered on any short wavelengths, loosen antenna coupling. If this does not eliminate the dead spot, remove from 5 to 10 turns from the radio frequency choke.

A complete list of parts necessary to construct this receiver appeared in the September, 1926, issue of CITIZENS RADIO CALL BOOK.

An Inexpensive Five Tube Tuned Radio Frequency Receiver

(See Diagram on Page 146)

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, 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 efficient manner. This receiver

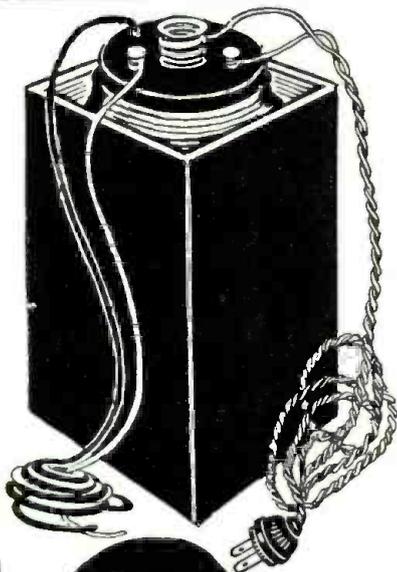
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Try This Battery Charger Ten Days Without Risk

SAVE
\$8.00
or more

Direct from Maker on Approval

Why pay \$10 to \$15 for a battery charger? Why just throw away \$8.00 or more? Invest only \$2.00 in the R. B. Charger and save at least \$8.00. In making this big saving you sacrifice no quality. We guarantee the R. B. Charger to do all that any charger on the market will do, and do it just as well. What more could you ask? It's just good judgment to pocket this big saving. Tens of thousands have done it and are delighted. Every day radio fans all over the country are making this big saving we invite you to make. Everyone is astounded at the amazing value. Every buyer more than pleased with the way the R. B. Charger does its work. Read the letters from users. Be convinced. Buy an R. B. Charger yourself. Then you, too, will praise it to the skies and recommend it to your friends.



Plug In On Any Lighting Socket, Any Time

The R. B. Charger comes to you complete ready to use. No extras to buy. Nothing to install. When you get it, just plug in on any lighting circuit, alternating or direct, and soon your batteries will be as fresh, strong and powerful as ever. It is positively guaranteed not to injure any battery, and to give a full complete charge to any storage A or B battery. We back this claim with a positive guarantee of satisfaction or money back.

\$ only 2.00

Read What Users Say—

"Received your charger and am very much pleased with it. It certainly does charge up a battery in quick time." S. S., _____, St. Louis.

"The charger I received from you is giving entire satisfaction." C. H., _____, New York.

"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." D. L., _____, Utah.

"The charger certainly does the work." D. S., _____, Philadelphia.

"Delighted with your Battery Charger. Worth double what you ask." M. O., _____, Texas.

"A friend of mine saw your Charger on my set and now wants one for himself. Please send one C. O. D. to _____." A. F., _____, Minn.

"If all radio equipment were as efficient as your Battery Charger, there would never be any complaints. Think mine is great." F. O. E., _____, Iowa.

"100% perfect. That expresses my opinion of your Battery Charger." G. G. M., _____, Tenn.

Complete—No Extras to Buy

The R. B. Charger is scientifically constructed—the design of a well-known radio inventor. It is built for long and efficient service. It is strong and sturdy, with a top of molded Bakelite. It is easy to handle. Hook it up in a moment. Anyone can operate it according to our simple, complete instructions. It is trouble-free. Just built for efficiency, long life and perfect battery charging. You buy it without risk, for we guarantee you satisfaction or money back.

Yes, Your Money Back if You're Not Delighted

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 ten 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 the coupon to us now!

R. B. SPECIALTY CO.

Dept. H-8, 318 Sycamore St., Cincinnati, Ohio

TEN DAYS TRIAL

Not Sold in Stores—Order Direct

R. B. Chargers are not sold in stores. They are distributed only by the manufacturers direct to users. They can be obtained only from advertisements like this. Our direct-from-maker-to-you plan of selling explains our astonishing low price of only \$2.00. 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.,
Dept. H-8, 318 Sycamore St., Cincinnati, O.
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.

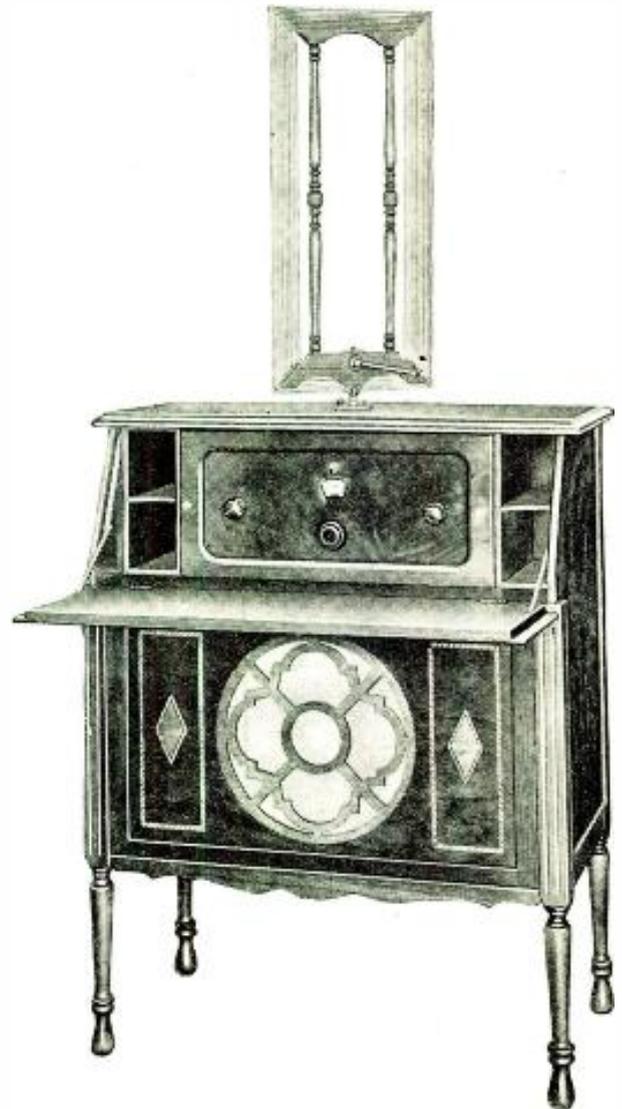
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Announcing "The Royal Blue Ribbon"

The Precision Radio Receiver

Here is the most remarkable radio receiver ever offered at any price. . . . Never in the history of radio has any manufacturer offered so much for so little. . . . Nearly one year has been devoted to the development of this receiver; every detail has received the fullest consideration regardless of expense; we now offer to you the finest, the truest, the most complete radio receiver that skill, money and ingenuity can produce. Each unit in this receiver is in balance and in harmony with every other unit. The best apparatus obtainable was found lacking, necessitating the manufacture of special, precision, apparatus throughout the set. However, due to mass production, proper buying and intelligent management, we are able to list this receiver at less than half the cost of any competitive line. Yet, the "Royal Blue Ribbon" is in a class by itself for tone quality, for selectivity, for reception and for all around performance. We positively guarantee distant reception seven days a week. With 21 local Chicago stations broadcasting, a standard Royal Blue Ribbon Receiver picked up 22 distant stations in a period of two hours, including New York, Denver, New Orleans, Baltimore, Dallas, St. Louis, Cincinnati, San Francisco, and others. This is truly the most powerful receiver ever put on the market.

There are no "Silent Nights" logged on the Royal Blue Ribbon Receiver.



Listing at \$249.50—complete with Loop. Unit, Speaker, Cabinet and 8 specially designed, unbreakable tubes, mounted in sockets. Write direct to our Chicago factory for catalog information and discounts.

Specifications and Noteworthy Features of the Royal Blue Ribbon

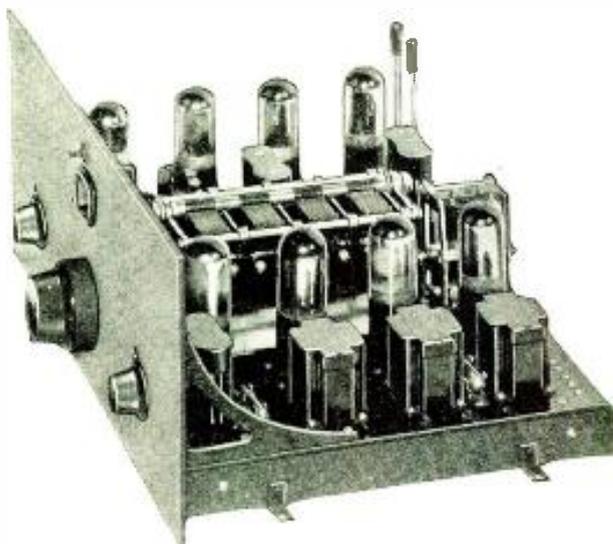
Eight tube, tuned radio frequency, loop operated receiver. This receiver is not assembled but is built on an aluminum casting to last forever. Four stages radio frequency; one tuned detector stage; three stages audio frequency. Receiver shipped separately, bolted to a drawer and packed so that no possible damage may result, in transit. Cabinet shipped as furniture. Drawer slides in freely. Specially built seven foot spiral horn, with Utah Unit designed to fill our requirements. De Luxe loop mounts flush in cabinet surface.

Furnished with Built-in Loop if Desired

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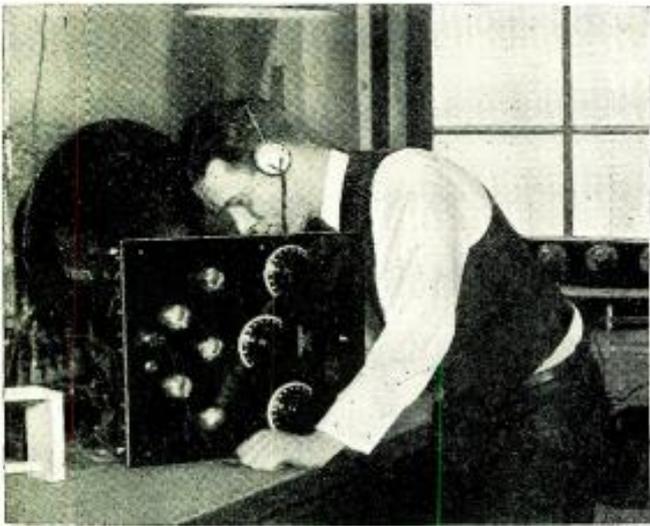
Some Territory Still Open. Write for Our Special Franchise
Contract Arrangements



The Royal Chassis, 7x18x11½ in., mounted in drawer which fits recess 9 in. high, 21 in. wide, and 12½ in. deep. Lists at \$125.00, including tubes.

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

There's money for you in RADIO



Wonderful opportunity for ambitious men to win success in this fast-growing profession

The Radio industry is expanding so rapidly that trained men are at a premium. There is a constant, urgent demand for operators—factory superintendents—engineers—service men—designers—salesmen.

There is no better way for you to succeed in this fascinating business than to study the Radio Course of the International Correspondence Schools. This course is new and complete. It was written by practical authorities in this field. It is endorsed by leading radio experts and radio manufacturers.

Quincy J. Workman, of Scranton, Penna., writes that he has "nearly doubled his salary" since he took up the I. C. S. Radio Course. He is now manager of the Radio Department of a large store.

J. B. McCune, of Donora, Penna., writes that the I. C. S. Radio Course enabled him to start a radio business of his own. This same course enabled John M. Paynter, of the U. S. Lighthouse Service, Charleston, S. C., to get a position as Radio Operator and Ship's Electrician. Scores of other men in radio factories, laboratories and stores report similar progress.

You, too, can get in on the ground floor if you act quickly. But don't delay too long. Mark and mail the coupon today and let us tell you all about the I. C. S. Radio Course and what it can do for you.

Mail the Coupon for Free Booklet

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Box 8319-B, Scranton, Penna.

Without cost or obligation, please tell me how I can qualify for the position or in the subject, before which I have marked an X:

RADIO

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|---|--|
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| <input type="checkbox"/> Electric Lighting | <input type="checkbox"/> Architects' Blueprints |
| <input type="checkbox"/> Mechanical Engineer | <input type="checkbox"/> Contractor and Builder |
| <input type="checkbox"/> Mechanical Draftsman | <input type="checkbox"/> Architectural Draftsman |
| <input type="checkbox"/> Machine Shop Practice | <input type="checkbox"/> Concrete Builder |
| <input type="checkbox"/> Railroad Positions | <input type="checkbox"/> Structural Engineer |
| <input type="checkbox"/> Gas Engine Operating | <input type="checkbox"/> Chemistry |
| <input type="checkbox"/> Civil Engineering | <input type="checkbox"/> Automobile Work |
| <input type="checkbox"/> Surveying and Mapping | <input type="checkbox"/> Airplane Engines |
| <input type="checkbox"/> Metallurgy | <input type="checkbox"/> Navigation |
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| <input type="checkbox"/> Pharmacy | <input type="checkbox"/> Mathematics |

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| <input type="checkbox"/> Traffic Management | <input type="checkbox"/> Show Card Lettering |
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| <input type="checkbox"/> Banking and Banking Law | <input type="checkbox"/> Business English |
| <input type="checkbox"/> Accountancy (including C.P.A.) | <input type="checkbox"/> Civil Service |
| <input type="checkbox"/> Nicholson Cost Accounting | <input type="checkbox"/> Railway Mail Clerk |
| <input type="checkbox"/> Bookkeeping | <input type="checkbox"/> Common School Subjects |
| <input type="checkbox"/> Private Secretary | <input type="checkbox"/> High School Subjects |
| <input type="checkbox"/> Spanish <input type="checkbox"/> French | <input type="checkbox"/> Illustrating <input type="checkbox"/> Cartooning |

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

ampere Tungar bulb is used. A number of switches are provided on the front panel of the unit, by which either the device is connected or disconnected from the receiver, the charging rate changed, or "A" or "B" batteries charged. The device is entirely automatic in character, just one switch being used to connect or disconnect it from the receiver.

"B" supply is obtained from a Majestic Standard "B" eliminator manufactured by the Grigsby-Grunow-Hinds Company of Chicago, Illinois. This unit is exceptionally well made and uses the Raytheon tube for rectification purposes. Two controls are provided by which voltages may be varied on the detector and radio frequency tubes. The Majestic "B" Eliminator plugs directly into the 110-volt, 60-cycle A.C. power and requires no further attention after the voltages have been adjusted for best results in reception.

The speaker used is a Sonochorde, a new product of the Bou-dette Manufacturing Company of Chelsea, Massachusetts. It is beautifully finished in a dark brown and is capable of very excellent reproduction. The unit is adjustable by which the speaker may be successfully used with any amplifier regardless of the impedance.

(If any further information is desired on any of the above described accessories, it can be obtained by writing direct to the manufacturers.)

Madison-Moore "One-Spot" Super-Heterodyne

(See Diagram on Page 144)

THE Super-Heterodyne in the past has generally been considered to be one of the most efficient circuits which could be incorporated in a home constructed receiver. This fact is readily recognized when consideration is given to the popularity of the various Super-Heterodyne circuits among the home builders during the past few years. Despite the fact that the Super-Heterodyne is quite unsurpassed for sensivity and selectivity, there has invariably been one undesirable feature present in the circuit which is more or less characteristic of receivers using the heterodyne principle. This characteristic of the Super-Heterodyne receiver is commonly known as repeater action. Repeater action appears in the form of the recurrence of a particular station at several points on the tuning controls. Some Super-Heterodynes in certain localities will repeat as many as five times on a particular station. While this feature is not of much consequence in sparsely settled districts, where the air congestion is very slight, attempts to operate a Super-Heterodyne in metropolitan areas where congestion is quite severe, usually magnifies the undesirableness of the repeater action in such a manner so as to make it extremely objectionable.

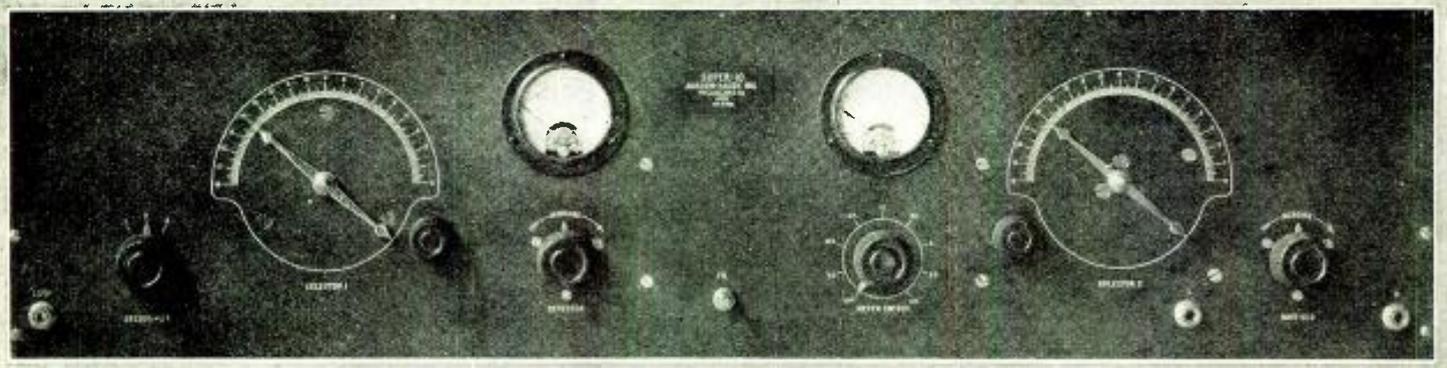
A potentiometer has been added to the receiver so that the first tube may be more easily controlled. By reason of its use, one is enabled to use five volts on the filament of the first tube from the highest station, namely, KSD, until about 260 meters is reached. From this point to the lower end of the scale it will be found necessary to turn back the rheostat controlling the first tube. In addition to having the potentiometer well over towards the positive side, it is suggested that the potentiometer be connected so that the grid return of the tube is increasing towards the negative side, as the potentiometer is rotated in a clockwise direction. This gives the same direction of rotation for increase of volume on the potentiometer as on the rheostats.

When these changes have been made and the set is ready to be operated again, the 10-ohm rheostat controlling the intermediate frequency amplifying tubes should be turned on full. The ballast resistor, in series with this rheostat, will prevent the intermediate filaments from being damaged by holding the filament voltage at five volts. If, when this rheostat is turned up full, there is a slight muffing of the signal or a tendency to oscillate at the upper setting of this rheostat, the condenser will not be needed across the primary of the first audio transformer. If no such tendency is manifested, there should be a fixed condenser placed across the primary of this transformer and the value should be such

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

NORDEN-HAUCK SUPER-10

AROUND THE WORLD WITH THE U. S. NAVY



Panel size, 36"x9"x1/4"

Super 10-tube Standard Admiralty Model

Weight: 55 lbs.

A SUPER-10 has been installed on board the "U. S. S. Wright," now sailing for Asiatic waters with the U. S. aircraft squadrons. This receiver will also be used for entertaining civilian representatives at various ports of call.

A NEW AND ADVANCED MODEL Highest Class Receiver in the World

THE NORDEN-HAUCK SUPER-10 is an entirely new and advanced design of Receiver, representing what we believe to be the finest expression of Modern Radio Research Engineering. It is the product of years of experience devoted exclusively to the attainment of an ideal Broadcast Receiver—regardless of cost.

Results obtained in every respect will upset all your previous ideas of good radio reception. The unusually large number of unsolicited testimonials constantly being received from users—concerns and individuals of international repute—indicates the absolute superiority of the NORDEN-HAUCK SUPER-10.

You, too, may enjoy the advantages of this wonderful receiver at a surprisingly moderate cost. Here are only a few of the host of features that place the NORDEN-HAUCK SUPER-10 far in advance of competition:

- 10 tubes employed to give perfect reproduction with unlimited range and volume power.
- Super selectivity on all wave lengths.
- Built to Navy Standards.
- Wide wave length range without change of coils, 200-550 meters full.
(Adaptable 35 meters to 3600 meters if desired.)
- Use Loop or Antenna.
- Simple to operate, having only two major tuning controls.
- No Harmonics. Signals are received only at one Point.
- Special Power Audio Amplifier, operating any loudspeaker and eliminates necessity of external amplifier.
- Can be operated directly from house current with socket power devices.
- Thoroughly shielded at all necessary points.

Complete Price List for Socket Power Operation

1 Norden-Hauck SUPER-10, completely constructed and laboratory tested.....	\$307.00
*1 Heavy-Duty 200 V. "B" Eliminator and Tube, 50/60 cycle A/C 110 V.....	42.50
1 Automatic "A" Power Supply, complete.....	29.50
10 Tested Tubes, including Power Tube.....	22.50
1 Western Electric Cone Speaker, 540AW or Farrand Sr., and Plug.....	32.60
1 Set Antenna Equipment, complete.....	5.00
2 "C" Batteries	2.00
TOTAL COST OF ALL ITEMS—NOTHING ELSE REQUIRED.....	\$441.10
*25/30 cycle A/C current, \$47.50.	

PROMPT EXPRESS SHIPMENTS NOW BEING MADE

Upon Request complete literature attractively illustrated, will be gladly mailed without charge, or full size constructional blue prints, showing all electrical and mechanical data, will be promptly mailed postpaid upon receipt of \$2.00.

Write, telegraph or cable direct to

NORDEN-HAUCK
Incorporated
ENGINEERS

Delaware Ave. & South Street
Philadelphia, Pa.

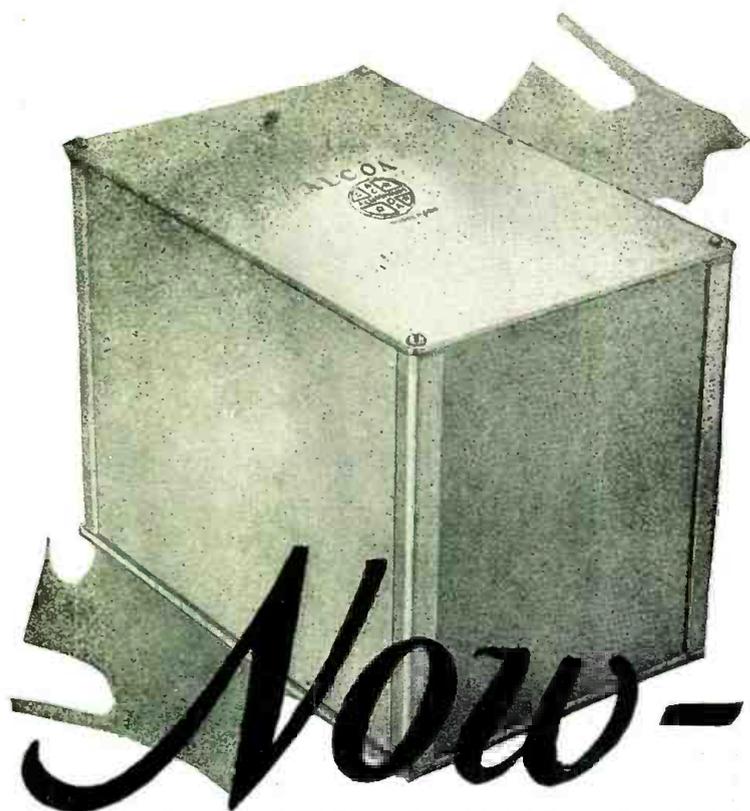
NORDEN-HAUCK, Inc.
Philadelphia, U.S.A.

TEAR OFF AND MAIL TODAY

Gentlemen:—
[] Please send me without cost or obligation on my part, attractive illustrated literature describing the new Norden-Hauck Super-10.
[] I enclose \$2.00 for which please send me, postpaid, complete full size constructional drawings, and all data for building the Super-10.

Name.....

Address.....



Now-

**ALCOA ALUMINUM
Box Shields**



To meet the growing demands of new radio design, which insist upon shielding, the Aluminum Company of America now provides a Box Type Shield.

Aluminum, used with success in the Alcoa Wing Type Shield (for interstage shielding) gives the set builder and the manufacturer

an adaptable, easily-worked material of great durability and shielding performance combined with extreme lightness. Its uniformly high quality, judged from both metallurgical and radio standards, is established.

The New Alcoa Box Shield is especially designed to be of the greatest use to the greatest number of set builders. If it does not suit your size requirements exactly you will find that a few moments easy work will adapt it most satisfactorily to your needs—being easily cut, easily worked and permanent when assembled.

Alcoa Aluminum Box Shields

are shipped knocked-down. Of heavy sheet, about the thickness of a half-dollar (.080"—No. 12 B. & S.), to be completely effective for shielding.

Consists of: Top, bottom, sides; 4 extruded corner-posts, 8 aluminum screws.
Assembles 5"x9"x6". Easily modified.

ASK YOUR DEALER OR WRITE US



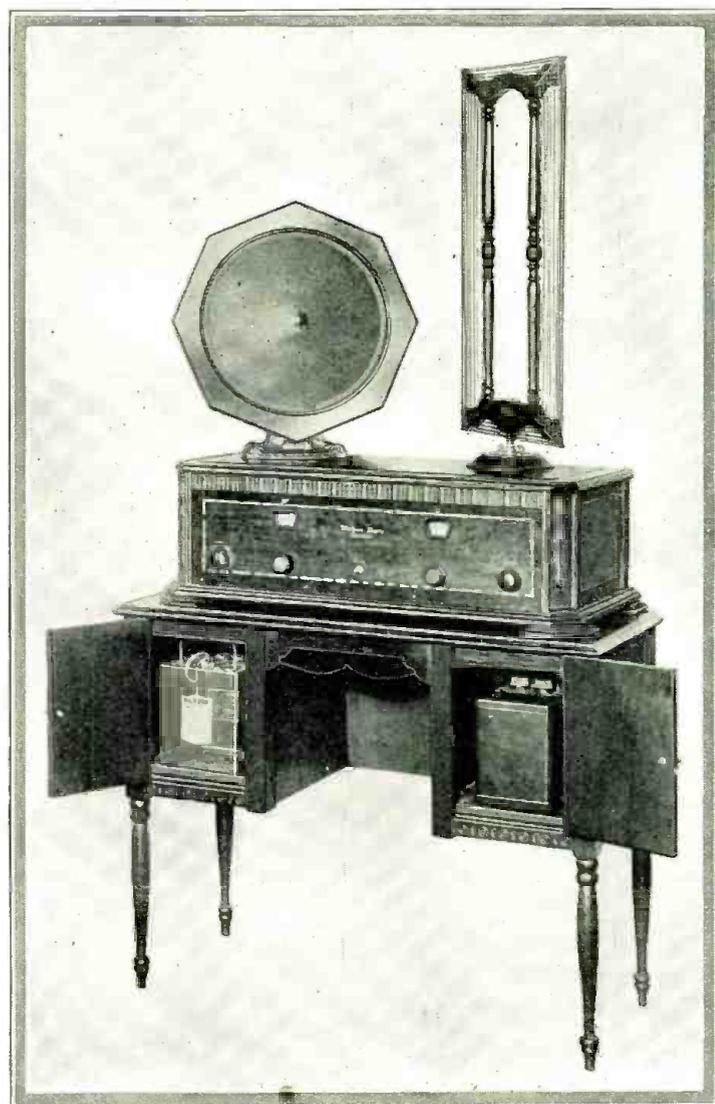
Some Other Radio Applications of Aluminum:—
Alcoa Shields, Box Shields, Cabinets, Panels, Variable Condensers, High-purity Rods, Foil for Fixed Condensers, Die-Castings, Screw Machine Products.

ALUMINUM COMPANY of AMERICA
2319 Oliver Building, Pittsburgh, Pa.



as to bring the intermediate frequency amplifier just to the point of oscillation when the rheostat is turned on full. This value may be a minimum of .0005 or a maximum of .001 mfd. As the value of the condenser is increased, the greater is the tendency for the intermediate frequency amplifier to oscillate.

A complete list of parts for building this receiver appeared in the December, 1926, issue of Citizens Radio Call Book.



The Madison-Moore Receiver installed in a console with accessories

The Madison-Moore "One-Spot" Receiver is shown installed in a cabinet and table with accessories in a photographic illustration appearing herewith.

The table is manufactured by the Southern Toy Co. of Hickory, North Carolina, and is sturdily constructed of high grade lumber and has a very excellent finish of dark brown mahogany, which is hand-rubbed and lacquered. A compartment is provided on each side of the table where the necessary accessories for the proper operation of the receiver may be stored and yet be easily accessible. The cabinet used in this illustration is one manufactured by the D. H. Fritts & Co. of Chicago, Illinois.

A combination of the Balkite Model J charger and "A" Box Filter supplies the necessary "A" current for the operation of the receiver. The Balkite charger is a new model and has the electrolyte in a large transparent glass container, where it is easily discernible at all times. In this respect the actual level of the electrolyte is indicated at all times and guess-work as to the level is entirely eliminated. The "A" Box Filter is a new device, which has been designed for use in conjunction with any 2-ampere-hour charger and effectively replaces the ordinary 6-volt storage battery when properly used. In actual operation the charger is

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

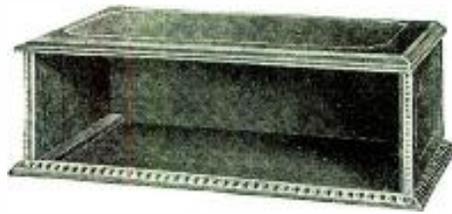
A handsome table of genuine walnut or mahogany veneer, top 5-ply. High grade lacquer finish rubbed to a piano finish. Has ample battery spaces. Top 17 x 36 in. Height 28 in. Battery spaces 8 in. wide x 9½ in. high x 13 in. deep.



PRICES
 \$16.75 EXPRESS PREPAID to Ala., Del., D.C., Ga., Ky., Md., N. C., Ohio, S. C., Tenn., Va., W. Va.
 \$18.50 EXPRESS PREPAID to Ark., Colo., Conn., Fla., Ill., Ind., Iowa, Kan., La., Me., Mass., Mich., Miss., Mo., N. H., N. J., N. Y., Okla., Pa., R. I., Tex., Vt., Wisc.
 \$20.00 EXPRESS PREPAID to Minn., Mont., Neb., N. M., N. Dak., S. Dak., Wyo.
 \$21.50 EXPRESS PREPAID to All other states.
 Cash with order or C. O. D. if one-half price is enclosed with order.

A New Cabinet That Will Appeal To You—The Blue Ridge

Full length piano hinge and lid support, both nickel plated, rubber feet. FREE BASEBOARD. Cabinet designed to allow a clear open space under baseboard for concealed wiring.



7"x18"x10"	.....	\$4.25
7"x21"x10"	.....	4.50
7"x24"x10"	.....	4.75
7"x26"x10"	.....	5.50
7"x28"x10"	.....	6.25
7"x30"x10"	.....	6.75

Your choice Mahogany or Walnut finish. High-grade lacquer rubbed finish.

The BLUE RIDGE CABINET is made of that King of cabinet woods—BIRCH
 Cash with order, f.o.b. Hickory

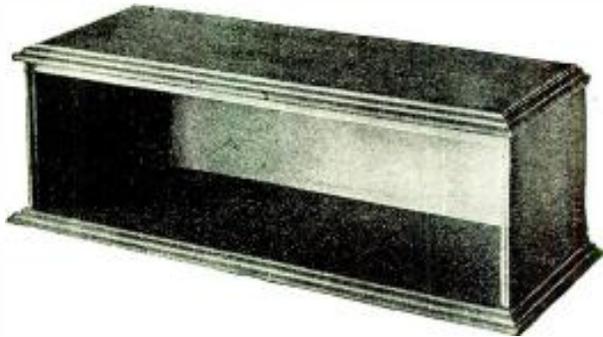
GRADE M FORMICA PANELS. Cut true with edges smooth. We guarantee these panels to be perfect in quality and to be of genuine FORMICA.

7"x18"x3/16"	.....	\$2.50	7"x26"x3/16"	.....	\$3.65
7"x21"x3/16"	.....	2.75	7"x28"x3/16"	.....	3.85
7"x24"x3/16"	.....	3.15	7"x30"x3/16"	.....	4.10

Postpaid in U. S. Your choice Black, Mahogany, or Walnut colors.

