

Oct. 25 1924 A 2-TUBE QUALITY REFLEX

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Functions and Uses of
Oscillators

By J. E. Anderson
Consulting Engineer

Trouble-Shooting for
All Types of Sets

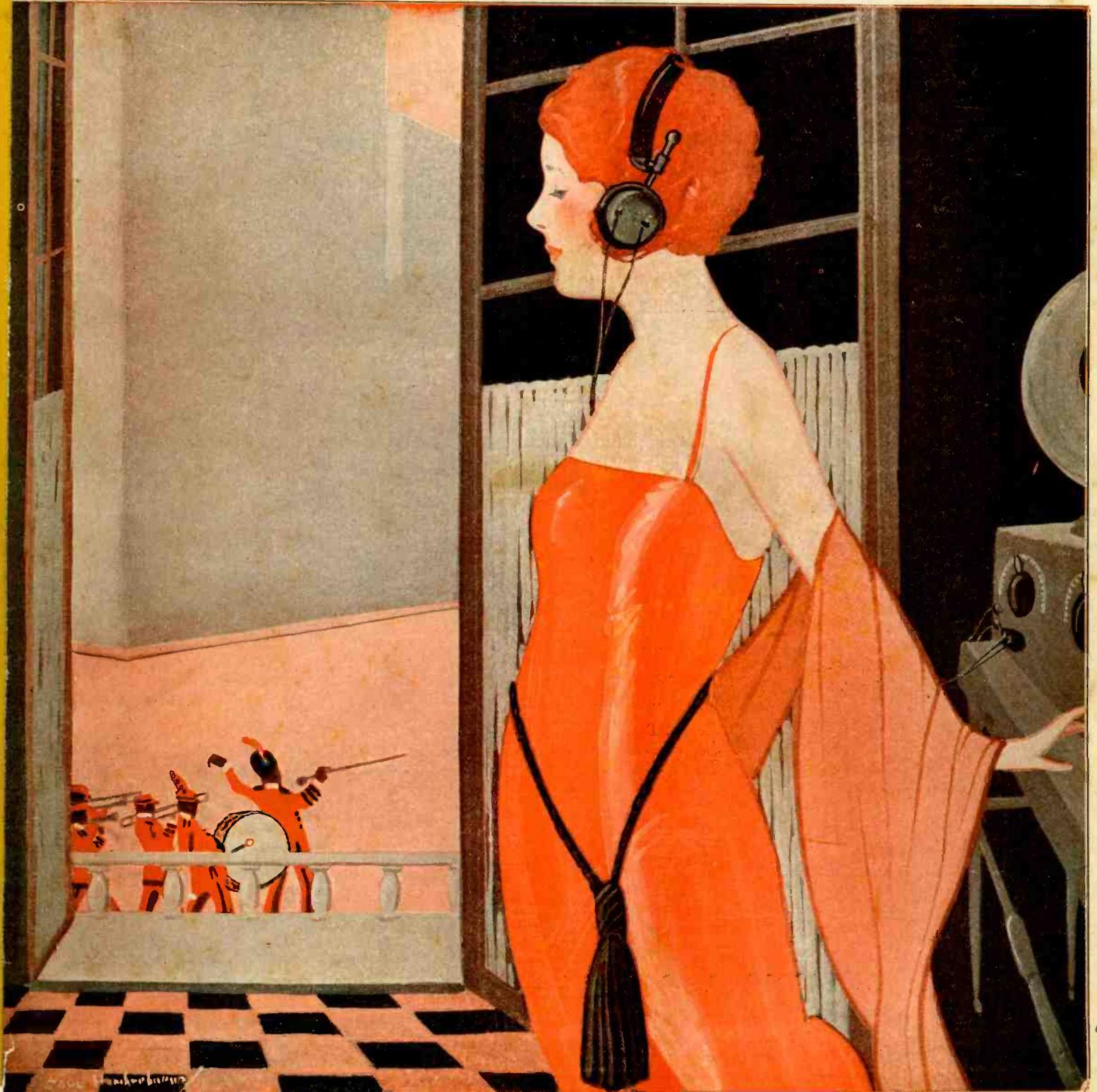
By Charles H. M. White
Consulting Engineer

Dissecting Mutual
Inductances

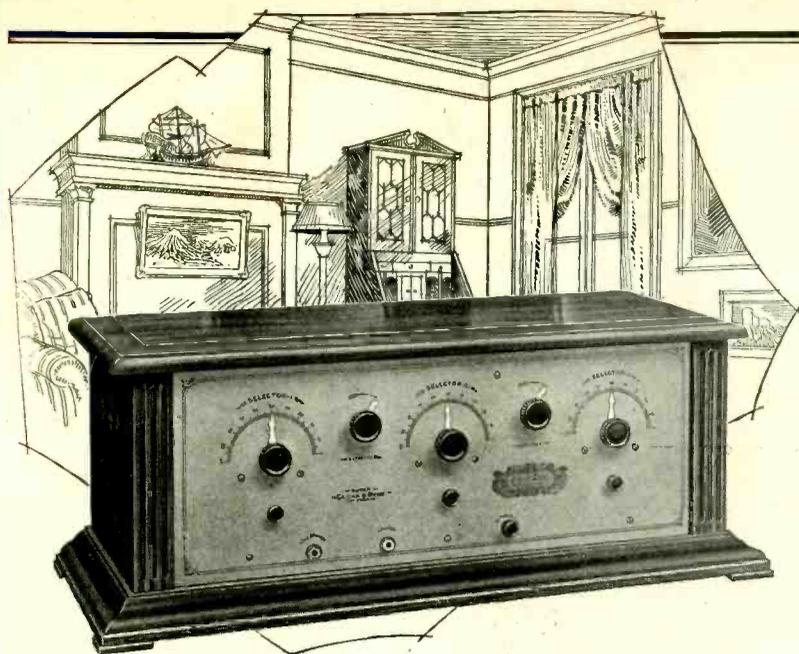
By Abner J. Gelula

Hoover Conference Ne-
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Almost All Sets

THE RADIO PRIMER



INTERFERENCE

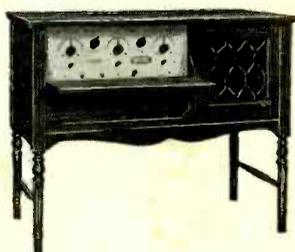


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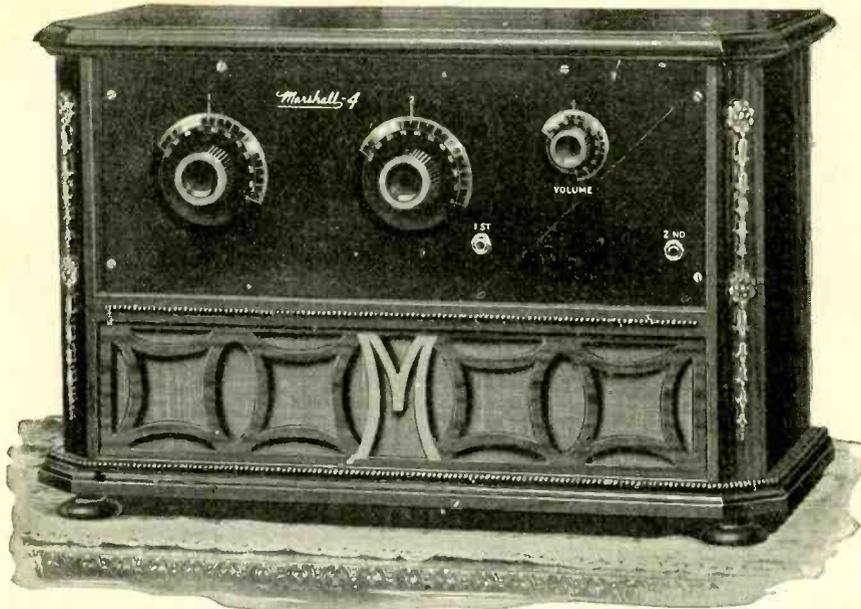
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VOLUME SIX OF
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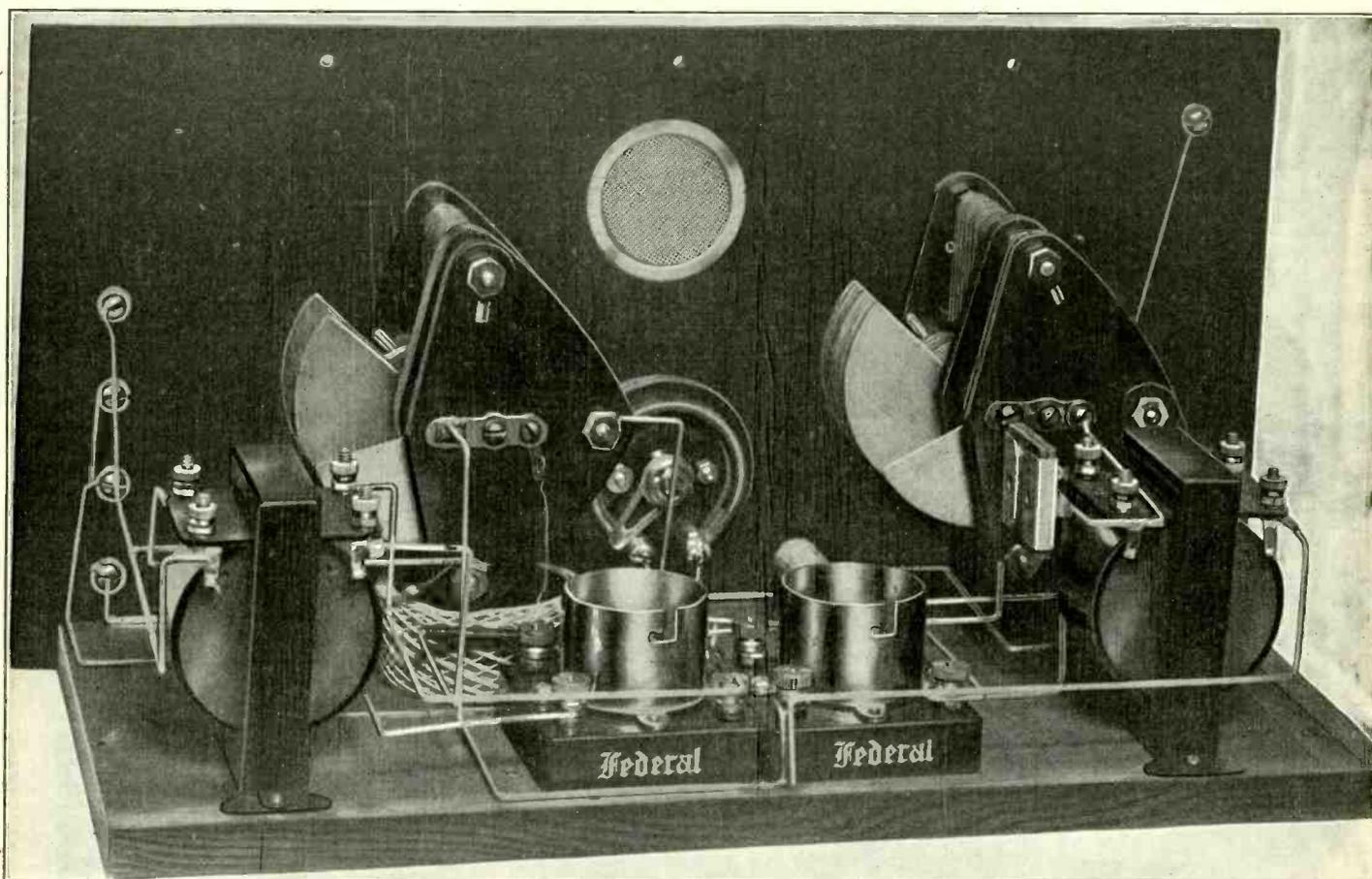
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A Quality Reflex

One Stage of RF, Crystal Detector, One AF Reflexed Stage and Straight AF Stage Used—Fine Signal Quality and Good DX Marks Loudspeaker Reception



BACK VIEW of the 2-tube loud speaker set, consisting of a stage of RF, crystal detector, a stage of AF reflexed in the first tube, and a stage of straight AF. The audio-frequency transformer at right is the high-ratio one, for the first AF stage, the one reflexed. The disposition of the parts is portrayed in the photo. The radio-frequency transformer used in the aerial circuit is omitted, to afford a clear view of the back of the variable condenser (at right). The honeycomb coil at bottom of the variable condenser at left is for the tuned impedance RF. As it tunes the plate to resonance with the aerial, it supplies regeneration through the capacity of the tube elements. The socket at left is for the second audio stage, the one at right for the reflexed radio-first audio stages. The aerial binding post is seen at right, top. The binding posts are panel mounted, but instead a terminal strip may be placed on the base-board. This set produces good signal quality, is selective and is pretty good at DX. The laboratory set used only one jack, as no earphone use was intended. To use earphones, follow the circuit diagram (Fig. 3).

By Milton Hirsch

WITH the advent of the reflex principle the problem of expense in constructing a set was considerably minimized, for it showed the way to making a tube do double duty. To date, however, there has been one big drawback to the reflex. It has proven rather difficult to get some of the circuits working properly. When you ask an experimenter how his reflex set is working, he may say: "It isn't reflexing." The set I shall describe certainly will reflex, and do so very well indeed, if directions are followed.

To lessen the difficulties in getting the set to operate, without decreasing its efficiency, it is recommended that the constructor use the parts adapted by the writer in the construction of the original set, and with

which satisfactory results were obtained. Of course, other parts may be used, but the degree of satisfaction obtained will depend on how good the parts are and how carefully the user assembles them.

Tuning System

Two tubes are employed. One of them functions as a combined radio and audio amplifier while the other acts as a straight audio amplifier. The tuning units consist of two coils of wire wound on one bakelite tubing, another coil of wire wound similarly on another tubing and two variable condensers. The second coil of wire is shunted by one of the variable condensers and is used as a tuned radio-frequency transformer.