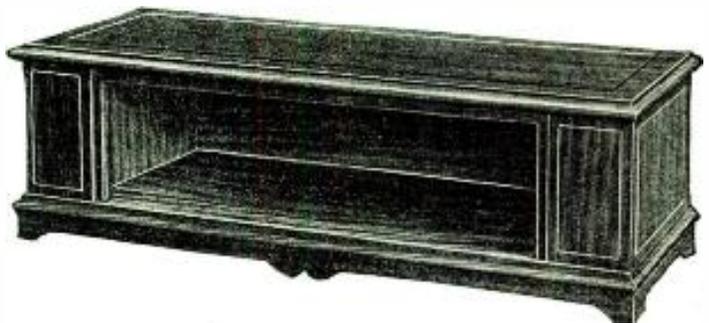
Write us for prices on other sizes. If you order both a panel and cabinet, deduct 25 cents from above prices, as both will be shipped together by express, collect.

The Famous Iveyline Cabinet



	Mahogany Finish	Solid Walnut
7"x18"x10"	.....\$3.50	\$5.00
7"x21"x10"	.....3.75	5.25
7"x24"x10"	.....4.00	5.50
7"x26"x10"	.....4.75	6.25
7"x28"x10"	.....5.50	7.00
7"x30"x10"	.....6.00	8.00

Our Beautiful Carolina Cabinet



7"x18"x10"	.....	\$12.00
7"x21"x10"	.....	12.00
7"x24"x10"	.....	12.00
7"x26"x10"	.....	13.00
7"x28"x10"	.....	14.00
7"x30"x10"	.....	14.00

Without Battery Compartments, deduct \$2.00 from price. Genuine Walnut or Mahogany Veneer. As beautiful as it looks.

The Iveyline and Carolina cabinets have full-length piano hinges and lid supports, rubber feet and FREE BASEBOARD. Prices f. o. b. Hickory, CASH WITH ORDER.

The Southern Toy Company, Inc.
 HICKORY, NORTH CAROLINA

Send for Free Catalogue



50c
Simply
MAIL
Coupon

NEW!

**An Improved Log Book—
Beautiful and Practical!**

Never before in radio history has such an attractive Log Book been published. It is a remarkable value at the amazingly low price of fifty cents. Bound in a two tone, flexible, Mocotan Leather, having an embossed cover. It is truly a fitting companion to the most expensive and most efficient radio receiver.

Lists All Important Stations

Every radiocast station in the United States and Canada using power of 250 watts or more is listed in this new, up-to-date, pocket size Log Book of 48 pages. Stations are indexed by call letters, wavelengths, and by location. This is a Log Book every DX radiofan should have for the call letters and wavelengths of every important foreign station are also listed in it. Ample space has been provided for the addition of new stations and for the listing of local low-powered stations.

Given FREE with Kurz-Kasch Dials

You can secure your copy of this new and improved Kurz-Kasch Log Book in any one of three easy ways. First, it is given away absolutely FREE with the purchase of a set of three Kurz-Kasch Vernier Port Dials. Second, it is for sale by practically every good radio dealer. Third, if your dealer cannot supply you, we shall send you a copy postpaid upon the receipt of fifty cents. When ordering from us, please print or write your name and address plainly on the coupon below.

THE KURZ-KASCH COMPANY
Dayton, Ohio

KURZ KASCH
Aristocrat Dials and Knobs

THE KURZ-KASCH COMPANY,
Dayton, Ohio

I enclose fifty cents. Kindly send me postpaid a copy of your new and improved, 48-page Log Book and information concerning Kurz-Kasch Plastic Products.

Name.....
Address.....
City..... State.....
My dealer is.....

functioning when the set is in use. The purpose of the "A" Box Filter is to filter out the ripples of the pulsating current delivered from the charger in such a way so as to allow a pure DC current to be supplied to the filaments of the tubes. The "A" Box Filter requires no attention except a periodic refilling of the electrolyte chamber with distilled water.

A Kingston "B" battery eliminator, manufactured by the Kokomo Electric Co. of Kokomo, Indiana, supplies the necessary "B" potential for the receiver. This device uses the celebrated Raytheon tube for rectification purposes and will deliver sufficient current for the proper operation of the circuit, without danger of overloading. Controls are provided by which the various voltages may be regulated until best results in reception are obtained.

The loop used with this receiver is the Bodine loop, manufactured by the Bodine Electric Co. of Chicago, Illinois. The loop is carefully manufactured with the highest grade of materials and will give excellent results when used with the Madison-Moore "One-Spot" Receiver.

(Further information on any of the above described accessories may be obtained by writing direct to the manufacturers.)

A HOME BUILT THIRTY-SIX INCH CONE SPEAKER

THIS speaker can be built for a very small sum of money and will give very excellent results. It has a cyanide hardened steel magnet 16 ounces in weight, and the magnet, pole pieces and full floating armature are treated to prevent rust and preserve magnetism. It also has a very short and strong driving rod that is adjustable to the audio output of the set with which the speaker is used. We understand that a complete constructional article on how to build this three-foot cone speaker will be sent for ten cents in stamps, by the Penn Radio Sales, 104 Fifth Avenue, Suite 2236, New York City, N. Y. Write to them direct for any other information.

**OBTAINING A BALANCED GRID EFFECT IN THE
ST. JAMES RECEIVER**

(See page 143 for wiring diagram)

IT is a well known fact that in the gas engine the cycle of events, starting with intake of the vaporized gasoline, followed by compression, explosion and exhaust of the burned gases, calls for a closely coordinated mechanical device. The timing, the valving must be as near perfect as possible to realize the fullest efficiency from the engine.

Closely analogous to the gas engine operation is the action in a radio receiver. We have a similar cycle of events occurring by the intake of energy charging the grid, which then builds up to its maximum potential and is finally discharged through the grid return lead so that the next charge may be impressed upon it. It is as highly important that the functions in a multi-tube radio receiver be coordinated as they are in a gas engine, perhaps more so, for each tube must handle successively the component energy of the previous tubes.

It is obvious that a gas engine, having one cylinder, would not present any difficulties in design, but if a number of cylinders are connected for coordinated action, all of the functions must be carefully planned. The exhaust manifold must be increased in size with the number of cylinders used to provide sufficient outlet for the burned gases. The same principles involved here would apply also to the multitube radio receiver.

As the energy collected from the antenna system is gradually built up in an increasing degree, each tube should have a grid balance which corresponds to the amount of energy it must handle. Viewing such a set, it would follow, that starting from a very infinitesimal amount and building up to a loudspeaker proportion, many thousand times the energy is represented at the output end. It has been common practice on intermediate systems, such as used in the St. James Receiver, to use a common grid return. This does not permit, however, the full value of the gain per stage that would be allowed if each grid were placed at the exact bias to most efficiently handle the energy impressed upon it.

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

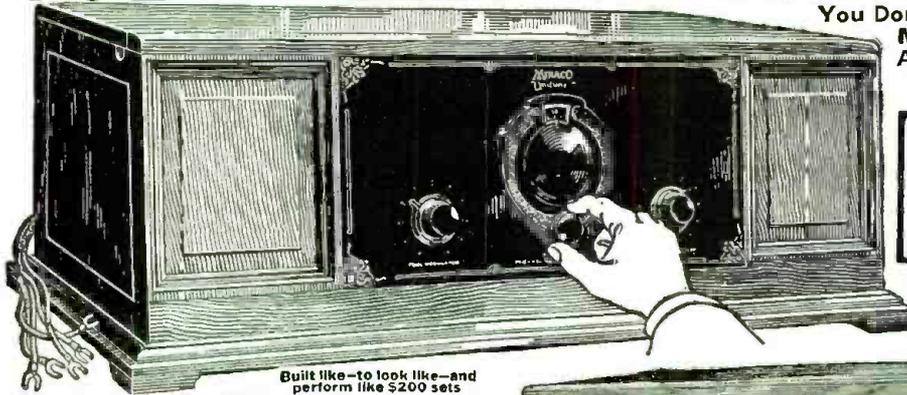
COMPARE WITH ANY 6^{to} 8 TUBE SETS

30 DAYS FREE IN YOUR HOME

Retail \$
LIST
Price

49⁷⁵
GET SPECIAL OFFER
One
year
GUARANTEE

You Don't Send a Penny
Mail Coupon for
Amazing Special
Offer!



Built like—to look like—and perform like \$200 sets

Real Single Dial Control!
Magnificent Big Powerful Miraco "Unitune"
Get Special Offer Amazing Low Price!

The celebrated Miraco Ultra—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, above shown, you turn one vernier knob for stations everywhere. Beautiful hand-rubbed, piano hinged, solid walnut cabinet, 23 in. long, 16 in. deep, 10 in. high. Sloping Bakelite panel is 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.

Send for Proof!

USER-AGENTS WANTED - - WRITE!
Reports from users everywhere 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.

Coast to Coast With One Dial First Evening
I set up the Miraco Unitune about 5 P.M. and heard 35 stations, New York to California, the first evening. The fifth station I heard was Schenectady, N.Y., about 2,000 miles from here. The eighth was Pittsburgh. Heard other stations in Illinois, Nebraska, Missouri, Oklahoma, Colorado, Iowa, Texas, Kansas, California, Catalina Island, Utah. C. D. KRAKEL, Sterling, Colo.

Has Tried 50 Makes—Finds Miracos Best
Having owned and operated over 50 radio receivers, some of the most expensive, well-known makes, including superheterodyne, I believe I know what standards a radio must meet to be absolutely satisfactory. In my estimation the Miraco Ultra and Unitune are the most beautiful, efficient and selective receivers I have ever used. They are as good as the best and better than most at any price. H. P. AEBERLI, Orhlee St., N. S., Pittsburgh, Pa.

Cuts thru Chicago Locals—Gets Coast to Coast on Single Dial

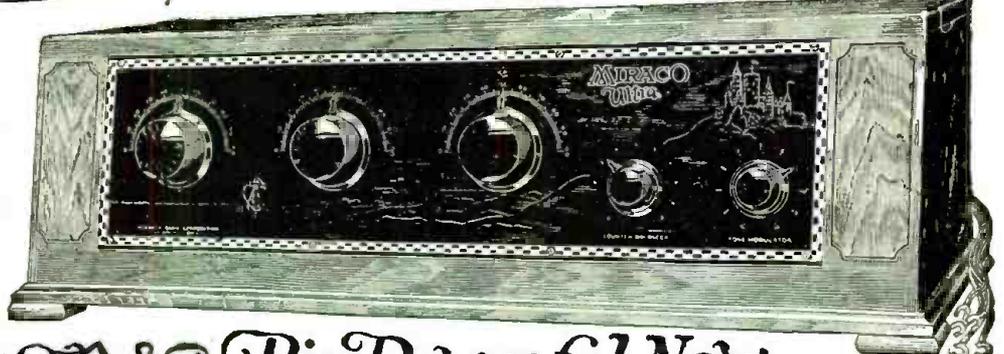
I live in a part of Chicago surrounded by powerful broadcasting stations, where costliest sets have failed to prevent interference. With my single dial Miraco Unitune, however, I have repeatedly astonished neighbors and friends by cutting through all the 17 or 18 Chicago stations and pulling in programs from Florida to California and up to Canada, clear and loud on the speaker. Every night is "silent night" for us so far as getting coast to coast. KFI, Los Angeles, and other California stations come in so loud I have to turn down the counterbalancer. I also separate the many Chicago locals. The Unitune is the most selective set I have ever heard of, and the tone quality is marvelous. And so big, handsome and easy to work—we just turn one dial and sweep the continent for programs. S. E. GUNTER, Addison St., Chicago.

Tunes Out Nearby Local With One Dial

Unitune One Dial set highly satisfactory. Find no difficulty in picking up and separating stations from 226 to 526 meters. Logged about 40 in ten days. I successfully tune out WCWS, Bridgeport—only 4 miles from my home—in 2½ points on the single dial. EDGAR R. THOMAS, Stratford, Conn.

Gets Distance Easy With 1 Dial

Unitune sure brings in far distant stations and is easy to tune. It is a marvelous set. LOUIS ULLSPERGER, Sterling, Neb.



27 In. Long
Fine Walnut Cabinet

Big Powerful New MIRACO

TRADE MARK REGISTERED

ULTRA-SELECTIVE LONG DISTANCE RECEIVERS - EASY ON CURRENT
Guaranteed UNBEATABLE Among the Big, Fine Multi-Tube Sets

UNLESS 30 DAYS of actual enjoyment, use and comparison in your home proves your Miraco the most selective, clearest toned and most powerful distance getter among ANY sets using up to 8 tubes—don't buy it! Be thoroughly convinced entirely at our risk. Your verdict final—absolutely no strings to OUR offer. Satisfaction UNCONDITIONALLY guaranteed by America's big, old, reliable makers of FINE sets—Midwest Radio Corporation—7th successful year. Many, many thousands of enthusiastic users throughout U. S. A. and Canada. Get their testimony. Get the amazing new low wholesale prices and Special Offer! Mail coupon or postal.

Operate From Light Socket or Batteries
Miracos are latest, up-to-minute, models with newest features. Unsurpassed for quiet, low-cost operation with A and B light socket power supply units or batteries. Power tubes and more than 90 volts of "B" can be used, although the amazing power built INTO a Miraco makes this unnecessary. Coupon brings full information, users' testimony. Amazing Special Offer!

Reduced Factory Prices—Save Lots of \$\$\$
Tremendously greater sales this season have made possible BIG reductions on our sets and accessories. Save MORE THAN EVER by dealing direct with Midwest. Or make big profits selling your friends. Get User-Agents' AMAZING Special Offer on Free Demonstrating Outfit (no red-tape, no contract to sign). Our offer will ASTONISH you. Clip coupon NOW.

7th Anniversary Special!

Only \$19.95 net—an unheard-of price for a high-grade, fully guaranteed 5-tube radio! It's the new \$30 (retail list) Miraco Compact—14" wide, finished in brown mahogany. Can't be equaled anywhere near the price in quality of construction, selectivity, distance-getting power, tone, ease and economy of operation—let 30 days' trial prove this! Complete with high-grade accessories—nothing else to buy—only \$49.85 net. Act quick—supply limited. Get Special Offer



Another bargain, direct from factory. Powerful, selective! clear, sweet tone.

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.

MIDWEST RADIO CORPORATION
Pioneer Builders of Sets

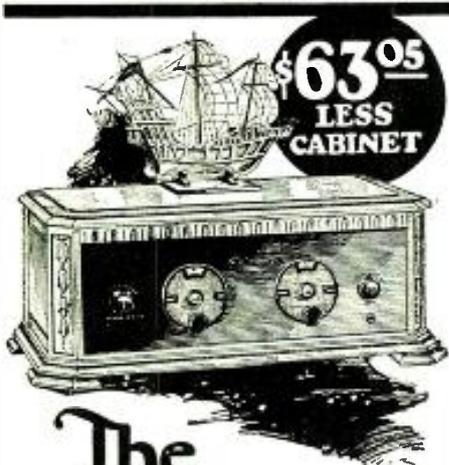
531-X Miraco Building
Without obligation, send free literature, testimony of users, AMAZING SPECIAL OFFER and full particulars of your big money-saving factory-price proposition on Guaranteed Miraco sets and all radio supplies. () Agent () User () Dealer

NAME
ADDRESS

Send coupon for
Amazing Special Offer!

\$19⁹⁵

This Coupon is NOT an Order



**The
Fullest Value
in Radio — plus
the joy of building it yourself**

WONDERFUL as the Hammarlund-Roberts Receiver was in 1926, when over 70,000 were built at home, this year finds the New HI-Q* Set incorporating many features which make it even finer value than ever before!

One interesting advance is complete shielding which prevents coupling between stages and eliminates oscillation. Another is Automatic Variable Coupling—a new feature which gives maximum and equal amplification over the entire tuning range. Its circuit is a marvel of efficiency and all parts are matched.

The result is a quality of **TONE**—a degree of **VOLUME**—and a keenness of **SELECTIVITY** which are a distinct radio achievement.

Anyone can build the New HI-Q* Set at home and save money. Follow simple instructions in the "How to Build" book and in a few hours have a radio equal to \$150 to \$200 factory-made units of similar efficiency.

**Parts Complete
(Less cabinet) \$63.05**



The most complete radio instruction book ever written

Get a copy from your dealer today or send 25 cents direct

Associated Manufacturers

Benjamin Electric Mfg. Co.	Martin-Copeland Co.
Carter Radio Co.	Radiall Company (Amperite)
Durham Resistors	Samson Electric Co.
Eby Mfg. Co.	Sangamo Electric Co.
Hammarlund Mfg. Co.	Westinghouse Micarta

**Hammarlund
ROBERTS
Hi-Q***

*High ratio of reactance to resistance. High ratio—Great selectivity—Loud Signals

HAMMARLUND-ROBERTS, Inc.
1182-T Broadway New York City

The use of a "C" battery will accomplish this balancing effect in a very simple manner and may be connected as follows: Flexible leads should be taken from the grid return binding post of each intermediate transformer designated by the minus sign, and these leads may be just long enough to reach the "C" battery, which has been placed in the rear of the baseboard as closely as possible to the transformers. The potentiometer arm lead is attached to a point on the "C" battery corresponding to 1½ volts negative. This allows a variation toward negative of 6 volts and 1½ volts towards the positive side. The grid leak and grid condenser on the second detector may be removed and replaced with a wire connection. Transformer No. 1 is connected to the positive side of the "C" battery. Transformers Nos. 2, 3 and 4 are connected and marked (temporarily) to the same point as the potentiometer connection of 1½ volts negative.



View of St. James Receiver Installed in Cabinet and Table with Accessories

The set is now turned on as for operation. A station may be tuned in and the potentiometer advanced toward the negative side until it is quite close to the breaking point. The voltage on the intermediates should be between 22 and 25, starting with No. 2 transformer. The grid return lead is now moved toward negative on the "C" battery as far as possible without the tube breaking into oscillation. It is attached at this point and No. 3 and No. 4 are similarly treated.

If the tube conditions, especially the oscillatory characteristics, are the same, the connections will be very much as shown in the

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Trade Mark Reg. U. S. Pat. Office

RADIO INTERFERENCE FILTER No. 1



Actual Size

Tinytobes

A new TOBE product making the TOBE line complete, from the smallest to the largest fixed condensers required in radio.

TINYTOBES are specified in the Lincoln Superhet., Victoreen, Sampson T. C., and many other leading circuits.

It would be hard to find a more efficient, compact and generally advantageous small fixed condenser than the TINYTOBE.

PRICES

Each	
.0001 Mfd. .00025 Mfd.	35c
.0005 Mfd.	35c
.001 Mfd. and .002 Mfd.	40c
.005 and .006 Mfd.	45c
.01 Mfd.	55c
.02 Mfd.	60c

No condensers of this kind are genuine unless they bear the trade-mark name TINYTOBE. Accept no substitutes.

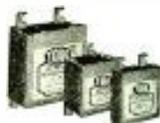


The TOBE 600 Line

High-voltage condensers for AmerTran and similar high-voltage packs. Big, husky 1000-volt D. C. continuous-operating voltage condensers—made to stand the gaff. Equipped with TOBE safety terminals.

PRICES

5 Mfd.	\$2.00
1.0 Mfd.	2.50
2.0 Mfd.	3.50
4.0 Mfd.	6.00



TOBE Filter Condensers

The standard for general radio use, for all operating voltages up to 300 volts D.C. Used by Philco, National Company, General Radio Company, King Radio, and many other leading manufacturers.



THIS new and effective filter unit is designed for the reduction of annoying Radio-Interference, caused by household motors of the D.C. or universal types, on oil burners, refrigerators, elevators and dumb waiters, washing machines, etc. It may also be applied to vibrator motors, etc., and will, in most cases, reduce the interference to a point where it is no longer noticeable. It is designed to be attached directly to the offending appliance, *not* to the Radio set. Strongly cased in a grounded metal container, with lugs for attachment to floor or base plate, provided with 5 flexible leads, for immediate attachment, and with wiring-diagram directly on label. Once installed, requires no attention or adjustments. Designed by Sewall Cabot, noted Radio engineer, and carrying the TOBE trade-mark.

Write us for descriptive pamphlet L-2 on TOBE INTERFERENCE FILTER No. 1. The list price is \$15.00, and if your dealer is not already supplied, will gladly fill your order direct on receipt of your check or money order.



The TOBE 400 Line

Specially cased condensers for 400-volts D.C. operating voltage. For use with Ity-theon BI and similar high-voltage rectifying tubes in B-Eliminators. Use short-path type condensers and equipped with unique TOBE safety terminals at base of can.

PRICES

1 Mfd.	\$2.00
2 Mfd.	2.75
4 Mfd.	4.50



This 4 mfd. TOBE Condenser—working voltage 250—has been specially designed for construction of power tube output filters, now so generally required between the Power tube plate of a Radio set and the speaker—for protection of speaker windings. Price \$3.50.



The TOBE Veritas HI-Current Resistor

A special and unexcelled resistor, capable of radiating 4 to 5 watts continuously without change or deterioration. Made to be soldered directly into the circuits without the use of clips, although of standard length, so that standard mounts may be used if desired.

Prices	3,000.	5,000.	Each
	2,000.	7,500 and 10,000	
	ohms		\$1.10
	50,000 ohms		.90
	.1 meg.		.80
	1/2, 1/4 and 1 meg.		.75

Tobe Deutschmann Co., Cambridge, Mass.

Engineers, Manufacturers and Importers of Technical Apparatus

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

New Superheterodyne

DID YOU NOTICE our advertisement on page 169 in the December, 1926, issue of the CITIZENS RADIO CALL BOOK? It called your attention to the

Victoreen Supreme

This receiver has met the approval of the Radio Public to such an extent that we are swamped with orders from thousands of dealers throughout the country.

A complete set of full size layout and schematic blue prints are awaiting your approval. Perhaps you already have a VICTOREEN and would like to improve it.

Complete blue prints and instruction sheets, \$1.00 net postpaid.

You Will Be Surprised

At the difference in quality, tone, volume and most of all the SELECTIVITY of the VICTOREEN SUPREME.

We Specialize in Superheterodyne Parts

Distributors for

Victoreen	Scott's World's Record
Melo-Heald Eleven	Nine-in-Line
Camfield Super-Selective Nine	

We are also wholesale distributors for the following manufacturers of HIGH-GRADE Radio parts and accessories.

Amperites
Kurz-Kasch Co.
Bodine Electric Mfg. Co.
Fiat Loops
Matthiessen Loops
Acme Wire Co.
Yaxley Mfg. Co.
Victoreen Coils & Rheostats
Hammarlund Mfg. Co.
Leslie F. Muter Co.
Scott Radio Mfg. Co.
Karas Electric Co.
Martin Copeland Co.
Fritts Super Cabinets
Micamold Radio Corp.
Thordarson Electric Mfg. Co.
Naxon Laboratories
Rathbun Dials
X. L. Radio Laboratories

Hood Rubber Co.
Lignole Corporation
Benjamin Electric Co.
Sonatron Tubes
Cunningham Grid Leaks
Saal Loud Speakers
Bremer Tully Mfg. Co.
Kodel Radio Corporation
Dynamik Chargers
Sterling Mfg. Co.
Universal Storage Batteries
Diamond "B" Batteries
Pal Radio Co.
Meloformers & Melocouplers
Camfield Radio Mfg. Co.
Nine-in-Line
Silver-Marshall, Inc.
Elkay Resistors

Dealers Wanted Everywhere.

Write for Catalogue and Discounts.

NELSON ELECTRIC CO.

Tel. Wabash 8719

508 S. Dearborn St., Chicago, Ill.

Liberal Discounts

Immediate Deliveries

illustration. Varying characteristics in the tubes, however, will cause this "C" battery to be tapped at various points. If sufficient care is taken in making these adjustments, a very noticeable gain is made on the efficient transfer of energy throughout the intermediate system, with a corresponding low noise level and generally better results. The "C" battery used is of the flat type $7\frac{1}{2}$ volt capacity.

LIST OF PARTS

These Parts or Any Reasonable Substitute Will Produce Satisfactory Results

- 1—Fiat-Loop
- 1—Lignole Drilled and Engraved Panel 7x24x3/16-inch
- 1—Jewel Pattern No. 135 0 to 8 Volts Voltmeter
- 1—9x23x $\frac{1}{2}$ -inch Baseboard
- 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
- 1—St. James Oscillector
- 4—St. James Dehydrated Intermediate Frequency Transformers
- 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
- 3—Formica Terminal Strips 1x3x3/16-inch
- 10—Eby Engraved Binding Posts
- 1—Pkg Kester Radio Solder
- 4—Doz. Kellogg Tinned Soldering Lugs
- 5—Doz. 5x $\frac{1}{2}$ -inch Round Head Wood Screws
- 50-Ft. Belden No. 12 Tinned Copper Hook-up Wire

The photographic reproduction accompanying this description shows the St. James receiver installed in a cabinet and radio table, with appropriate accessories. The table shown is manufactured by the Southern Toy Co. of Hickory, North Carolina, and is finished in dark brown mahogany. An easily accessible compartment opening to the front, is provided on each side of the table for the necessary accessories for the proper operation of the receiver. The cabinet containing the receiver itself is a product of the D. H. Fritts & Co., of Chicago, Illinois, and is known as the "Super Cabinet." It is constructed entirely of genuine walnut lumber and has a beautiful hand-rubbed and lacquered finish. The combination of the dark mahogany table and lighter walnut cabinet has a very agreeable appearance.

Power supply for the filaments of the tubes is obtained from a Willard 100 Ampere hour storage battery, a product of the Willard Storage Battery Co., of Cleveland, Ohio. A "B" power unit, known as the Constant "B", manufactured by the All-American Radio Corp. of Chicago, supplies the necessary "B" potential. This unit uses the celebrated Raytheon tube and will deliver sufficient current to the receiver without danger of overloading it. The speaker is also a product of the All-American Radio Corp., and is known as the All-American Reproducer. It is capable of very excellent reproduction and when used in conjunction with the St. James Super-Heterodyne will give tone quality which will be satisfactory to the most discriminating listener.

The Fiat loop is a product of the Radio Appliance Laboratory of Chicago and is exceptionally well suited for the St. James.

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



Raytheon

Removes B-batteries and Improves Radio Reception

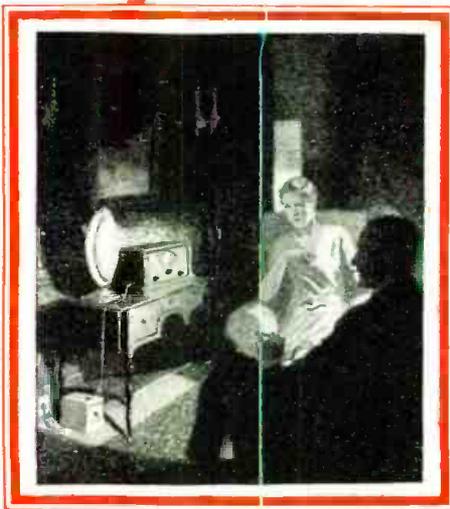
LIGHT socket power is as logical for a radio receiver as it is for a vacuum cleaner or a toaster. It has the same advantages of convenience and economy. But the current from your socket must be changed to an entirely different form of electricity in order to supply power to radio tubes. That's where the Raytheon Rectifier comes in.

THINK of connecting your radio to the same dependable electric power that supplies your lights! Imagine the thrill of the deep, rich, natural tones made possible by ample reserve power. Invite your friends in for the biggest program of the week, secure in the knowledge that your reception is not dependent upon failing B-batteries.

Here is real radio enjoyment!

This marked advance in dependable radio power supply has been made possible largely by the Raytheon Rectifier, a simple tube which makes ordinary house current do the work of fresh B-batteries—and more.

Already more than twenty of the



"All the Comforts of Home—and a New Confidence in the Reliability of Radio"

leading manufacturers of radio power units are equipping them with Raytheon. In the eighteen months since these units were first put on the market, a round half million have been purchased. This very night, on thousands of sets such as yours, they will furnish the silent and unseen power for pleasing radio entertainment.

Never before has such a revolutionary development in radio received

such immediate acceptance. Raytheon-equipped power units are everywhere recognized as the leaders in the field. Why? Because they supply the extra power needed for highest quality reception. They maintain a uniformly high voltage so that your reception is *always* at its peak, night after night, and month after month.

No wonder the news is spreading like wildfire that Raytheon-equipped power units strike a new note in radio performance.

Yet the upkeep is almost negligible. Even the largest radio set will consume only a few cents worth of power per month. The Raytheon tube, guaranteed for at least a year, costs but six dollars. And the complete power unit, which costs no more than a few of the heavy batteries it replaces, will last for years. You will be proud to own this up-to-date electrical appliance which brings reliability and improved quality to radio. Go to your dealer and ask him to modernize your radio set with a Raytheon-equipped power unit.

RAYTHEON MANUFACTURING COMPANY
Cambridge, Massachusetts

The Better Radio Power Units Are Raytheon-approved and Raytheon-equipped

- ACME B-POWER SUPPLY
Acme Apparatus Co.
- ALL-AMERICAN CONSTANT-B
All-American Radio Corp.
- BOSCH NOBATTERY
American Bosch Magneto Corp.
- BURNS B-BATTERY ELIMINATOR
American Electric Co., Inc.
- "BT" B-POWER UNIT
Bremer-Tully Mfg. Co.
- CORNELL VOLTAGE SUPPLY
Cornell Electric Mfg. Co.
- CROSLEY, A, B & C POWER
Crosley Radio Corp.
- ERLA HUM-FREE B ELIMINATOR
Electrical Research Labs., Inc.
- GENERAL RADIO PLATE SUPPLY
General Radio Company
- MAJESTIC "B" CURRENT SUPPLY
Grigsby-Grunow Hinds Co.

- ELECTRON CURRENT B SUPPLY
King Electric Company
- KINGSTON B-BATTERY ELIMINATOR
Kokomo Electric Company
- MAYOLIAN "B" SUPPLY
Mayolian Radio Corp.
- MODERN "B" POWER
The Modern Electric Mfg. Co.
- NATIONAL POWER SUPPLY
National Company, Inc.
- SPARTON RADIO B-POWER
Sparks-Withington Co.
- STERLING "B" POWER
The Sterling Mfg. Co.
- VALLEY B-POWER UNIT
Valley Electric Co.
- WEBSTER B-POWER UNITS
The Webster Co.
- ZENITH, A, B & C POWER
Zenith Radio Corp.

THE prestige of the manufacturers listed here is ample assurance that their Raytheon-equipped power units are carefully manufactured and backed by liberal guarantees. Their units have been designed in full co-operation with the Raytheon laboratory. Only those whose units meet certain essential requirements are authorized to use this symbol in connection with the complete power unit:



and NOW RADIO

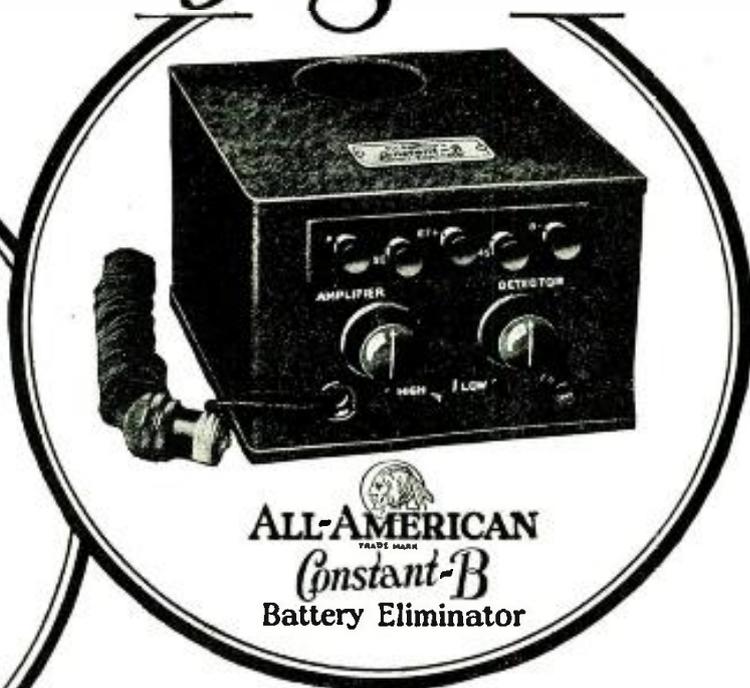
RAYTHEON IS THE HEART OF RELIABLE RADIO POWER

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

“—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

ALL-AMERICAN 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.

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

Webster "Little Giant B-C"

With Raytheon Tube and
Webster "Duo-Choke"



Size 5 3/4" high, 6 1/8" wide, 11 1/2" long over-all

Socket Power for the Largest Set

Five Positive Current Controls

Detector B supply adjustable from 5 to 90 volts, intermediate amplifier B from 20 to 125 v., power tube B from 125 to 180 v., intermediate C and power tube C supplies from 0 to 45 v. This enables supplying all tubes the exact values needed for best reception. When the line voltage of the lighting current goes up or down, as it often does, with the Little Giant B-C, the variation in B voltage is automatically offset by a proportionate variation in negative C voltage, keeping the plate values balanced at the point of best reception. Adjustments are easily made and when made require no further attention until tubes are changed. "Little Giant B-C" may be used without ground for loop receiver. Its beauty adds a touch of distinction to any set.