Those who at present own reflex sets have probably learned that in a majority of cases the antenna circuit

Panel of Quality Reflex

does not tune sharply enough. In this particular set, to correct this fault, we have employed an aperiodic primary. This increases the selectivity without adding to the number of controls. To further increase selectivity we have employed a means by which the radio-frequency stage may be brought into resonance with the antenna circuit. This is tuned impedance coupling, one of the most efficient methods of coupling.

The tuning of the plate circuit by the use of this impedance coil causes a transfer of energy from plate to grid in the radio-frequency stage, the current being passed from one element of the tube to another. The result is that the signals are gratifyingly strong, thus overcoming the objection of volume loss that is a frequent comment by newcomers in radio when comparing tube and crystal reception. Nothing compares with the quality of tone resulting from crystal rectification—certainly not the phonograph, and probably the crystal result is as natural as pure telephonic transmission by land wires. This fascination impels many to use crystal rectification, and if only the volume is made sufficient the result is great.

Detector

I used a fixed crystal detector, as results therewith were perfectly satisfactory.

Assembly

On a baseboard are mounted the transformers, sockets, crystal detector and a small hard rubber shelf, on which are mounted the binding posts for battery, aerial and ground, to preserve neatness.

A desirable feature in the tuning of this set is its similarity to the method employed in operating a Neutrodyne, but in the present set there are only two tuning controls, and if they are properly set their readings for any station will be practically synchronized.

Due to the sensitivity and extreme selectivity of the set it is possible to tune in distant stations while the locals are in operation.

Laying Out the Panel

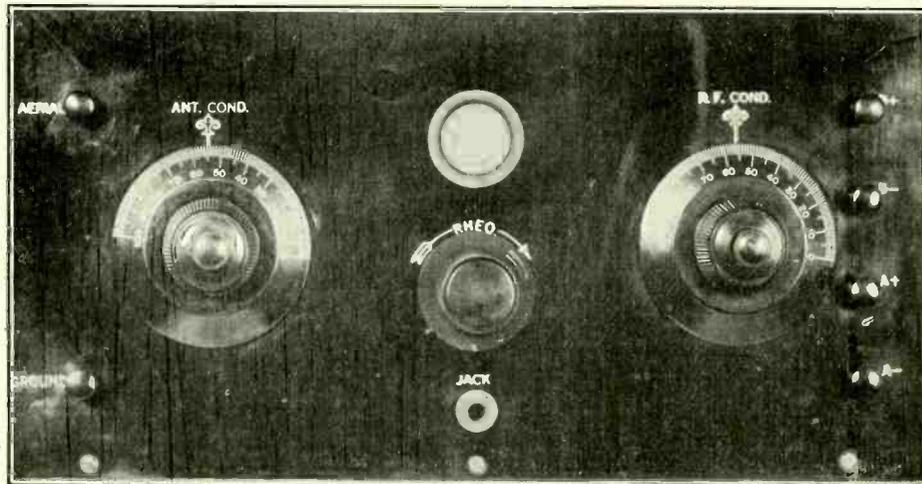
The first step is to lay out the panel for mounting the condensers, rheostat, phone jack and bezel. Divide the width of the panel in half and draw a line from top to bottom. At a point 3" up from the bottom on this center line, with a center punch, mark the location for the shaft of the rheostat. Most of the rheostats are accompanied by a template. With the aid of this, and using the point just marked on the panel as a guide, the location of the holes for the supporting screws of the rheostat may be located. After marking these, drill the holes, the size of which can be determined by the size of the screw to be used; or, if a template accompanies the instrument, the screw size will be found next to the corresponding holes.

With the rheostat mounted, the next step will be to mark a point on this same center line 1 1/4" up from the bottom. Here will be placed the phone jack. Again, on the same center line, but 1 1/4" down from the top, inscribe a point for locating the bezel.

The two condensers are mounted 3" in from each side of the panel and 3 1/2" up from the bottom. After determining the location of the center shaft of the instrument with the aid of a template, proceed to lay out the position of the other holes necessary for mounting

the condensers. If no template accompanies the instrument, mark the mounting screws with some whitening and place the centre shaft through its assigned hole. Then press the condenser mounting screws against the panel. This will give you a satisfactory means of determining their location.

Other parts of the set should now be mounted to the baseboard, particular care being taken to mount them



PANEL (Fig. 2) of the quality reflex. The binding posts are designated, also the identities of the variable condensers.

so that all connections will be as short as possible.

For those who do not wish to mount the binding posts on the panel it is suggested that they mount them on a small shelf 1/2"x7", which in turn is mounted on the baseboard. If two screws about three inches long are used, the shelf will be raised off the baseboard.

Preparing Honeycomb Coil

Next wind ten turns on top of the honeycomb coil. Do not fail to have the extra ten turns go in the same direction as those on the honeycomb proper. The end of the honeycomb, which is on top, should point in the same direction as the end of the 10-turn primary.

After having wound the ten turns, secure them with a little sealing wax, which might be obtained from the top of an old B battery. The honeycomb coil has now been "transformed" into a fixed coupler and it is all ready for mounting.

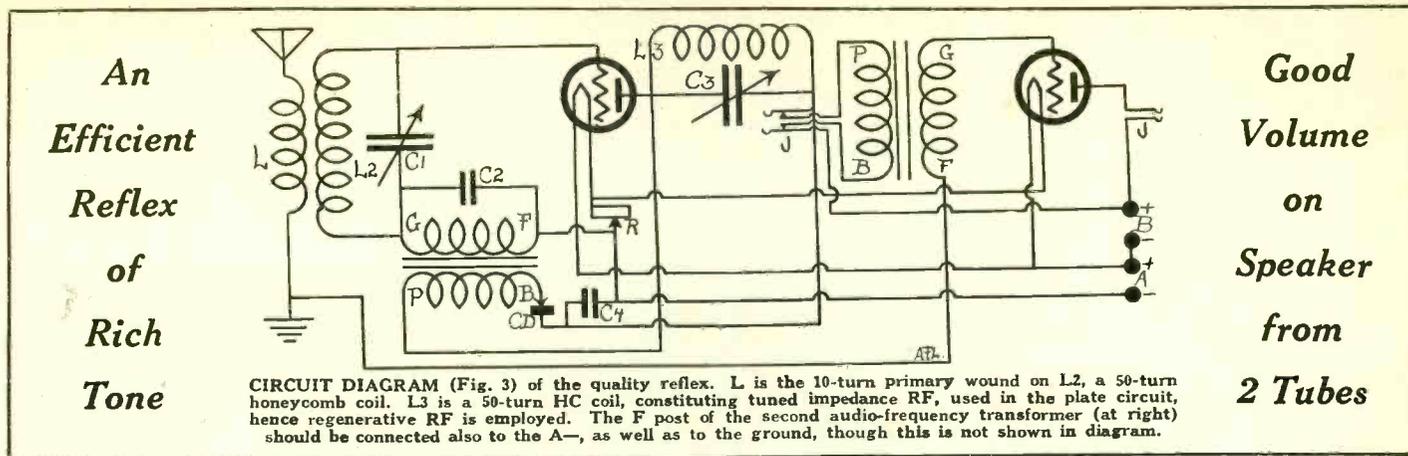
To do this, take a piece of soft brass (of the thin variety) about 2" wide and 4" long. Cut this in half, so that you have two pieces of brass 1" wide and 4" long. Now, 1/4" in from each end drill a hole that will accommodate an 8/32 screw. Remove the small nuts on the back of the variable condenser that hold the pieces in place. Place one end of one of the 4" strips over one of the screws from which the nut has just been removed. Tighten up the nut. Now slip on the honeycomb fixed coupler so that it will be at an angle similar to that adopted for Neutroformers. Remove the other nut holding the condenser end plates and slip the other holes in the same brass strip over the screw. Again tighten the nut. The coil ought to be held firmly in place. The operation should be repeated for the other coil, save that no extra turns are wound on it.

With all parts mounted, next proceed to mount the baseboard to the panel by means of two small brackets or with three small screws evenly spaced across the panel, about 1/2" from the bottom.

Operating Instructions

Now for the operation of the set. Place the two tubes in their sockets and hook up the A battery. Turn on the rheostat and if the tubes light connect the B bat-

How to Wire Hirsch's Set



teries. To determine whether the set is now ready for tuning in the stations, tap the tubes lightly and if they ring it is an indication that you can safely proceed. The dials of the condensers should be set at 0° when the plates are entirely unmeshed. If this is done, the operator will find that the dials will read practically the same for any station. If at first results are not obtained, try reversing the primary and secondary connections of both transformers. You may also find that better results are obtained with the two small fixed condensers removed.

On the first tryout of this set, after having tuned in a station on 360 meters, I was able to tune in stations on 326, 327 and 380 meters respectively with the vernier of the antenna condenser without any one station interfering with the other and with almost phonograph volume from the loudspeaker. At another time while stations on 405, 455, and 492 meters were on the air, stations on 448 and 509 meters were tuned in with great volume and without any interference from other stations.

Once the local stations have been logged it will be an easy matter to bring in the distant ones.

LIST OF PARTS

- | | |
|--|--|
| Two tubes, 201A or 301A. | One Erla bezel. |
| Two variable condensers, vernier, .0005 mfd. (normally 23 plates). | $\frac{1}{4}$ lb. No. 20 DCC wire. |
| Two Acme AF transformers, high and low ratio. | One 6-volt storage A battery. |
| Two honeycomb coils, 50 turns each, unmounted. | One fixed crystal detector. |
| Two fixed condensers, .001 cap. | One panel 7x14". |
| One single-circuit jack. | One baseboard, 7x13". |
| | Two Federal sockets. |
| | One double-circuit jack. |
| Screws for mounting transformers, two long screws with nuts to mount the strip on which are to be mounted the binding posts; brass strip; 100 feet 8-strand aerial wire; 50 feet No. 14 insulated lead-in wire; connecting wire, solder, lugs. | One Amsco rheostat. |
| | 90 volts B battery. |
| | Six Eby binding posts. |
| | One cabinet to fit. |
| | One piece of hard rubber, $\frac{1}{2}$ x7". |

Wiring Directions

1. Connect the A+ direct to the F+ posts of the two sockets. Connect the A— to one terminal of the rheostat, R, the other side of the rheostat going to each of the F— posts on the two sockets. The F— and ground are connected and this same lead goes to the F or S2 posts on each of the two audio-frequency transformers. One of these transformer F connections is not shown in the diagram, Fig. 3. The +45 post of one B battery is joined to the —45 post of the other and the unconnected remaining B— goes to the A+. This completes the A battery wiring.

2. Connect the aerial to the beginning of the coil L, the 10-turn primary, and the end to the common ground and A— lead. The beginning of a honeycomb coil emerges from under the winding; the end is on top. The end of the primary therefore is the terminal pointing in the same direction as the end of the honeycomb (secondary).

3. Connect the beginning of L2 (a) to the stator plates of the variable condenser, C1, and (b) to the grid of the first tube, the one at left in Fig. 1. The end of L2 goes (a) to the rotor plates of C1 and (b) to the grid post of the first AFT, the one at right in Fig. 1. The fixed condenser C2 is placed on this transformer, one side to the F or S2 post, the other side to the G or S1 post.

4. One side of the coil L3, 50-turn honeycomb, preferably the beginning, goes (a) to the plate of the first tube, at left in Figs. 1 and 3, (b) to one side of the variable condenser, C3, and (c) to the P or P1 post of the first AFT. The other end of the coil goes (a) to the other side of C3, (b) to one of the outside leaves of the jack, J, (at left) and (c) to one side of the crystal. Connect this lead to the frame or right angle of the jack. If the circuit diagram is followed, there will be two jacks, one (J, at left), for the detector and the other (J, at right) for the second AF stage. If no ear-telephone use is desired, omit the first jack, as was done in the laboratory set, as shown in Fig. 2. In that case the end of L3 goes direct to one side of the crystal. Now connect one side of the fixed condenser C4 to this same lead (the end of the plate coil) and the other side of C4 to A—. The remaining free side of the crystal goes to the B or P2 post of the first AFT. Connect the remaining outside spring of the jack to B+ 90 volts. The inside spring that makes contact with the frame of the jack goes to the P or P1 post of the second AFT and the last spring goes to the P2 or B post of this AFT. The G or S1 post of the AFT goes to the grid of the second tube. The F or S2 post already has been connected to F— and ground. The plate of the last tube goes to the frame of the remaining jack and the other side of the jack to B+ 90 volts.

Cite Your Results In Building Sets

[Those who construct any circuit or unit from data in RADIO WORLD are requested to write to Results Editor, RADIO WORLD, 1493 Broadway, New York City, and state how they fared. When possible give the trade names of the parts you use, or the manufacturers' names. Results letters will be published, including trouble-shooting letters. Readers may include questions in the same letter. The questions will be answered in the Radio University Department.]

When Trouble Troubles You

Expert Guidance for Making Your Set Work Best

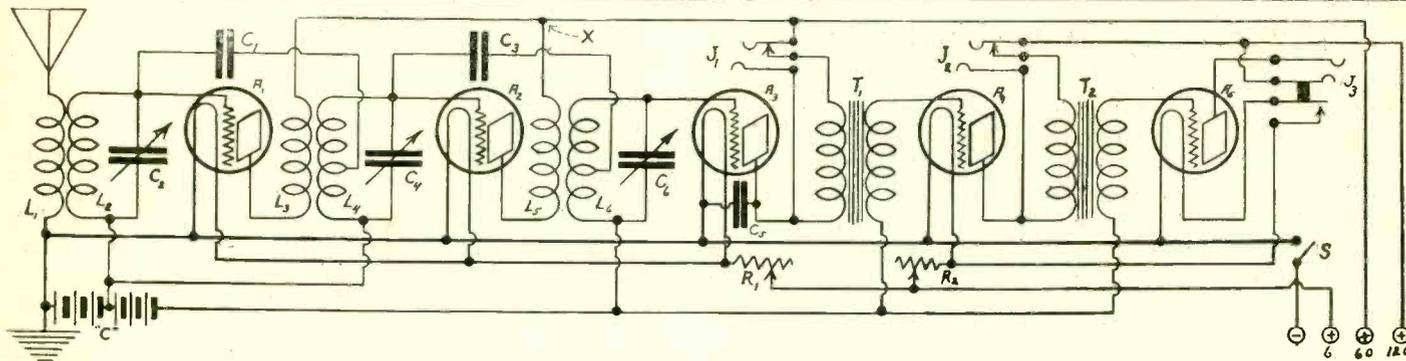


FIG. 1, wiring diagram of a Neutrodyne. L1L2, L3L4 and L5L6 are the Neutroformers. The variable condensers are C2, C4 and C6, and C1 and C3 the neutralizing condensers. Note that the detector has a grid bias, as well as the amplifiers. The author has maintained that it is better not to bias the detector.

By *Charles H. M. White*

Consulting Engineer

TROUBLE-SHOOTING in any type of work depends solely on systematic methods, the systematic elimination of probable defects in a scientific manner until the real cause or seat of the trouble has been found. This is the first law of troubleshooting and little will be gained if it is ignored. Hasty here-and-there search generally results in failure. If your radio receiver does not work there is a definite reason and there is nothing mysterious about it. Abandon the idea of mystery from the start. A great deal of success in finding trouble depends upon your attitude as well as your methods.

For ease of treatment I am dividing all vacuum tube receivers into four general types:

1. Regenerative.
2. Radio-Frequency and Neutrodyne.
3. Super-Heterodyne.
4. Reflex.

General Tests

Regardless of your style of receiver there are two things which must be tested first before you look for trouble in the wiring and parts; the batteries and the tubes. All B batteries should be carefully tested with a voltmeter for voltage. A 45-volt block of batteries that reads below 35 volts is likely to produce noises similar to atmospheric static. Likewise, a 22½-volt block should not read lower than 18 volts. In addition to noise, weak B batteries greatly cut down the sensitivity of any style of receiver. A marked inability to get distance clearly and distinctly is one of the outstanding results of B battery depletion.

If your receiver uses C batteries as well these should be tested for voltage. The normal working voltage should be 1.5 volts per cell. If the C battery voltage is far below this value the battery is more of a detriment than an aid. In some receivers serious howling in the audio-frequency amplifier is caused by the failing voltage of the biasing C battery. Dry cell A batteries are the cause of a great deal of trouble with some radio outfits. A voltage test means little here. Dry cells for this type of work should be tested with a small pocket ammeter which reads 0-30 amperes. A fresh dry cell will move the needle pointer past the 30 amp. point, whereas a weak battery will yield less than 18 amperes. Do not allow the ammeter to stay on the dry cell more than a fraction of a second—just enough to determine the reading approximately—since this test rapidly ex-

hausts the cell if continued. If a storage A battery be used the voltage test is also worthless. A hydrometer should be used. A reading 1300 indicates excellent condition, full charge; 1200 means O. K. at present but on the downward trend; 1100, completely discharged. In a few batteries 1250 is maximum, however. When a battery is charged fully or completely discharged it is likely to become noisy. The best radio condition for a storage battery is with the hydrometer reading of 1200 approximately, because in this condition the voltage is steadier. Storage B batteries are treated and tested in the same manner as storage A batteries. Buy the necessary instruments or hydrometer to test your A and B Batteries. They are well worth the price.

The next general test is that of the tubes. This test is more difficult. Very often a tube will light and even operate with a fair degree of success and still be defective or growing more defective each day. The simplest way to test tubes is to try them out in a neighbor's set and try his in your set. The chances are both of you will not have defective tubes. Certain types of circuits demand utmost energy from a vacuum tube and soon run the vitality out of it.

Regenerative Receivers

Determine if the detector tube will oscillate. Place the earphones on and touch the grid terminal at the tube socket with varying degrees of tickler or feed-back adjustment. If it is found that the tube does not oscillate, that is, no click is heard in the phones when the moistened finger touches the grid at some one particular adjustment, then the circuit is dead. A regenerative circuit must oscillate to be successful. If, however, a continued hum is heard in the phones, whether the finger touches the grid or not, you can rest assured that there is an open circuit. Perhaps it is a soldered connection that has come loose, or a phone plug or jack that has worn and become faulty. Maybe the tube socket springs have lost their "life" and become loose. Reverse the tickler connection and at the same time check up on the battery connections and see if the right polarity has been followed in hooking the battery to the receiver. Test out your grid condenser with a dry cell and note if you get a spark when it is connected across the battery and the circuit is broken. Some regenerative receivers are extremely critical on grid leak adjustment. Try another size grid leak or another grid condenser. Remove and change the size of the bypass condenser across your phones or input stage of audio-frequency transformer. If the tube oscillates at every

Morsels for Experimenters

Emergencies and Short Cuts Revealed by an Expert

By Jay Lewis Cermack

Eliminating Distortion from Loud Speaker

DISTORTION in a loud speaker, if not traceable to the wiring of the audio-frequency unit or its transformers, may be reduced to a minimum by facing the loud speaker to the wall of the room at a distance of about six inches. This distance varies with the type of loud speaker to be used and can be determined only by experiment. Of course, adjusting the diaphragm of the loud speaker unit may help, but there are loud speakers in which the diaphragm cannot be adjusted. If the transformers are at fault, distortion may be eliminated almost entirely by shunting .001 or .002 fixed condensers across the primaries, across the secondaries, or across both primaries and secondaries. A .005 fixed condenser in series with the G post of the transformer and the ground terminal may also help. One of these combinations is right for your particular unit and this combination, of course, must also be determined by experiment. Reduction of the B battery voltage will help reduce distortion.

* * *

Crystal Used Instead of a Grid Leak

GRID leaks play an important part in the construction and operation of most regenerative sets. An ordinary crystal detector of either the double-mineral or the cat-whisker type may be used in place of the usual grid leak. A good mineral, when properly adjusted, will work wonders on DX.

* * *

Pepping Up Aluminum Aerial 'Coppering'

WHEN an aluminum aerial is used its efficiency may be increased by coating the wire with copper. This is done by wetting some copper sulphate crystals and rubbing them briskly on the surface of the wire with a piece of cheese cloth. Thus the efficiency of copper and the lightness of aluminum may be combined.

* * *

Shunted Condenser Aids B Battery

AB BATTERY when old is likely to cause jumpy reception of signals and a good deal of "fading." It is at times impossible for the BCL to obtain a new battery. A fixed condenser of from anywhere .001 to .006 mfd. capacity shunted across the terminal of the B will cause the battery to perk up.

What Makes Waves Travel Distance

THE more amperes in the aerial circuit and the greater the pressure in volts between the aerial and ground the more powerful will be the waves set up and the longer the distance over which they spread. The weather and territory over which the waves travel are factors to be considered. Hertzian waves travel further over water than over land because there are fewer objects, such as buildings and trees, to absorb the energy. Sensitiveness of the receiving set is also important.

* * *

Tips on Wire for Ground Connections

IF copper, the ground wire should not be smaller than No. 14 and if copper-clad not smaller than No. 17. Run the wire as directly as possible to the ground. Gas pipes should never be used as the ground, because static or electric sparks are likely to jump about and ignite the gas. The cold-water pipe or radiator generally serves well as ground contacts. The cold-water pipe is to be preferred because it has fewer joints and leads more directly to the earth.

* * *

Chemical Heat Used for Soldering

WHEN there is soldering to be done and no consistent source of intense heat is available the use of a few tablets of the drug Utropin, obtainable for a few cents from any druggist, will solve this problem. One of the tablets is started with a match, a very intense and hot flame resulting and lasting for two or three minutes. Soldering may be done without the use of an iron.

* * *

Run Wires Under the Cabinet

IF a radio set is so built that the connection binding posts are arranged along the bottom edge of the panel, it is a good idea to raise the cabinet an inch or so above the table by means of small rubber plugs. The wires leading to the posts can then be run beneath the cabinet and out from the back, thus keeping them out of sight.

* * *

Go to Bed for Aerial In an Emergency

IF you are entertaining your friends with a simple regenerative 3-tube set and a sudden gust of wind blows your aerial down, ruining the concert, run a lead-wire from the bedspring of the nearest bed and use that as an aerial.

How Oscillators Function

By J. E. Anderson

THERE are many types of vacuum tube oscillators in common use for radio and other purposes. They are used for oscillating wave meters, heterodynes, Super-Heterodynes, bridge measurements, and for many other purposes. A few of the more common types of oscillators used for radio reception and transmission are shown herewith.

The design accompanying each of the oscillators is based on the supposition that the desired frequency of the oscillations is from 550 to 1,350 kilocycles, the broadcasting frequency range.

The simplest of all oscillators is the standard Hartley circuit, Fig. 1. It consists of a single vacuum tube, an A battery, a B battery, a C battery, a rheostat (R), and a tuned circuit comprising an inductance coil L and a variable condenser C. Part of the inductance coil is in the plate circuit and part in the grid circuit, thus giving the necessary reaction to produce oscillations.

The value of the inductance may be 200 microhenries and the value of the condenser .0005 microfarad. The coil should be tapped at a point between the middle and two-thirds from the plate end. Fifty turns of No. 24 double cotton covered wire on a bakelite tube 3" in diameter will give approximately the right value of inductance.

This circuit is not suitable for use in a Super-Heterodyne or other circuit where a common plate battery is used on account of the negative return lead. If so used the plate currents of all the other tubes in the receiver would pass through part of the coil L, and this would constitute an undesirable coupling. It is, however, suitable for an independent heterodyne, where separate batteries are used, for an oscillating wave meter, or as a source of high frequency oscillations, where no great constancy of frequency or purity of the wave is required. It is excellent for use when harmonics of the fundamental are desired.

What may be considered as a modification of the Hartley circuit is shown in Fig. 2. This is so arranged that it may be used in conjunction with other tubes in a complex circuit on common batteries. It is frequently used as the source of high frequency oscillations in a Super-Heterodyne receiver. It contains the same elements as the standard Hartley shown in Fig. 1, and, in addition, it has the condenser C_0 . This condenser, which is in series with the tuning condenser C, is used to complete the tuned circuit. Its value must be so large that it does not appreciably affect the natural frequency of the tuned circuit, as determined by condenser C and the inductance of L_1 and L_2 . It should be a good grade mica dielectric instrument, having a value of .005 microfarad or more.

The inductance in the tuned circuit is obtained from the two coils L_1 and L_2 . The sum of these two inductances should be equal to the inductance of coil L in Fig. 1. They may be wound in the same manner as that coil; but, instead of bringing out a tap near the middle, the wire is cut and the two leads brought out, one of which is connected to the plus side of the B and the other to the minus side of the C battery. The condenser C_0 is used to bridge the gap, or to by-pass the high frequency current across the batteries. C should be a .0005 microfarad variable condenser.

Still another modification of the Hartley is shown in Fig. 3. This has also been arranged so that it may be used on common batteries in conjunction with other tubes in a complex circuit. It comprises essentially the same number of elements as the preceding circuit except that a grid leak resistance is used in place of a grid battery. The condenser C_0 is now used for preventing the high voltage of the plate battery from reaching the grid. Its value may be about .001 microfarad, and it should be a good mica dielectric condenser. The values of C and L are the same as the corresponding parts in Fig. 1. The grid leak R_0 should be about 12,000 ohms.

This is one of the most satisfactory oscillators for Super-Heterodyne circuits.

Fig. 4 illustrates a simple type of oscillator used very often in heterodynes and Super-Heterodynes, as well as for other purposes. It is the ordinary tickler regenerative circuit with tuned grid. It may be used with other tubes on common batteries. The oscillating coil L_1 may consist of about 50 turns of No. 24 double cotton covered wire on a bakelite tube 3" in diameter, and the tickler L_2 may consist of about 40 turns of the same size wire on the same tube. The two coils should be wound with a separation of about one-fourth inch. Either the plate and grid terminals of the coils may be adjacent, or the grid battery and the plate battery terminals may be. The latter connection is the preferred, although the drawing indicates the other for convenience. The condenser should be a 23-plate variable; that is, one having a maximum capacity of .0005 microfarad.

The Meissner circuit, shown in Fig. 5, is usually considered as one of the three fundamental types of oscillator, but it closely resembles the Hartley circuit. In the Meissner oscillator the tuned circuit is coupled electro-magnetically to both the plate circuit and the grid circuit; that is, mutual inductance is used in place of direct coupling. This possesses advantages in that the tuned circuit is not so greatly affected by changes in the plate and filament batteries and by changes in the load on the tube. This is especially true

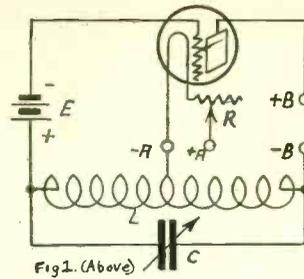


Fig. 1 (Above)

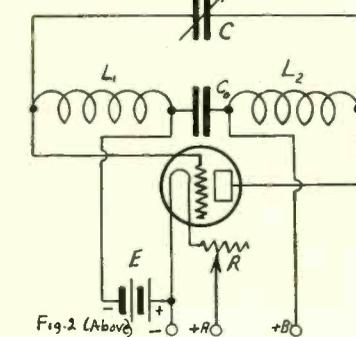


Fig. 2 (Above)

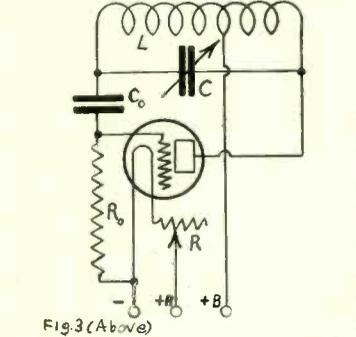


Fig. 3 (Above)

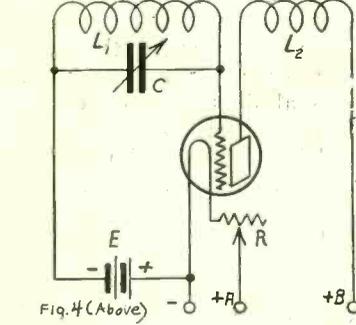


Fig. 4 (Above)

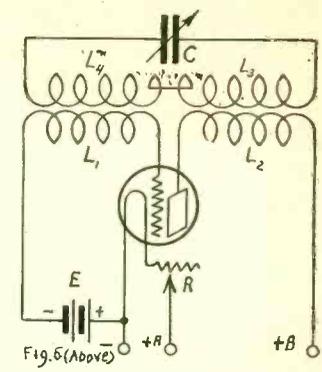


Fig. 5 (Above)

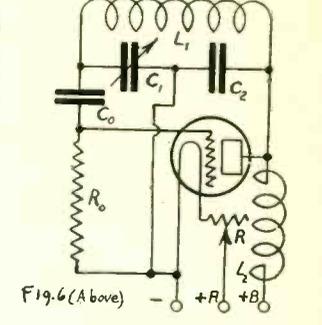


Fig. 6 (Above)

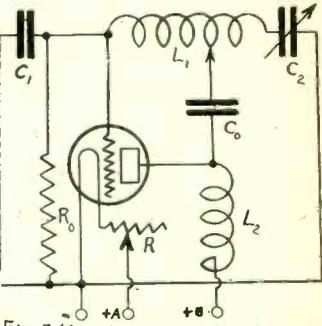


Fig. 7 (Above)

THE SIMPLEST oscillator is the Hartley circuit (Fig. 1), part of the inductance being in the grid circuit and part in the plate. A modification (Fig. 2) permits the use of the oscillator in the Super-Heterodyne. A grid leak resistance is used instead of a grid battery in the same circuits (Fig. 3). A common type used in Super-Heterodynes is shown in Fig. 4. The Meissner circuit (Fig. 5) is regarded as one of the three fundamental types of oscillator, but it is much like the Hartley circuit. The third fundamental circuit is the Colpitts (Fig. 6), using electrostatic coupling. An arrangement enabling variation of coupling, often deemed desirable, is shown in Fig. 7.