Price complete with Raytheon BH tube.....\$50.00

Webster Super-B—three variable B controls (no "C") same size as Little Giant B-C—detector adjustable from 5 to 75 volts, intermediate 20 to 125 volts, power tube 125 to 180 volts. Can supply 67 1/2-V. lead through extra Clarostat. Furnishes smooth, unfailing quiet B supply for any set from 5 to 12 tubes up to 60 milliamperes drain.

Price complete with Raytheon B tube.....\$39.00

"Economy-B"—two variable B controls and power tube tap delivers up to 180 volts (same size as Little Giant B-C). For 6-tube set with power tube.

Price complete with Raytheon B tube.....\$35.00

Popular B—open type, two variable B controls and power tube tap delivers up to 180 volts. For 6-tube set with power tube.

Price complete with Raytheon B tubes.....\$32.50

The above are for 50-60 cycle 100-125 volt A.C. supply. Built special for 220 volts A.C. supply.

Direct Current Unit (same size as Little Giant B-C) operate from 110-V. D.C. supply. Smooth, quiet B current for any set up to 10 standard tubes.

Price complete.....\$25.00

All prices slightly higher West of Rockies and foreign.

Send for address of nearest distributor and for Free Booklet, "Improving Your Radio."

THE WEBSTER COMPANY

860 Blackhawk St.

Chicago, Ills.



The KINGSTON

B Current Supply Unit

THE KINGSTON B CURRENT SUPPLY UNIT keeps your radio always at the peak of volume and clear reception. Attach to your light socket and forever forget reception troubles and the nuisance and expense of batteries.

The Kingston is trim, handsome, compact, and has a record of unexcelled success since its introduction. It is built of the best materials by expert workmen. It contains no acid or solution, will not heat, and operates without noise or vibration. Three different voltages are obtainable at the same time, as each tap is adjustable over a wide range, making possible any desired voltage from 5 to 150, in perfect harmony with the needs of your individual set. Your dealer has the Kingston or, if not, we will see that you are supplied.

PRICE

Complete with Raytheon Tube

Type 2—For 110-120 volt A.C. 60 cycle current	\$35.00
Type 2A—Higher powered for extremely large sets	42.50
Type 2C—For 110-120 volt A.C. 25 or 30 cycle current.....	47.50



KINGSTON

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



Majestic "B" Current Supply

delivers pure direct current from your light socket

Majestic Standard-B
Capacity, nine 201-A tubes or equivalent. 45 milliamperes at 135 volts.

\$26.50

West of Rocky Mts., \$29.00
Raytheon Tube \$6.00 extra

Majestic Super B
Capacity one to twelve tubes, including the use of power tubes. 45 mils. **\$29.00** at 150 volts..
(AS ILLUSTRATED)
West of Rocky Mts. \$31.50
Raytheon Tube \$6.00 extra

Majestic Master-B
Positive control of all output voltage taps. For sets having high current draw or heavy biasing batteries. 60 mils. at 150 volts.

\$31.50

West of Rocky Mts. \$34.00
Raytheon Tube \$6.00 extra

5 Points of Superiority

1 Better Reception

No hum. Superior to any source of power.

3 Dependability

Maximum, unvarying power always available.

2 Economy

Low first cost. Cheapest and best form of "B" Power. Costs only a fraction of a cent per hour.

4 Durability

No acid or liquids. Uses Raytheon Tube; no Filament to burn out.

5 Flexibility

Voltage can be accurately adjusted to meet varying conditions in every city—and on any set.

Ask for a demonstration on YOUR Set
(Can be purchased on deferred payments)

GRIGSBY - GRUNOW - HINDS - CO. 4560 ARMITAGE AVE, CHICAGO-ILL.

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

Plate Voltage Aplenty For Big or Little Sets



The Type 405 Plate Supply

The Type 405 Plate Supply delivers ample plate power to permit its use with multi-tube sets where there is a heavy current drain as well as with receivers having small current demands.

The Type 405 Unit operates on 110-volt (60-cycle) A. C. and provides voltages of 45, 90, 130, and 200.

Voltages are readily adapted to plate requirements of all standard tubes in popular use by means of fixed resistances. These resistances are tightly sealed from dust and moisture thus eliminating bothersome and noisy tendencies of variable resistance voltage controls.

The Unit is contained in a metal case with attractive black crystalline finish and has a conveniently located A. C. switch.

Price with Raytheon "BH" tube.....\$46.00

Ask Your Dealer or Write for Bulletin 926-C

GENERAL RADIO CO., Cambridge, Mass.

GENERAL RADIO

PARTS AND ACCESSORIES



Radio dealers recommend and use the

ekko Ground Clamp

because it eliminates the high percentage of radio troubles due to faulty ground

Imperfect ground contacts are responsible for a high percentage of all radio troubles. The ekko Clamp eliminates these troubles by insuring perfect contact. Radio dealers know this. That is why they include an ekko Clamp with radio set installations and instruct their service crews to use it in replacing old faulty grounds.

The hardened steel points of the ekko Clamp bite through paint, rust, dirt, corrosion or any other insulation. Its positive contact insures full signal strength. Easy to use. Ground wire screws to Clamp. Clamp attaches to nearest pipe by a turn of the screw. Non-corrosive, permanent. Finished in white nickel. Fits 1/4 to 1 1/4 inch pipe. At your dealer's.

Radio Dealers:

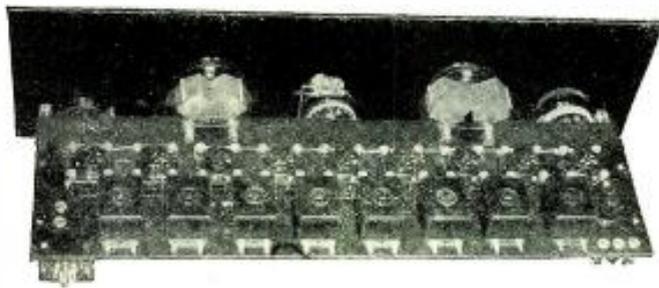
The ekko Clamp is supplied in lots of ten in an attractive counter display that helps you sell this most popular of all ground clamps.



The Ekko Company

111 West Monroe Street, Chicago, Ill.

NINE IN LINE MAKES RADIO HISTORY



Read the article on Nine-In-Line in this issue and you will find the results obtained on this record breaking circuit will convince you of its merit.

Immediate Delivery on All Parts as Specified by the Call Book

We Do Not Substitute

LIBERAL DISCOUNTS TO THE TRADE

We Ship Everywhere—24 Hour Service

Note: We are the largest distributors of parts in the country—try us for the hard-to-get parts

Send for Free Literature and Prices

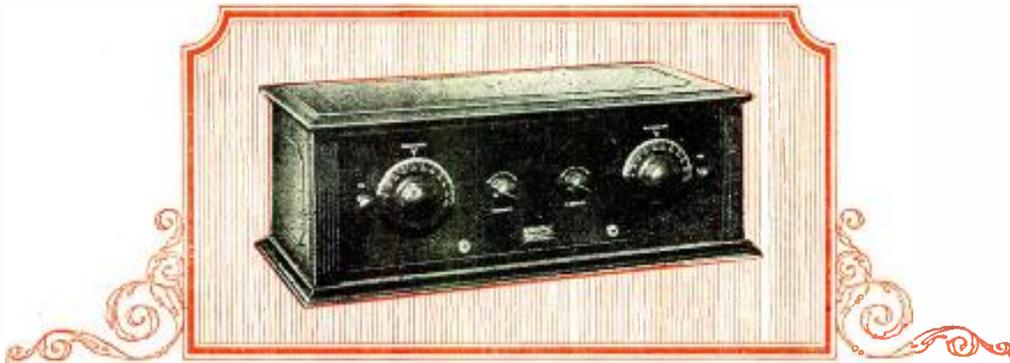
HUDSON-ROSS, Inc.

116 S. Wells St., Chicago

SAVE TIME AND MONEY BY ORDERING FROM US

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

BROWNING-DRAKE RADIO



Factory Built Sets and Complete Kits

BROWNING-DRAKE radio is known to almost every fan. Any development based on as sound scientific research as this work at Harvard University, was bound to endure. Consider the number of designs which have come and gone since 1923 and you will understand that this has been a receiver very much out of the ordinary.

For the fan who wishes to make his own, Browning-Drake is now offered in a new official design approved by Glenn H. Browning and

Dr. Frederick H. Drake. The way is made easy by essential instructions contained in every kit, or sent in booklet form upon receipt of twenty-five cents.

Complete factory-built receivers, backed by the same research facilities and with our guarantee of performance, are now standard on the market. If your dealer cannot supply you with the Browning-Drake Corporation kit or the complete receiver, send us his name and we will see that your requirements are taken care of.

DEALERS: The new Browning-Drake kit, designed complete in conjunction with several well-known manufacturers, is now available from your distributor. If you are unable to secure kits or sets from distributors in your territory, we will see that your order is filled.

BROWNING-DRAKE CORPORATION, Brighton, Mass.

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

Citizens Radio Call Book's Improved

You can build the Improved Nine-in-Line easily and successfully with these parts specified by Citizens Radio Call Book. See complete list of parts on next page.



TRANSFORMERS

Citizens Radio Call Book specifies H F L Units where marvelous performance is demanded. These supreme instruments have been approved and endorsed by Radio News—Radio Review—Radio Engineering—Radio Mechanics—Chicago Daily News—Chicago Evening Post—in fact by every leading Radio Authority . . . a universal endorsement that stamps H F L as the highest standard of excellence in Radio.

Get H F L Units at your Dealer. Write direct for descriptive literature.

HIGH FREQUENCY LABS.

131 N. Wells St. Chicago

THE PEER OF ALL RECEIVERS

TREMENDOUS POWER

The 9-in-Line affords a tremendous power that cannot be found in any other receiver. . . . Power that is well-controlled, and that guarantees the highest quality of reception whether tuned to a whisper or a roar.

HAIR-LINE SELECTIVITY

Powerful local broadcasting stations cannot blanket the 9-in-Line. Coast to Coast reception is customary with every 9-in-Line regardless of its location. 9-in-Line Receivers in New York and Chicago achieved remarkable DX records while every local station was on the air. Tests all over the country have established the fact that the 9-in-Line is altogether unequalled for Selectivity and Sensitivity.

UNEQUALLED PURITY OF TONE

Combined with its tremendous power and extreme selectivity the 9-in-Line possesses a naturalness of tone hitherto unknown to Radio. Its exact fidelity of reproduction is the supreme achievement of today . . . the last word in perfect radio reception. Anyone can build this remarkable receiver at small cost. The owner of a 9-in-Line receiver knows that he has the finest broadcast receiver obtainable, and one that will be up to date for years to come.



YAXLEY No. 10
Midget Battery Switch

Selected Again

Among the fine parts recommended for the 9-in-Line Receiver you will find Yaxley Approved Radio Products. You will get better results by sticking to these dependable devices.

Each product is made with the greatest precision and is fully guaranteed to give you satisfaction.

Rheostats **Switches**

Pup Jacks
Resistance Units
Cable Connector Plugs



Yaxley Manufacturing Co.
9 So. Clinton St., Chicago

Centralab

Specified for the

Nine-in-Line



Centralab Standard Radiohms

Can be varied smoothly throughout the 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

Central Radio Laboratories

26 Keefe Avenue Milwaukee, Wis.
Makers of a full line of variable resistances for 69 manufacturers of leading standard sets

DEPENDABLE



PRODUCTS

Leslie F. Muter Company

76th St. & Greenwood Ave.
Chicago

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

9 IN LINE Receiver

See Article
In This Issue!



Get These Parts
From Your Dealer

9-IN-LINE PARTS

- | | |
|--|--|
| 3 H. F. L. No. H.210 Transformers | 1 Yaxley Filament Switch |
| 2 H. F. L. No. H.215 Transformers | 1 Yaxley 3L Resistance |
| 2 H. F. L. No. F.320 Transformers | 1 Yaxley 4L Resistance |
| 1 H. F. L. No. L.425 R. F. Choke Unit | 1 Yaxley Battery Cable, complete |
| 1 H. F. L. No. L.430 R. F. Transformer | 2 Yaxley 6-ohm Rheostats |
| 9 Benjamin Sub-Panel Mounting Sockets | 5 Yaxley Pup Jacks |
| 2 Benjamin No. 9082 Tuning Condensers | 1 Centralab Radiohm, 200,000-ohm |
| 2 Kurz-Kasch Vernier Dials | 1 pr. Benjamin Brackets |
| 1 Chelton .000045 Midget Condenser | 1 7x26" Celeron Front Panel |
| 2 Muter 1 mfd. By-Pass Condensers | 1 7x24" Celeron Base Panel |
| 2 Muter .002 Mica Condensers | Screws, nuts, bus bar wire, spaghetti, and solder lugs |
| 1 Muter .0005 Mica Condenser | 1 "Qualitone" Loop |



THE QUALI-TONE LOOP

Specified by Citizens Radio Call Book for the 9-in-Line, and invariably selected by experts, for use with the finest receivers. Note exclusive thumbscrew attachment that keeps wires taut always. List Price **\$10.00**

Duro Metal Products Co.
2649 N. Kildare Ave.
Chicago

9-In-Line Complete Set of Parts, without Loop, Screws, Nuts, etc., \$109.40

CELERON PANELS Are Selected for the 9-in-Line



Note front panel in illustration of receiver. NINE-IN-LINE Celeron Panels accurately drilled and tastefully decorated, in stock at Chicago. Special attention given the Radio trade by one of the oldest manufacturers in the industry.

Panels for NINE-IN-LINE and other popular kits carried in stock. Immediate service rendered jobbers on standard sized panels in both black and grained surfaced Celeron for their regular trade.

THE CELERON COMPANY DIVISION OF DIAMOND STATE FIBRE CO.

Chicago, Ill.—1656 Besley Court
Phone Brunswick 3200

Bridgeport, Penna.
Near Philadelphia

A NEW STRAIGHT LINE FREQUENCY CONDENSER BY

BENJAMIN



The new features are: 1. Single or three-hole mounting. 2. Low loss (losses reduced to lowest possible degree). 3. Rugged ball bearing construction. 4. Small and compact. 5. A real straight line frequency curve improves selectivity and sensitivity. 6. No bunching of stations. 7. Easier tuning and setting of the dial.

Push Type Cle-ra-tone Sockets
Spring supported — shock absorbing.
Stop tube noises. Contacts always clean.

Adjustable Shelf Brackets
Supports sub-panel with room underneath for accessories and wiring.



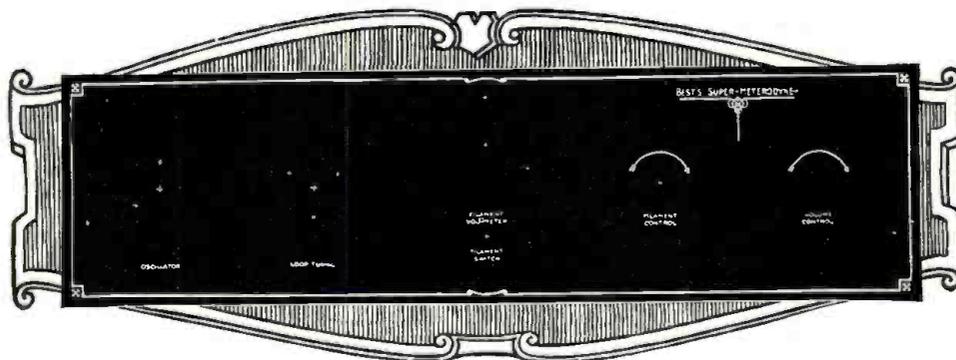
Benjamin Electric Mfg. Co.

120 S. Sangamon St.

New York CHICAGO San Francisco



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



One Spot, Best's, Karas and Other Kit Panels

Formica Kit Panels handsomely decorated in gold on gloss Black Formica are available for the following Kits: Madison Moore, One Spot, Karas Equamatic, Best's Superheterodyne, Bremer Tully Power Six, H. F. L. Nine-in-Line Superheterodyne with sub panel, Victoreen single-dial and two-dial, Aerodyne, St. James 8 Tube, and Browning Drake National. They are sold by leading jobbers and dealers everywhere.

FORMICA products are recognized the world over as the finest available for radio purposes.

Special Panels cut to size and Formica Tubing are also available for amateurs.

THE FORMICA INSULATION COMPANY
4666 Spring Grove Avenue
CINCINNATI, OHIO

FORMICA
Made from Anhydrous Bakelite Resins
SHEETS TUBES RODS

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



The Last Word in **STRAIGHT- LINE FREQUENCY CONDENSERS**

12 New Exceptional Features

- 1—A real Straight-Line Frequency curve.
- 2—Of the smallest possible size consistent with high accuracy and ruggedness.
- 3—Exceptional Low Loss—losses reduced to lowest possible degree.
- 4—Very rugged in construction—the end plates are of heavy brass and ribbed to gain strength.
- 5—Single hole mounting. Also an optional 3-hole screw support.
- 6—The rotor moves on ball bearings.
- 7—Each condenser tested and adjusted to a very high degree of precision.
- 8—Wide spacing of plates insures accurate matching in multi-stage sets using a single control.
- 9—Mounting plate effective shield against any hand capacity.
- 10—Pressure on shaft of condenser has no effect on capacity.
- 11—Even motion. So constructed that plates will not bind or grip at any point.
- 12—Makes for greater selectivity and easier tuning.

.00025 Mfd., \$3.50
.00035 Mfd., \$3.75
.0005 Mfd., \$4.00

In every test applied to the "Lekeless," it has shown its superiority in selectivity, in sharpness of tuning, greater tuning range, finer and fuller tone values.

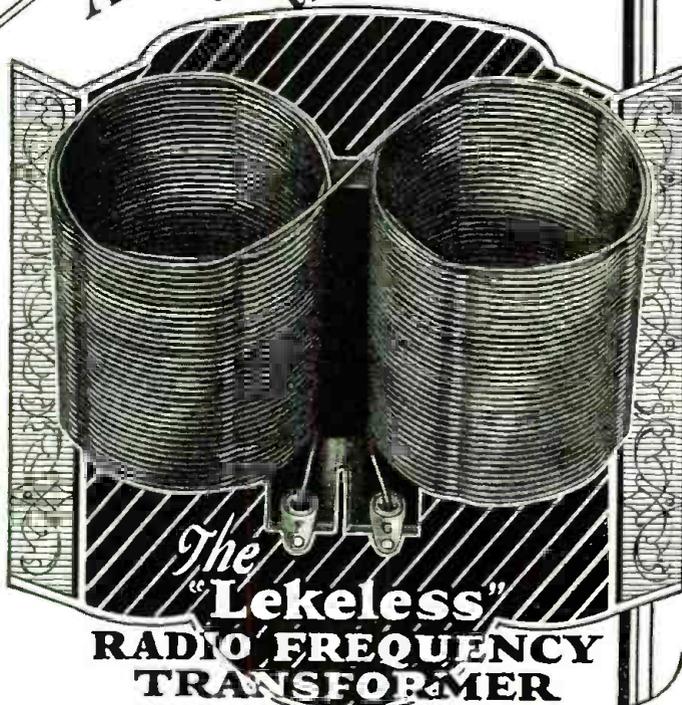
Loose basket weave. No interstage coupling. Low apparent resistance at broadcasting frequencies. Highest ratio inductance over apparent resistance. Lowest percentage of comparative increase of radio frequency resistance to direct current resistance. Lowest apparent inductance at broadcasting frequencies compared to inductance at 1 kc. Lowest rate of decrease in ratio of inductance over apparent resistance at radio frequencies to the same values at audio frequencies. 170 to 574 meters—for .00035 Mfd. Condenser.

Single Transformer, \$2.50

Benjamin Electric Mfg. Co.

120-128 S. Sangamon St., Chicago, Ill.
New York: 247 W. 17th St. San Francisco: 448 Bryant St.
Manufactured in Canada by the Benjamin Electric Mfg. Co. of Canada, Ltd., Toronto, Ontario

*A Great Advantage
to the Set
that has
it!*



Tuned Radio Frequency Transformers



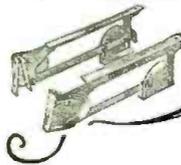
All Benjamin Radio Products are of the same high standard as the far-famed Cle-Ra-Tone Sockets~



Battery Switch



Adjustable Brackets



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

VICTOREEN

Brookfield, Mass.,
January 17, 1927.

Victoreen Radio Inc.,
Cleveland, Ohio.

Gentlemen:

I have constructed an eight tube Victoreen Super and would like to be advised if the following results are unusual. Last evening between ten and twelve o'clock, E.S.T., I picked up the following stations without any antenna of any kind. My ground wire is about five feet long and was connected to the ground terminal of set.

PWX - Havana, Cuba
WMBF - Miami, Fla.
GEW - Cuba
WDOD - Chattanooga, Tenn.
WBBM - Chicago, Ill.
WIBO - Chicago, Ill.
WENR - Chicago, Ill.

I also gathered in what we call the locals. At every turn of the dial there was a station.

I have been using as an antenna about 30 feet of ordinary outside antenna wire wound hoop fashion on a frame and had wonderful results.

I thought the set was fooling me so took the aerial and placed it in another room about 20 ft. from the set and received the same stations with the same volume.

I never knew what radio was until I built my Victoreen and I have tried about a hundred different hook-ups.

Yours truly,

G. P. Fletcher

Recognized Superiority

The George W. Walker Co.

6528 Carnegie Avenue

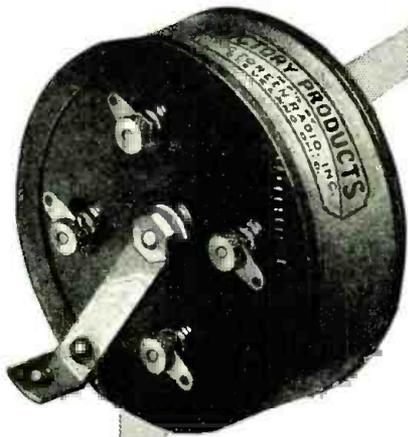
Dept. A

Cleveland, Ohio

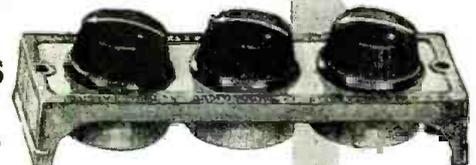
Branches in Principal Cities

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

RADIO PARTS



**The Victoreen
Universal Circuit is
a Wonderful Success**
Victoreen Parts Used Are



R. F. Transformers

Because Victoreen Transformers are actually tuned to a precision within one-third of 1 per cent, they are especially recommended to all builders of Super Sets. Victoreen Transformers are available in two types—No. 170 for use with storage battery tubes and No. 171 for dry cell tubes.

Price \$7.00 each

Master Control Units

A mighty important feature of this unit is that it provides compensation to regulate any difference in capacities between the higher and lower wave lengths. Used in circuits employing two or more condensers of the same capacity. Easy to mount—no change of wiring necessary.

Two condenser type. Price.....\$19.50
Each additional condenser. Price..... 4.50

Audio Control Units

Permits minimum number of panel controls and consists of 3 rheostats of proper ohmage mounted on the bakelite base. Controls the second detector and audio tubes.

Use Type 3-R for 201-A tubes.
Use Type 3-R-1 for power tube.

Price \$4.50 each

Rheostats

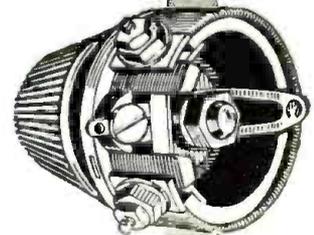
Zero temperature coefficient resistance remains absolutely constant. More turns of wire than used on ordinary rheostats. Three terminals simplify wiring.

Made in 5 resistances: 2, 6, 10, 20 30 ohms. Price.....\$1.20
Victoreen Potentiometers—200 and 400 ohm resistances. Price..... 1.50



Master Control Unit

A Victoreen Super is the last word in radio. It is without a peer. It has range, clarity, volume and selectivity.



Rheostat

The demand for Victoreen products is greater than ever before. If you have never built a Victoreen Super using the Victoreen Universal circuit, you have missed one of the greatest pleasures in radio.
Send for a folder today.

The George W. Walker Co.

6528 Carnegie Avenue

Dept. A

Cleveland, Ohio

Merchandisers of Victoreen Radio Products

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



Piracy of the Air!

Bring in All the stations clear and loud! Cut Right in Between Them, and Bring Them Out of the Speaker One at a Time!

The Famous Melo-Heald Eleven Circuit

Described in this issue of the Citizens Radio Call Book. The One Circuit That Lives Up to Its Reputation and Claims! Cuts Through All Interference—Cross Country on Any Night!

A letter from a user of this circuit described by the Radio Call Book that illustrates how it robs the air of its radio waves:

St. Louis, Mo., December 6, 1925.

Gentlemen.

You were good enough to acknowledge my letter of Nov. 5th regarding the results secured from my receiver built from the Melo-Heald Circuit, so I'm going to give you a few more facts that may or may not interest you. At least, I feel so elated over having such good success since I last wrote you, that I want you to know about what I have accomplished with my set.

In the last three days I have logged the following stations:

- WOK Chicago (Homewood) Ill.
- WBBM Chicago, Ill.
- KFWF St. Louis, Mo.
- WIBO Chicago, Ill.
- KMMH Clay Center, Neb.
- WHT St. Louis, Mo.
- KPYE Chattanooga, Tenn.
- WDDO New York, N. Y.
- WMAK Lockport, N. Y.
- WFBM Indianapolis, Ind.
- WGHP Detroit, Mich.
- WKBE Webster, Mass.
- WOI Ames, Ia.
- WIL St. Louis, Mo.
- WSBF St. Louis, Mo.
- WORD Evansville, Ind.
- WWSB Chicago (Woodale) Ill.
- WOIL Council Bluffs, Ia.
- WOO Kansas City, Mo.
- KMOX St. Louis, Mo.
- WEMC Berrien Springs, Mich.
- WKAR Lansing, Mich.
- WMBI Chicago, Ill.
- WAIU Columbus, O.
- KPRC Houston, Texas
- WPG Atlantic City, N. J.
- WGN Chicago, Ill.
- WLIB Chicago (Elgin) Ill.
- KDKA Pittsburgh, Pa.
- WSMB New Orleans, La.
- KOA Denver, Colo.
- WSAI Cincinnati (Mason) O.
- WJAZ Chicago, Ill.
- KTNT Muscatine, Ia.
- WCAL Northfield, Minn.
- WJAX Jacksonville, Fla.
- KFAB Lincoln, Neb.
- KSAC Manhattan, Kan.
- WCBD Zion, Ill.
- WLS Chicago (Crete) Ill.
- KRLV Dallas, Texas
- CFCA Toronto, Ont., Can.
- CHIC Toronto, Ont., Can.
- CKCL Toronto, Ont., Can.
- CNRT Toronto, Ont., Can.
- WEW St. Louis, Mo.
- WHN New York, N. Y.
- WDAF Kansas City, Mo.
- WEBH Chicago (Mooseheart) Ill.
- WJJD Chicago (Mooseheart) Ill.
- KTHS Hot Springs, Ark.
- KVOO Bristolow, Okla.
- KDOO Tulsa, Okla.
- WHAZ Troy, N. Y.
- WAOI San Antonio, Texas
- WHAS Louisville, Ky.
- WBBR Brooklynn (Roseville) N. Y.
- WCCO St. Paul, Minneapolis, Minn.
- WKRC Cincinnati, O.
- CNRT Cincinnati, O.
- WSB Atlanta, Ga.
- WOS Jefferson City, Mo.
- WQJ Chicago, Ill.
- WJZ New York, N. Y.
- KFNF Shenandoah, Ia.
- KMA Shenandoah, Ia.
- KFI Los Angeles, Calif.
- WRC Washington, D. C.
- WBAP Fort Worth, Texas
- WFAA Dallas, Texas
- WOC Davenport, Ia.
- WSUI Iowa City, Ia.
- WCFL Chicago, Ill.
- KFRU Columbia, Mo.
- WMC Memphis, Tenn.
- WXR Detroit (Pontiac) Mich.
- WCJ Detroit (Pontiac) Mich.
- WHO Des Moines, Ia.
- WOAW Omaha, Neb.
- KYW Chicago, Ill.
- KFUO St. Louis, Mo.
- KSD St. Louis, Mo.
- KTW Seattle, Wash.
- KLDS Independence, Mo.
- WHB Kansas City, Mo.
- WHAR Atlantic City, N. J.

And, since my last letter, besides the relatively easy Canadians logged previously, I have logged the following foreign stations: LOW Buenos Aires, Argentina CZE Mexico City, Mexico FAM Guadalajara, Mexico ANZ Mexico City, Mexico and the station of the Portola News Co., LAS PALMAS, CANARY ISLANDS.

It just seemed to me that this was a pretty good record, and while you are undoubtedly receiving equally or more favorable reports from other sections of the country where interference is not so severe as in my community, I wanted to get this to you with my further statement of appreciation of the Melo-Heald Eleven Tube Circuit and what it will do.

Yours truly, Missouri Theater Bldg. LGF/ES

John E. Frumson

(Dr. Frumson's first letter appeared in the last issue of the Radio Call Book.)

ROBERTSON-DAVIS COMPANY, Inc.

Dept. RCB-1

412 Orleans Street

Chicago, U. S. A.

District Representatives:

- A. C. Lopez Co., 40 West 33rd Street, New York, N. Y.
- L. M. Church & Son, 300 Eleventh Street, S. W., Washington, D. C.
- Pacific Hoosier Sales Co., 1547 West Pico Street, Los Angeles, Calif.
- Southern Sales, Incorporated, 2030 Dryades St., New Orleans, La.

Makes Use of Certified Meloformers and Melocouplers



Mr. Merwyn Heald, B.S., E.E., designer of this melodious and powerful circuit, built it around Certified Meloformers and Melocouplers, the audio and radio frequency transformers described below, using standard stock parts that can be purchased anywhere for the balance. His faith in laying the success of his idea to these transformers has been more than justified by the results secured by himself and those who have followed his advice.

The Melocoupler is a superior type of radio frequency transformer, built with an air-core, for specific service in high-powered construction, that does not depend upon a freak circuit to perform at highest efficiency. The Melocoupler is provided in three different types: 135 R. F.; 120 R. F.; and 160 R. F.; each peaked, wound and tested at the same point of efficiency, making kits unnecessary.



The Meloformer is a special alloy-core audio frequency transformer that successfully operates three stages of audio without the usual doctoring with bypass condensers or resistors, and which also renders beautiful reproduction without slightest distortion on as high as four stages.

Certified Amplification

Every Meloformer and Melocoupler is Certified and manufactured under an unconditional guarantee—each made and tested by the same process and standards. Therefore, in building a receiver with them, it is possible to buy each transformer from a different source and secure the same excellence of operation as in a hand-picked laboratory set.

For FREE copy of Full Size Blue Print of Circuit as described by Citizens Radio Call Book and further particulars on Certified Meloformers and Melocouplers, MAIL COUPON OR WRITE TODAY.

FILL IN AND MAIL THIS COUPON TODAY FOR BLUE PRINT AND PLANS FREE

Robertson-Davis Co., Inc., 412 Orleans St., Chicago, U. S. A.

Pls send me Full Size Blue Print, Plans and Specifications of the Melo-Heald Eleven Circuit described in this issue of the Citizens Radio Call Book, and also further particulars on Certified Meloformers and Melocouplers, manufactured by you, and which were used by Mr. Heald in designing his receiver. This is to be sent FREE and without obligation.

Name.....

Address.....

City.....

State.....

RCB-1

(Write or Print Clearly)

Specifications of the Melo-Heald Eleven Circuit as described in this issue of the Citizens Radio Call Book, and also further particulars on Certified Meloformers and Melocouplers, manufactured by you, and which were used by Mr. Heald in designing his receiver.