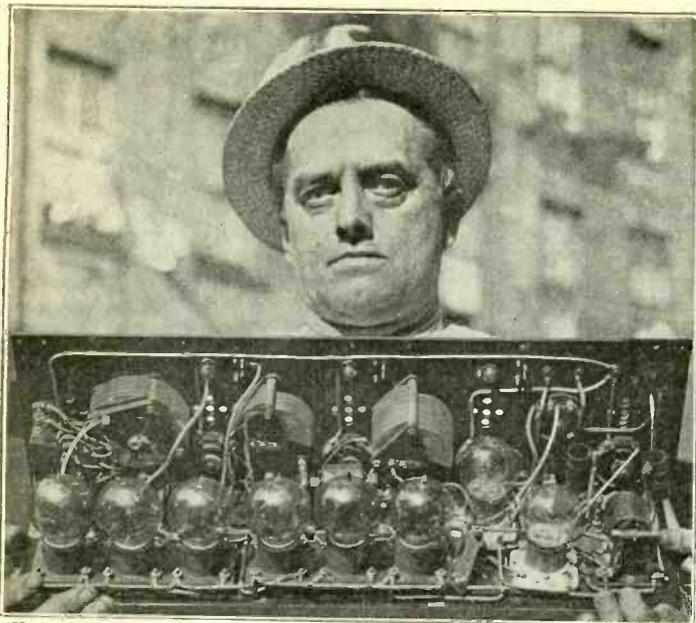
when the coupling between the plate circuit and the grid circuit is loose, a condition which may readily be obtained. Hence this circuit is capable of giving a constant frequency and pure wave form. It is therefore suitable for purposes where freedom from harmonics and a definite frequency are desirable. It is often used in oscillating wave meters. It may also be used with other tubes on common batteries.

There is one disadvantage, however. If a single coil is used in the tuned circuit coil L_2 will induce an electromotive force in that coil, and the current thus set up will induce an electromotive force in L_1 . But L_2 will induce an electromotive force directly in L_1 . These two electromotive forces oppose each other in the grid circuit of the tube, one tending to maintain oscillations and the other to stop them. The result is that the circuit will not oscillate readily; and, when it does, its frequency is not that which should be expected from the values of the condenser and the inductance coil in the tuned circuit. To overcome this difficulty two sets of coils are used, and these are placed at right angles to each other so that there is no mutual inductance between them.

The sum of the inductances of the two coils L_2 and L_1 should be
(Concluded on next page)

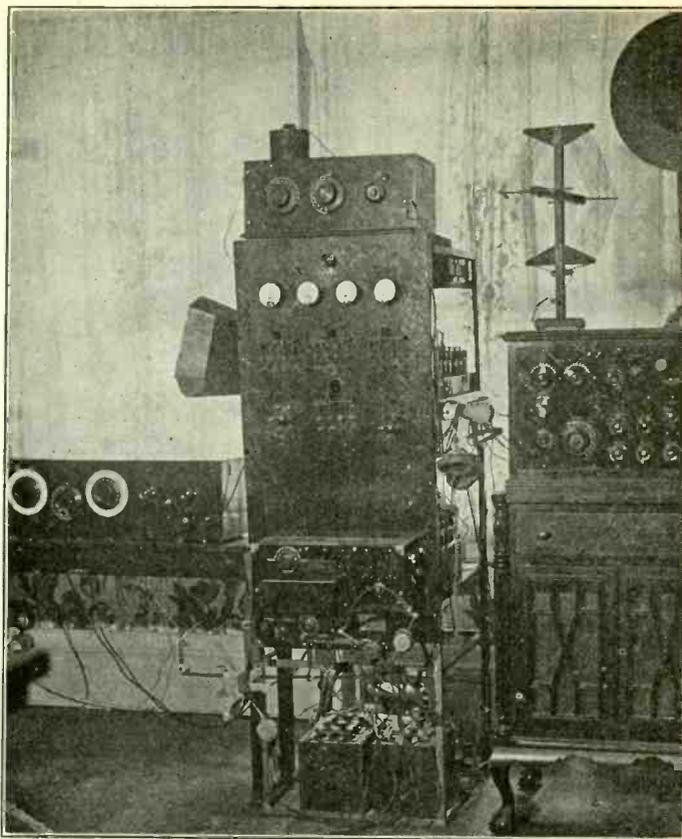
Super-Power

Mapes' Outfit



(Kadel & Herbert)

NO, it's not an 8-tube Perplexodyne, neither is it a set that heard Mars! It is simply a little audio-frequency amplifier. Try it on your 5-tube Neurodyne receiver and the neighbors will get up a petition to give you free lodging for an unlimited period. This AF amplifier was built by Paul de Kilduchevsky, a New Yorker, who desires his set to be heard above the raucous traffic noises. Eight power tubes are used. The first stage has two tubes in parallel, the second three tubes in parallel and the third also three tubes in parallel. This permits great amplification without overloading or distortion. By means of change-over switches only one tube per stage may be used. The variable condensers are used across the transformers to regulate the tone. From this amplifier the builder gets greater volume than anybody who has heard it ever encountered before from a home-made set. As volume ranks next to DX in the qualities most desired from a set by the majority of fans, this receiver should prove popular.



THE RADIO REFUGE rendezvous of Col. S. H. Mapes, well known in the radio world, showing his elaborate experimental layout. (Kadel & Herbert)

A Study of Oscillator Circuits

(Concluded from preceding page)

equal to the inductance of the single coil used in Fig. 1. Each may consist of 35 turns of No. 24 double cotton covered wire, wound on bakelite tubes 3" in diameter. L_2 may consist of about 20 turns of the same kind of wire and wound on the same tube as L_1 . L_1 may consist of about 50 turns of wire on the same tube as L_2 . The same size or finer wire may be used for this coil. If desired the coupling between L_1 and L_2 may be made variable.

The third fundamental type of oscillator is the Colpitts circuit, which uses electrostatic coupling between the grid and plate circuits to obtain oscillation. A practical circuit of this type is shown in Fig. 6. The oscillating circuit comprises the inductance coil L_1 and the two condensers C_1 and C_2 . The former condenser is in the grid circuit and the latter in the plate circuit. Either of these condensers, or both of them, may be variable in order that the frequency of the oscillator and the coupling between the grid and plate circuits may be changed.

C_3 is a blocking condenser, which prevents the plate voltage from reaching the grid. It should be a mica dielectric condenser of .001 microfarad capacity. R_0 is a grid leak of approximately 12,000 ohms. L_2 is a high frequency choke coil, which may be a 150-turn, duo-lateral coil or its equivalent. This coil prevents the high frequency current in the plate circuit from short-circuiting through the plate battery.

The disadvantage of this type of oscillator is that, whenever the frequency is changed by varying the condenser C_1 , the coupling is also changed; so that, for certain settings of that condenser, there may not be enough feed-back to maintain oscillations. This requires that the coupling be changed by also changing condenser C_2 . This difficulty may be overcome by leaving the two condensers at the most suitable adjustment and by varying the frequency by changing the value of the inductance coil L_1 , which may then be a variometer.

The Colpitts type of oscillator is used frequently in transmitting circuits where the desired frequency is fixed, or where a very narrow frequency band is desired. The variable condenser is then used merely to obtain fine adjustment of frequency and to compensate for slight changes in frequency due to changes in operating conditions. But in this application of the oscillator it is often desirable to change the coupling in order to change the antenna output, and any change in the coupling also changes the frequency.

Hence it is desirable to have an arrangement which allows a change in the coupling without also changing the frequency.

This is accomplished by the modification of Colpitts circuit, shown in Fig. 7. In this circuit the inductance coil L_1 is tapped at a number of points, and the plate of the tube is connected to one of these taps through the blocking condenser C_3 . This condenser, the grid leak, and the radio-frequency choke coil all have the same values as the corresponding parts in Fig. 6.

Condensers C_1 and C_2 in both Fig. 6 and Fig. 7 may be equal in value, or C_1 may be considerably smaller. As one of the condensers is varied, it should be done in such a way that the ratio of C_1 to C_2 varies from unity to about 1 to 4. The condensers may both be .001 variable air condensers, or one may be a fixed mica condenser of that value and the other a variable condenser.

The inductance coil L_1 in these circuits should be the same as the inductance coil in Fig. 1.

This modification of the Colpitts circuit is used in many of the more important transmitting circuits.

The rheostats R in all the circuits given above depend on the type of tube which is used. If a UV199 or a C299 is used on a 4½-volt battery the rheostat should have a resistance of 30 ohms; if a UV201A or a C301A is used on a 6-volt battery the resistance should be 10 ohms, and if a WD12 or 11 is used the rheostat may have a resistance of 6 ohms, provided a 1½-volt battery is used.

The value of the plate voltage may vary from 18 up to 90 or 120 volts, depending on the type of tube, and on the intensity of the oscillations desired.

The grid biasing battery E , shown with some of the circuits, may be omitted for all voltages up to 45 volts. For higher voltages on the plate it is best to refer to the tube manufacturers' recommendations for that particular type of tube.

In the four circuits shown in Figs. 1, 3, 4 and 5 a large value condenser may be connected across the B battery to by-pass the high frequency currents. Its value should be 0.1 microfarad or higher. This condenser is not necessary, but it is desirable. In Figs. 2, 6 and 7 it would serve no useful purpose, as, in Fig. 2, C_3 is a by-pass, and in Figs. 6 and 7 the choke coil L_2 prevents the high frequency currents from passing through the battery, thereby increasing efficiency.

Change in Nearly All Sets Made Necessary by Action of Hoover Conference

Broadcasting Wave Band to Be from 200 to 545 Meters

By Herman Bernard

WASHINGTON.

THE most important administrative document in the history of radio—the report of the Third Radio Conference to Secretary of Commerce Hoover—has been made public. Its conclusions are virtually law, since the parties in interest themselves constituted the conferees, and the entire nature of the conference was, as formerly, one of voluntary agreement among interests sometimes sharply conflicting. The biggest points in the report are the reassignment of broadcast wavelengths and the cautious approval of a Super-Power test. The reassignment means many stations will get new wavelengths, and that the range is extended from 200 to 545 meters.

Manufactured sets usually range from 250 to 600 meters. Home-constructed sets often range only from 260 to 526 or a little higher. Hence some change must be made in most receivers. As for the Super-Power test, the Radio Corporation of America is now able to get a temporary license to erect a station outside of any congested area and using 50,000 watts, the greatest power in American radio history.

The test is to determine whether this will overcome static, enable the station to be heard in isolated points in the United States, Canada and South America, even Europe, and whether Super-Power is better adapted for nation-wide broadcasting of momentous events than interconnection of stations by land wires. One of the fears expressed, especially by small stations, is that the Super-Power station will drown out everything else for hundreds of miles around and create a semi-monopoly. In the absence of any data the conference agreed to let the test prove the result. Secretary Hoover may refuse to renew the temporary license, should experience warrant.

The wavelength question was discussed under the heading of interference. The report set forth:

"The great problem in broadcasting is that of interference. It may arise in several ways, either by direct interference of one station by another, because of too close proximity of frequency, interference by

The Pith of the Report

1. Broadcasting wavelength band extended to be from 200 to 545 meters, the extension being mostly downward. [This means some change must be made in nearly all existing receivers and that manufacturers of sets and coils will have to govern themselves accordingly.]
2. New system of zoning, whereby more wave channels are available for broadcasting, and Atlantic stations sharing wavelengths with a new Zone 6 (Pacific), whereby conflict is avoided, due to distance and time difference.
3. Plans made for further elimination of code interference by band reassignment.
4. Station ratings changed. Instead 7A, B and C the classes will be 1, 2 and 3, according to quality, in that order.
5. Additional channels provided for marine use.
6. Amateurs' bands slightly changed and temporary allocation to below 150 meters confirmed. Amateurs' area increased.
7. Government censorship of programs opposed.
8. Higher power for broadcasters approved. Extends present 1,000 watt limit. [Not to be confused with Super-Power, which contemplates enormous increase.]
9. Greater appropriations recommended to Congress for the radio work of the Department of Commerce, especially inspection.
10. Super-Power stations cautiously sanctioned as a test only, license to be temporary. Stand taken because of desirability of reaching remote places in the United States.
11. Inter-connected broadcasting encouraged.

radiotelegraph signals, and interference from outside electrical sources.

"In dealing with the first of these causes, the Conference has been successful in providing additional channels so that stations may not conflict with one another. To accomplish this the present broadcasting band has been extended so as to include all wavelengths from 200 to 545 meters. Furthermore, a new system of zoning has been worked out by which it is possible to obtain still additional channels. The net result will be that instead of the number of wavelengths now used by general broadcasting stations, there will be an increase of 30 wave bands or channels, bringing the total up to 100."