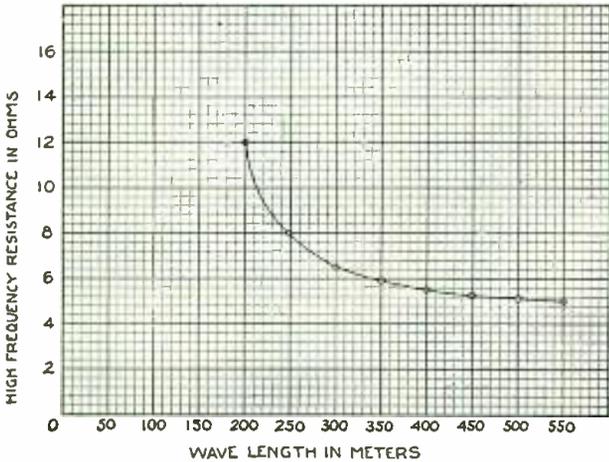
**PARTS AS SPECIFIED IN
For the 6-Tube**



**CALL BOOK CIRCUITS
Shielded Neutrodyne**

Only \$10 Per Set of Four

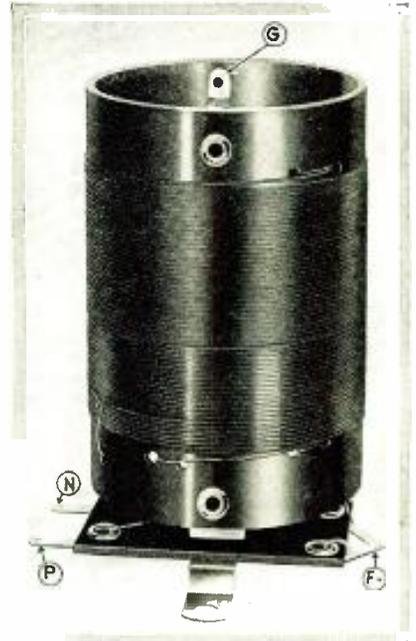
Special Radio Frequency Transformer built to specifications. Note sturdy construction →



The radio frequency transformer, pictured to the left, is especially designed for the Shielded Neutrodyne Receiver. It is extremely well made, and is built under rigid specifications with careful inspection and incorporates the latest engineering practices. The construction is of such sturdy character that the transformer may be handled extensively, even roughly, during the assembly of the receiver without danger of damage, or impairment of electrical qualities. The coils are wound upon the Bakelite tubing by an automatic, mechanical means, thereby insuring perfect space winding and uniform inductance at all times. Soldering lugs are located at convenient points, by which the proper connection may be easily made.

Complete set of 4 coils as specified **\$10.00**

Curve showing the radio frequency resistance of the Special Keystone Radio Frequency Transformer



**Parts for the Call Book's
"Inexpensive 5-Tube T. R. F. Receiver"**



Keystone .00035 mfd. Variable Condenser



Set of 3 Keystone Coils, 1 Tapped Auto-Transformer and 2 R. F. Transformers

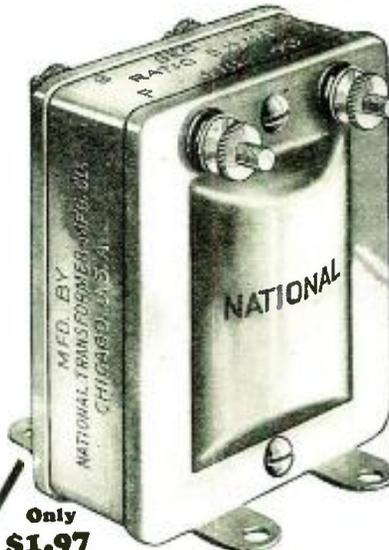


Keystone Grid Leak

You can now obtain genuine specified parts, blue prints and complete wiring diagram of the "Inexpensive 5-tube Tuned Radio Frequency Receiver" as listed in the December, 1926, issue of Citizens Radio Call Book and as per review of famous circuits presented in this issue. This is the circuit built by thousands of fans. You'll be surprised what an efficient, first-rate sets you can build from these parts for very little money—the cost of Keystone parts as specified being only \$12.16 complete. Think of it! A real opportunity for set builders, fans and those who want a high-grade 5-tube receiver of unusual tone, volume and selectivity.

Take advantage of this opportunity NOW. Note illustrations of parts and also special offer on transformers shown opposite. Use the handy coupon below when ordering.

AMAZING MONEY SAVING OFFER!



Only **\$1.97**

Why the "KEYSTONE" NATIONAL" is BETTER

The secret is in its extra large, especially shaped, high-grade silicon steel core, and its oversize special-wound core. Hence, no other transformer, regardless of price, can out-perform the National—in amplification, in fidelity of reproduction. They are heavily nickel plated, all over, and polished so they are just like mirrors. They make a neat looking job.

INSTANTLY—You'll Notice a Tremendous Improvement in Volume and Tone

Rip out your old audio transformers. Put these oversize, handsome, 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. Nationals 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.

YOU CAN SAVE MONEY!

Thousands upon thousands of fans have found them to be the final answer to perfect one 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.

The special, low price of \$1.97 will hold only so long as our stock lasts. Thousands who have used Nationals will order as many transformers 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 for your own set, order NOW. Use the coupon. Save money. Order TODAY!

DEALERS AND JOBBERS: Write for special prices on all standard Keystone parts to meet the demand of your customers.

Keystone Radio Laboratories, Inc.
154 Whiting St., Dept. CR3, Chicago, Ill.



- You may send me the following, which I have checked:
-Set of 4 Shielded "6" Coils at \$2.50 each. \$10.00.
 -Blue Prints of Inexpensive 5-Tube T. R. F. Receiver, 50c.
 -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 Autotransformer and 2 Keystone R. F. transformers at \$3.48 set. (Any one coil separately \$1.20 each)
 -Keystone .00035 Mfd. Variable Condensers at \$1.48 ea.
 -Keystone 2 meg. Grid Leak, at \$0.30 each.

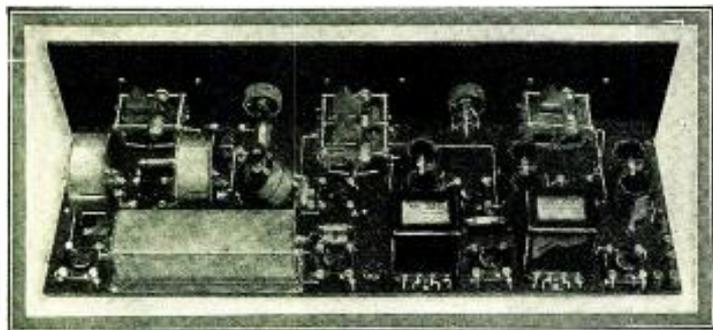
I agree to pay postman \$.....plus few cents postage. We pay postage if you send cash with order. (add total amt. of order)

Name.....
Street.....
City..... State.....

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

CAMFIELD

SUPER-SELECTIVE 9



The Most Sensitive and Selective Circuit Ever Developed

This circuit uses many features of proven merit never before incorporated in a Radio receiving set. These features result in an outstanding achievement, namely: The simultaneous increasing of both selectivity and sensitivity to a point heretofore considered impossible.

The turning of a switch on the panel converts this set from a five-tube 2-control receiver (with low battery consumption) for the reception of local stations to a 9-tube Super-Selective and Super-Sensitive circuit capable of tuning through powerful local stations and receiving distant stations from coast to coast on a ten-kilocycle separation of frequency.

This new circuit is easy to construct, simple to operate, and comparatively inexpensive. It will outperform any radio set you have ever used.

Complete set of parts for Camfield Super-Selective 9 as specified by Citizens Radio Call Book, \$117.40. Complete set of constructional blue prints, \$1.25.

Silver-Marshall Transformers Raise to \$8.00 Each
April 1st

Order Your Parts and Kits from Us
Mail Orders Receive Immediate Attention

DEALERS AND SET-BUILDERS write for our complete catalogue and discount schedule. We are specially equipped to give you prompt service and to deliver high quality guaranteed merchandise for the following kits and circuits.

Camfield Super-Selective 9
Karas Equamatic
Madison Moore
Victoreen
And All Standard Circuits

The Cleveland Products Company
2138 East Ninth Street
Cleveland, Ohio
Radio Since 1921

Special Announcement

*A Message of Extreme
Importance to Everyone
Interested in Radio*

The Laboratories of the Citizens Radio Call Book have constructed a new and wholly unique radio receiver which has been named "The Camfield Super-Selective Nine." The circuit used is the greatest improvement made in years. It represents an outstanding achievement in the radio art, namely, the simultaneous increasing of both selectivity and sensitivity to a point heretofore considered impossible.

The reduction of the theoretical circuit design to a practical receiving set was made possibly only through the use of the new Camfield Equaltone Condensers and the Camfield Duoformer Coils, parts of the highest possible quality and of unique electrical and mechanical design.

I therefore had the opportunity to do the final testing of this new receiver and on February 6th I took it to the country residence of a friend a few miles north of Benton Harbor, Michigan, and made exhaustive tests, before an audience of six people. The result of this test was the reception of stations located in all parts of the United States, including KFI, Los Angeles, KGO, Oakland, California, KGW, Portland, Oregon, on the west coast; WBAP, Fort Worth, Texas, WSMB, New Orleans, WJAX, Jacksonville, Florida, on the south; WJZ, New York, WEA, New York, WBZ, Boston, WCSH, Portland, Maine, in the east; WCCO, St. Paul, Minnesota, and KEOO, Two Falls, South Dakota, on the north. In a few hours time stations on more than 60 of the possible 89 wave channels were received. The only factor preventing the reception of a station on every possible wave band was the time required to wait for the announcement of call letters.

It is true many receiving sets today are capable of tuning in distant stations. The remarkable feature about

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

this new receiver was the volume and clarity of the signals from stations located a thousand miles or more away and the fact that each station was received without interference from any other station with the exception of a few cases where two or more stations were broadcasting simultaneously on the same wavelength. News events from Cincinnati, a children's hour program from New Orleans, dance music from Florida, grand opera from New York City and symphony orchestra selections from Boston were all received with volume and clarity heretofore obtainable only from local stations.

This, my friends, is radio!

Comparative tests conducted during daylight hours proved that this new circuit was capable of receiving market reports and other programs of interest in a pleasing and understandable manner from stations that could not be heard at all with many of the best receiving sets in use today. I, therefore, give you assurance that this new circuit opens up entirely new possibilities for the extended and practical use of radio.

This receiver may be operated either as a highly efficient 5-tube set for the reception of local stations or as a Super-Sensitive and Super-Selective 9-tube receiver for distance reception. This novel arrangement never before used in a popular set places the new circuit within the means of everyone interested in radio, as the 5-tube receiver may be constructed first at a nominal cost and the other four tubes added at a later date without the necessity of altering the set or discarding any of the parts.

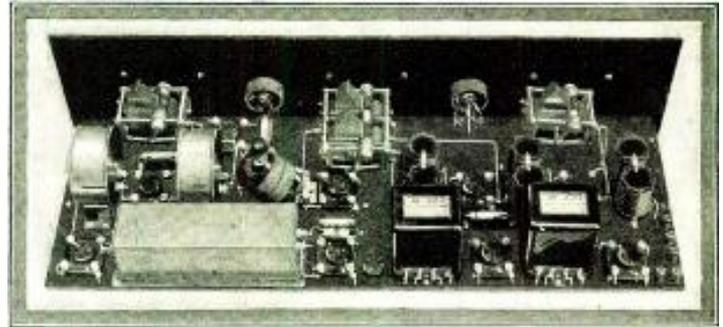
Since the beginning of radio I have had the opportunity to test a great many receiving sets employing circuits of every kind and description and I am confident that this new circuit is superior to anything that has ever been offered to the radio set builder and the broadcast listener. I am proud to allow it to be associated with a name that is synonymous with radio parts of the highest possible quality and I take pleasure in giving it my unconditional endorsement and recommendation to you.



Note: The following pages of advertising by well-known manufacturers and distributors is a further endorsement of the merits of this new receiving set.

CAMFIELD

SUPER-SELECTIVE 9



**The Most Sensitive and Selective
Circuit Ever Developed**

Dealers and Set Builders

This New Camfield Circuit Means

QUICK SALES

and

MORE PROFIT!

Because

**It Will Out-Demonstrate Any Other Set for
Combined Sensitivity, Selectivity
and Tone Quality**

DEALERS WANTED EVERYWHERE

MAIL ORDERS A SPECIALTY

**Write for Our Catalog and Dealer
Discount Schedule**

We Specialize in Kits and Parts for the Following:

Camfield Super-Selective 9	National Browning Drake
Camfield Duoformer 5	Bremer-Tully Counter-phase
Remler-Super	Aerodyne
Victoreen-Super	Thordarson-Power Compact
Lincoln-Super	National-Power Compact
Dynaform-Super	Silver Marshall Shielded Six
Silver Marshall-Super	
Citizens'-Super	
Karas Equamatic	

The M&M Co.
480-500 PROSPECT AVE.

AKRON

CLEVELAND

YOUNGSTOWN

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

Use Genuine Camfield Super Select

As Specified by Citizens Call Book

The Finest Radio Frequency Transformer Ever Made



The many complimentary letters received by us from set-builders located in all parts of the country are conclusive proof that the Camfield Duoformer Coils are the finest radio frequency transformers ever made.

These coils have been specified by the Citizens Radio Call Book for use in the new Camfield Super-Selective Nine Receiver described in this issue, because of their special electrical construction which suppresses disturbing oscillations. It is this important characteristic of the Camfield Duoformer that has made this new wonder circuit possible.

Camfield Duoformers have been specified by Mr. E. M. Sargent for use in the Infra-Dyne circuit because of their uniformity for gang Condenser operation and because comparative tests prove them the best coil on the market for this purpose.

Because of their non-oscillating characteristics and their high amplification, combined with good selectivity, Camfield Duoformers have been selected by the discriminating set-builder for use in any circuit requiring radio frequency amplification.

Prevent Disturbing Oscillations in the set you are going to build or in your present tuned Radio Frequency Set, by using Camfield Duoformers

The Camfield Duoformers use a new and highly efficient system of preventing oscillations that eliminates all possibility of disturbing howls and whistles when you are tuning your receiver.

Circuits using Camfield Duoformers have good sensitivity, good selectivity, and are extremely simple to construct and operate.

We have prepared a sixteen-page booklet entitled, "Radio Frequency Amplification Without Disturbing Oscillations," describing the operation of the Camfield Duoformer and giving complete instructions for building the Camfield Duoformer Five Receiver. Use the coupon on this page today and obtain your copy of this instructive pamphlet.

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.
357-363 East Ohio St., Chicago, Illinois.

Check one or more of the following:

Inclosed find \$10.00 for one Type 22K Kit of Three Camfield Duoformers.

Enclosed find \$..... for..... Camfield Equaltune Condensers, Type.....

Free literature on Equaltune Condensers.

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.

Name.....

Street.....

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



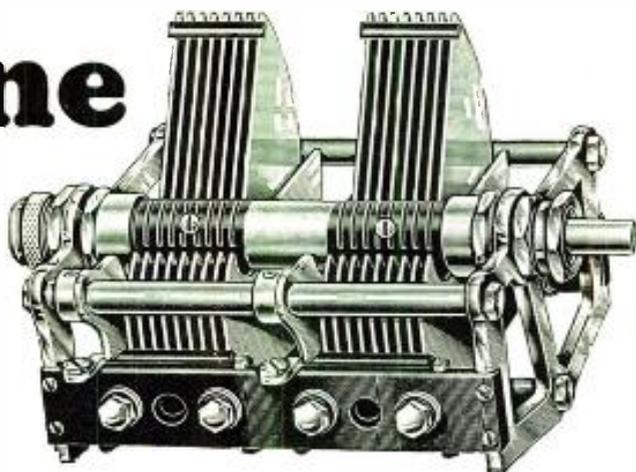
Main Office:
Camfield Radio Mfg. Company
357-363 E. Ohio St.
CHICAGO

Branch Offices:
Boston San Francisco
New York City Los Angeles
Philadelphia Portland
Cleveland Seattle
Salt Lake City St. Louis

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

Parts for the Camfield Five Nine

Adjustable



Dependable

CAMFIELD

Equaltune Condensers

Designed to Give

BETTER OPERATION IN ANY RADIO SET

The new line of Camfield Equaltune Condensers is an outstanding achievement in the radio field. They are made in single, double and three-gang units and have been especially designed for multiple circuit tuning with a single control. By using combinations of the three different units, any desired number of circuits may be tuned with a single dial.

Their design is not the work of a single radio or mechanical engineer, but represents the combined efforts of many engineers of long training and experience in both fields. The result is a Condenser that is electrically and mechanically as near perfect as modern factory methods can produce.

These features of the Camfield Equaltune Condensers are not to be found in any other one Condenser on the market:

1. To facilitate sharp tuning and perfect balancing in sets of the unit control type, the Camfield Equaltune Condensers are provided with a special adjustment feature which makes possible the perfect equalization of all circuits after the receiver has been completely wired. This eliminates the necessity for using Vernier or trimmer condensers of any kind. Complete instructions and a

special tool for making this adjustment are packed with each double and three-gang condenser.

2. The shaft may be shortened or lengthened or entirely removed without affecting the adjustment of the rotor plates. This provides a simple means for connecting several units together with a single shaft and anywhere from one to six condenser units may be operated with one dial.

3. The Condenser is so designed that it may be mounted from either end. This is accomplished by reversing the shaft cap nut and the panel mounting nut. After the shaft cap nut has been removed, the shaft may be extended from the opposite end of the condenser by loosening the set screws on the rotor hub.

4. A variable spring tension is provided and the rotor is mounted on ball bearings, which insure extremely smooth running over a long period of operation.

5. Camfield Equaltune Condensers are beautifully finished. The rotor and stator plates are of bright dipped brass. All other parts are hand buffed and nickel plated.

NOTE: If your dealer cannot supply you, send money order direct to us and your condensers will be shipped by return mail.

Type	Capacity	Price
251 (Single)	.00025	\$ 4.75
252 (Two Gang)	.00025	9.50
253 (Three Gang)	.00025	14.25
351 (Single)	.00035	5.00
352 (Two Gang)	.00035	10.00
353 (Three Gang)	.00035	15.00
501 (Single)	.0005 Mfd.	5.50
502 (Two Gang)	.0005 Mfd.	11.00
503 (Three Gang)	.0005 Mfd.	16.00

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

SELECTIVITY

SENSITIVITY and TONE QUALITY
To a Degree Heretofore Considered Impossible
IS NOW A REALITY WITH

PRICE



\$15.00

RUSCO TYPE 10KC BAND PASS FILTER **SPECIFIED BY CITIZENS CALL BOOK** **For the New**

CAMFIELD SUPER-SELECTIVE 9

The Rusco Type 10KC Band Pass Filter consists of a network of inductance and capacity, designed to pass a band of frequencies 10 Kilocycles wide.

This new unit has a very low and uniform impedance to all frequencies between 90 and 100 Kilocycles and an extremely high impedance to all other frequencies.

It has been especially designed to replace what has commonly been called a "Tuned Stage Transformer," heretofore used in circuits of the type that amplify all incoming waves at one fixed intermediate frequency.

When used in this manner the result is perfect selectivity between stations broadcasting on a frequency separation of only 10 Kilocycles.

Selectivity

The Rusco Type 10KC Band Pass Filter cuts off very sharply on both sides of the ten Kilocycle Band it has been designed to pass and therefore gives much better selectivity than it is possible to obtain with the so-called "Tuned Stage Transformer," or any other device heretofore used in receiving circuits.

Sensitivity

Because of the extreme selective characteristics of the new Rusco Type 10KC Band Pass Filter, it is possible to use both an Antenna and radio frequency amplification in connection with circuits that in the past have given satisfactory selectivity only when used with a loop.

The use of an Antenna to replace the loop greatly increases the over-all sensitivity of the circuit, and at the same time the band pass filter gives increased selectivity.

Tone Quality

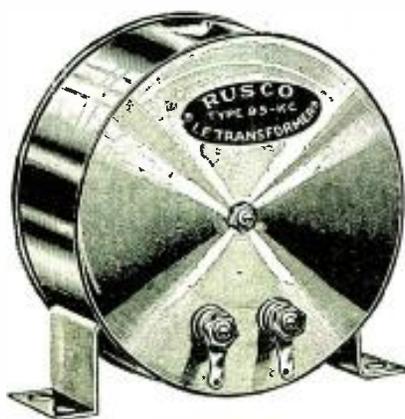
In the past it has been general practice to make the "Tune Staged Transformer" peaked as sharply as possible at the desired intermediate frequency. When good selectivity was obtained in this manner the side bands of the wave were cut off and the result was distortion. Circuits using the Rusco Band Pass Filter have uniform amplification over a band of frequencies 10 Kilocycles wide, which is sufficient to take in all the audible side bands, and the result is perfect reproduction.

It is therefore evident that circuits using the Rusco Type 10KC Band Pass Filter have a combination of selectivity, sensitivity, and tone quality never before obtainable in a receiving set.

The Rusco Type 95KC I. F. Transformer

In order to obtain satisfactory results with the Rusco Type 10KC Band Pass Filter, it is necessary that the other transformers used in the circuit give maximum amplification at a frequency of 95 Kilocycles, approximately the center of the filter band.

For this reason we are placing on the market the Rusco Type 95KC I. F. Transformer, specially designed for use with the Rusco Type 10KC Band Pass Filter.



Rusco Type 95KC I. F. Transformer
 Price, \$6.00

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FEATURING THE NEW GENERAL RADIO DOUBLE IMPEDANCE

A NEW Amplifier Unit

which provides for FAITHFUL REPRODUCTION of

FULL ORCHESTRATION



Type 373
Double Impedance Coupler
Price \$6.50
(2 required)



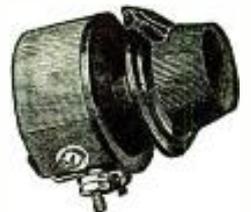
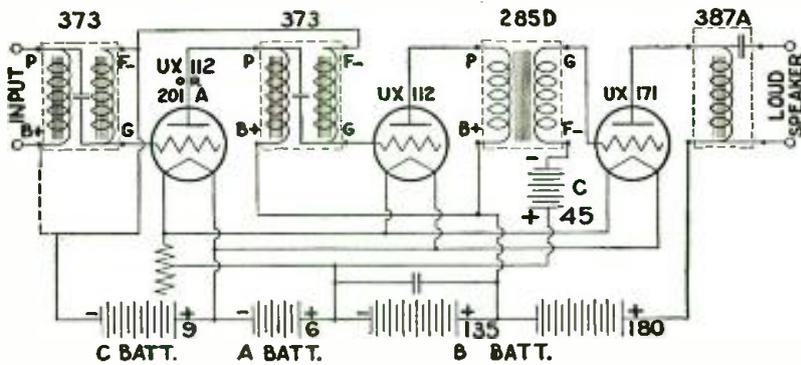
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Audio Transformer
Price \$6.00
(1 required)



Type 387-A
Speaker Filter
Price \$6.00
(1 required)

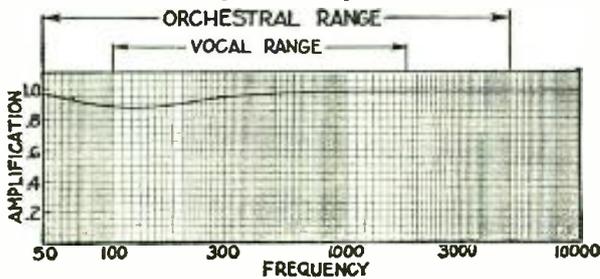


Type 349
UX-Tube Socket
Price 50c
(3 required)



Type 410
Rheostat
6 chms
Price \$1.25
(1 required)

A graphic representation of the vocal and instrumental range as amplified by the Type 373 Double Impedance Coupler



The extent of its range of even amplification is from appreciably below 60 cycles to over 10,000 cycles, with a gradual downward deviation of slightly less than 7% between 100 and 400 cycles. This deviation in an otherwise perfect amplification curve is so slight as to be practically negligible, because the ear of the average individual cannot detect a variation of intensity of much less than 25%.

The amplification curve, in fact, compares favorably with that generally obtained with resistance coupled systems which have the disadvantage of large sacrifices of plate voltages.

The above circuit diagram shows a combination of two stages of double impedance coupling and one stage of transformer coupling with speaker filter.

While the use of double impedances is not new in principle, the General Radio Type 373 Double Impedance Coupler is unique in design and performance. To facilitate installation, the complete unit, consisting of two impedances and a fixed condenser, is contained within a metal shell. It is connected in an audio amplifier circuit in precisely the same manner as a transformer. The amplifier combination shown above may be readily adapted to any standard manufactured or home constructed receiver, and will produce a very noticeable improvement in tone quality.

Its high and even amplification extends over the range of FULL ORCHESTRATION. The deep bass notes of the tuba are brought out in full timbre as are the shrill notes of the piccolo. The range of the human voice is covered with pleasing clarity.

The above amplifier combination has the further advantages that it may be used with the General Radio Type 405 Raytheon Plate Supply Unit. By substituting two Type 373 Units for the transformers of a two stage transformer coupler amplifier, the above combination may be completed and proper plate voltages provided by using the General Radio Type 400 Power Amplifier and Plate Supply.

Ask your dealer or write for folder 373
GENERAL RADIO CO., Cambridge, Mass.

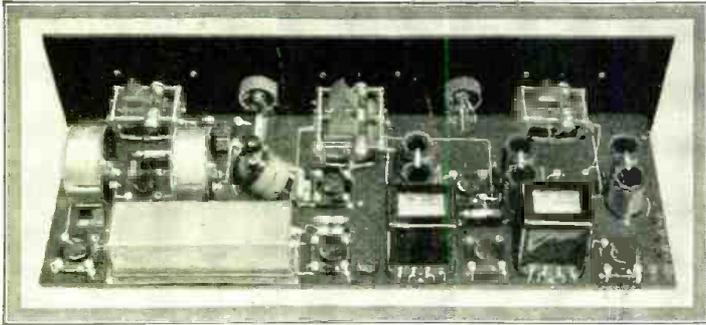
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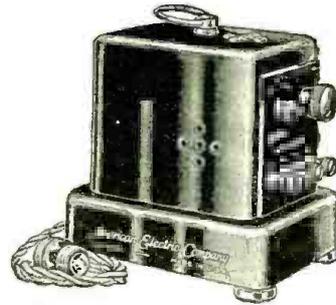
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The Burns "B" Eliminator handles any load up to twelve tubes. It is the only eliminator on the market delivering certain specified voltages at fixed draws. Equipped with Burns Transformer, Burns Condensers and Burns chokes. No filament to burn out. It is noiseless and uniform in operation, giving a smooth, distortionless flow of current so essential to clear reception.

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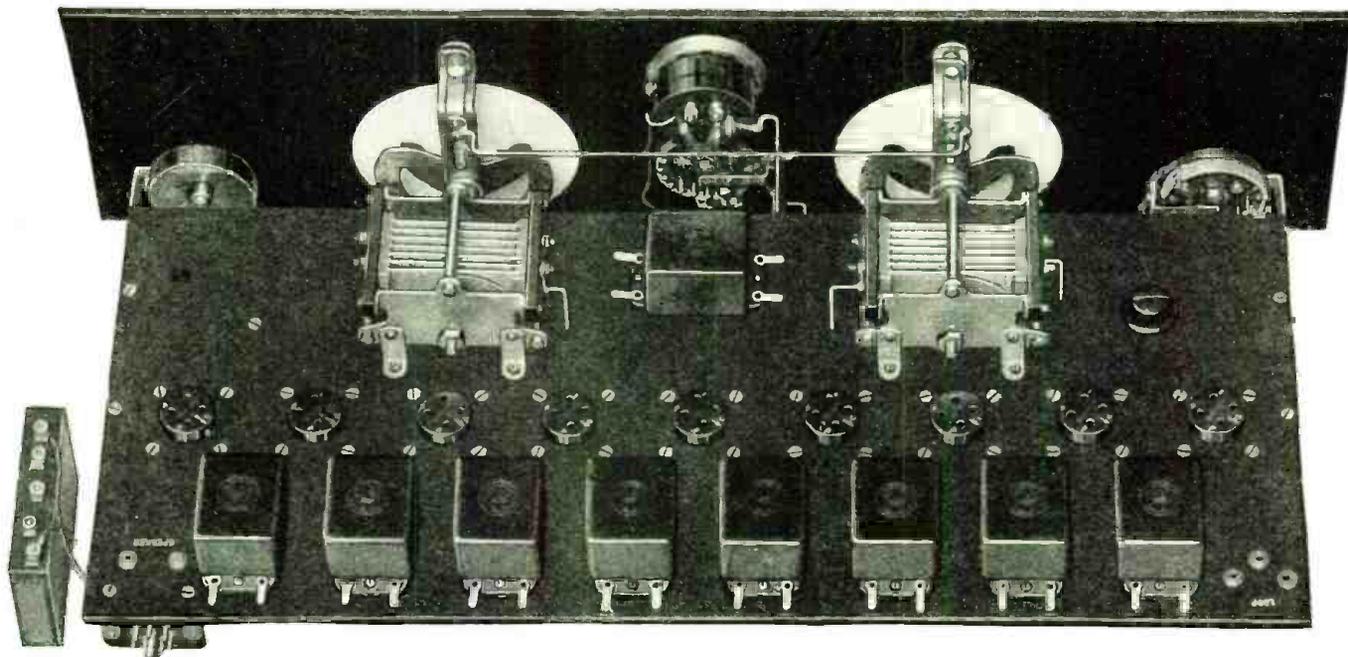
The **HARCO COMPANY**

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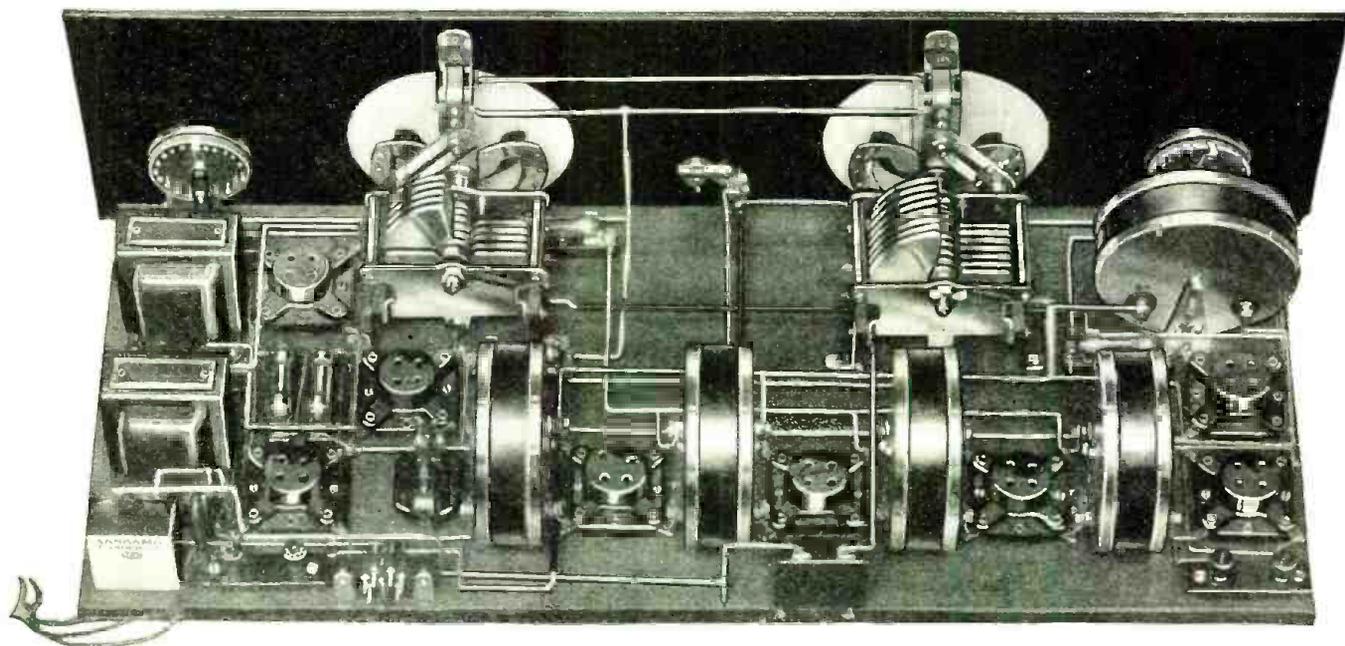
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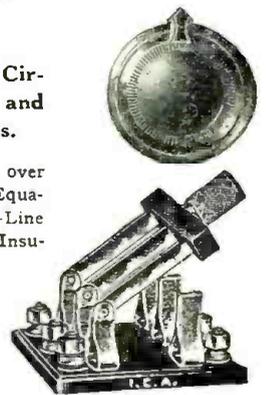
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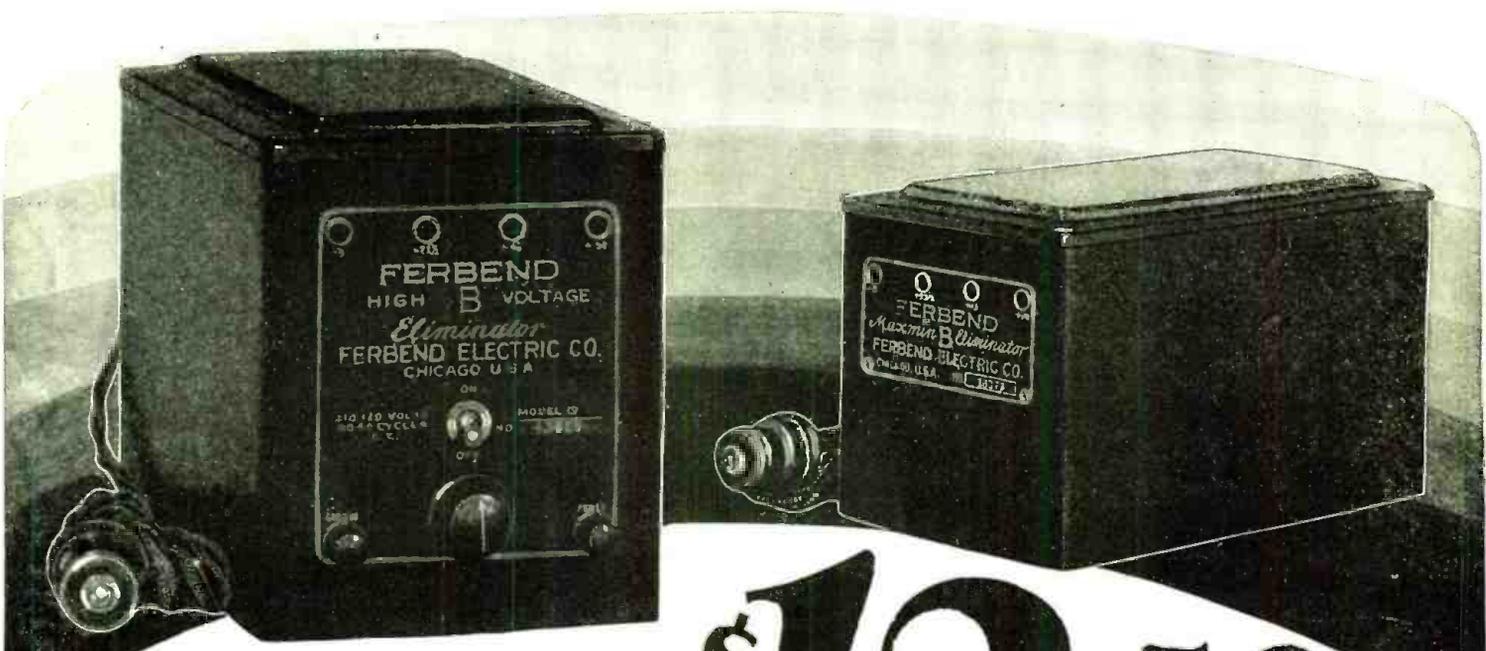
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Have been using your Eliminator for a year and well satisfied with it as it gives good results and is free from any hum.

ELMER A. RIGGS.

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Your Eliminator has given me wonderful continuous service for the past year.

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The Eliminator I bought from you a year ago works fine.

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The moment you see the good Ferbend "B" Eliminator you understand why during its first two years of successful service, it has made nearly 50,000 friends. "Singular Value" is written all over this fine instrument.

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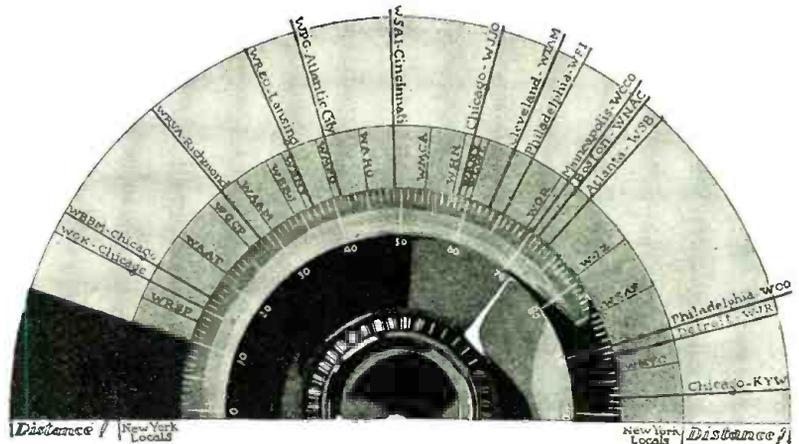
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Inspire on hearing **RGS** this receiver

In
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Where confusion reigns in the air and station overlaps station on the tuning dial of the ordinary radio receiver, the R. G. S. Receiver, in a recent two-hour test, brought in sixteen local stations without "cross-talk." But that's only the beginning of the story. The R. G. S. Receiver, during the short period of this test, pierced thru this heavy barrage of locals to fifteen distant stations—and still there was no trouble with "cross-talk." The actual results of this two-hour test are recorded in the log above. We claim that this is meeting modern broadcast conditions—and meeting them CONCLUSIVELY.

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Leading Radio Engineers now specify LIGNOLE panels.

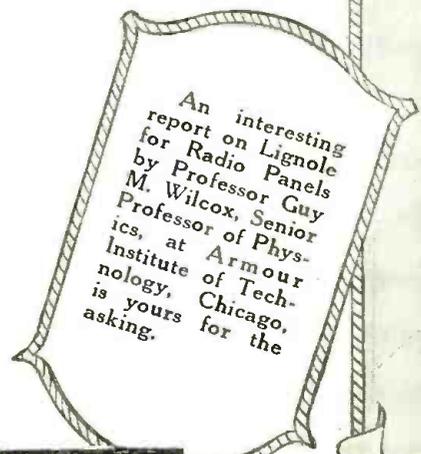
LIGNOLE, the new specially treated wood panel that meets all panel requirements, has been selected, used, and is now endorsed and recommended by such eminent engineers as, Arthur Lynch, Herman Bernard, T. H. H. Nakken, Joseph Calcaterra, St. James, Victoreen, John F. Rider, High Frequency Laboratories, Citizens Radio Call Book, and a host of others of both national and international reputation.

LIGNOLE panels are made of genuine woods, and finished either plain or in two-tone, or they are inlaid with beautiful real wood inlays.

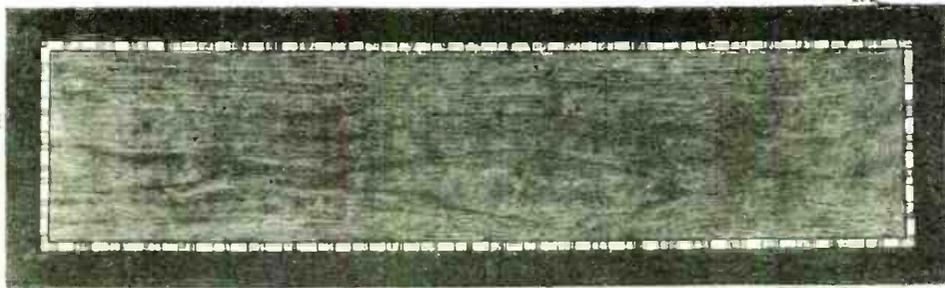
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The Radio Call Book's new Shielded Six requires Concert Master Shielded Tubes to make it 100% shielded. Tests made prove conclusively that Concert Master Coppers increase volume, improve tone clarity and pay for themselves many times over in the power saved on "A" battery consumption alone. Concert Masters are encased in a protective copper casing and not foil, so that they actually shield and protect the tubes.

If you are building a shielded set, be sure to use Concert Master Coppers. Or use them in any set and you'll notice a decided improvement at once.

The illustration above shows the Concert Master true to life. It is encased in a protective copper shell (not foil or wire) that prevents stray capacities, and being grounded to the negative "A" terminal, it saves on power consumption to a marked degree.

Increases Clarity and Volume

Concert Master Coppers (the nick-name given to these shielded tubes by enthusiastic fans the country over) insure sharper tuning, increased volume and D-X, greater clarity and a pure, naturally sweet musical tone.

Eliminates Squeals, Howls and Microphonic Noises

One of the outstanding characteristics of Concert Master Coppers is their ability to eliminate foreign noises in reception. The interior soft cushion, with no period of vibration, makes this tube practically air-suspended and definitely eliminates squeals, howls and microphonic noises.

A Guaranteed Tube

If your dealer cannot supply you now, order direct from us, giving your dealer's name. Enclose remittance or, if you wish, we will send C. O. D. We pay postage on cash orders. Order today—NOW. Complete satisfaction guaranteed. Tubes immediately exchanged if not burnt out or broken.

Cost Little More Than Ordinary Tubes—Last Much Longer



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-Type 199 Tubes.....\$2.50 each
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-Type 200A Detector Tubes.....4.50 each
-Type X112 Power Tubes.....4.50 each

Box of 5 Matched Type 201A Tubes in Attractive Carton.....12.50

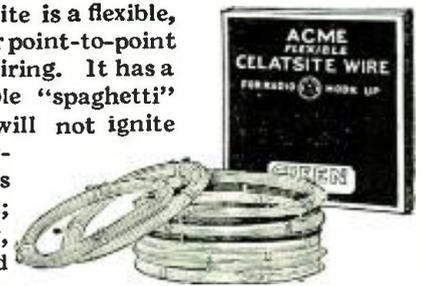
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 Please send me literature and further information. My dealer's name and address is

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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.



CELATSITE BATTERY CABLE

—a silk-covered cable of varicolored Flexible Celatsite wires, for connecting batteries to set. A color for each terminal. You know whether you have the right connection or not.

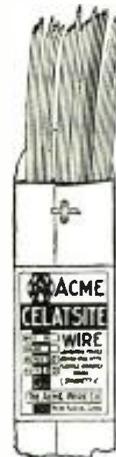
Prevents
"blowing" of
tubes
and
gives set an orderly appearance.



Does Away
With Tangled Wires

THE ORIGINAL CELATSITE

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—best outdoor antenna you can buy. Consists of 7 strands of enameled copper wire twisted into a cable—a design that presents maximum area for reception. The enamel prevents corrosion and consequent weak signals. Made up in either No. 14 or No. 16 size.

Write for Folder "C"

It describes all these Acme products in detail and gives hints on soldering.



THE ACME WIRE CO. - New Haven, Conn.



30 Days Trial

Only **ONE** Dial to Tune



1 Dial
5 Tube
\$57.00
RETAIL PRICE

THE LAST WORD IN RADIO... and the biggest value ever offered

Yes Sir!—you can put a NEW 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.

POWERFUL—DEPENDABLE WESTINGALE 5-TUBE—COAST TO COAST

Don't buy and 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 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.

Agents Wanted Everywhere---Buy at Cost

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

Special Discount
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.

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1751 Belmont Ave., Chicago

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Please send your FREE Catalog on the New 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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at Last**

A new type condenser filters current direct from charger to set. The first device of its kind ever offered to the public.



\$19.50
East of Rockies

The ABOX Filter

**Gives "A" Current from
Light Socket—
Contains No Batteries!**

THE Abox Filter is in no sense a Battery. It is a filter circuit consisting of a choke coil and two of the new Andrews electrolytic condensers which operate on a new principle and permit enormous capacity with small space, cost and weight.

The Abox Filter handles as much as five amperes and renders the current absolutely smooth and suitable for proper operation of the tubes.

It is only half the size and less than half the weight of a storage battery. Used with a suitable charger the Abox Filter provides a complete "A" eliminator drawing power from the light socket. Can be installed by anyone in a few moments.

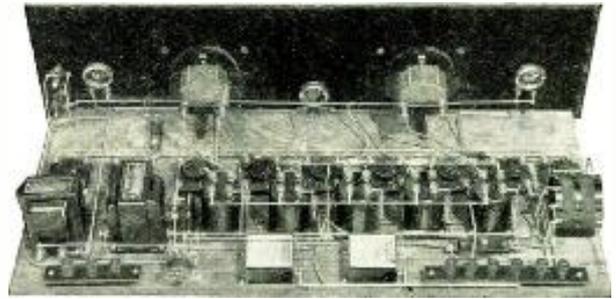
It is never charged or discharged and supplies no power of its own. It is always ready for immediate use, even after long periods of idleness. There is nothing to wear out. It does not deteriorate either in use or lying idle, and will last for many years.

For an explanation of this remarkable development write for folder, describing in detail its construction and use.

THE ABOX COMPANY

215 N. Michigan Avenue

CHICAGO



**SCOTT'S NEW WORLD'S RECORD
SUPER 9
DISTANCE**

The New World's Record Super 9 has power "to burn." It brings in distant stations and puts them on the speaker with almost unbelievable volume. It is designed by E. H. Scott who holds four verified World's Records for the reception of stations 6,000 miles or more distant.

SELECTIVITY

Today's conditions demand a receiver that is capable of bringing in without interference stations 10KC apart. The World's Record Super 9 uses five perfectly matched Selectone Long Wave Transformers, two of which are filters. These filters are sharply peaked to a 10KC cut off, thus giving maximum selectivity without cutting useful side band frequencies.

We Have Complete Sets of Parts for This Marvelous Receiver and Can Ship Your Order Promptly

Price for complete set of parts including drilled and engraved panel, \$91.15

FREE: Literature and Information Is Yours for the Asking Hudson-Ross are headquarters for all leading circuits. Circuits are tested in our own laboratories and must meet a rigid test before we O. K. them for resale. LIBERAL DISCOUNTS TO THE TRADE.

HUDSON-ROSS, Inc.

116 S. Wells St., Chicago

The World Is Our Market—We Ship Everywhere

**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 creep 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.

4226 Wrightwood Ave. Chicago, U. S. A.

*Originators and the World's Largest
Manufacturers of Self-fluxing Solder*

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

SELECTONE TRANSFORMERS



Designed by E. H. Scott whose famous receiver The World's Record Super established four verified world's records for CONSISTENT reception of stations 6,000 to 8,000 miles distant.

Selectone transformers cut through the local stations with ease and their tremendous amplification bring in the distant stations with ample volume and perfect tone quality.

Tested—Perfectly Matched—Guaranteed

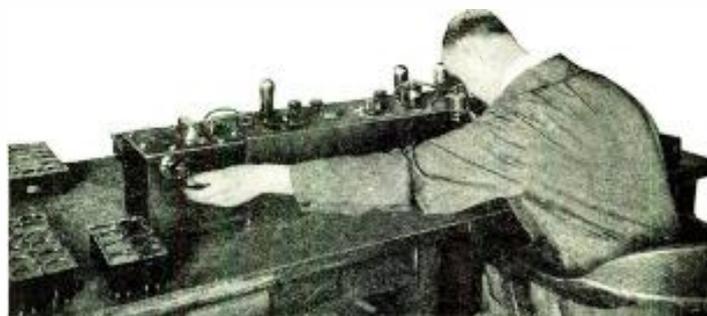
TYPE R.400. Has specially designed iron core which limits stray fields and makes it possible to place transformers quite close together without danger of coupling or causing instability. Coils before sealing in case are vacuum impregnated so that all characteristics of coil remain constant. Price \$6.00.

TYPE R.410. A sharply peaked filter transformer that insures remarkable selectivity. The condenser used to tune the primary is sealed inside the case with the coils. This makes it possible to supply a filter that we KNOW is exactly tuned to the peak frequency. Price \$6.00.

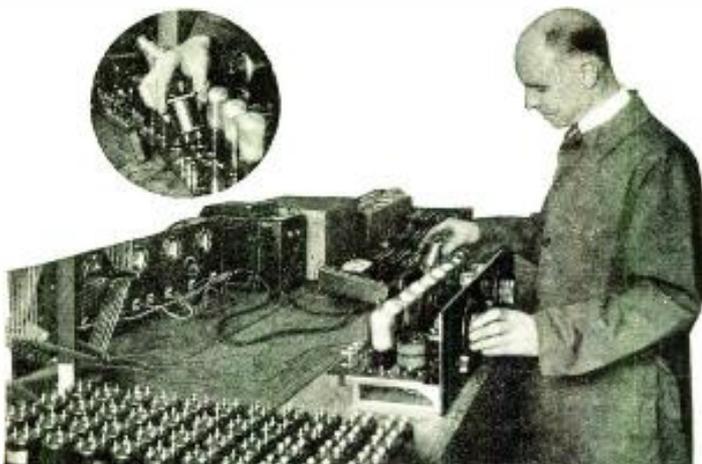
A Laboratory Product

TESTED AND MATCHED WITH PRECISION EQUIPMENT

To secure maximum amplification and fine tone quality all transformers must be perfectly matched. Selectone transformers are all tested with the finest of laboratory apparatus which enables the peak frequency to be accurately determined within 1/20 of 1%.



Apparatus for Matching Transformers



Special Testing Receiver

ALL SELECTONE TRANSFORMERS GIVEN AIR TEST
To make absolutely sure that every set of Selectone transformers are perfect in every way—high amplification, selectivity, tone quality,—a special test receiver using the standard circuit is used. This is so constructed that a set of transformers can be plugged in as easily and quickly as you insert a tube in a socket.

Send for illustrated literature describing in detail Selectone Transformers and tests they undergo, and the story of the development of the World's Record Super, Radio's greatest DX Receiver.

DEALERS

WRITE FOR DISCOUNTS

JOBBER

SET BUILDERS

IF YOUR DEALER CANNOT SUPPLY YOU ORDER DIRECT

SCOTT TRANSFORMER CO.

7620 Eastlake Terrace

Chicago, Ill.

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



The SONOCHORDE CONE

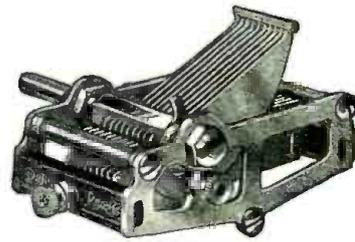
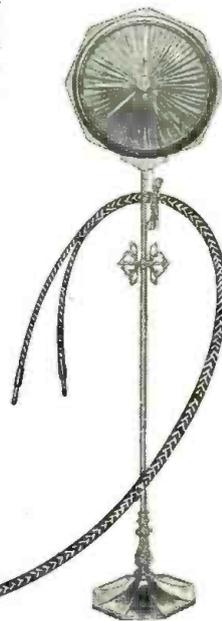
Speaker of Eloquence

There are three Sonochorde models—Table, Wall and Floor Standard—each equipped with the famous Sonochorde actuating unit with its super-powered magnets, balanced and angularly spaced, capable of lifting ten pounds.

Sonochorde is the original Cone with the rich wine-colored silk front and mahogany finished unbreakable frame. The back is protected. The base is provided with full size pads. Expert craftsmanship is apparent in every detail. In comparative tests Sonochorde is invariably first choice for tone quality, volume and beauty.

Write for New Illustrated Folder

BOUDETTE MFG. CO.
Chelsea, Mass.



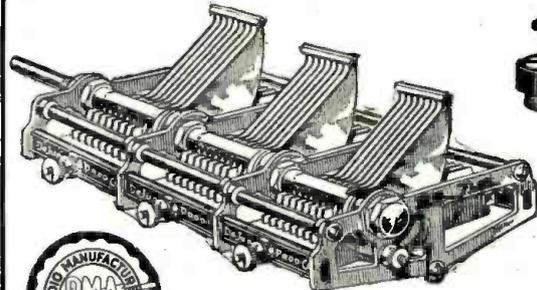
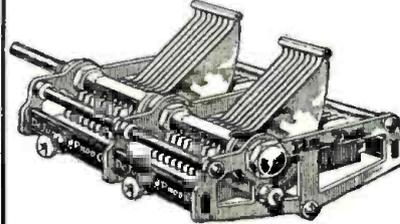
DeJUR

Condensers

Single, Tandem
Triple

In All Capacities

The DeJur Condenser is the most accurate tuning unit made. The tandem and triple types have proven to be the most efficient gang units on the market. All types made in .00025, .00035 and .0005 capacities.



DeJur one-hole mount rheostat eliminates all back-panel fussing.

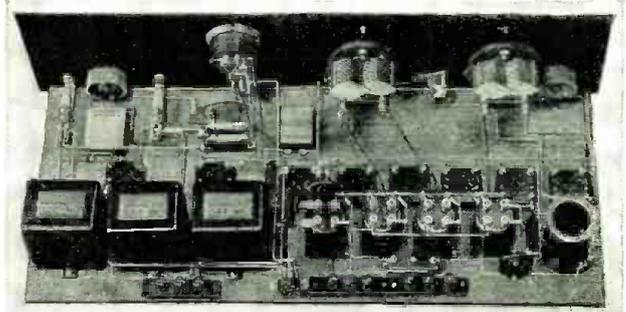
Write for catalog of complete line of DeJur Radio Products.



DeJUR PRODUCTS Co.

World's Largest Manufacturer and Exporter of Radio Products
199C Lafayette St., New York City

CITIZENS SUPER EIGHT AN OVER NIGHT SUCCESS



IT goes without saying that a circuit developed in the laboratories of the Citizens Radio Call Book must be good, but look at the parts used: Remler, Sangamo, Silver-Marshall, etc. No wonder this circuit is taking the country by storm.

All the parts in stock exactly as specified. We never substitute.

Most liberal discounts to the trade. Immediate delivery—24-hour service. Parts in stock for all the popular circuits.

SAVE TIME AND MONEY BY ORDERING FROM US

FREE Literature and Information

HUDSON-ROSS, Inc.

116 S. Wells Street CHICAGO

The World is Our Market—We Ship Everywhere

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

SM

LABORATORY SPECIFICATIONS



Have you read full details of the new S-C II receiver in the April issue of Popular Radio?

What greater proof of excellence of S-M parts could be asked than their selection by the designers of the following receivers?

- Infradyn
- Shi-Idded Six
- Silver-Cockaday
- Silver-Cockaday, II
- Best's A. C. Browning-Drake
- Best's A. C. Diamond of the Air
- Radio News Batteryless Receiver
- Radio Broadcast Super
- Radio Age Super
- Radio Broadcast Local
- LC-27 Junior Power Pack
- Citizens Call Book Monotone Receiver
- Call Book Power Pack
- Callies Super
- Radio Mechanics "A", "B" and "C" Eliminator
- Radio Engineering "A", "B" and "C" Eliminator
- Radio Mechanics Man-O-War Super
- Lincoln Super
- Best's Short Wave Set
- Hush-Hush II Short Wave Set
- Popular Mechanics Super
- Christian Science Monitor 6 tube Browning-Drake
- Radio Engineering Short Wave Set
- New York Sun "B" and "C" Eliminator for Resistance Amplifiers
- Chicago American Short Wave Set
- Chicago Post Power Amplifier
- Best's 1927 Super
- Radio News Power Amplifier
- Loftin-White
- Popular Radio, Town and Country Receiver
- Radio News Super
- Nakken's Ultra Five
- Cockaday's Pre-Selector
- Chicago Daily News Short Wave Adapter
- Camfield Super 9
- Call Book "B" Eliminator
- Radio Broadcast Reservoir B
- Popular Mechanics "A", "B" and "C" Eliminator and Receiver
- Radio Mechanics Portable Super
- Chicago Daily News Receiver
- Citizens Super 8
- Improved Victorcen Super

Do you know that for impedance coupled amplification the S-M 220 transformer can't be beaten when used as a choke coil? Do you know that with the new R. C. A. and Cunningham high- μ tubes, the S-M 220 is the only unit having high enough inductance for uniform amplification—100, 900 or 1300 henries, at will?

Have you finished reading this issue of the Call Book? Do you realize that the Citizens Laboratory selected S-M products for nearly 20% of this issue's designs? What better recommendation could be asked than their selection for the Camfield 9, the Citizens OWN Super 8, and the Laboratory's own B eliminator (equivalent kit, S-M No. 652)?

Briefly, that's the S-M sales story—just that you'll always find MORE experts, more of those "in the know" invariably depending on and specifying S-M products simply because they're GOOD!

THE ANSWER—GUARANTEED!

Have you ever hooked up a B eliminator, anticipating wonderful results, then turned it on and heard a whole crop of new noises, "motor-boating," "putting," and a lot more your local experts couldn't tell you how to eliminate? And then when you did apply a good suggestion for clearing up your troubles, you found that the quality of reception was not up to batteries? And maybe a condenser went West with a discouraging bang? And finally, when you did get it working, turn the knobs as you might, you could only guess at the voltages your tubes were getting?

Those are exactly the points you won't encounter with the new S-M Reservoir B, for it's guaranteed not to "motorboat" with the largest set, and its output voltage is constant to a few per cent. No matter if your set uses from one to ten tubes, you KNOW the 90 volt tap won't vary more than good batteries. And the 180 volt tap will really supply enough power to a 171 to give real quality—the 45 volt tap gives a more constant output than any other eliminator! That's the answer of S-M engineers to common eliminator troubles—the 652 kit. You can put it together in two hours on the living-room table, and it's guaranteed to give you greater satisfaction than batteries or other eliminators, for its voltages are always constant, and it won't "motor-boat" with any normal set, be it a one or ten tuber.

Price, with full instructions—\$34.50, less one CX-313 and one CX-374 tubes.

Save Money By Buying Your S-M Parts Now

Now is the time to buy your S-M parts at a pronounced saving, for effective April 1st, the prices of certain items will be raised from thirty cents to three dollars.

The price increases, listed below, are necessary not because of high manufacturing costs, but simply because certain S-M products contain one and one-half to two times as much material as competitive items. S-M 220 audio and 221 output transformers, for example, contain twice as much silicon steel and copper wire as the next largest transformers on the market. Yet the forthcoming price increases actually leave them priced as low or lower than other parts containing less actual material value!

That the engineering as well as the material worth of S-M products is nationally recognized is proven by the fact, for example, that more S-M audio and output transformers have been sold, according to available figures in recent months than any other types. Just pick up an S-M transformer, examine it, compare it with any others, and you'll see just how much more S-M gives you for your money, even at the new prices. Then look at the list at the left and you'll find your judgment confirmed by the selection of S-M parts for over half the season's popular receivers!

	Price, April 1st	Save by buying now
220 Audio transformer	\$ 8.00	\$2.00
221 Output transformer**	7.50	1.50
275 Choke coil	.90	.30
276 Choke coil	1.00	.40
329 Power transformer	9.00	3.00
330 Power transformer	9.00	3.00
331 Unichoke	8.00	2.00
332 Condenser bank	12.50	2.50
D type coils	5.00	1.75

**For those desiring an output transformer with cord and tip-jacks, type 222 is now available at \$8.00.

SILVER-MARSHALL, Inc.
836 West Jackson Blvd., Chicago, U. S. A.

Hampton-Wright's Economy Catalog Brings a Great Radio Store to Your Front Door

ORDER YOUR FREE COPY!

The radio store that has so efficiently served hundreds of fans and set builders is at your command by merely writing for Hampton-Wright's economy catalog. Sets, parts and accessories of known worth—for every radio need are listed.

It will be a pleasure to have the book—to use the equipment—and to do business with Hampton-Wright. Your wants will be filled in a way that will be satisfactory to you. The catalog will be sent immediately after you request it.

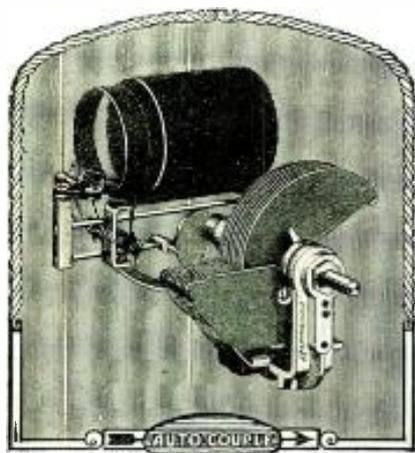
In Ordering Specify Catalog No. J-8

HAMPTON-WRIGHT

P. O. Box 181

Indianapolis, Ind.

Seventeen of the Best Circuits of the Year Are Built Around HAMMARLUND Precision PRODUCTS



The "AUTO-COUPLE"

A scientific assembly of Space-Wound Coil, "Midline" Condenser and Aluminum Shield, giving automatic, graduated primary coupling at every condenser setting and insuring maximum transfer of energy at each wavelength. Officially specified for use in the new Hammarlund-Roberts "HI-Q" Receiver, but equally efficient in any other receiver of similar characteristics.

COCKADAY "LC27"
LOFTIN & WHITE
ST. JAMES SUPER
LACAULT "LR4"
MORRISON "VARION"
SARGENT "INFRADYNE"
POPULAR SCIENCE
MONTHLY "POWERFUL"
HAYNES "DX2"
MULTI-VALVE"
WORLD'S RECORD SUPER

BROWNING-DRAKE
VICTOREEN SUPER
PACENT "ULTIMAX"
HARKNESS "KH-27"
HENRY-LYFORD
CARBORUNDUM SUPER
HAMMARLUND-ROBERTS
"HI-Q"
H. & C. "UNI-VALVE"

Hammarlund Products have always had the respect of enlightened engineers, because Hammarlund has never deviated from the highest standards of quality during sixteen years of manufacturing precision instruments for telephone, telegraph and radio use.

Your radio can never be better than

the parts that go into it. Play safe—follow the lead of experienced designers—use Hammarlund Condensers, Coils, Equalizers and Shields. They are made to meet exact requirements in every type of modern receiver. Your dealer will tell you that they are no higher in price than other standard radio parts. Write for Descriptive Folders.

HAMMARLUND MANUFACTURING CO.
424-438 West 33rd Street

New York

For Better Radio
Hammarlund
PRECISION
PRODUCTS

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

Stop that Rushing Hissing Noise



CeCo Type "H" Special Hard Detector

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.

Price \$2.50

CeCo Type "G" High Mu 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.

Price \$2.50



Write for Data Sheet Giving Details of the Complete CeCo Line

C. E. MFG. CO., Inc. Providence, R. I.
Largest Plant in the World Devoted Exclusively to Radio Tube Manufacture

He Uses **CC** Tubes!

READ THIS!

"The tubes work out very well indeed, the HIGH MU being one of the best I have used in conjunction with resistance coupled amplifiers."

(Signed) Glenn H. Browning.

Note: Mr. Browning (President Browning-Drake Corp.) refers to CeCo Type "G." Ask your dealer for this splendid High Mu Tube. Complete instructions wrapped with each tube.

The Tube of Longer Life

CC

A Type for Every Radio Need

HERE IT IS!

Marvelleous Townsend
"B" ELIMINATOR only \$4.95
(Complete) \$1.00 Down Balance C.O.D.



Direct from Factory
at lowest price on record

Here is great news! For half the price of a set of "B" batteries you can now enjoy

Greatly Improved Reception

and be done forever with the nuisance of recharging and renewing unreliable "B" batteries. We make every part that goes in the Townsend "B" Eliminator in our own factory. That's the reason we can give it to you at such a remarkably low price—give you a high quality instrument backed by a real guarantee. Users report splendid results. A fine "B" Eliminator at the lowest price on record. Our 10 days' Free Trial proves it.

Rush Order Today

Simply fill out the coupon and slip it into an envelope with only \$1.00. Get it into the mail at once. Your "B" Eliminator will be sent you promptly by return mail. Deposit \$3.95 only with the postman. Try out the Eliminator for ten days—then if not astonished and thrilled by improvement in operation, return it to us and purchase price will be refunded in full. You don't need to put up with battery nuisance another day when it is possible to own a "B" Eliminator at this startlingly low price. Send for it today.



Money Back—

if not amazed and delighted

You alone are the judge. We could not afford to make this guarantee if we were not sure of the Townsend "B" Eliminator's splendid performance. Just plug into your electric light socket and in a moment you will realize what good reception means. Delivers up to 100 volts on any set, on direct or alternating current—any cycle. Gives full wave rectification. Full tone, clarity and volume—uninterrupted by screeches of fading batteries.

TOWNSEND LABORATORIES

713 Townsend Street

Dept. 26

Chicago, Ill.

Attach only \$1.00 to this Coupon!

TOWNSEND LABORATORIES
713 Townsend St., Dept. 26, Chicago, Ill.

Gentlemen: Attached find \$1.00. Kindly send at once Townsend "B" Eliminator, C.O.D. for \$3.95 plus postage, on guaranteed 10-day free trial.

Name.....

Address.....

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

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

EUGENE G. WILE

7 North Tenth St., Philadelphia, Pa.

We Can Furnish the Specified Parts for the Following Circuits:

Madison-Moore One-Spot Super

Victoreen Super

Improved Nine-in-Line

World's Record Super Nine

Samson "TC" DeLuxe

Amertran Power Pack and Plate Supply

Dongan "A-B-C" Eliminators

Thordarson

Phasatrol Receiver

Lodge "N" Circuit

Browning-Drake

Cockaday LC-27

Impedance Coupled Super

Mailed Orders Filled Promptly



The Perfect Volume Control!
ELECTRAD

Royalty Variable
High Resistances

Exclusively licensed by the Technidyne Corporation under U. S. Patent No. 1593658, July 27, 1926.