Concerning the new classification:

"The Conference recommends a new classification for stations. Present Class B stations are hereafter to be known as Class 1; Class A stations as either Class 2 or 3, and Class C stations to go either into Class 1, 2 or 3, according to their character.

"The Conference recommends that the Class C stations still remaining on a wave-

length of 360 meters be assigned new wave lengths. This, of course, does not mean the abolition of Class C stations, but merely that instead of all of them operating on one wavelength as at present and interfering with each other they shall have separate assignments and be distributed through the broadcasting band.

"The details as to the allocation of wavelengths to the particular stations under the new zoning system are being worked out by a continuing committee in cooperation with the Radio Supervisors of the various districts."

Other excerpts from the report, which was adopted by the entire conference, follow:

Censorship

The conference recommends that the policy of the Department of non-interference in programs sent out by broadcasting stations should be upheld. Any other attitude would necessarily involve censorship in some degree.

Interconnection

The interconnection of stations so as to provide for simultaneous broadcasting has been the most important development of the last eighteen months. It has now made possible a wide extension in knowledge of national events. It means a vast improvement in program. It makes the talent of our great cities available everywhere. It has reached the point where a few stations are now thus interconnected as a matter of routine and regular procedure. There have been very recently several actual demonstrations of the possibility of nationwide simultaneous broadcasting by interconnection. The Conference affirmatively finds that simultaneous broadcasting of national events is

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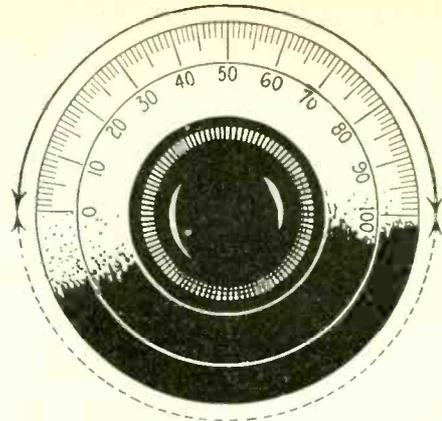
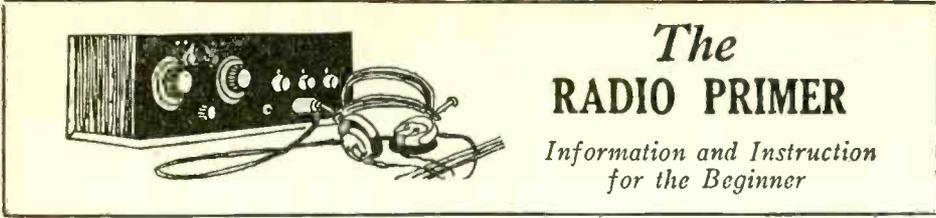
Get Ready!

No matter what kind of a receiver you have you will be able to make it respond to the entire new wavelength band that goes into effect soon.

How

will you do it? By following directions to be published in next week's **RADIO WORLD**, issue of November 1, on sale Wednesday, October 29, at all newsstands.

Dissecting Mutual Inductances



A DIAL, as if mounted on a variometer, (Fig. 3). Minimum inductance is represented by zero. The rotor then should be at right angles to the stator. The dotted line represents the use of negative mutual inductance.

The Difference in Construction and Use of the Variometer and the Variocoupler—How the Variometer Produces a Superdyne Effect

By Abner J. Gelula

THE most useful of all tuning instruments are the variocoupler, the variometer and the variable condenser. Without one or more of these instruments in the outfit we have no means of a continual, even method of changing the wavelength of the receiving set.

The variable condenser is little more than one series of plates rotating at close proximity to another series, without touching. The variable condenser operates on a principle known as capacity. The variocoupler and variometer, however, operate through inductance. In the case of the variable condenser, by varying the capacity, various changes occur in the set, such as changes in wavelength and changes in the natural inductance of a coil with which it is connected. In the case of the variocoupler and variometer all changes in wavelength and inductance are made by the rotation of a coil instead of a plate. Of course each instrument has its place in the circuit. There are many times that either a variometer or variable condenser may be used, but only one who understands the theoretical operation of the instruments will be able to judge which is better for a given purpose.

The Variocoupler Described

Referring to Fig. 1 we notice the variocoupler consists of two distinct coils, the rotor, on top, and the tuning coil or stator. The rotor rotates within the tuning coil and is usually wound on a ball. There are, say, 55 or more turns of No. 22 double silk covered wire on the tuning coil. This is tapped, that is, small loops are made at certain successive stages of the winding, so that connections may be made later to a tap switch. After the coil is finished, usually there will be two sets of taps—six taps at every fifth turn, and five taps at every turn. These taps are brought out to two switches which are in turn connected to the aerial and ground.

The rotor is wound with 35 to 45 turns of No. 24 DS wire, the turns equally divided on each side of the ball. A shaft is run through the rotor for turning it.

How Variometer Works

The variometer (Fig. 2) is an instrument similar to the coupler, except that the rotor wire is attached to the stator in series, that is, one end wire of the inside coil is connected to one end wire of the outside coil leaving two connections from the variometer called terminals. The beginning of the variometer is at the stator terminal and the end is the rotor terminal.

The closer the winding is of the rotor placed to the winding of the stator, the sharper the tuning will be, which means that interference will more easily be eliminated.

When constructing a variometer or variocoupler, two forms must be procured, one small enough to rotate entirely within the other coil.

In mounting either the coupler or variometer on a panel a calibrated dial is

highly desirable. The dial is at zero, meaning the minimum of inductance, when the rotor winding is at right angles to the stator or tuning coil. In the case of the variocoupler, minimum inductance is at an angle of 90 degrees, or at number 50 on the drawing of the dial on this (Concluded on page 23)

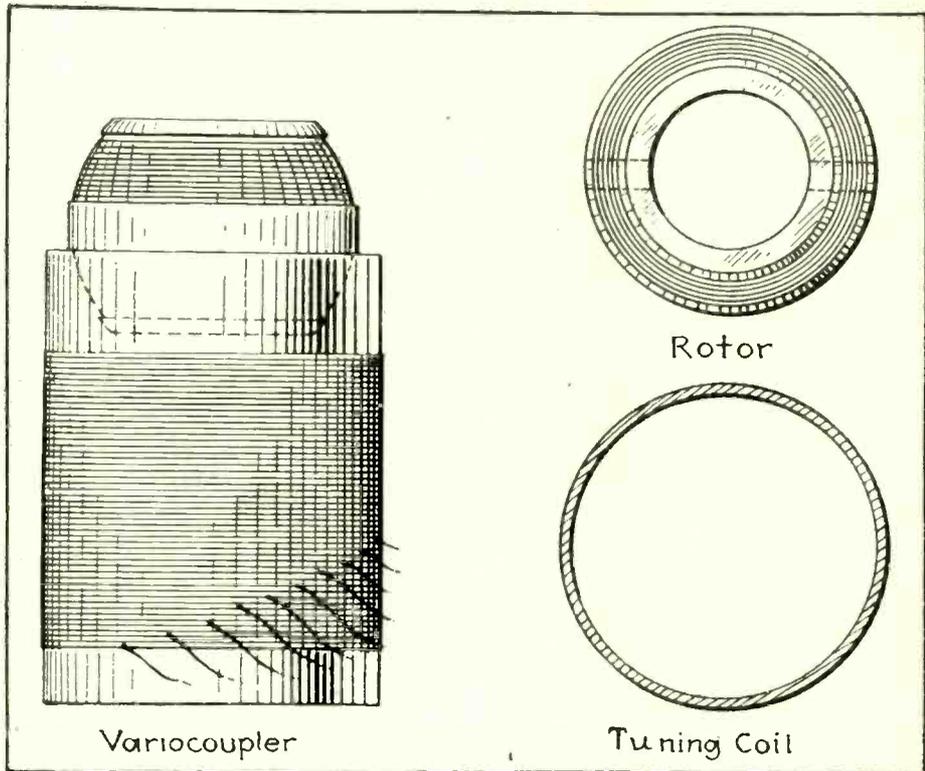


FIG. 1—At left, a variocoupler, the shaft omitted. The rotor is on top. The stator is the stationary form, with its winding of wire. The radiating lines represent the manner in which taps are taken from the stator.

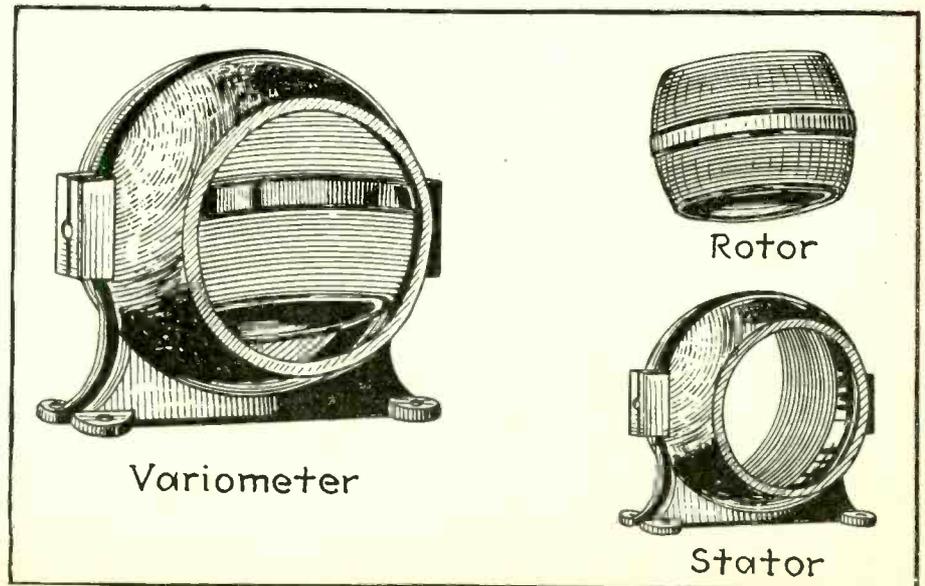


FIG. 2—The variometer, at left, shows the rotor and its winding clearly. The stator winding is hidden inside the globular insulation. The shaft goes in the opening in the block at left.

1-Tube Set Works a Speaker

The Radio University

A Question and Answer Department conducted by RADIO WORLD for its Readers by its Staff of Experts. Address Letters to Radio University Department, RADIO WORLD, 1493 Broadway, New York City.

WILL 201A tubes work in the Superdyne as well as the 199? 2. Will I get better results with 201A in the audio amplifier than with 199? 3. Will 199 work well in a push-pull amplifier?—William Williams, Hancock, Va.
1. Yes. 2. Yes. 3. Yes.

IN YOUR August 2 issue you describe loop aerials. I have tried them on my set but cannot receive anything. The outdoor aerial brings them in fine.—Wm. Bouldin, 3d, E. Orange, N. J.
The loop aerial can only be used effectively on two or three stages of radio frequency amplification. You have not mentioned the type set you are using.

WILL YOU kindly print a circuit for one tube that will operate a loudspeaker. I do not want a complicated circuit.—Wm. Handel, 831 5th Ave., New York City.
Fig. 40 is a diagram of the Dynoflex. Under

tube of the Superdyne?—Glenn Neely, Dolgeville, N. Y.

1. Use only the 13-plate condenser with this coil in a Neutrodyne. 2. It is not necessary.

ON a Universal 3-tube receiver, would a choke coil between the tube and the transformer improve the set?—Henry Von Wienew, Thayer, Ind.
No. As to your other question (omitted), we cannot undertake to compare the merits of commercially made receivers.

I WISH to receive a wavelength of 200-600 meters. What parts shall I use with one tube? 2. What is the best method of varying the wavelength, tapped coil or load coil and fixed condensers, cut in and out by switches?—T. J. Jeans, Delta Hotel, San Francisco.

Variocoupler designed for this wavelength, a variometer for the plate circuit and a variable condenser for the primary circuit. One socket.

ity.—Fred Schick, 327 Mortimer St., Buffalo, N. Y.

Place the condenser in the ground lead, the variable plates to the ground side. It is quite natural that the 200 tube be turned on full.

I HAVE a 5-tube set. Tuning is accomplished with two 23-plate condensers. The set tunes too sharply. How may I broaden it?—T. L. Finch, Lookeba, Okla.
Lengthen your aerial. Use 13-plate condensers.

WHERE CAN I get the data for the Solodial circuit?—J. W. London, 115 Scoville Way, N. S., Pittsburgh, Pa.

You will find full information in the August 23 issue of RADIO WORLD.

I HAVE a Neutrodyne that I am unable to balance. It is O. K. above 400 meters, but below 400 it squeals terribly.—T. M. Barry, Manhattan, Kan.

Try switching the tubes around. Connect the neutrodons across the grid and plate of the RF tubes. This in many cases stabilizes the set when all other methods fail.

IN THE OCT. 4 ISSUE of RADIO WORLD there is a circuit entitled "A Fine 4-tube Receiver." 1. After the coils are wound, how should I mount them? 2. In the panel layout, a switch is shown. What is it for? 3. Where may I obtain the transformers already wound? J. P. Campbell, Lenoir City, Tenn.