Specified by radio engineers and technicians where accurate and dependable resistances and perfect control of volume are desired.

- 1—Resistance element is not exposed to any mechanical operation.
- 2—Electrical contact is made positive by metallic arm on wire-wound strip.
- 3—There is no mechanical binding and shaft works smoothly over entire range.
- 4—The same resistance is always obtained at the same point.

Write for Free Hookup Circular

*Type B—100,000 ohms, recommended as volume control by Citizens Radio Call Book
175 Varick St., New York

ELECTRAD

A Range for every need—take your choice.

Type A—1/10 to 7 meg-ohms.

Type B—1500 to 100,000 ohms.

Type C—500 to 50,000 ohms.

Type D—10,000 to 70,000 ohms. (Detector control for "B" eliminator.)

Type E—Compensator; 500,000-ohm Potentiometer.

Type F—0 to 2000 ohms.

Type G—0 to 10,000 ohms.

Type H—0 to 25,000 ohms.

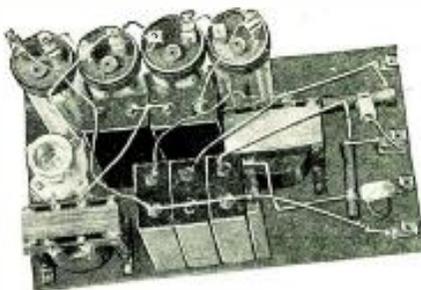
Type J—0 to 200,000 ohms.

Type K—0 to 5000 ohms.

Type L—0 to 500,000 ohms.

Type M—\$2.00.

All other types—\$1.50.



You can build
THE BEST B-UNIT

Low in Cost
Unequaled Tone
Quality
Ample, Uniform
Power

THE MOLLIFORMER B-UNIT

Improved Results Guaranteed

The Molliformer is guaranteed to give you a finer reception than B-Batteries can afford. A-C Hum is absolutely eliminated, even on the phones. There is no B-Unit on the market that can equal the amazing performance of the Molliformer. It solves once and for all every question of B power, and guarantees the user a B current that is ideal—strong, steady and dependable always. Only through the improved Molliformer Choke with a capacity of 125 henries and the Molliformer rectifier is it possible to secure the uniform power so essential for true tonal reproduction.

Get the best. You can build the Molliformer and save money. Detailed building instructions with each kit—Nothing critical—in use for over two years—Sold on a guarantee of satisfaction or your money back.

THE MOLLIFORMER B-UNIT

COMPLETE KIT—All parts—110-125 volts—	\$17.00
60 cycle.....	
ASSEMBLED UNIT—Ready for	\$22.00
service.....	

Add \$2.00 for 25 or 40 cycle current

DEALERS

*The Molliformer will make friends for you—write for discounts
Exclusive territory granted*

C. E. JACOBS SOLE 2810 N. KEDZIE AVENUE
MFR. CHICAGO



HOTEL FORT SHELBY

Lafayette Blvd. at First St.
DETROIT

You'll enjoy the Fort Shelby's hospitality, its complete comfort, its convenience of location—less than 5 minutes' walk from wholesale, retail, financial and theatrical centers. You'll appreciate the privacy and tip-saving advantages of Detroit's only servidor equipment. Famous restaurant and Coffee Shop. Moderate charges.

An especially pleasant room with private bath, \$3.50 a day and up; rooms with running water and circulating ice water, \$2.50 up. Fort Shelby Garage close by.

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

Whatever panel is specified an **ACE** is safest to use.

We selected a special radio grade of hard rubber for **ACE PANELS** to give greatest protection against leaks and losses that often cause poor reception. And that is important in building any set.

An **ACE PANEL** will keep down the cost — because it's always sold at a popular price.

As to appearance —

ACE PANELS

with **Crackle Surface** give the rich effect of Spanish leather. They're **NEW**, and distinctive enough to improve the looks of the finished set in any type cabinet.

Most any radio dealer can sell you an **ACE PANEL**. But if you can't find one send us the price (see below) and we will deliver by mail.

BLACK CRACKLE SURFACE			
3-16 in. thick	Back smooth, black	Back smooth, Mabog, stained	
7 x 10 in.	\$.89	\$.96	
7 x 12 "	1.07	1.15	
7 x 14 "	1.25	1.35	
7 x 18 "	1.60	1.75	
7 x 21 "	1.86	2.00	
7 x 24 "	2.15	2.30	
7 x 26 "	2.30	2.50	
7 x 30 "	2.65	2.90	

ACE PANELS are made by the manufacturers of the famous **RADION PANELS**.

AMERICAN HARD RUBBER CO.
11 Mercer St., New York, N.Y.
Branch: Conway Bldg., Chicago, Ill.

The **LYNCH** Metallized **RESISTOR ASSORTMENT**



Contains the following:
Three .1 Meg.
One 1 Meg.
One .5 Meg.
One .25 Meg.
One 2 Meg.
Complete, \$1.25

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.

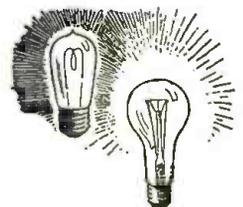
Comprising a concentrated metallized deposit one-thousandth of an inch thick upon a glass core and sealed within a glass tube, each **LYNCH METALLIZED FIXED RESISTOR** wins in the exacting tests of time and service.

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 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

[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 \$1.25, plus postage.

(Name) _____ (Address) _____

Or send check or money order and give postage.

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

Centralab

CENTRAL RADIO LABORATORIES

PRODUCTS

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

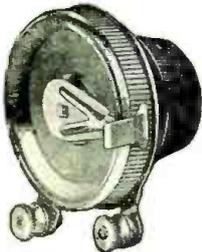
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Centralab Rheostats always operate smoothly and noiselessly, for the resistance element is firmly clamped between insulated metal discs so that it cannot move or warp. This maintains uniform spacing between windings, giving even regulation and eliminating dead spots.

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Central Radio Laboratories

26 Keefe Ave. Milwaukee, Wis.
Makers of a full line of variable resistances for 69 manufacturers of leading standard sets



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Known the World Over for Clarity of Tone, the All-Wood Orchestrion is admittedly the peer of all Loud Speakers.

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are specified for such circuits as Hammarlund-Roberts HQ, Brown-ing-Drake, Cockaday L. C. 27, In-fradyne, Victoreen, and are also recommended exclusively for scores of other famous circuits. EBY Bind-ing Posts are also the choice of 90% of the leading receiver and acces-sories manufacturers today.

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ENGLAND'S MOST POPULAR RADIO RECEIVER—MORE SELECTIVE THAN A SUPERHET

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Including diagrams, etc.....\$16.75

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Total, inc. tubes.....\$49.25

Every Kit guaranteed. All kits shipped with complete instructions, data, and diagrams. Send check or money order, or we will send C.O.D. Orders filled immediately and shipped prepaid.

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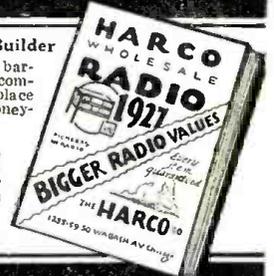
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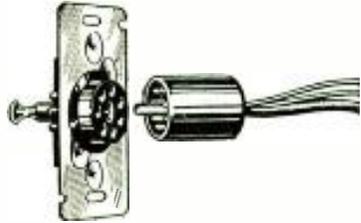
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Your favorite dealer will tell you about the Jones MULTI-PLUG or, if you prefer, write to us direct.

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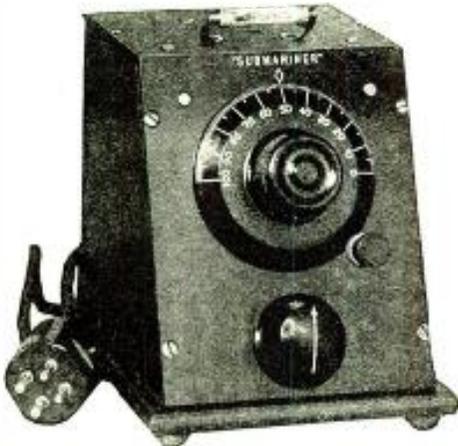
Chicago, Illinois

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THE STANDARD SET CONNECTOR

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 such as UV 199, UX 199 or 201 A.



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, between 30 and 75 meters. No changes necessary to your present set.

SUMMER RECEPTION PRACTICAL AT LAST

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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Karas Condensers

Selected for the new 100 Kilocycle Super-heterodyne featured in this issue of the Citizens Call Book.

IN the 100 Kilocycle Super using air core transformers, featured in this issue of the Call Book, Karas Orthometric Straight Frequency Line Variable Condensers (23 plate, .0005 mfd. capacity) are used. These remarkable precision condensers are well adapted to the very fine tuning requirements of this new 100 Kilocycle Super—in fact of any super-heterodyne. They possess an absolutely straight or flat frequency curve which means that every adjoining station is separated from its neighbor by a 10 kilocycle division exactly as the stations are allocated by the government—one point on the dial. They thus distribute all stations evenly over the dial—a vital point in eliminating tuning troubles through doing away with endless searching for stations.

Karas Condensers are best for any super because they have the lowest losses known, and have no measurable resistance. Grounding of rotor plates and frame goes away with body capacity effect. Highest quality hard rubber dielectrics placed well outside of the effective electrostatic and electromagnetic field do away with absorption losses. You get strong, powerful signals with Orthometrics because of their low resistance and their scientific construction. Made of fine brass throughout, with rigid, die-stamped frames and plates. No other condenser on the market is so sturdy—renders so remarkable results—and lasts as long as Karas Orthometrics. Build yourself a 100 Kilocycle Super with Karas Condensers and you will have an extremely satisfactory radio receiving set of which you will be truly proud.

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Your dealer handles Orthometrics or can get them for you. You will need TWO for the 100 Kilocycle Super. If you prefer, you may order these direct from us by filling out and mailing coupon. SEND NO MONEY. Simply hand the postman the price of the condensers plus a few cents postage.

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KARAS ELECTRIC CO.,
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Please send me 2 Karas Orthometric Variable Condensers, 23 plate, .0005 mfd. capacity. Price \$7 each. I will pay the postman \$14 plus postage upon delivery.

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Address.....

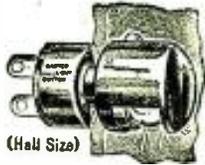
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Dial Light.....\$1.75



Half Size
"IMP" Battery Switch, 65c
Long and Short Aerial
Switch. Price 70c

Are specified in all the really popular circuits, year after year. You could not have a greater guarantee of satisfaction. Every Carter part is an original design, built for a specific purpose. There is nothing just like it. Avoid make-shifts. Buy Carter parts and be assured that you have the best that can be obtained.

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(Half size)
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Up to 75 ohms.....50
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ohms\$1.00



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combined (Six
Resistances)
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(1/2 meg. and five
lower resistances)



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lower resistances)

Fixed
Condensers



(Half size)
"IMP" Inductance Switches
4 to 9 Point
\$1.00 to \$1.25



(Half Size)
"MIDGET" Potentiometers,
200, 400 ohms,
75c
500, 800, 1000,
2000, 3000, 4000
and 5000 ohms..\$1.25
Also "IMP" Potentiometer,
200 or 400
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Jack Switches, 4 Combinations of Springs,
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Half Size
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Half Size
"TU-WAY" Plug, 60c

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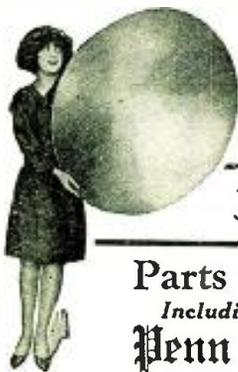
Half Size
"IMP" Plug, 15c

(Quarter Size)

Volume Control

Receptacle Jack \$2.75
Other type Out-lets, 80c and 90c

Offices in Principal Cities of the World



Build It Yourself

3 ft. Cone Speaker

Parts Complete Including Genuine Penn Cone Speaker Unit \$14.15

Approved!

"I wish to congratulate you on your loud speaker. The results obtained either on a two peanut tube set or a 10-tube Super 10 with four stars of audio are simply wonderful." R. B. T. (Lincoln Cars), Montreal, Can.

"We put the speakers together and they worked fine. Everyone is enthusiastic about them." Volney Hurd, Radio Ed., Christian Science Monitor, Boston.

"Properly constructed the unit produces a reproduced tone quality that is without exception remarkable." Milo Gurney, Technical Ed., Radio Digest, Chicago.

"Is the best I have heard, the 3-ft. cone cannot be beat at any price." H. M. L. (Banker), Galesburg, Ill.

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You can build this really wonderful 36" Cone Speaker at home in one evening and save four-fifths of the retail price of a factory-built 3 ft. Cone Speaker. It's easy with genuine PENN parts—the original parts for the 36" DOUBLE Cone Speaker just like those made by the largest and most experienced speaker manufacturers.

Marvellous Tone Quality

"Has splendid quality of reproduction both of voice and of music," says E. E. Cordrey, radio instructor, Arkansas State Teachers College. "Every note on the musical scale played by orchestra, on organ, piano or any other instrument registers wonderfully over this fine speaker," says G. Haywood, Cleveland. "It has a beautiful tone," R. T. Keeling, Pontiac, Mich., writes. You'll really enjoy radio reception with this speaker. The PENN is a marvel of design and construction; has full 16 oz. magnet, super-magnetized and udalayed to prevent rust, preserve magnetism. Unit alone, \$9.50.

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75c each. Set of three, \$2.00

Curved Battery Filler

Replenish your A Batteries, Wet B Batteries, Trickle Chargers, Eliminators and Power Units without moving them from your cabinet. Also good for your Automobile Battery. The curve does the trick—fits in the tightest places. No radio fan should be without one.

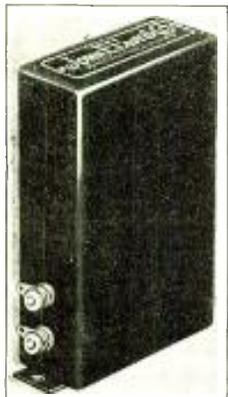
4-oz. Bulb 65c, 6-oz. Bulb 75c

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with 400 volts plate supply. Bring in the deep bass notes.

Fast Quality Hi-Test Condensers were designed for use with power compacts providing 400 volts D.C.

Condensers required for power compacts using UX216B and UX874 Tubes:

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- 1—Type 1016 1 Mfd. 180 working voltage. Price80
- Kit No. 1210 containing all of the above condensers 12.00

If your dealer cannot supply you order direct from the factory. Write for descriptive booklet.

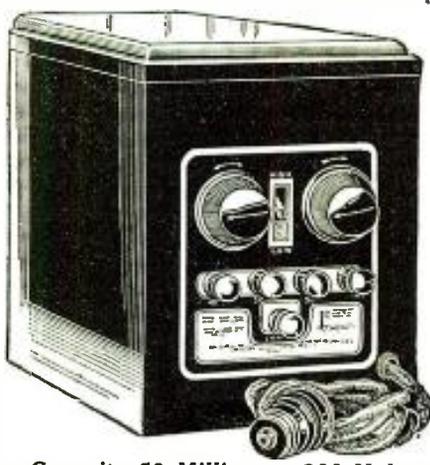
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B ELIMINATOR \$22.95

COMPLETE WITH RAYTHEON TUBE

THE GENUINE
\$50 Value—
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Using No Filament
Full-Wave
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Fully Guaranteed

Capacity 50 Milliamps, 200 Volts
Adequate for 1 to 15 Tubes

Positively the Greatest Value in "B" Eliminators

While the regular market price of the Genuine is around \$50.00, our factory-to-you price is only \$22.95. At this price, everyone can afford to own a Genuine 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!

Contains no materials or parts which are subject to wear. Always delivers the same, unvarying output of current. Employs the use of the famous Raytheon tube to specify the current. There is no filament to burn out, sag, or wear, therefore lasts forever. Has full wave rectifications, exceptionally efficient. Uses but a few cents worth of current a week. No liquids or chemicals. This is a genuine high capacity eliminator and a quality product throughout.

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The materials used in making the Genuine 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, oversize 40-Henry chokes smooth out every ripple and hum from the alternating current. There is nothing to deteriorate, wear out, or replace.

The Raytheon tube and Eliminator are good for a lifetime of service and are fully guaranteed. Capacity, 50 milliamps up to 200 volts for 15-tube sets or less.

Send money order for \$22.95, west of the Rockies add 10%, direct to factory NOW, and shipment will be made at once, or order C. O. D., if you wish, and pay charges on delivery. Write today—NOW—while this offer is in force.

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- Ship at once, post paid, \$22.95 (check enclosed). West of the Rockies add 10%.
- Ship at once, C. O. D., for \$22.95, plus slight express charges.

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

AX12 - \$3.00



TUNER
\$5.00

It has made a reputation for highest efficiency under severest tests, for selectivity and distance and is used in conjunction with the

ANTENNA COUPLER
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to produce the non-reradiating four tube set; an inexpensive and efficient receiver which is easy to build.

THE ONLY BASKET WEAVE DUO-FORMER



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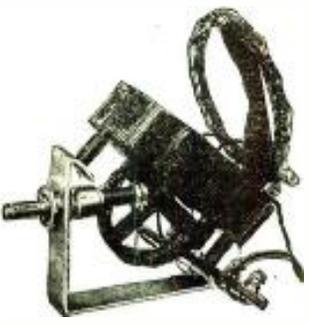
GEN-RAL

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New Automatic Switch

It switches the "B" battery eliminator and trickle charger on and off automatically. Plug it in and forget it. Write for particulars.

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Hook-ups



For
Radio Frequency

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Clip this ad.

World Radio Units

Save You 50%

Automatic-Unvarying
"A" Current
from Your Light Socket



World "A" Power Unit **\$12⁷⁵** Complete

Automatically provides even, unvarying "A" current from the moment you throw on your set switch. A marvelous improvement—at less than half the cost of any similar equipment. Finer reception, uninterrupted by "fadeouts" and "screeches." Absolutely noiseless. Assures full tone quality from your set and wider DX range. Shipped complete, subject to inspection on receipt of price—or C. O. D. if you wish. 25-Amp. Unit for sets of 4 tubes or less, \$12.75. 60-Amp. Unit for sets of 5 tubes or more, \$15.75.

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Sturdy construction. Solid Rubber Case protection. Recharged for almost nothing. Endorsed and listed as standard by Radio News Lab., Pop. Radio Lab., Pop. Sci. Inst. Standards, Lefax, Inc., and other famous Radio Authorities.

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Just state number wanted, and we will ship same day order is received by Express C. O. D., subject to examination. 5% discount for cash with order.



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6 Volt Radio Storage "A" Battery

Unequaled battery value! 25-ampere capacity. Ideal for Trickle Charger. Solid Rubber Case. Shipped C. O. D. subject to inspection, for only \$5.00. Send today. 5% discount for Cash with Order on any World Unit.

\$5.00



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Change range of Resistors to meet changing characteristics of the Set and accessories—
It Works!

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Your receiving Aerial is equally important if you are to get best reception.

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FULL ADJUSTABLE BALL AND SOCKET Pat. Pend.

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Size\$1.00
Set consists of spearhead top and ball and socket base.

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Set consists of spearhead top, guy wire collar and ball and socket base.

Universal Style

MODEL C 1/2" Pipe
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Set consists of spearhead top and ball and socket base.

MODEL B 1" Pipe
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Set consists of spearhead top, guy wire collar and ball and socket base.

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MICAMOLD RADIO CORPORATION

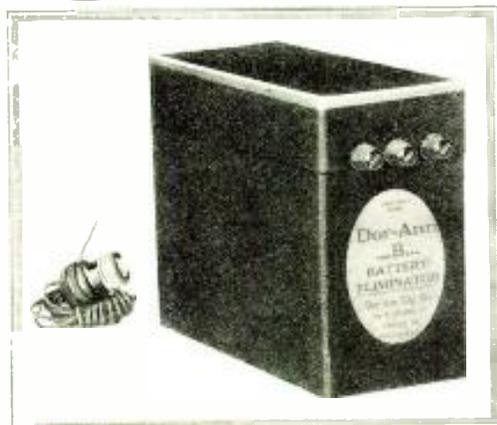
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The amazing success of this "B" eliminator is the biggest radio sensation of the year. The tremendous demand for the new Dor-Ann "B" Eliminator has taken the manufacturers by surprise.

Hear any radio set operating with a Dor-Ann "B" Battery Eliminator and you will realize that there is not a competitor of any price that can surpass it.

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Neat, sealed, and ready for use. Measures 3½x8½x7 inches, beautifully designed. Plug it into your electric light socket and turn on your set. No tubes to burn out, no acid to burn your rugs.

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No hum or noise. Clear reception. Will operate on A. C. or D. C. current. Will work any set from 1 to 11 tubes. The voltage can always be adjusted accurately from 15 to 135 volts, drawing from 10 to 50 milliamps. Very economical—will operate a set for 200 hours at the small cost of one cent. Also has a capacity that is guaranteed against breaking down.

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From
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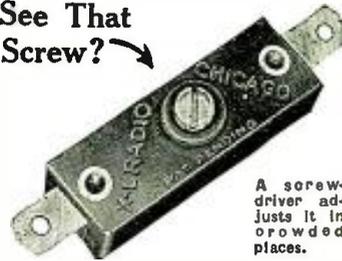
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A screw-driver adjusts it in crowded places.

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This is a new interference eliminator that limits the interfering stations from spreading all over your tuning dials. It keeps them separated from interfering with each other, helps to bring out some stations stronger. Built with the new type low-loss cyclone coil, neatly and substantially constructed, nothing frail, everything encased. Don't confuse with anything you have ever tried. Wonderful for broad tuning sets. Works on any aerial except a loop. Try the

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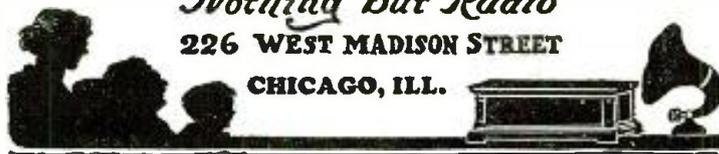
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Cuts out the local noises sometimes mistaken for static;

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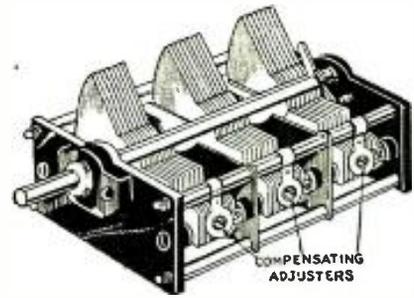
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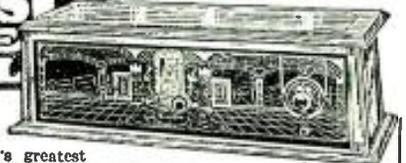
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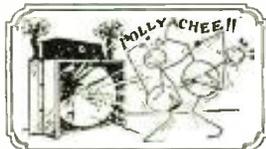
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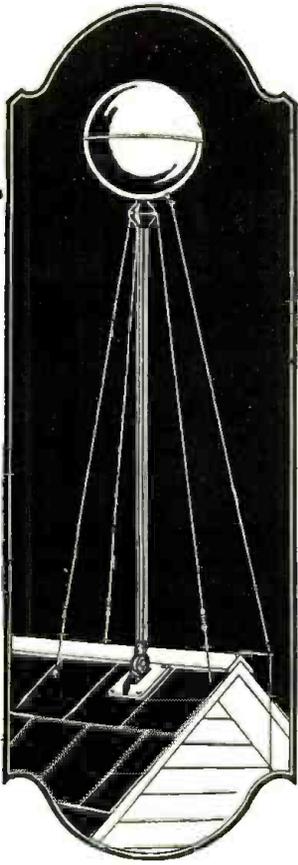
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to Install**

Efficient on all circuits; non-directional, so more stations are logged; less static; less interference; more selective. Your own set will amaze you.

**Get the Station You Want
Without Interference—**

AT last you can have the kind of radio reception you have always wanted—and you don't need to buy or build a new set to do it.

All you need is a Super-Ball Antenna. You will actually be amazed at the finer results you can get by using the "Super-Ball Antenna." Your radio will have greater selectivity—the tone will be clarified and static will be reduced to the very minimum. The Super-Ball is non-directional, easy to install, will not corrode—and it lasts a lifetime!

30-day Unqualified Guarantee by the manufacturer.

Write for information today, and for name of your local dealer.

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FRITTS RADIO CABINETS

The Choice of Leading Engineers

when showing their new hookups. Regarded by the trade as the finest Radio Cabinets made.

STANDARD SUPER



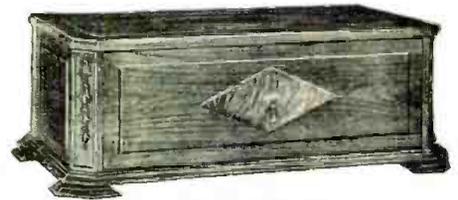
The original Italian Chest Type In Motif — **SOLID WALNUT**. Four Post construction. Top and sides have raised panel effect. Decorations slightly Polychromed.

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.

SUPER VESTA



SOLID WALNUT

Made in all standard panel sizes, from 21 in. to 30 in. Inside depth from panel to back 11 in. Inside height 8 in.

Finish: The best known to the trade, viz.: Dark walnut varnished. Hand, water and oil rubbed.

Our line also includes Consolettes and Radio Tables. Descriptive leaflets and prices upon request.

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CONSTANT POWER

FOR THE "A" CIRCUIT ON YOUR RADIO

Using

SILITE

the Wonder Rectifier
**PRACTICAL EFFICIENT
NOISELESS AND
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Beyond Belief**



Sets requiring 6 volts operating on 110 volt 50-60 cycle house lighting current **\$27.00**

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.

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Build the best—

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Potter Condensers are American made of best of materials to full capacity. They are the product of seventeen years' experience in manufacturing condensers exclusively. They are available in all sizes and types.

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SYD

LIFE LONG
"B" BATTERY

UNCONDITIONAL 2-YEAR GUARANTEE
It's Quality—Not Price—That Makes a Real Battery

Type B2
100 Volts
with a
Complete
Charger,
\$15.50



145 Volts
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The SYD Battery pictured above is a storage "B" Battery made of Edison Elements, which have nickel and iron in their construction. The solution used is a preserver of nickel and iron, thereby giving the battery practically unlimited life.

SYD Batteries are built to give the user real value for every dollar he invests. Only the finest materials are used in their construction. Remember that the quality of the battery and not the price determines its worth. That's why SYD Batteries are preferred and used by thousands.

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Manufactured and Sold Exclusively by
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Prices on complete kits will be sent on
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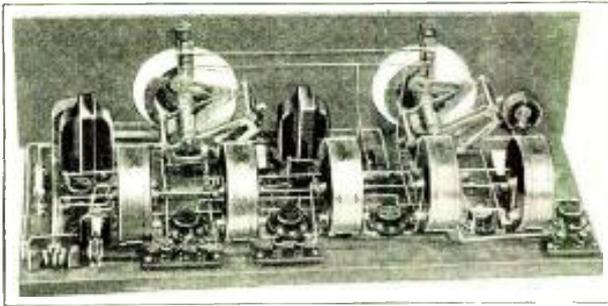
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Wabash 1901

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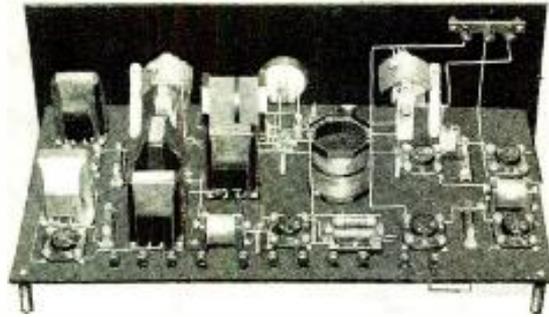


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Complete Parts as Specified by Citizens Radio Call Book **\$121.75**

The Improved Madison-Moore "One-Spot" Receiver illustrated, from specifications by Citizens Radio Call Book, is one of today's most popular circuits. It has established a record of performance that has not been surpassed.

We offer our highest recommendation and approval for the above circuits. All parts are guaranteed to perform satisfactorily and one complete set of Citizens Blue Prints will be furnished with each kit. Write us today about our kit service or for catalog C.R.B.



IMPEDANCE COUPLED SUPERHETERODYNE RECEIVER

Complete Parts as Specified by Citizens Radio Call Book **\$134.20**

The Impedance Coupled Super-Heterodyne Receiver is another circuit which is worthy of exceptional mention. Its performance has won the endorsement of thousands of users.

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Licensed by Rider Radio Corporation
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\$2.75

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THE newest and most efficient balancing device yet developed for radio frequency amplification! PHASATROLS stop oscillations, simplify tuning, prevent distortion and enable your tubes to operate at highest efficiency, without radiating interference to your neighbors. Easily and quickly installed in any radio frequency set. No technical knowledge required.

At your dealers, or write direct.
FREE hook-up circular on request.

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Give the RESULTS You Hope for

The increasing popularity of Twin-Eight R. F. Transformers is due to the enthusiastic boosting of thousands of fans who have secured outstanding results by using Twin-Eights to replace coils in old sets or in building new sets. The scientific design of Twin-Eights assures unusual results. The coils are self-supporting, and compactly wound, using wire with precisely the correct thickness of insulation. Exactly correct proportion and coupling between primary and secondary provides *tremendous amplification*. The closely limited field prevents oscillation, due to interaction between adjacent coils. Secure better results by replacing old coils with Twin-Eights or build a Twin-Eight receiver. Hookup free. Full size blue prints 50c each. Matched set of 3 Twin-Eight coils—\$6.00. Single coils—\$2.00 each.

The Bodine DeLuxe Loop

Combines extreme efficiency with delightful beauty of design. It replaces the clumsy, unsightly radio loop with a beautiful piece of solid walnut furniture. A unique feature of this handsome loop is the jack mounting. The jack permits the loop to be turned continuously in either direction or instantly dismounted. The jack may be mounted inside the cabinet and the loop plugged in through a small hole in the cover, thus eliminating all exposed connecting wires.

Made for .0005 M. F. and .00035 M. F. condensers. Price \$12.00.

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2256 West Ohio Street, Chicago, Ill.
Please send complete literature and hookups covering your products.

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



Make Your Radio A "MODERN" Shielded Set

No unshielded set complete without them, no reception as perfect as it could be with them. "MODERN" Shields give each tube a chance to function unhampered by interference from magnetic and static fields, prevalent in all unshielded sets regardless of make or hook-up as many interferences some of which sound like static are manufactured within the set itself and can only be remedied by metallic grounded shields. "MODERN" Shields protect the tubes from microphonic sound waves by insulating them from the surrounding ether and by three rubber tipped spring fingers inside of shield which press tightly against the tube, arresting any vibrations set up by jars, sound waves or telephonic vibrations in the cabinet; the rubber tips eliminate any possible conductive leakage from shield to tube. "MODERN" Shields confine the heat around the tube, causing quicker action, greater efficiency.

less power, longer battery life and modified summer static. "MODERN" Shields are recommended for sets or tubes that squeal, whistle, howl, choke, snap or produce indistinct or mushy reproduction. Tone and volume are greatly improved by their use. "MODERN" Shields should be placed over each tube in the set to obtain maximum results, connect copper wire in series to binding post on each shield and to ground post on set. "MODERN" Shields are pressed from special alloy metal fitted with rubber cushion base which eliminates transmission of telephonic vibrations to the tubes, each shield is adjustable to any tube, height or spring tension desired. The base of each shield is dipped in a special insulation to assure against shorts or grounds in their application. Complete instructions come with each shield. "MODERN" Shields retail for \$1.00 each, none genuine without the "MODERN" trade mark. Ask your dealer for a set of "MODERN" grounded shields today or order direct from



"MODERN" LABORATORIES

400 Oliver Street: Owosso, Michigan

Distributors, Dealers and Agents Wanted.
(Wire for Territory Reservations)

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Complete Stock of the Following on Hand for Immediate Delivery:

540-AW Cone Loud Speaker (Table type 18 inch)	\$32.00
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6025B Amplifier A. C. Type	
including two 205-D Vacuum Tubes	115.00
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including two 104-D Vacuum Tubes	160.00
104-D Vacuum Tube for 6031-A Amplifier	15.00
205-D Vacuum Tube for 6025-A and 6025-B Amplifier	14.25
216-A Vacuum Tube for 7A Amplifier and 14A Loud	
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Speaker	15.00
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No. 539-AW Receiver (Complete Unit) for 540-AW,	
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Our experience in correcting defects in Radio Receivers either by repairs or improvements, has helped hundreds of our clients in enjoying Better Radio Reception.

For a charge of \$2.50, an inspection and test of any radio set will be made (sent to us by express prepaid), a detailed report recommending improvements or repairs—including the cost of such charges will be furnished before proceeding with same.

On superheterodynes or other highly complicated circuits, the charges will be \$5.00.

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Your home in CLEVELAND

Your home there, to be perfect, should be in the center of theatre, shopping, and business districts. It should be on all the main motor routes, and have complete garage facilities too. It should have a popular-priced Coffee Shop served by the same kitchen as the luxurious main dining room. It should have 600 large, outside rooms, all with bath. Its rates should be from three dollars. The service goes without saying. We mean the Winton, of course.

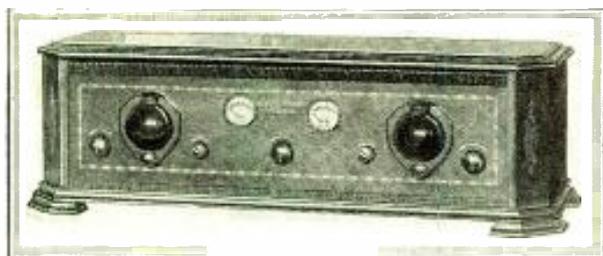
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Cleveland

PROSPECT AT NINTH

Cabinets of Merit



Cabinets in stock have piano hinges and are 10 in. deep. Grooved front top rail being removable.

Sizes	Walnut Only	Panel to Match	Sizes	Walnut Only	Panel to Match
7x18-10	\$15.00	\$1.26	7x26-10	21.00	1.62
7x21-10	17.00	1.47	7x30-10	23.00	2.10
7x21-12*	17.50	.....	7x28-11	23.00	1.96
7x24-10	19.00	1.68	7x30-11	26.00	2.10

*For Hammarlund-Roberts Hi-Q Receiver.

Infradyne Cabinet \$26.00

WRITE FOR folder showing complete LC-27 Line and other Radio Furniture.

Corbett Cabinet Mfg. Company

St. Marys - - - Pennsylvania

St. James Two-Forty Transformer



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THE HEART

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Vacuum treated dehydrated coils, sealed off from all atmospheric changes.

Units matched within 50 cycles operating at 240,000 cycle guaranteed.

Write for Folder—it's free. Full sized working plans make it easy to build.

4 Intermediate Transformers.....	\$30.00
1 Oscillator.....	5.00
1 Choke Coil.....	1.50
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	\$36.50
Working Plans.....	1.25

If your dealer cannot supply you, we will on receipt of \$36.50 send above parts postpaid and include working plans

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COMPLETE PARTS FOR THE



And All Other World's Record Super Models Including new model described in this issue of Citizens Radio Call Book.

Headquarters for Kits for

**Hammarlund HI-Q
Silver-Marshall Shielded Six
Klontz Super**

Described in this issue.

And All Other High-Grade Receivers

Write for descriptive literature and prices

THOR RADIO COMPANY

35 S. Dearborn St.

CHICAGO

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

\$500 in Cash Prizes

The directors of the Citizens Radio Call Book offer \$500.00 in cash prizes for the best drawing or painting done in color for prospective covers.

First Prize	\$150.00
Second Prize	100.00
Third Prize	75.00
Fourth Prize	50.00
Five Prizes, each	25.00

The conditions of the contest are as follows:

1. The subject of the painting may be any topic having to do with radio.
2. No person connected with the Citizens Radio Call Book as an employee will be eligible to this contest.
3. Size of all paintings to be 16 inches high x 14 inches wide or 24 inches high x 21 inches wide as the picture must lend itself to a vertical reduction rather than horizontal. Your art may be submitted on any suitable drawing paper, cardboard or canvas, drawn in crayon, ink, wash, water color or oil.
4. The names and addresses of the person making each drawing should in addition to being plainly inscribed on the back of the drawing be placed in a separate envelope securely attached by a clip or pin.
5. Drawings may be sent by registered mail, parcel post or express. All drawings must be sent prepaid. None will be accepted collect. They must not be folded or creased but mailed flat between two cardboards or rolled and mailed in a stout mailing tube.
6. The judges in this contest will consist of the following: Mr. Lewis Greel and Mr. Elmer Forsberg, instructors of the Art Institute of Chicago; Mr. Chas. O. Stimpson, president of the Citizens Radio Service Bureau.
7. The publishers reserve the right to retain all drawings submitted but agree to pay for any drawing used for publication purposes.
8. All drawings must be addressed to Cover Editor, Citizens Radio Call Book, 508 S. Dearborn Street, Chicago, Ill. This contest closes at noon, September 1, 1927, and the winners will be announced in our November 1927, issue.

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| WORLD'S RECORD SUPER | INFRADYNE |
| MADISON-MOORE ONE SPOT | HAMMARLUND HI-Q |
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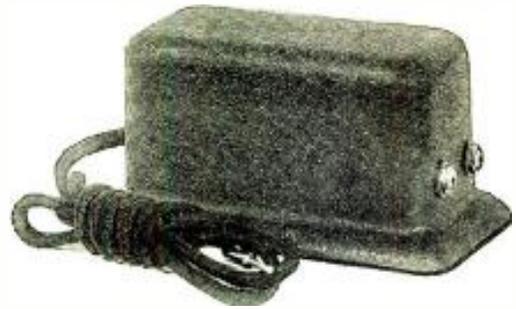
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Protects and eliminates rattle in your speaker; gives better tone quality.

You'll be proud to own an AMSCO Orthophone

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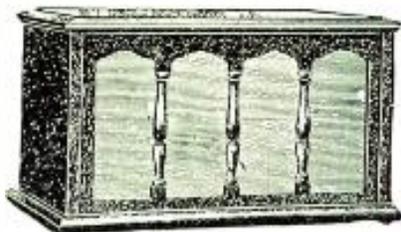
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BARGAINS!!

IN FIRST-RATE RADIO GOODS!
MAGNAVOX SPEAKER!



List Price
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Our Price
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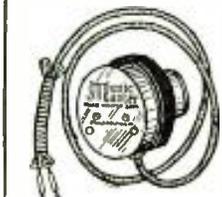
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WARREN
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Price
\$7.00
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Karas Harmoniks are all stage ratio transformers with extremely high primary impedance and a remarkably low distributed capacity. Their low hysteresis loss insures a maximum amount of energy being released for amplification at all frequencies. We use large coils in these Harmoniks, with many thousands of turns of wire, giving a very high inductance. Iron cores are large, and their controlled air gap insures high amplification of low frequency fundamental harmonics. Karas Harmoniks are scientifically shielded, and perfectly matched. Be sure to install Harmoniks in your Victoreen.

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Chicago

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Address.....

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

(If cash accompanies order we prepay delivery charges.)

Official Service Station

for

**MADISON-MOORE
REMLER INFRADYNE**

If your receiver does not perform properly, bring it or send it to us and we will make it give satisfactory results.

Prices of complete kits will be sent on request.

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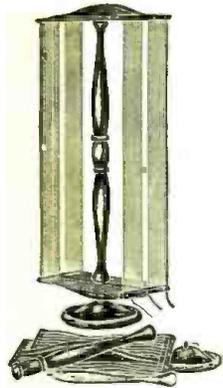
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The Best Loop You Can Buy at Any Price— Yet Costs Only \$7.50



This Ideal Box Type Loop combines the three qualities demanded by every set owner: (1) Unsurpassed Reception, (2) Beautiful Design, (3) Moderate Price. A highly efficient receiver on any 5-tube or superheterodyne Circuit using .0005 condensation (one or more stages of Radio Frequency). 180 degrees of directional control. 54 strand, silk covered Belden wire.

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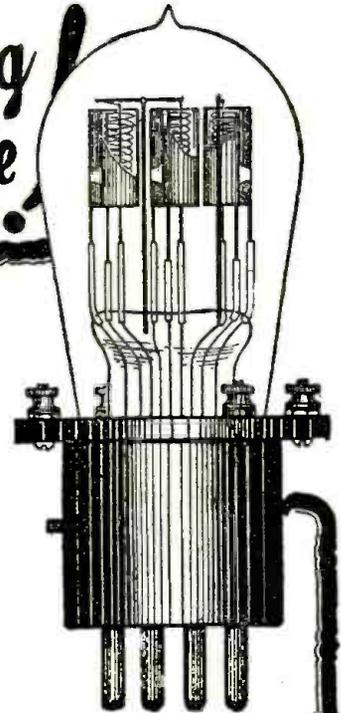
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Every set builder who plans to build a set from the Call Book should have a copy of the Harco Catalog. All the latest popular kits are listed at prices that save you money.

Every Set Builder Should Have a Copy
All that is new in radio is in the Harco Catalog. Harco service gets the parts to you when you want them. Get the catalog and send your next order to Harco.

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*Astounding
Unbelievable!*



**One
Multivalve--
but Many Tube
Performance**

Operates on 5 volts,
 $\frac{1}{4}$ amp. Wet or dry
batteries.

EMERSON MULTIVALVE

*Used and Specified for the Famous
Sir Oliver Lodge "N" Circuit*

Gives power, distance, clarity of tone, maximum volume—all on the loud speaker—with one multivalve—in multivalve you find detector, radio frequency and audio all in one.

One Emerson Multivalve operates the standardyne multivalve one tube set, on a loud speaker—manufactured by Standard Radio Corp., Worcester, Mass.

**List Price, Standardyne
Multivalve Set, \$25.00**

**List Price, Emerson Multivalve,
\$6.50**

Remember The Emerson Multivalve fits any standard socket. It can be used in any of the standard circuits. It means less wiring, more compact assembly, and at least $\frac{2}{3}$ reduction in battery consumption.

DEALERS AND JOBBERS: The Emerson Multivalve is selling fast. It will pay you to stock it. Write for particulars.

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134-138 W. Lake St. Chicago Ill.

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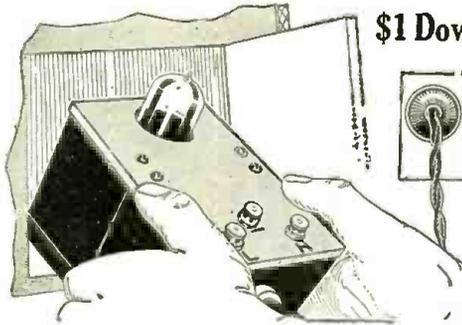
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This simplified Separator cuts out the stations you don't want—it helps you select your favorites with no annoyance. It reduces static—Works on any set using aerial—Increases volume—Will not change tuning readings—And acts as a separator—enabling you to greatly eliminate annoying interference.

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OPERATE YOUR RADIO FROM LIGHT SOCKET for 6³⁹



\$1 Down

OPERATES 1 TO 15 TUBE SETS

Has separate binding posts so that it is equally effective for large and small radios. Completely equipped with cord, plug, and ready to connect to your present set. Battery must be used for accumulator (your present 6 volt battery is all right). Just make a few simple connections and in two minutes you can forget about your A current supply. No changes need be made in your set.

FULLY GUARANTEED Your Money Back If Not Satisfied

The laboratory has expended years of research to make this pleasure possible for you. The high cost of electric operation is now wiped away and everyone can now enjoy the superior results of this up-to-date invention. You will be delighted with the volume and distinctness of your radio programs.

AMAZING INVENTION ELIMINATES "A" BATTERY TROUBLES

Why take your battery out to be charged or bother with chargers when for a small sum you can convert your set into an electrically operated radio?

By connecting with your present A battery an accumulator your A battery current can be drawn right from the light socket. You can secure more volume, get distance easily, and never have to worry about your battery going "dead." Electrically-operated radios are the latest improvement, and are recommended by the leading radio authorities.

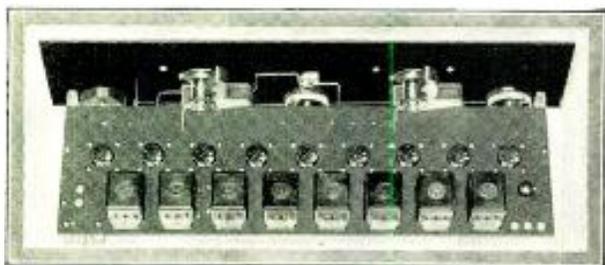
MONARCH MFG. CO., Dept. RA, 4554 Malden St., Chicago, Ill.

Send at once your A Battery Device. Enclosed find \$1.00. I agree to pay postman balance amounting to \$5.39 plus postage.

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

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

COMPLETE KIT SERVICE

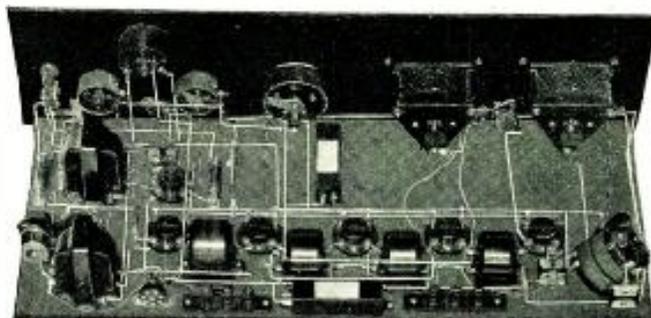


IMPROVED NINE-IN-LINE SUPER

Complete parts as specified by Citizens Radio Call Book **\$110.85**

The Improved Nine-in-Line Super has justly earned a reputation for unusual distance reception, selectivity and tone quality. This is chiefly the reason for its leading position of Supers today.

We endorse the above circuits. All parts are guaranteed to perform satisfactorily and one set of Citizens Blue Prints will be furnished with each kit. Write us today about our kit service or for catalog C.R.B.



30 K. C. SUPERHETERODYNE

Complete parts as specified by Citizens Radio Call Book **\$92.85**

The 30 K. C. Super is a remarkable circuit incorporating advanced principles of radio and design. Its simplicity in construction will allow the average man to build it with ease.

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Trickle Charger \$2.50 in U.S.A.
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BIG NEW 1927 CATALOG-FREE
 Dealers, Agents, Set Builders—get our big 1927 Catalog—225 nationally advertised lines. Lowest prices in America. Largest, most complete stock. Radio's latest developments. It's FREE—send for your copy now.
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The Spring issue of the Citizens Radio Amateur Call Book will be out right after March 1st.

Complete new lists of all transmitting amateurs in the World—over forty countries.

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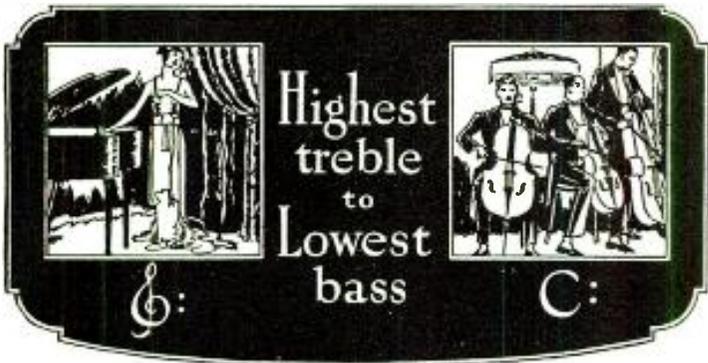
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 508 S. Dearborn St. Chicago, Ill.

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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.

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:-: 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.



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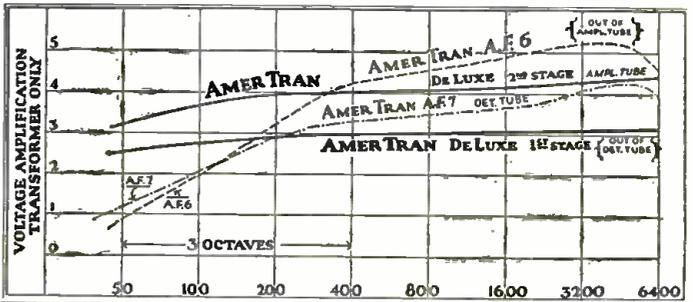
Our Kit Service Department publishes a special folder for customers who desire complete parts for all popular circuits.

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Frequency scaled in Octaves

The above curves are plotted from measurements made in accordance with the latest tentative rules of the N. E. M. A. These curves have been proven conservative, and accurately represent the AmerTran De Luxe Audio transformer.

What Is Audio Transformer Efficiency?



The AmerTran De Luxe Audio Transformers
Made in two types for first and second stages.
Price, \$10.00



The AmerTran Power Transformer Type PF52
This transformer is intended for use in the better type of power supply developments. It will convert the standard 110-volt, 60-cycle alternating house lighting current to a higher voltage for the plate and lower voltage for filament supply.
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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.
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For one and one-half years the AmerTran De Luxe has been used with great success by all those seeking improved audio amplification. The secret of its excellence centers chiefly in the special alloy core material which provides the high inductance needed for the normal amplification of the fundamental base tones. This makes possible an improved coil structure for maintaining the higher frequencies with no appreciable "peak" or "droop" until beyond the useful range.

There is a remarkable absence of the muffling of sibilant sounds and "back-ground"—often noticeable with transformers having "drooping" characteristics.

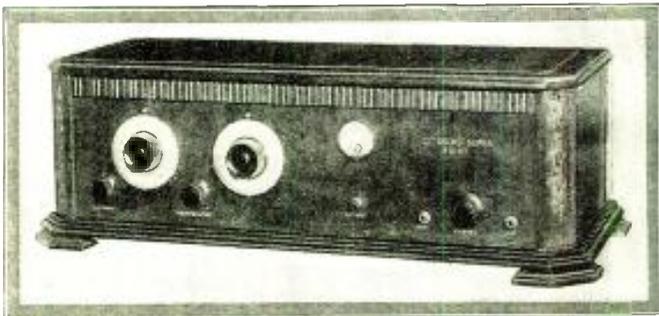
The AmerTran De Luxe is well made and designed to give long, dependable service. Metal cased and embedded in a solid compound it is not affected by climatic changes.

The better reception obtained by installing correctly a pair of AmerTrans is final proof of their high efficiency rating.

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Vee Dee

METAL ART PANELS For Your Citizens Super Set



There's a good reason why the engineers who designed the CITIZENS SUPER RECEIVER selected the VEE DEE Metal Panel.

The quality of steel—the accuracy of drilling—the exacting manufacturing standards of this 34 year old institution—all were contributing factors in receiving the award of merit. The VEE DEE Metal Art Panel for the Citizens Super Radio is finished in rich, beautifully grained Walnut or Mahogany and is handsomely decorated with Litho-Bronze design and lettering. Comes drilled and ready for mounting. Furnished with vulcanized fibre bushings for proper insulation. Size of panel, 7x26 inches.

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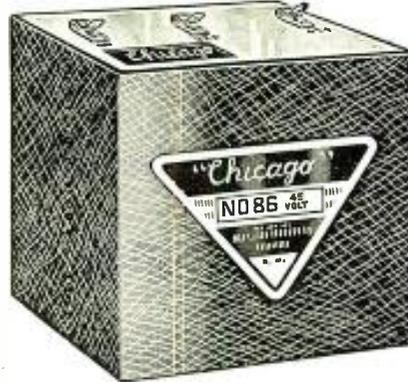


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Save money and improve your sets by adopting Vee Dee Metal Art Panels. We co-operate in working out new panel designs. Lowest prices—liberal terms. Write to

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The "Chicago" Heavy Duty "B" Battery

The Largest 45 Volt Battery Made

Shipped on Approval Direct from Factory

Approved by the Radio Institute of Standards. Successfully used by thousands of radio owners. Contains 30 double capacity cells. Provides maximum power and efficiency, giving six months radio service, with ordinary usage. Size of battery 8-3/16x4 1/4x7-3/16. Weight, 13 3/4 pounds. Price, only \$3.75. Sold on absolute guarantee to give 6 months' service or we replace with new battery.

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2. Fit in console of your radio.
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4. Are equal to any \$19.50 charger on the market.

You Must Be Satisfied or Your Money Will Gladly Be Refunded

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

FULL SIZE BLUE PRINTS

Actual size blue prints are now available for the construction of any circuit described in the Citizens Radio Call Book. Each set of four or more prints consists of a schematic wiring diagram, a graphic wiring diagram, a baseboard layout, a front panel layout, and where a sub-panel is used, a sub-panel layout.

The schematic wiring diagram shows in a symbolic manner each piece of apparatus and all connections between component parts. It is of exceptional value to the experienced experimenter and builder in that it allows an instant visualization of the circuit. The graphic wiring diagram is helpful to the less experienced builder, since it illustrates in a pictorial way all connections made between the various parts. Each instrument is carefully drawn to scale, with all terminals plainly marked so that the receiver may be completely assembled and wired with no chance of error even though the person has no knowledge of radio symbols.

The baseboard layout accurately shows, to the fraction of an inch, the location of each piece of apparatus mounted on the baseboard or sub-panel. The front panel layout indicates the size and location of all holes and appropriate engraving. Either the baseboard or front panel layout can be used as a template, since they are drawn with such accuracy so as to insure the proper placing of parts on the baseboard and obviate the possibility of ruining the panel through any inaccuracy in scaling or faulty calculation.

Positive success is assured with the fullest satisfaction when Citizens Radio blue prints are used in the construction of a receiver. Their use makes it possible to construct a receiver exactly like the laboratory model in a short space of time, with the possibility of error reduced to an absolute minimum.

Please Order Blue Prints by Number and Name

No. 44	Melo-Heald Super-Heterodyne	\$1.40	No. 5	General Radio Universal Receiver (Five Drawings)	\$1.50
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No. 50	The Camfield Super-Selective Nine (Five Drawings)	1.50	No. 11	9 Tube 45 K.C. Super-Heterodyne.....	1.40
No. 51	The Lodge "N" Receiver.....	1.40	No. 12	Madison-Moore Super-Heterodyne Using 201-A Tubes	1.40
No. 52	The Improved Nine-In-Line Super Using 201-A Tubes (Five Drawings).....	1.50	No. 13	Browning-Drake 5 Tube Receiver Using Acme Impedance Amplifier	1.40
No. 53	A Compact "B" Supply with Voltage Regulator Tube	1.40	No. 14	Browning-Drake 4 Tube Receiver Using Audio Transformers	1.40
No. 54	A Self Modulated Oscillator.....	1.40	No. 15	Raytheon B Battery Eliminator.....	1.40
No. 55	A 30 K.C. Super-Heterodyne Receiver.....	1.40	No. 16	Precise 8 Tube Super-Heterodyne.....	1.40
No. 56	The Improved Browning-Drake Receiver.....	1.40	No. 17	Bremer-Tully Counterphase Six.....	1.40
No. 57	A Complete Plug-In Power Amplifier.....	1.40	No. 18	An Efficient 5 Tube Receiver Using Space Wound Coils	1.40
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			No. 35	5 Tube Camfield Duoformer Receiver.....	1.40
			No. 36	Monotune Receiver	1.40
			No. 37	Madison-Moore "One-Spot" Receiver.....	1.40

Full-Size Graphic Wiring Diagrams

No. 59	An Impedance Coupled Super-Heterodyne Receiver	\$0.60	No. 26	4 Tube Non-Radiating Receiver Using Audio Transformers	\$0.60
No. 19	Silver-Marshall Improved 5 Tube Dual Control Shielded Receiver.....	.60	No. 27	5 Tube Non-Radiating Receiver Using Resistance Coupled Amplifier.....	.60
No. 20	Silver-Marshall Improved 7 Tube Super-Heterodyne .....	.60	No. 29	6 Tube All-American Toroid Receiver Using Impedance Amplification .....	.60
No. 21	All American 5 Tube Toroid Receiver.....	.60	No. 38	Premier 6 Tube T. R. F. Receiver.....	.60
No. 22	Premier 5 Tube T. R. F. Receiver.....	.60	No. 39	Unicontrol Nine-In-Line Super-Heterodyne..	.60
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No. 24	Alden 5 Tube T. R. F. Receiver Using Shielded Coils and Gang Control Condenser.....	.60	No. 41	Samson Special T. C. Receiver.....	.60
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			No. 43	Six Tube T. R. F. Receiver Using Alden Localized Control60

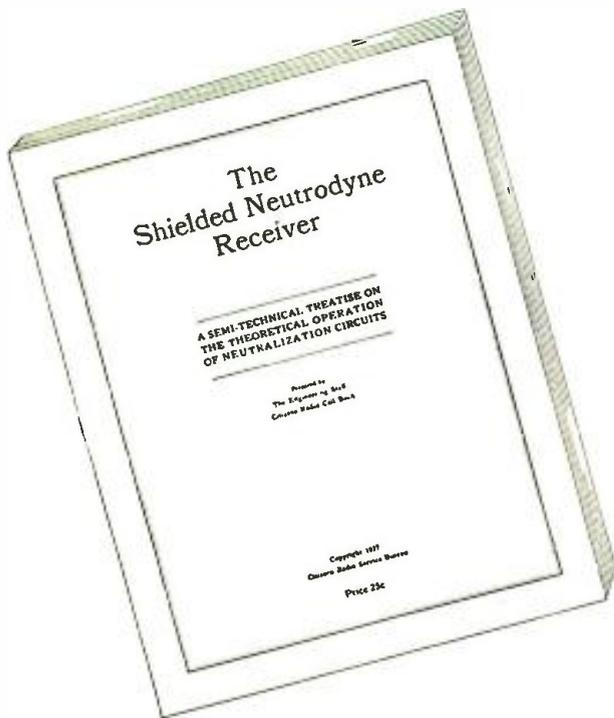
The above prices are effective March 1, 1927. Any of the above blue prints will be sent postpaid by return mail upon receipt of the proper amount.

CITIZENS RADIO SERVICE BUREAU

508 So. Dearborn Street

Room 750

Chicago, Illinois



Up until the present time there has not been available, to the home constructor, technical information relative to modern receivers written in such form that it might be readily understood by the inexperienced fan.

The Engineering Staff of the CITIZENS RADIO CALL BOOK has prepared and is offering to its readers a booklet which is devoted to the theoretical operation of neutralized circuits and which is written in such a form that it should be very valuable to the home constructor and is of a very instructive nature.

The Shielded Receiver which is described in this booklet is the zenith of modern receivers in the home constructor field.

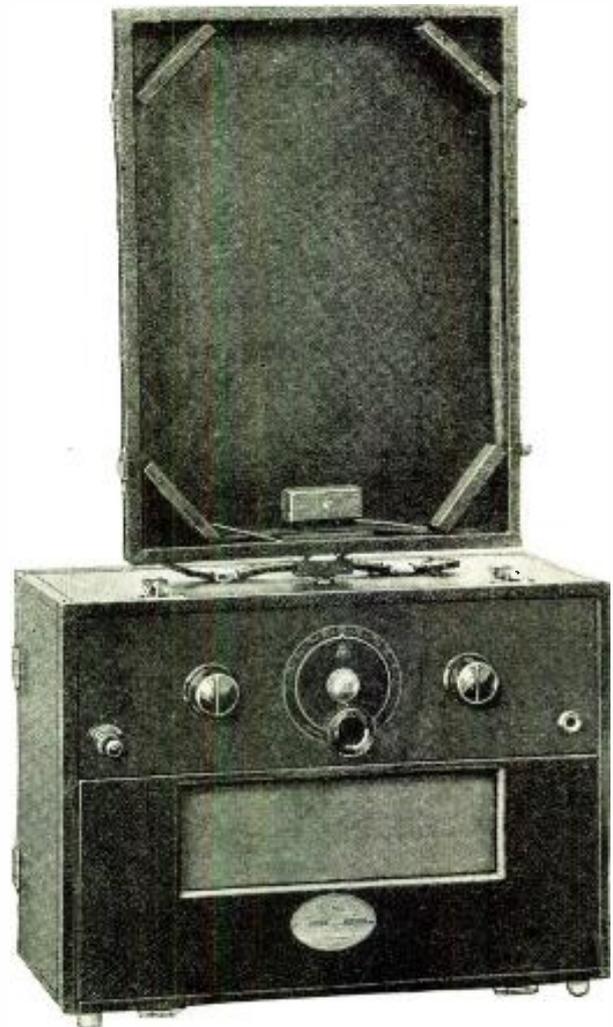
This book also contains complete mechanical instructions, how to assemble and wire this remarkable receiver. These instructions were very carefully compiled after a six months' investigation by expert radio engineers and radio mechanics.

Sent postpaid upon receipt of 25 cents in stamps or coin.

CITIZENS RADIO SERVICE BUREAU
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The Hyatt-6 Tube Portable Radio Receiver

NEW MODEL



A portable Radio Receiver of highest quality and substantial construction, for the home, hotel, club, hospital. Selective, long range, tone quality and volume. Employing 6-C299 or UV199 tubes, 3 standard dry cells, 2 Burgess No. 5308 "B" batteries and 1 Burgess No. 5360 "C" battery.

Jobbers and Distributors

Join Us in the Distribution and Sale of This Wonderful Receiver
Write for Our Plan and Discounts

Equipment includes loop aerial, in-built speaker with unit, single dial control. Enclosed in a brown leatherette covered and well built cabinet 15 in. wide, 11½ in. high, 9¼ in. deep. Weight 14 lbs. less tubes and batteries; 28 lbs. fully equipped. List price, less accessories, \$85.00, f. o. b. Chicago, Ill. List price with full equipment, \$105.00.

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Circular and Discount

THE ELECTROPHONE CORPORATION
56 East Washington Street Chicago, Ill.

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



Welty's Plug-in Shielded R. F. Coils

ARE adaptable to any R. F. position in any receiver. Our standard coils are .00035 capacity. Special coils obtainable in any desired inductance on special order. 3/4-inch diameter—3 1/2-inch high. Coil prongs plug into standard UX sockets. Automatically grounded copper shield prevents "pick up" or "body capacity," yet coil has enormous amplification with maximum selectivity.

Welty's Plug-In Shielded Coils are described further elsewhere in this magazine.
Price Per Coil (Socket Included).....\$4.00

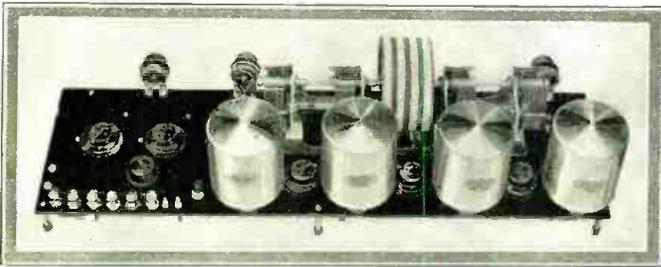
Welty's Completely Wired CHASSIS

Pictured below, in either 5-6-7 tubes, will provide the maximum in quality reception. Incorporates Welty's Shielded Plug-In Coils, Naald Centralized Control Condensers, and similar quality apparatus, in a remarkably efficient assembly that produces unequaled tonal quality, selectivity and distance at a reasonable cost. Ask for free catalog.

PRICE

5 Tube Chassis.....	\$58.00
6 Tube Chassis.....	68.50
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Special Walnut Cabinet.....	23.00

Radio Products **WILLIAM A. WELTY & CO.** Radio Sets
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5 TUBE



\$19.50

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will be disposed of below cost—\$19.50 each. One to a customer only to introduce Premier Quality Radio Receivers to the user.

Handsome walnut finish cabinet. Genuine 7"x21" Bakelite front panel and sub-base—Premier quality parts throughout—U. S. Navy Department: licensed hook-up—Very selective and guaranteed comparable with any set made for long distance reception.

Orders will be filled until stock is exhausted. Attach remittance to this ad and mail today. Money back (less carrying charges) if not satisfied.

PREMIER ELECTRIC COMPANY
Grace St. & Ravenswood Avenue. Dept. 137 Chicago, Ill

\$1 GET DISTANCE

Amazing Invention for Any Radio

Why confine your radio programs to a few local stations when the expensive concerts, dance music and lectures of hundreds of big cities are ready for you? Connect this **DISTANCE GETTER** to your radio, tune according to instructions and presto!—note the distant programs roll in!



SATISFACTION GUARANTEED

Your money instantly refunded if you are not satisfied. The article on proper tuning, furnished **FREE** with each Distance Getter, alone is worth the price. Galloway of Chicago writes:

"Results beyond all expectations. Cuts thru locals like a knife." Homes of Palos, Ill., says: "Send three more for my friends. I get Denver and California easily."

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4554 Malden St., Dept. X, Chicago, Ill.
Send me Distance Getter, postpaid. Enclosed find \$1.00 (M.O., stamps or check.)
Send C.O.D., plus small postage added.
Also send 100 page Radio Catalogue Free.

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

INVEST

a two-cent stamp and write for our new discount sheet

Before You Investigate

any farther.

Here is a real parts house at your back door and you'll admit our prices are right.