1. They are mounted right behind the variable condensers, one parallel with the condenser plates, the other at right angles to the condenser plates. This arrangement will also make them

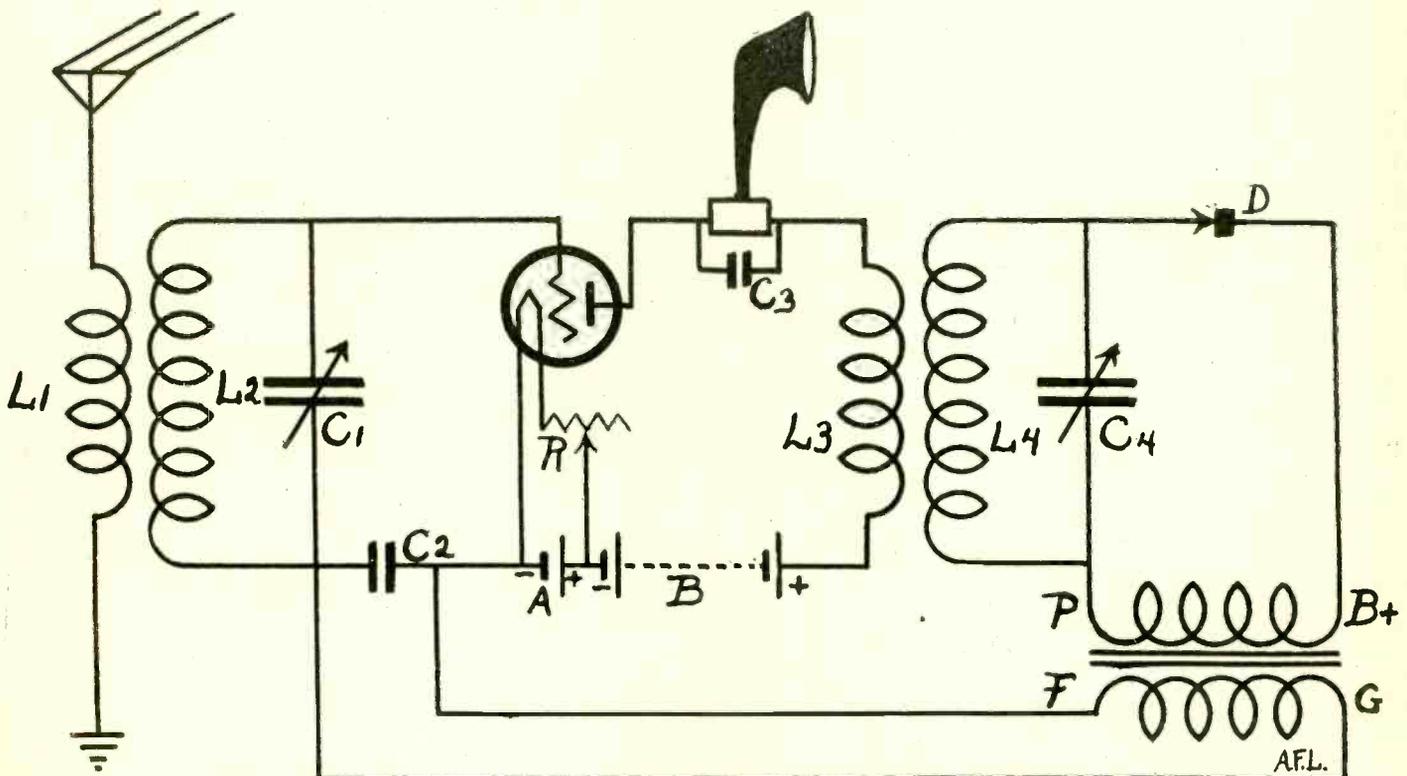


FIG. 40, the Dynoflex, an efficient 1-tube reflex. L1L2 is a radio-frequency transformer used as the aerial tuning element. On a spider-web form wind 10½ feet of No. 24 double silk covered wire for L1 and 55 feet of the same wire for L2. L1 and L2 are wound together, side by side, in the same operation. After the end of L1 is reached continue on with L2 until the end of that winding is reached. Bind the coils with linen thread through the apertures between spokes. Then cut away the form. L3L4 is made the same way. C1 and C4 are low-loss variable condensers, .00035 mfd. (17 plates). C2 and C3 are .001 mfd. fixed condensers. The crystal may be fixed or adjustable. Use 201A tube, 301A, 216A or DVZ. C2 is mounted across the secondary of the AFT. Use at least 90 volts B battery.

good conditions, using a good aerial and ground system, local stations may be brought in on the speaker. Full constructional data was published in RADIO WORLD, issue of August 9.

I HAVE a variometer-variocoupler set with 3 tubes. I can't tune out local stations even if they are 30 to 40 meters from a DX station. Is there any addition that I can make to this set?—Robt. P. Somers, 1546 Lincoln Ave., Pittsburgh, Pa.

Shorten the aerial to 50 or 75 feet. You may buy or make filter coils that will be very helpful. The Selectocoil, described in RADIO WORLD, issue of August 2, is an easy solution.

I HAVE an Ambassador 1-tube set. I can't get KSD.—Mossie Johnson, 605 Cleveland St., Charleston, Mo.
The information furnished is not sufficient to enable a solution.

PLEASE tell me the number of turns on the coil described by Neal Fitzalan in the issue of Sept. 6, when used with a 13-plate and with a 23 plate variable condenser. 2. Can the grid return be biased with a C battery on the first

one 6-ohm rheostat. 2. Tapped coil.

IN YOUR Oct. 4 issue of RADIO WORLD you have an article on a "Dandy 1-tube DX Set," by Herbert E. Hayden. Can I add a stage of radio-frequency? 2. What would be the approximate cost of parts, etc?—Arthur N. Booth, 394 May St., Worcester, Mass.

1. Yes. The circuit has been forwarded to you. 2. \$10.

WILL YOU kindly decide this A states that on a receiving aerial of two wires, if a jumper is placed at the far end it will be more effective, while B believes that the jumper shortens the actual receiving length.—N. H. Bush, Tekonsha, Mich.

Both are wrong. On a receiving aerial one wire will bring in just as much as a multi-wire aerial, jumper or no jumper.

I HAVE a 5-tube set combining radio frequency as published by A. P. Peck in the Sept. 20 issue. The set works fine except for a little body capacity affecting the aerial condenser. The detector bulb, a 200, must be turned up full. I would also like to increase the selectiv-

at right angles to each other. 2. In cutting the A battery in or out. It may be omitted. 3. Any reliable RF transformer may be used.

PLEASE GIVE ME instruction for winding the low-loss coils indicated by Chas. M. White in the issue of Oct. 4, RADIO WORLD. Can the coils described by Burt C. Caldwell in the same issue be used?—Beauford B. Fisher, 205 15th St., Pacific Grove, Calif.

Refer to the diagram on page 11, Oct. 4 issue. E and G are 5 turns. F and H are 50 turns. Both wound with No. 22 DCC wire. The Caldwell coils cannot be used for this circuit.

CAN WD12 tubes be used on "The Single Dial on a Loud Speaker" set?—I. W. Jacobs, St. Louis.
Yes.

WOULD YOU advise me to build a 5-tube Neutrodyne? 2. Shall I use a potentiometer? 3. Is a by-pass condenser necessary in this set? 4. Can I put 3 stages of AF amplification on it?—Clyde Stephens, S. Sioux City, Neb.
1. Yes. 2. Not necessary. 3. Across the primary of the first audio it may be helpful. 4. Yes.

Impedance RF for Greater DX

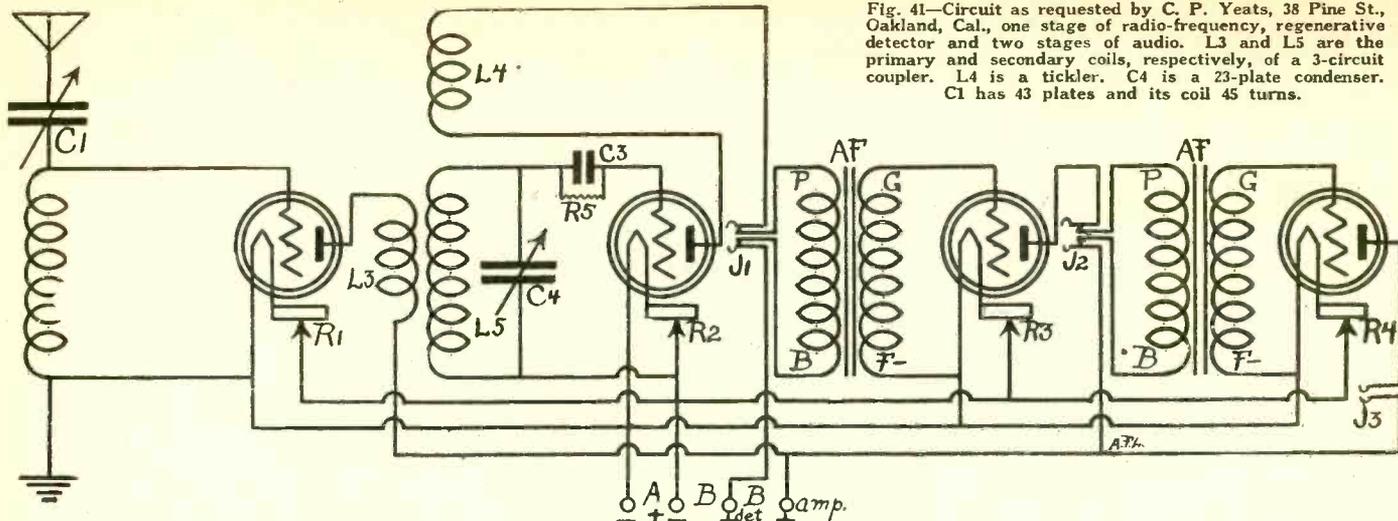


Fig. 41—Circuit as requested by C. P. Yeats, 38 Pine St., Oakland, Cal., one stage of radio-frequency, regenerative detector and two stages of audio. L3 and L5 are the primary and secondary coils, respectively, of a 3-circuit coupler. L4 is a tickler. C4 is a 23-plate condenser. C1 has 43 plates and its coil 45 turns.

But do not complicate the wiring, as the extra stage of audio may cause the set to howl. Preferably let the last stage be resistance AF.

I HAVE four UV201As, two audio-frequency transformers, two variable condensers and one radio-frequency transformer. Will you kindly print a circuit that will use this apparatus?—C. P. Yeats, 38 Pine St., Oakland, Okla.

Fig. 41 gives the circuit that you request. L is a 50-turn coil wound on a 3-inch diameter tubing. L4 is a variometer. Jacks are shown, for they are the most convenient means of switching to various stages of amplification.

WE HAVE a 500-volt motor generator that we would like to reduce to 350 volts.—Culler Electric Service Co., Orangeburg, S. C.

Do you wish the motor to be run from 350 or the generator to deliver 350? Do you use AC or DC? Kindly specify.

I HAVE a Westinghouse RC set. The second stage refuses to work. Would you advise making a Harkness out of it.—John E. Holft, Detroit, Mich.

No doubt the second audio-frequency transformer is burnt out. Get another transformer as near the same dimensions as is possible.

I AM WILLING to spend some money for a good receiving set. I am an absolute novice, and I am relying wholly upon you for a real set. I am located in a 2-sty brick structure in a city of 12,000.—Chas. B. Hewson, Orange, Texas.

A circuit employing two stages of radio-frequency amplification, tube detector and two stages of audio would do nicely.

KINDLY tell me what is the best set for \$50 to \$70. What are the best tubes?—S. W. Jackson, Canonsburg, Pa.

We cannot undertake to discriminate between commercial sets. If you want to build a set yourself the 3-circuit tuner might satisfy you. The 201A type are usually best for all-around work.

HOW may a 1-tube 3-circuit tuner be arranged without mounting? 2—Would I be able to receive New York stations on a loop with this set? 3—If not, how long an aerial would I need? 4—Would a four-wire aerial improve my reception and distance? Under all ideal conditions, how far should this set receive?—L. K. Raymond, Hartford, Conn.

1—Fig. 41 shows you how. The Globe coil is pictured. 2—No. 3—Approximately 75 to 100 feet, figuring a lead-in of about 15 feet. 4—No; a one-wire aerial will receive just as well as four wires. 5—Probably 800 to 1,000 miles.

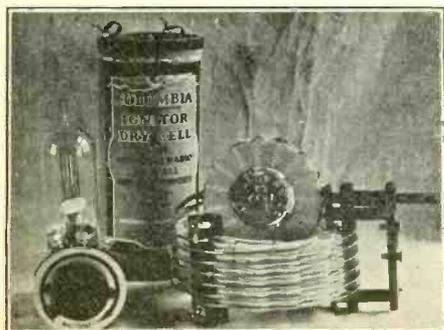


Fig. 42—Answer to query of L. K. Raymond, Hartford, Conn., who asks how a 3-circuit tuner may be arranged without mounting the various units. The variable condenser should be in front of the coil.

**RADIO WORLD'S
Broadcast University**

*Questions and Answers On
the Air Every Wednesday Evening
at WLS, the Sears-Roebuck
Station, Chicago — Department
Conducted by Mat H. Friedman,
RADIO WORLD'S Chicago Representative.*

IS THERE any way that I can clear up a lot of interference between 360 and 429 meters? The set doesn't oscillate between these points even if I advance or decrease the potentiometer. I have an Atwater-Kent 4-tube set.—A. S. Meano, Hurst, Wis.

Place a variable condenser of 45 plates in the ground lead. Set the condenser with the plates half way out, and tune as usual, making final adjustments on the condenser. A smaller variable condenser, placed instead across the plate coil may help.

PLEASE TELL me why do signals fade away and then gradually come back again? This troubles me a lot.—G. F. Mills, S. E. 23d St., Des Moines, Ia.

Fading is a natural phenomenon that is still baffling scientists.

WHERE can I get information about Rev. Henry A. Judge's article? —A. J. Hughes, Imogene, Ia.

RADIO WORLD, Sept. 13 and 20, "Tubeless Set Works Speaker."

I BUILT an Ultradyne according to the specification in your magazine. 1. What can I do to increase the wavelength? I receive only up to 450 meters. 2. How can I get the stations clearer?—Dr. T. C. Hood, Waupaca, Wis.

1. Lengthen aerial. Place a small coil (about 15 turns) in series with the grid lead of the first tube. Be sure that the coil is at least 3 feet away from the set proper.

WHY DO two Chicago stations go on an off the air during the program? 2. I am using UV200 Radiotron. I get WGN loud sometimes and other times not so loud, yet I operate my set like an expert. Do you think my B battery is gone?—Philip Schneider, Jr., 6137 S. California Ave., Chicago, Ill.

1. No doubt you mean that the station fades away, then comes back again. Although fading is a natural phenomenon it should not occur so close to the broadcasting station. Perhaps it is your location. 2. Test your 22½ volt B battery. If it reads below 16 volts buy a new one.