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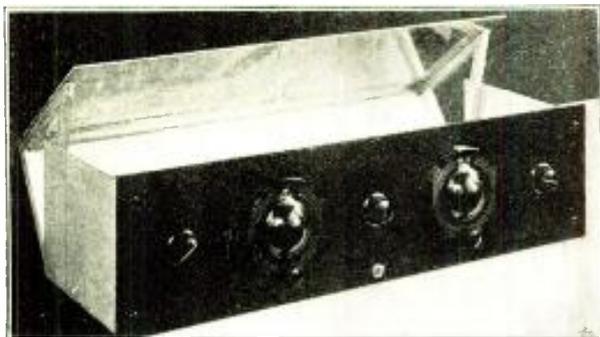
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for all "B" Eliminators and Power Amplifiers
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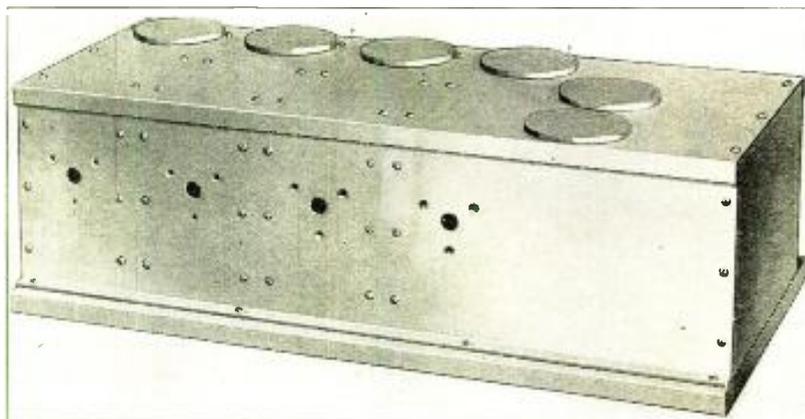
We Specialize in Aluminum Shields for Radio Receivers



Shield designed especially for the Nine-In-Line Superheterodyne

Leading radio engineers have long recognized the fact that proper shielding is a most important necessity in a receiver today. Our extensive experience in the manufacture of shields admirably suits us to manufacture, in quantity, as well as develop designs for individual needs. Correspondence from jobbers and manufacturers is cordially invited.

The illustration, below, shows a complete "knock-down" shield for "The Shielded Neutrodyne Receiver" described in the December issue of this publication. It is mechanically correct in design and exceptionally well made, being assembled with only the use of a screwdriver. We are in a position to supply these shields on short notice, either as single orders or in quantity.



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Write for the KARAS Manual About the Amazing EQUAMATIC 5-Tube Sensation

WE want every reader of the Citizens Radio Call Book to have a copy of our Karas Equamatic Manual. If you have not yet secured your copy, write for it today. It will be sent to any address upon receipt of 10c to cover postage and mailing.

The Equamatic Manual gives the complete story of the amazing Karas Equamatic 5-Tube Tuned Radio Frequency Receiver—the first to solve the problem of the exactly correct energy transfer between primary and secondary inductances at every wave length setting of the dials, automatically, in a simple, scientific manner. The Equamatic is the receiver that startled the country—caused more discussion—aroused more interest among radio experts, leading technical writers, editors, professional and amateur set

builders and the entire rank and file of radio than any other receiver ever designed. We have scores of letters in proof of this.

The Karas Equamatic Manual not only tells all about this great receiver—how it works—why it works—how to build it—but also gives fascinating facts about the Equamatic that you will find of vital value in logging scores of DX stations from one end of the country to the other.

Write for this book today. Then build the Equamatic. Learn at first hand how powerful it is—how it cuts right through the strongest local barrage—how it outdistances any other receiver in its tremendous volume of clear, pure, sweet, undistorted TONE. Your dealer can supply you with the necessary Karas and other parts. Write us for complete information.

Send for it TODAY—
Just Mail the Coupon

Fill out and mail the coupon, enclosing 10c, and we will send you the complete Karas Equamatic MANUAL, telling all about the EQUAMATIC 5-Tube Sensation. Get the book—then build the set. Mail the coupon NOW.

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1003 Association Bldg.
Chicago

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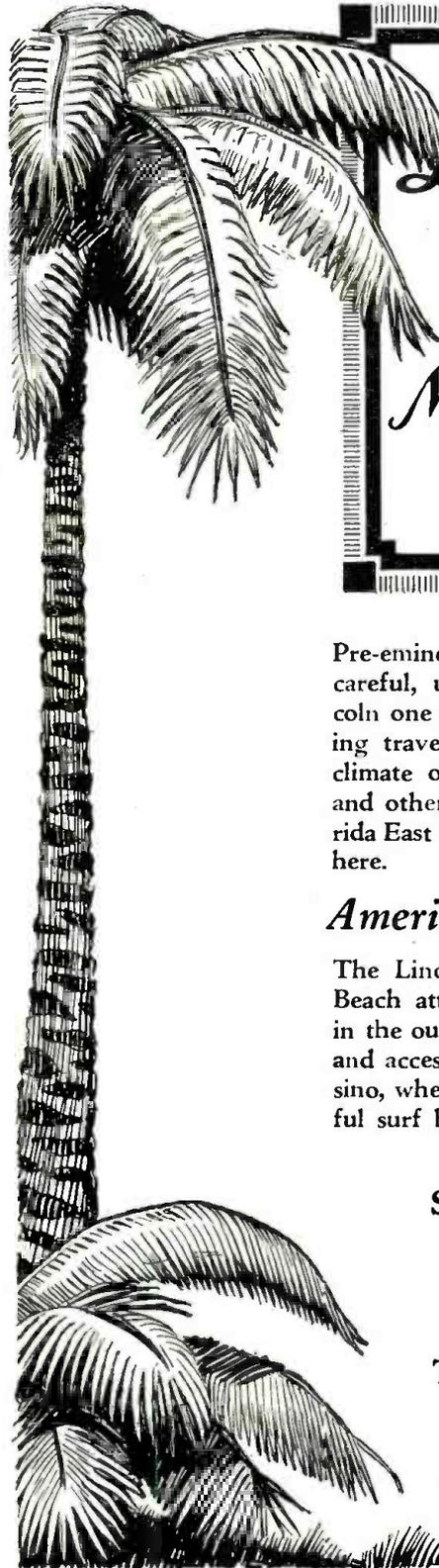
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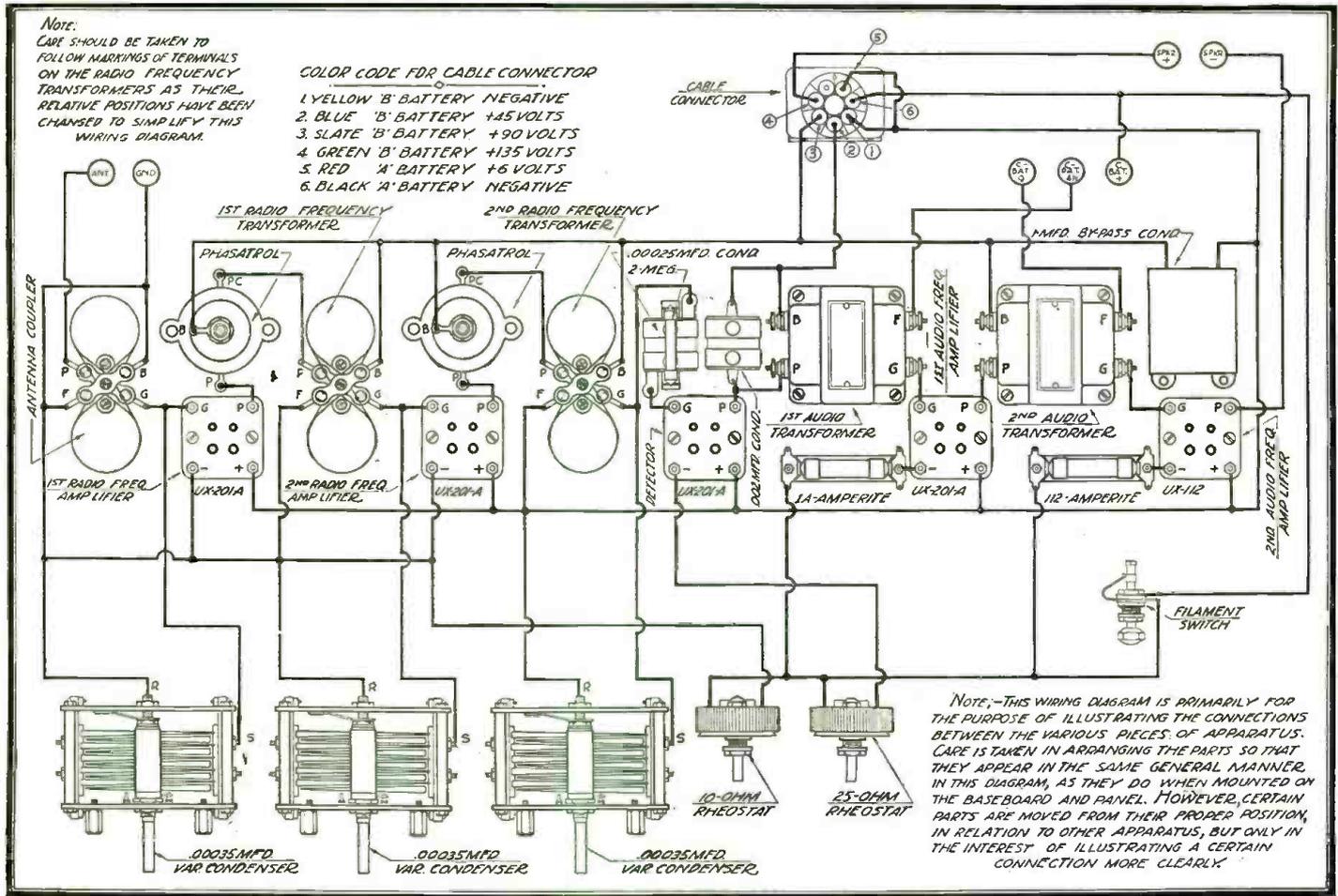


Fig. 3. Pictorial wiring diagram for the novice, showing every connection in entire receiver

(Continued from Page 94)

It is sturdily constructed of genuine walnut lumber and has a beautifully hand-rubbed finish and is lacquered.

The speaker shown is a product of the American Electric Company of Chicago, Ill., and is known as the Burns Speaker. The unit used in the speaker is adjustable, thereby making the speaker applicable to any receiver regardless of the impedance of the amplifier.

A Willard 100-ampere storage battery is used to supply the necessary filament potential to operate the vacuum tubes. The battery is manufactured by the Willard Storage Battery Company of Cleveland, Ohio. The "B" supply and charger are both manufactured by the Fansteel Products Company of North Chicago, Ill. The eliminator is known as the Balkite Model X and is fully capable of supplying the necessary "B" potential to the receiver

without danger of overloading. The charger is the Model J, which replaces the previous charger manufactured by the Fansteel Products Company. The new charger is modeled somewhat along the lines of the original Trickle Charger in that the electrolyte is contained in a transparent glass container by which its level can be observed at any time.

A Yaxley Automatic Control Relay is used in this installation and renders the entire system of accessories automatic in operation. The charger is connected to the battery when the receiver is not in operation and the "B" eliminator connected to the receiver when it is in operation, etc.

Photo "B" shows the Phasatrol Five Receiver mounted in a cabinet manufactured by the Corbett Manufacturing Company of St. Marys, Pa.

(Further information on any of the above described accessories may be obtained by writing direct to the manufacturers.)

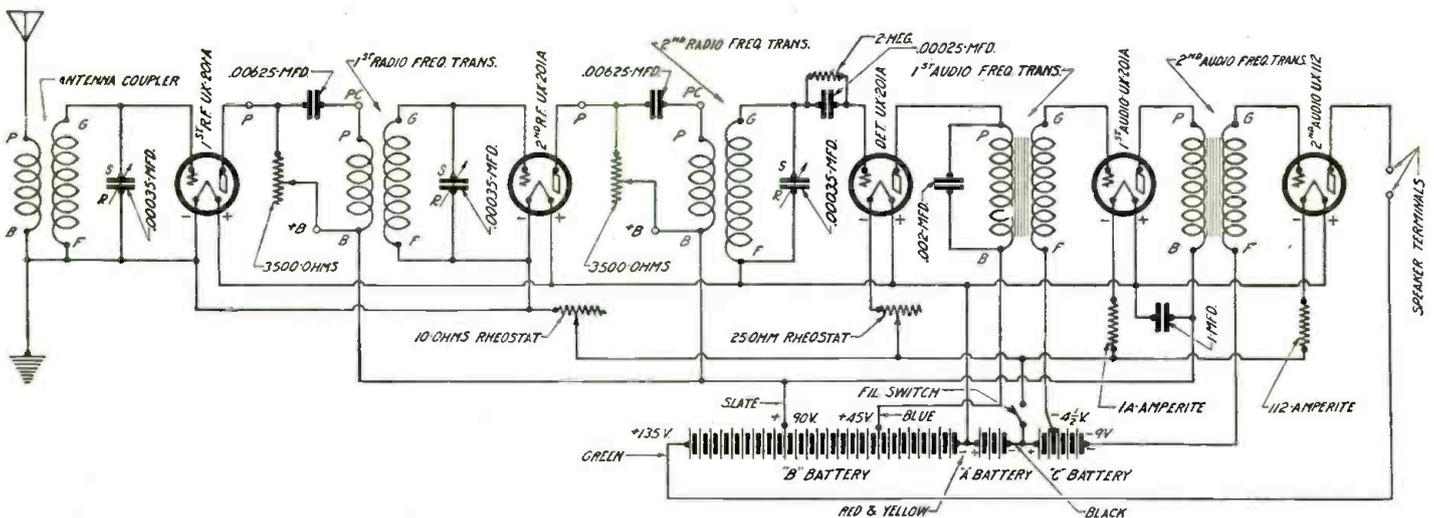


Fig. 4. Schematic wiring diagram

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Under the personal supervision of
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Official Service Station

for

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WORLD'S RECORD SUPER
SILVER-MARSHALL**

If your receiver does not perform properly, bring it or send it to us and we will make it give satisfactory results.

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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.

If your radio dealer does not sell Powerola, tell us, and we will advise our nearest distributor demonstrator. Write for literature, terms and prices at once.

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

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WE HAVE BEEN APPOINTED

Official Service Station for the Following Manufacturers

Madison-Moore	General Radio	Klontz Radio
Camfield Radio	Browning and Drake	Scott Radio Laboratories
Gray & Danielson (Remler Infradyne)	Samson Electric Co.	Silver Marshall
	High Frequency Laboratories	Karas Electric Co.

IF you have constructed any sets using the merchandise of any of the manufacturers mentioned above and for any reason are unable to make it perform satisfactorily, bring the receiver in to us; we will advise you fully as to what is necessary to make it function properly.

We have assigned one man to each manufacturer's parts and guarantee the results will be in accordance with all claims made by manufacturers. If you are unable to bring the set in personally, ship the same to us, securely packed and crated, by American Railway Express, prepaid, then write us. We will notify you before any work will be done, advising you fully the trouble and approximate cost of repairs.

KITS

Our completely equipped laboratory is at your service—we will construct, repair or design any receiver you wish. We will also rebuild your present receiver and bring it up to date.

We can furnish you with complete kit to construct your receiver—all kits furnished by use are matched and tested in the laboratory, at no extra charge—we guarantee them to perform at maximum efficiency. Prices will be quoted on request.

REMEMBER—the confidence of the manufacturers listed above have been placed in this laboratory, who guarantee to give to you, their clients, the same conscientious service that the manufacturer would give you himself. It is more practical and more wise to bring your problems here than to some irresponsible radio man who is unfamiliar with the merchandise you wish serviced. This is an era of specialized effort and we are specialists for the above mentioned parts, and our charges are no more than you would pay for inferior workmanship.

RADIO SERVICE LABORATORIES, Inc.
508 South Dearborn St., CHICAGO, ILL.

Laboratory Service

—By—

GERALD M. BEST

Gerald M. Best, Technical Editor of "RADIO," published in San Francisco since 1917, and D. B. McGown, formerly a Radio Inspector in the Sixth Radio District, are conducting the "RADIO" Matching, Testing and Calibration Laboratory. The publishers of "RADIO" have equipped this modern laboratory with the latest devices for accurate workmanship and we are ready to serve you—right now. The vast experience gained by these two prominent radio authorities is your safeguard in assuring successful operation of your receiver or transmitter. The rates charged for this service are most reasonable, as the schedule shows.

Schedule of Rates

Effective February 1st, 1927

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25 cents for measurement of capacity.

B BATTERY ELIMINATOR CONDENSERS—

Checking working voltage, both a.c. and d.c., any size up to 1000 volts; per condenser\$1.00

COMPLETE SETS—

Laboratory test of any complete set, up to 10 tubes. Complete check-up of all parts\$5.00

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Facilities are available for testing transmitters and transmitting equipment of all kinds. Phantom and real antennae are available for testing complete transmitters on all wavelengths up to 2500 meters. Power is available for testing apparatus and power supply equipment on any of the following circuits:

D.C. to 2000 volts.

A.C. testing at commercial frequencies and voltages up to and including 6600 volts, single or polyphase.

Testing equipment is also available for use with 500 cycle single phase to 5 K.W. High voltage D.C. from a mercury arc rectifier up to 10,000 volts is also available.

Suitable meters of all types and kinds are on hand for testing such equipment and making all necessary measurements to make proper and complete tests of such equipment and apparatus.

Owing to the special nature of such tests, no regular fees will be quoted, but correspondence is invited on this subject.

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COILS—Any make. Matching inductance and matching resistance, 35c per coil or \$1 for a set of three. Thorola, Camfield, Benjamin, Precision, All American, Bremer-Tully, Quadraformer and other standard coils can be matched to operate perfectly with single, double or triple condensers. When condensers are to be matched with coils, the charge is 50c per unit, consisting of condenser bank and coil. In other words, a three gang condenser can be matched with three separate coils at a cost of \$1.50. Curves, per unit, \$1.00 additional per curve.

VARIABLE CONDENSERS—Air condensers, variable. Checking maximum and minimum capacity, 25c for a single condenser, 50c for a two gang condenser, 75c for a triple gang condenser. Curves, \$1 additional per bank.

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Any make. Matching pairs, testing for grounds, shorts and open circuits and matching with proper amplifier tubes, 50c each. Transformer curves of frequency characteristics from 35 to 8000 cycles, \$1.50. (Impedance or inductance measurements at any desired frequency.)

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Any standard type for receiving sets, 50c for measurement of amplification constant at any one audio frequency. Ten cents per tube for matching pairs. Complete sets of tubes matched for multi-tube sets. Proper oscillator, detector, r.f., amplifier and power tubes selected for various parts of the circuit. Ten cents per tube in lots of 4; 25c per tube in quantities of less than 4.

GRID LEAKS—

25 cents each for accurate measurements of d.c. resistance.

I. F. TRANSFORMERS—

\$2.50 for matching a set of intermediate frequency transformers with specified tuned transformer. \$1.00 for frequency characteristic curve. An extra charge is made if tuning condenser is furnished by us.

QUESTIONS ANSWERED

Gerald M. Best answers on an average of 15,000 radio questions a year as a part of his work with the publishers of "RADIO." Read his QUESTION AND ANSWER department in "RADIO" every month. Get a copy of the latest issue from your news dealer or send 25 cents direct to the publishers.

How to Ship—

If you have parts on hand to be tested, matched or calibrated, ship them to us pre-paid. Securely pack all shipments in wood boxes or heavy cartons. Insure your shipments. We will return the apparatus to you in the original carton. The shipping charges are to be paid for by yourself. Plainly mark all apparatus as follows:

"Laboratory"
Pacific Radio Pub. Co.
435 PACIFIC BUILDING
SAN FRANCISCO, CAL.

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

Complete Approved Parts

for Citizens Radio Call Book's New 6-Tube

Shielded Neutrodyne

Are Now Ready for You

Because we believe it to be one of the most advanced, most highly perfected radio sets yet developed, we are co-operating with the Citizens Radio Call Book in the thorough exploitation of this fine set. This wonderful circuit has already created a sensation since its introduction to the public a few

months ago. And, the live dealer will not fail to take advantage of this market now waiting for this new wonder 6-tube shielded set. Thousands will be constructed this year. It is new! It is better! It meets the present conditions in broadcast reception to perfection! It is what the people want!

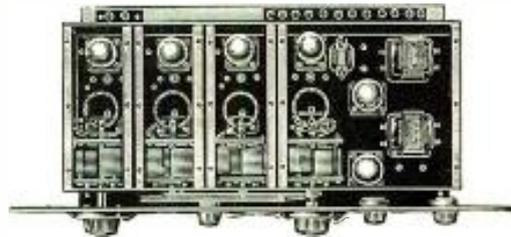
A New Proven Plan to Stabilize Radio Retailing

Up until now, the bane of radio retailing has been the "off season," when goods must be offered at a sacrifice to keep trade coming. Now this company has created a new plan of merchandising to make the radio store a year 'round profit maker. There need not be one "dead" month or week!

Turn Lean Months into Fat Profit Makers

During the Spring and Summer, when radio is "slow" you turn your major efforts to other seasonable lines which may be carried right in the same store. These lines include Automobile Tires and Accessories, Electrical Fixtures, Lamps, Wiring Supplies and Household Appliances. A limited supply of Golf, Tennis and Outdoor items rounds out your stock. Millions of dollars are annually spent in every section of the country for these necessities of modern life. Equip one of these new kind of stores.

We help you select your stock, so that little investment is required. We tell you what numbers will sell fast. We show you how to make a real "killing" on this new idea. Shortly you will see these stores everywhere. Get in now on the ground floor!



High power in broadcasting has made highly selective receivers imperative to combat interference. This super selectivity is accomplished both with more efficient arrangement of apparatus and proper shielding. This shielding, when rightly done, practically eliminates electro-magnetic pickup and interaction between stages. Now with our specially drilled shield, construction of such a receiver is as simple as any other.

The famous Neutrodyne circuit enjoys a merited popularity because of its easy tuning, fine tonal qualities and wide range. This new 6-tube receiver is a distinct advance in the application of this great circuit.

All necessary parts for building this fine set may be selected from our catalog. An example are these special requirements:

- 1 8 $\frac{7}{8}$ x9 $\frac{7}{8}$ x $\frac{1}{8}$ -inch Drilled Micarta Sub-panel. List, \$1.60.
- 4 3 $\frac{5}{8}$ x6 $\frac{1}{8}$ x $\frac{1}{8}$ -inch Drilled Micarta Sub-panels. List, \$0.54.
- 3 $\frac{3}{4}$ x7 $\frac{3}{4}$ x $\frac{1}{8}$ -inch Drilled Micarta Terminal Strips. List, \$0.14.
- 1 1x10x $\frac{3}{8}$ -inch Drilled Micarta Terminal Strip. List, \$0.24.
- 1 1x3x $\frac{1}{8}$ -inch Drilled Micarta Terminal Strip. List, \$0.10.
- 4 Keystone Radio Frequency Transformers. List \$10.00.

Send now for a copy of our catalog. In it, you will find the other equipment for this and dozens of other popular circuits. Attractive discounts to dealers. Our wholesale prices give you a good margin. Orders either in small or large quantities are given prompt and careful attention.

In writing for our Dealer's catalog, please use your letterhead and give names of two wholesale firms with whom you now deal.

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Dept. 61

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**1927 Spring and Summer
 RADIO BARGAIN BOOKLET**

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RADIO BOOKLET

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 Samson Impedance Intermediate
 Frequency Super with Band
 Pass Filter
 General Radio Super
 Melo Heald 11-tube Super
 Improved Nine-In-Line Super with
 "A" Tubes
 Lodge "N" Circuit
 Alden Tru-phonics Amplifier with
 Welte Shielded Coils
 Madison-Moore
 Best's 45,000 Cycle
 St. James Super
 Victoreen Super
 Universal 4-Tube
 Infradyne
 Aerodyne
 Silver Six
 620 Silver Cockaday
 B. T. Counterphase
 Hammarlund-Roberts
 Short Wave
 Browning Drake
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BATTERY ELIMINATORS

Kits and Factory Built

All-American, Bremer-Tully, Burns,
 Thordarson, Silver-Marshall with
 Voltage Regulating Tube, General
 Radio, Majestic, and other popu-
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A complete line of parts and ac-
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 ers, such as:

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 Bruno, Buell, Cornsco, Dubilier,
 General Instrument, Hammarlund,
 Karas, National, Remler, Signal,
 Silver-Marshall, Walbert, and
 many others.

Sent to you

FREE

If you are planning to build any of the radio sets, battery eliminators, or amplifiers described in this issue of the Citizens Radio Call Book, be sure to write for a FREE copy of our new 1927 Spring and Summer Bargain Booklet—ready for you March 15, 1927.

WE guarantee to save you money. Before you buy your parts to build any of the sets, amplifiers or battery eliminators described in this issue of the Citizens Radio Call Book be sure to see our new Bargain Booklet and save money. It is sent to you free.

Includes also a complete line of accessories made and nationally advertised by leading manufacturers—batteries, chargers, loudspeakers, etc.—all at money-saving prices. And don't forget this: We handle only brand-new apparatus—standard makes that are fully guaranteed. QUANTITY sale of QUALITY apparatus explains our low prices. Compare with others and see why thousands of fans look to us as radio headquarters.

*Write today for your FREE copy
 A post card will do!*

Catalog will be mailed on or about March 15, 1927

CHICAGO SALVAGE STOCK STORE

"The Largest Radio Store in the World"

509 South State Street

Dept. CB3

CHICAGO, U. S. A.

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



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This neat wire is very flexible and may be run above the picture molding, around a window frame, or under the rug. The neutral color of the attractive overall braid makes the wire practically unnoticeable when exposed to view. The cable of stranded fine copper wires is very efficient.

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This tinned copper lead-in and ground wire is well insulated and when properly soldered assures long service of maximum efficiency. The tinned copper makes soldering easy and avoids corrosion at joints.



BELDEN LOUD SPEAKER EXTENSION CORD

Enables you to move the loud speaker about the room and greatly increases utility of the receiver. Makes it possible to operate loud speaker in kitchen, on the porch, in the dining room, or near the chair of an invalid. Installation is simple and easy.



Use Belden Accessories with Your Radio Set

For best reception equip your set complete with Beldenamel Aerial, Belden Lead-in and Ground Wire, and Belden Fused Radio Battery Cord.

It is easy to install these proven accessories on your set, and they provide maximum distance and volume with utmost safety. The best is cheapest in radio. Specify Belden Accessories when you buy.

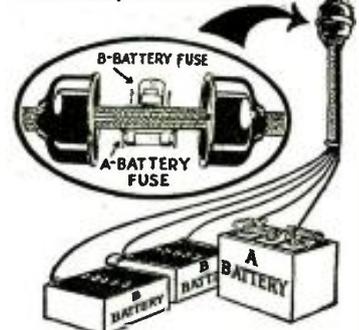
BELDENAMEL AERIAL WIRE

This improved wire for outside aerials is a big aid in bringing in distant signals with clarity and volume. Each individual strand of Beldenamel Wire is enameled separately. The enamel is impervious to weather, fumes and smoke, and the aerial is just as effective after years of service as when first installed. Beldenamel Aerial Wire is made of the same high quality of Beldenamel that is so widely used by electrical manufacturers. Ask for Beldenamel Aerial in the striped orange cartons.



The Belden Fused Battery Cord provides:

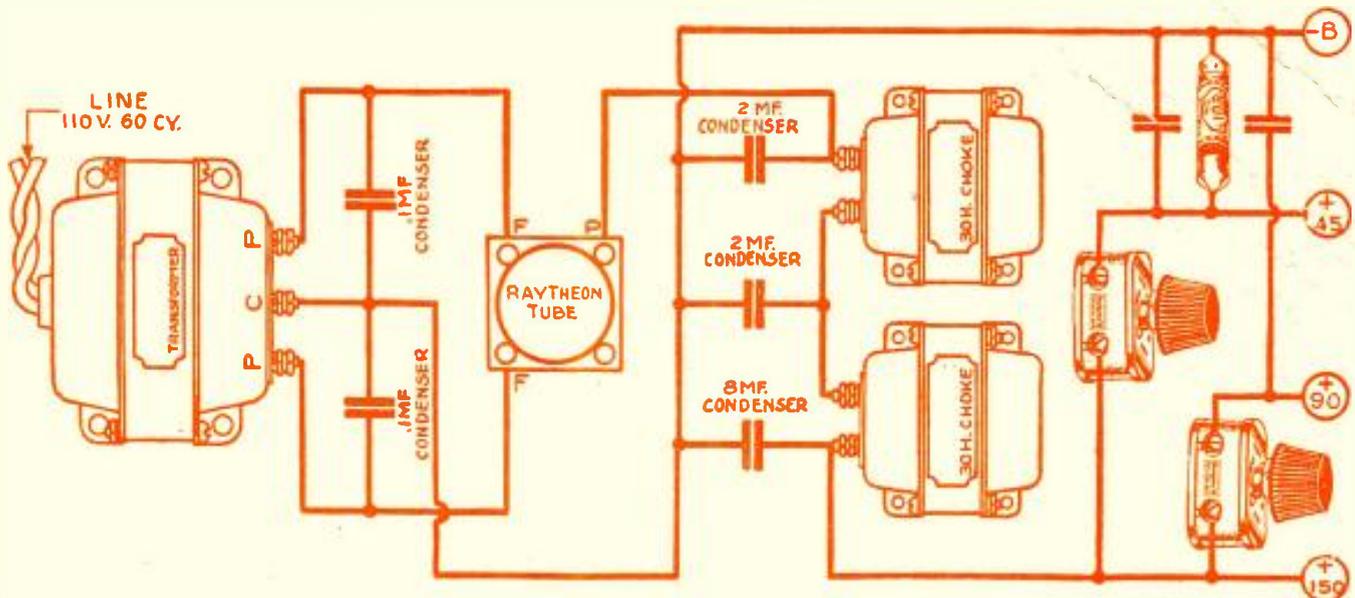
- 1—An A-battery fuse.
- 2—A B-battery fuse.
- 3—A polished bakelite cover for the battery fuses.
- 4—A compact connecting cable that dispenses with loose wires.
- 5—A color-code on each wire for identifying each circuit.
- 6—A time saver, because the cord is quickly connected and easily concealed.



BELDEN MANUFACTURING COMPANY

2322-A So. Western Ave., Chicago, Ill.

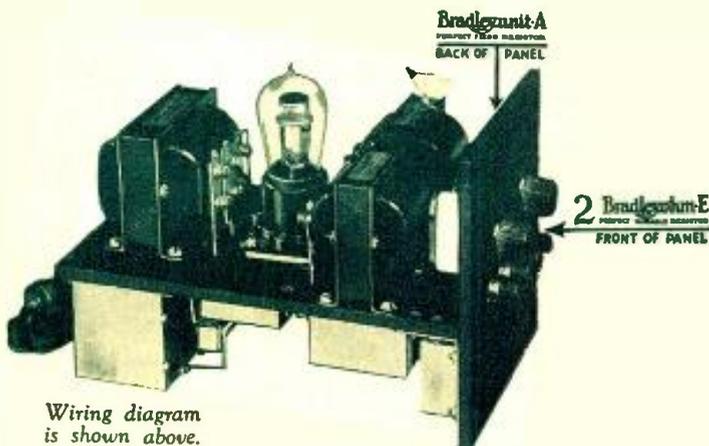
Tell 'Em You Saw It in the Citizens Radio Call Book



Your B-Eliminator Will Be Improved

By Installing Allen-Bradley Resistors

WHEN you build a B-Eliminator, be sure that your kit contains Bradleyohm-E for plate voltage control and Bradleyunit-A for fixed resistors. Then you will be assured of perfect plate voltage control.



Wiring diagram is shown above.

Bradleyunit-A PERFECT FIXED RESISTOR

This solid, molded, fixed resistor has no glass or hermetic sealing in its construction. It is a solid unit, with silver-plated end caps, that is not affected by temperature, moisture and age. By all means, use Bradleyunit-A when you need a fixed resistor.



Always insist that Bradleyohm-E and Bradleyunit-A are included with your B-Eliminator kit. You then will be assured of perfect voltage control.

Send for folder "How to Build a B-Eliminator" describing seven popular hookups

ALLEN-BRADLEY COMPANY
488 Clinton Street Milwaukee, Wis.

Bradleyohm-E PERFECT VARIABLE RESISTOR

This oversize variable resistor is used as standard equipment by leading B-Eliminator manufacturers. 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. Ask for Bradleyohm-E in the checkered carton.



Use Allen-Bradley Perfect Radio Devices