I CANNOT GET outside of Des Moines with the crystal set that I built. What can I do to increase its distance?—Carl Olson, 819 W. 9th St., Des Moines, Ia.

The set will not reach across the state of Iowa. Davenport is the nearest station outside of Des Moines.

DISREGARDING the cost of building a set, as well as the upkeep, would you suggest that I build an Ultradyne, a Super-Heterodyne, Superdyne, Neutrodyne, or Magnadyne? I want sensitivity, selectivity, DX and volume.—Frank F. Firman, E. 4th St., Waterloo, Ia.

Super-Heterodyne or Neutrodyne. The Neutrodyne is easier to build. The Magnadyne is a low-loss Neutrodyne that meets your requirements.

WE HAVE a 6-tube Neutrodyne receiver, but use the phonograph attachment for the loud speaker. The results are not very good. Would you advise me to get a loud speaker B battery?—Mrs. Wm. Turker, Rhinelander, Wis., R. R. 2.

Yes, both speaker and B battery.

I HAVE a 2-tube reflex set. It gives me excellent results and up to 200-300 miles for distance. I wish to add a push-pull amplifier for more volume. (1) Would you advise the amplifier to the set in its present condition, or remove the one stage of audio that I have on now? (2) Would you advise a separate B battery on the push-pull? (3) I am using 90 volts at present. How much C battery bias, tapping the B, would I need?—Frank A. Berg, 3411 13th St., Racine, Wis.

(1) Add it to the set in present condition. (2) It may make reception clearer. (3) A separate C battery is needed. Try 3 to 9 volts. Experiment will tell you which voltage is best.

WILL UV201A be as good as 199 in the Superdyne? Why does the Tuska Superdyne use only two controls instead of three?—Robt. E. Kaufman, Grand Center, Ia.

Yes, the 201A will work as well. The Tuska Superdyne uses a special variable condenser that eliminates one control, because the A— goes to a common stator and the grid leads of the two coils to distinct sets of rotor plates.

I HAVE a 4-tube Crosley. I receive local stations with volume, but cannot get 50 miles distance.—J. S. Coon, 1505 Wolfe Ave., Evanston, Ill.

Probably your aerial and ground system. The set is an efficient one.

Join RADIO WORLD'S University Club

And Get Full Question and Answer Service for the Coming 52 Weeks.

RADIO WORLD, 1493 Broadway, New York City:

Enclosed find \$6.00 for RADIO WORLD for one year (52 Nos.) and also consider this as an application to join RADIO WORLD'S University Club, which gives me free information in your Radio University Department for the coming year.

Name

Street

City and State

Telegraph queries will be answered collect the same day as received. Be sure to direct in your query that the answer be sent collect.

Speech by Davis Next Friday

BROADCAST PROGRAMS

THE time given on the programs is that of the time division in which the station is located, i. e., Eastern, Central, Mountain or Pacific time. To convert Eastern time into Pacific time subtract 3 hours, hence the program from KGO, Oakland, Cal., if given as 8 P. M. would be 5 P. M. for those listeners who are under Eastern time. To convert Mountain time into Eastern time subtract two hours from the time given in the program of a station located in Mountain time. To convert Central time into Eastern time, subtract one hour from the time given in the program of a station located in Central time. Make the following subtractions to accomplish the specified conversions: from Pacific to Central time, 2 hours; from Pacific to Mountain time, 1 hour; from Mountain to Central, 1 hour. The above are for listeners desiring to tune in to stations to the west of them. Those desiring to ascertain the time as shown by their own clock, to tune in to stations to the east of them, should make the following additions to make the specified conversions: Eastern to Pacific, add 3 hours; Eastern to Mountain, 2 hours; Eastern to Central, 1 hour; Central to Pacific, 2 hours; Central to Mountain, 1 hour; Mountain to Pacific, 1 hour; Eastern to Central, 1 hour. The conversion table is published below:

Listener Located in	Station Located in	Add	Subtract	Result, Time by your clock
Eastern	Central	1 hr.		1:56
Eastern	Mountain	2 hrs.		
Eastern	Pacific	3 hrs.		
Central	Mountain	1 hr.		
Central	Pacific	2 hrs.		
Mountain	Pacific	1 hr.		
Pacific	Mountain		1 hr.	
Pacific	Central		2 hrs.	
Pacific	Eastern		3 hrs.	
Mountain	Central		1 hr.	
Mountain	Eastern		2 hrs.	
Central	Eastern		1 hr.	

Thursday, October 23

WIP, Philadelphia—509—1 P. M., orch. 1:30, weather. 3, recital. 6, weather. 6:05, dinner music. 6:45, livestock and produce market reports. 7, bedtime stories. 8, "The Home Lighting Contest for School Children." 8:15, Philadelphia Police Band.

WLW, Cincinnati, 423—10:45 A. M., weather, business reports. 1:30 P. M., business reports. 3, market reports. 4, French lesson. 10, message from the United States Civil Service. 10:03, popular songs; instrumental and vocal. 10:30, concert by Milnor Trio, comic dardario: "The Music Lesson." 11, Milnor Trio.

KFI, Los Angeles, 469—5:50 P. M., news. 5:30-6, news. 6:45-7:30, lecture; orchestra. 7:30-8, Crosby Sisters. 8-9, orchestra. 9:10, studio program. 10-11, vocal and instrumental recital.

WCB, Zion, Ill., 345—8 P. M., male chorus assisted by Mrs. Inman, soprano; Miss Florence Farrar, contralto; Alexander Depew, flute.

KDKA, East Pittsburgh, Pa., 326—9:45 A. M., stockman reports. 11:55, time. 12 M., weather; stockman reports. 12:15 P. M., Scalo's orchestra. 6:30, Little Symphony Orchestra. 7:15, Radio children on a trip to Coney. 7:30, talk by Automobile Club. 7:40, stockman reports to be announced. 8, Little Symphony Orchestra. 9:55, time; weather. 11, studio concert.

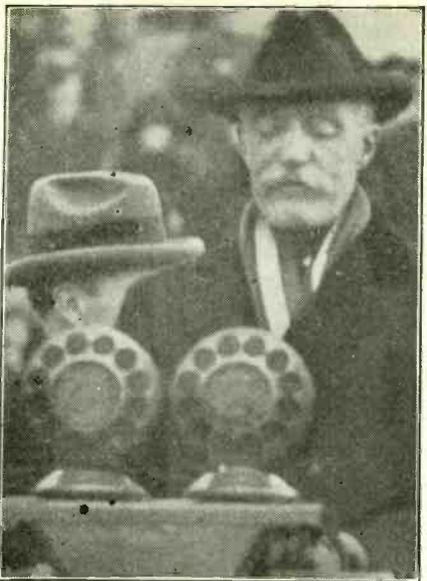
KGW, Portland, Oregon, 492—11:30 A. M., weather. 12:30 P. M., concert. 5, children's program. 7:15, markets; weather; news and police reports.

KYW, Chicago, 536—6:30 A. M., physical exercises. 9:30, financial and commercial markets. 10:30, farm and home service. 11:35, table talk. 12:35-4 P. M., afternoon frolic. 6:02-6:18, news, financial and final markets. 6:35-7, bedtime story. 7-7:30, dinner concert. 8, "Twenty Minutes of Good Reading." 9:15, baritone solo. 9:15, "Safety First." talk. 10-11:30, "At Home" program. 11:30, "Night Hawks."

WEBH, Chicago, Edgewater Beach Hotel, 370—7-8 P. M., talk, delegate United Lutheran Church convention. 9-10, dance; Elizabeth Berry, soprano; musical bits; Carrol Kearns, baritone. 11-12, dance; Harry Davis, baritone; Edgewater Beach Trio; Nick Lucas, songs; Edgewater Beach Revue.

KHJ, Los Angeles, 395—12:30-1:15 P. M., orchestra. 2:30-3:30, musicale. 6-6:30 Hickman's Orchestra. 6:30-7:30 children's program. 7:30 "Art." 8-10, Boyz'n Motor Car Co. program. 10-10:30, Hatch Graham, singer and banjoist. 10:30-11, dance. Hickman's Orch.

WCAE, Pittsburgh, 462—12:30 P. M., news; weather. 3:30, new. 4:30, stock market reports.



ADMIRERS of Governor Pinchot, of Pennsylvania, flock to the loudspeaker and headset whenever he takes his determined stand before the microphones.

6:30, concert. 7:30, Uncle Kaybee. 7:45-8:15, special features. 8:30, Radio Revue.

WLW, Cincinnati, 423—10:45 A. M., weather; business reports. 1:30 P. M., business reports. 3, market reports. 4, French lesson; piano solo. 10, Message from the United States Civil Service. 10:03, entertainment, Doherty Melody Boys. 10:30, Milnor Instrumental Trio. Comic Radario: "The Music Lesson, featuring Senator Schultz." 11, Doherty Melody Boys

WRC, Washington, D. C., 469—6 P. M., children's hour. 7:30, dance. 8:15, song recital. 8:30 piano. 8:45, song recital. 9, Scotch songs. 9:15, to be announced. 9:30, song recital. 9:55, time; weather.

WGY, Schenectady, 380—11:55 A. M., time. 12:30 P. M., stock market report. 12:40, produce market report. 12:45, weather. 2, music and address, "Therapy." 6, produce and stock market quotations. 6:15, condition of New York State highways. 6:30, dinner music. 7:45 new books. 8, Polish music, "Smiezka Polka."

WBAP, Fort Worth, 476—7:30-8:30 P. M., concert. 9:30-10:45, School of Music.

CNRM, Montreal, 341—8 P. M., piano, J. E. Martin; baritone, A. C. Lawrence; recitation, Mildred Page; soprano, Mrs. John Anderson; violin, Audrey Read; tenor, Thos. Irving; address, Dr. W. J. Black.

WOO, Philadelphia, 509—11 A. M., organ. 11:30, weather. 11:55, time. 12 M., music. 5:15 P. M., organ and trumpets. 7:30, sports results and police reports. 9:55, time. 10:02, weather.

WHN, New York City, 360—12:30-1 P. M., orchestra. 2:15, Radio Girl. 2:30, jazz band. 3, popular songs. 3:45, baritone. 4, lyric tenor. 4:15, joint recital, soprano, violinist, pianist. 4:45, "Tea Time Talk." 4:50, concert pianist. 5, orchestra. 6:30-7, music, string quartet. 7-7:30, Alamac orchestra. 9:30-9:37, news. 9:37, baritone. 9:50, contralto. 10, orch. 10:30, orch. 11, popular songs. 11:15, revue. 11:30, orch. 12:01-12:30 A. M., Ted Lewis Symphonic Clowns.

KYW, Chicago, 536—8 to 8:30 P. M., musical program. 8:30 to 8:45, "Around the Town with KYW." 9:05, "Good Roads." 9:15, talk by Managing Editor Breeder's Gazette. 9:45 P. M. to 12:30 A. M., midnight revue.

WOR, Newark, 405—7 A. M., gym class. 2:30 P. M., piano recital. 2:45, soprano. 3, piano recital. 3:15, soprano. 3:30, Grand Street Follies. 6:15, "Radio for the Layman." 6:30, Cooper's orch. 7:15, sports, by "Jolly Bill" Steinke.

WWJ, Detroit, 517—8 A. M., setting-up exercises. 9:30, "Tonight's Dinner." 9:45, public health service bulletins. 10:25, weather. 11:55, time. 12 M., music. 3 P. M., orch. 3:50, weather. 3:55, market reports. 8:30, orch. 10, dance music. 11, orch.

WEAF, New York City, 492—11 A. M.-12 M., pianist; "Making Winter Goodies"; talk by Helen A. Ballard. 4 P. M., music. 4:15:15, lecture-recital from Columbia University. 5-5:30, children's week program. 6-12, concert quartet: contralto; talk by Bank; "Touring"; soprano; baritone; pianist; Vincent Lopez and orch. from Hotel Pennsylvania.

WEEL, Boston, 303—1 P. M., luncheon, Boston Chamber of Commerce. 7, talk by Mayor Curley. 7:10, Big Brother Club. 7:40, cornetist. 8, dance; orch. 9-12, Program New York Studio.

Friday, October 24

WEBH, Chicago, 370—7 P. M., concert selections. 8, Agatha Karlen, reader; musical bits. 9, dance; Frederick Agard, tenor. 10, Rita McFawn, soprano. 11, dance, orch.; Winter Garden Four, songs. 12, Sandy Meek, songs; Dean Remick, pianist.

CKAC, Montreal, 425—1:45 P. M., concert. 4,

weather and stock reports. 4:30, 110 lessons (World Radio Language).

KHJ, Los Angeles, 395—12:30-1:15 P. M., Piggly-Wiggly Girls. 2:30-3:30, musicale. 6-6:30, Hickman's orch. 6:30-7:30, children's program. 8-10, program of Mullen & Bluett. 10-11, Hickman's dance orch.

WIP, Philadelphia, 509—1 P. M., music. 1:30, weather. 3, recital. 6, weather. 6:05, music. 6:45, market reports. 7, bedtime stories.

WMAQ, Chicago, 447.5—1 P. M., sport results. 4:10, "English as She Is Spoke." 4:30, music. 6, organ. 6:30, orch. 8, Wide-Awake club. 8:30, musical geography. 9, program from Ottawa, Ill.

KSD, St. Louis, 546—8 P. M., address by Burton K. Wheeler, Vice-Presidential candidate on the Independent ticket, direct from the Coliseum.

KYW, Chicago, 536—6:30 A. M., setting-up exercises. 9:30, news and comment. 11:35, table talk by Mrs. Anna J. Peterson. 6 P. M., news, financial and final markets; review of Chicago trade. 6:35, bedtime story by Walter Wilson. 7, concert. 7:30, program broadcast from KYW's studio. 8:20, speeches of the American Farm Bureau Federation. 9:30 P. M., to 12:30 A. M., revue. 12:30, organ recital.

WLW, Cincinnati, 423—10:45 A. M., weather; business reports. 1:30 P. M., market reports. 3, stock quotations. 4, recital. 8, speech by John W. Davis, Democratic candidate for President. (Direct from Music Hall, Cincinnati.)

KDKA, E. Pittsburgh, Pa., 326—7:30 A. M., free hand calisthenics. 9:45, Stockman reports 11:55, time. 12 M., weather. 12:30 P. M., Sunday school lesson. 6:30, organ. 7:15, the Radio Rhymster. 7:30, "The Constitutional Convention." 7:40, Stockman reports. 8, feature. 8:15, "Football Coaching." 8:30, concert. 9:55, weather.

WFAA, Dallas, Tex., 476—12:30-1 P. M., address.

WDAR, Philadelphia, 395—11:45 A. M., daily almanac. 12 M., organ. 2-3 P. M., Arcadia concert orch. 4:30, dance. 5:45, sporting results. 7:30, Dream Daddy. 8, "Turning the Pages"; studio recital. 10 P. M. to 1 A. M., Arcadia dance orch.

WGY, Schenectady, N. Y., 380—11:55 A. M., time. 12:30 P. M., stock market report. 12:40, produce market report. 12:45, weather. 2, music and one-act play, "The Bank Account." 6, produce and stock market quotations; news. 6:30, stories for children. 7, international Sunday school lesson. 7:45, health talk; selections, "The Footlights," WGY orch.

WCAE, Pittsburgh, 462—12:30 P. M., news; weather; reading of program for the day. 3:40, news. 4:30, Sunshine Girl. 6:30, concert. 7:30, Uncle Kaybee. 8, special feature. 8:15, special feature. 8:30, Harmony Boys' orch.

WHO, Des Moines, Ia., 526—7:30-9 P. M., Tolbert McRae, baritone; artists from the Des Moines Conservatory of Music.

WGY, Schenectady, N. Y., 380—8 P. M., radio drama, "The Bird and the Fish"; WGY orch. 10:30, college night program.

WEEL, Boston, 303—7 P. M., talk by Mayor Curley. 7:10, Big Brother Club. 7:45, talk. 8, concert, Conservatory of Music. 8:15, musicale; baritone. 8:40, Hawkins Dance Orch. 9, program from New York Studio. 11, Eisenbourg Dance Orch.

WEAF, New York City—492—11-12 A. M., "A Trip to Athens and the Parthenon"; organ; market and weather reports. 4-5:30 P. M., club program for women; soprano; children's week program. 6-10:30, Waldorf-Astoria orch.; children's stories; violinist; Billy Jones and Ernest Hare; soprano; xylophone; dance orch.; pianist.

WBZ, Springfield, Mass., 337—11:55 A. M., time signals, weather, market report. 6 P. M., concert. 7, market report. 7:05, current book review. 7:30, bedtime story. 9:55, time, weather. 10, concert. 11, concert. 11:30, dance.

KYW, Chicago, 536—6:30 A. M., morning exercises. 9:30, late news and comment. 11:35, table talk. 12:30 P. M., "The Progress of the World." 6:02-6:18, news, financial markets. 6:35-7, bedtime story. 7-7:30, dinner concert. 7-7:10, orch. 7:10-7:20, "Original Nighthawks." 7:20-7:30, orch. 7:30-8, Duncan Sisters Music Publishing Company Program. 8:20-8:45, speeches, "Farmers' Produce Markets." 9:30-12:30 A. M., midnight revue. 12:30, organ recital.

KFAE, Pullman, Wash., 330—7:30 P. M., piano numbers, violin solos.

KGW, Portland, Ore., 492—11:30 A. M., weather. 12:30 P. M., concert. 5, children's program. 7:15, markets, weather, news bulletins and police reports. 8, popular lecture. 10:30, Hoot Owls.

WRC, Washington, D. C., 469—3 P. M., fashion. 3:10, song recital. 3:20, "Beauty and Personality." 3:25, current topics. 3:35, piano recital. 3:50, The Magazine of Wall Street. 4, song recital. 6, stories for children by Peggy Albion.

WOO, Philadelphia, 509—11 A. M., organ. 11:30, weather. 11:55, time. 12 M., music. 5:15 P. M., organ and trumpets. 7:30, sports results; dinner music. 8:30, special program. 9:10, musical program. 9:55, time. 10:02, weather. 10:03, organ. 10:30, dance.

WBZ, Springfield, Mass., 337—11:55 A. M., time; weather; market report. 6 P. M., dinner concert. 7, market report.

WHN, New York City, 360—2:15 P. M., baritone. 2:30, popular songs. 2:45, orch. 3:45, chat to children. 4, the children's poet. 4:15, baritone. 4:30, lyric soprano. 4:45, "Serial Story." 5, orch. 6:30-7, music, string quartet. 7-7:30, Alamac orch. 9:30-9:37, news. 9:37, orch. 10, soprano. 10:15, "Maytime." 10:20, "Who Wants a Bad Little Boy." 10:25, "The Pal That I Loved." 10:30,

Princeton-Notre Dame Football Game on Saturday

dance. 11, tenor. 11:10, popular songs. 11:20, baritone. 11:30, Alabam Club orch. 12:12:30, Ted Lewis and his Symphonic Clowns.

WBAF, Ft. Worth, Tex., 476-7:30-8:30 P. M., concert. 9:30-10:45, organ.

WLW, Cincinnati, 423-10:45 A. M., weather; business reports. 1:30 P. M., market reports. 3, stock quotations. 4, music recital; French lesson. 5, speech by John W. Davis, Democratic candidate for President. (Direct line from Music Hall, Cincinnati.)

WOR, Newark, 405-7 A. M., gym class. 2:30 P. M., Celia Newmark, soprano. 2:45, popular program. 3:15, Celia Newmark, soprano. 3:30, talk about work with soldiers and sailors. 3:45, Chinese recipes. 6:15, cornet solos. 6:30, "Man in the Moon" stories. 7, cornet solos. 7:15, "Sports," by "Jolly Bill" Setinke.

WWJ, Detroit, 517-8 A. M., setting-up exercises. 9:30, special talk. 9:45, Public Health Service. 10:25, weather. 11:55, time. 12 M., music. 3 P. M., orch. 3:50 weather. 3:55, market reports. 8:30, orch.

Saturday, October 25

KDKA, E., Pittsburgh, Pa., 326-9:45 A. M., live-stock reports. 11:55, time. 12 M., weather; live-stock reports. 1:30 P. M., concert. 3, Pitt-Tech football game. 6:30, concert. 7:15, Richard the Riddler. 7:30, sport review. 7:40, Sunday school lessons. 8, "Inside Movie Gossip." 8:15, feature. 8:30, concert. 9:55, time; weather.

WGY, Schenectady, N. Y., 380-11:55 A. M., time signals. 12:30 P. M., market report. 12:40, produce report; football game, Princeton vs. Notre Dame, at Princeton. 9:30, dance music.

WCAE, Pittsburgh, Pa., 462-12:30 P. M., news weather; reading of program for the day. 3, play by play, Pitt-Tech football. 6:30, concert. 7:30, Uncle Kaybee. 7:45, popular songs. 8, football scores. 8:15, special feature. 8:30, music.

WBZ, Westinghouse, 337-11:55 A. M., time; weather. 6:30 P. M., orch. 7, market report. 7:30, bedtime story. 7:40, concert. 8:45, concert. 9:15, concert. 9:55, time.

WHN, New York City, 360-2:15 P. M., soprano. 2:25, pianist. 2:35, soprano. 2:45, orch. 3:45, soprano. 4:15, lyric tenor. 4:30, Klwanis period. 4:45, impersonations and songs. 5, Southern Harmonists. 6:30-7, music. 7-7:30, orch. 7:30, orch. 8, "Goodnight Children." 8:10, dramatic tenor. 8:20, Arthur Stone, world's famous blind pianist. 8:30, harmonica player. 8:45, popular songs. 9, "Barnyard Sketches." 9:15, soprano. 9:30-9:37, news. 9:37, baritone. 9:55, popular songs. 10:05, "What Election Day Means to You." 10:15, singing and ukulele. 10:30, trio, assisted by orch. 11, Jimmy Clarke and entertainers. 11:30, Roseland orch.

WRC, Washington, D. C., 469-6 P. M., children's hour. 7:45, Bible talk. 8, song recital. 8:30, "Radio Interference and What Can Be Done About It." 8:45, to be announced. 9:55, time; weather. 10:30, dance, N. Y. Hotel Astor orch.

WEBH, Chicago, 370-7-8 P. M., concert selections; Sunday School Lesson, Dr. Herbert W. Virgin; talk; John W. Harrison, baritone. 9-10, dance; William H. Hunt, tales; Langdon Borthers, Hawaiian guitars; Marie Kelly, readings. 11, dance selections; Nick Lucas, songs. 12, Marie Kelly, readings; Edgewater Beach Trio; Langdon Borthers, Hawaiian guitars.

CKAC, Montreal, Can., 426-7 P. M., kiddies' stories. 7:30, orch. 8:30, vocal and instrumental concert. 10:30, orch.

WGY, Schenectady, N. Y., 380-Football game between Princeton and Notre Dame, at Princeton. 9:30 P. M., music.

WBZ, Springfield, Mass., 337-11:55 A. M., time; weather. 6:30 P. M., orch. 7, market report. 7:30, bed time story. 7:40, concert. 8:45, concert. 9:15, concert. 9:55, time; weather.

KYW, Chicago, 536-6:30 A. M., exercises. 9:30, news and comment of the financial and commercial markets. 10:30, farm and home service. 11:35, table talk. 6:02-6:18 P. M., news; financial markets. 6:35-7, bedtime story. 7-7:30, concert. 7-7:10, orch. 7:10-7:20, "Original Nighthawks." 7:20-7:30, orch. 8-8:58, musical program. 9:05, stories, articles and humorous sketches. 9:35-11:30, late show.

WBAF, Ft. Worth, Tex., 476-7 P. M., review of the interdenominational Sunday school lesson by Mrs. W. F. Barnum.

WLW, Cincinnati, 423-10:45 A. M., weather; business reports. 1:30 P. M., market reports.

KSD, St. Louis, 546-7 P. M., music and specialties, Missouri Theatre.

KGW, Portland, Ore., 492-11:30 A. M., weather. 10 P. M., dance.

WMAQ, Chicago, 447.5-4 P. M., sport results. 6:30, orch. 8, high school band. 8:40, travel lecture. 9, Chicago Theatre review.

WOO, Philadelphia, 509-11 A. M., organ. 11:30, weather. 11:55, time. 12, orch. 5:15 P. M., organ, trumpets, band. 7:30, sport results; police reports. 9:55, time. 10:02, weather.

WLW, Cincinnati, 423-10:45 A. M., weather; business reports. 1:30 P. M., market reports.

WIP, Philadelphia, 509-11 P. M., organ. 1:30, weather. 2:30, play by play description of the football game between University of Pennsylvania and the University of Virginia, from Franklin Field, University of Pennsylvania. 6,



THE COMPOSER of "Turkey in the Straw." He recently broadcast from Chicago, fiddling great. Who remembers the name of the composer of that piece so popular a generation ago? The original of the Radio World cover on this issue goes to the one whose correct answer is received first.

weather. 6:05, music. 6:45, market reports. 7, bedtime stories. 8, talk by Wesley Hill. 9, special request program. 10:15, dance.

KYW, Chicago, 536-6:30 A. M., setting up exercises. 9:30, news and comment. 10:30, farm and home service. 11:35, table talk by Mrs. A. J. Peterson. 6 P. M., news, financial and final markets. 6:35, bedtime story by Walter Wilson. 7, concert. 8-8:58, Salvation Army band. 9:05, short stories, articles, humorous sketches. 9:35-11:30, late show; Coon-Sanders "Nighthawks."

KHJ, Los Angeles, 395-12:30-1:15 P. M., news items and music. 2:30-3:30, musicale. 6-6:30, Hickmon's Concert Orch. 6:30-7:30, children's program; bedtime story by Uncle John. 8-10, Newberry Elec. program. 10-11, Hickman's dance orch.

WFAA, Dallas, Tex., 476-12:30 P. M., address. 8:30, Hawaiian music. 11, orch.

SATURDAY, OCTOBER 25

KDKA, E., Pittsburgh, Pa., 326-9:45 A. M., Stockman reports. 11:55, time. 12 M., weather. 1:30 P. M., concert orch. 3, Pitt-Tech football game. 6:30, West. band. 7:15, Richard the Riddler. 7:30, sport review. 7:40, Sunday school lessons. 8, "Inside Movie Gossip." 8:15, feature. 8:30, concert. 9:55, time; weather.

WMC, Memphis, Tenn., 500m-12:30 P. M., Program from Shrine Roof. 8:30, Operatic program by Hugh Sandidge.

WHAS, Louisville, Ky., 400m-4-5 P. M., Alamo Theatre Orchestra, Polic bulletins, Weather, humor, news. 4:55, Livestock, produced and grain market. 5, Time. 7:30-9, Concert of Mrs. Pleasant M. Brooks, news, time at 9 o'clock.

KPO, San Francisco, 423-Noon, Time Reading, Scripture. 1-2 P. M., Time. 3:30-5:30, Tea d'antant, Bradfield's Band. 8:00-12:00, Weidner's Dance orchestra.

KGW, Oakland, Cal., 312m-Noon, stock reports and weather. 4-5, Concert Orchestra of the Hotel St. Francis, San Francisco. Vinton La Ferra conducting. 8, Program by Merced Boys' Band. 10:00-1:00 A. M., Dance by Halstead's Orchestra.

WDAF, Kansas City, Mo., 411-3:30 P. M., The Star's radio orchestra. 5:50 to 6:00, marketgram, weather, time and road report. 6:00 to 7:00 (School of the Air), piano tuning-in number; address, thirteenth of a series of talks by speakers from the editorial staff of The Star; the Tell-Me-a-Story Lady; music, the Hanlein-Knutson Trio-an Ensemble. Hotel Muchlebach. 11:45 P. M. to 1:00 A. M. (Nighthawk Frolic), the "Merry Old Chief" and the Plantation Players, Hotel Muchlebach; Eddie and Bobbie Kuhn's K. C. A. C. orchestra.

WDAF, Kansas City, Mo., 411-3:40-4:30 P. M., trio. 5:50-6:30, weekly Boy Scout program. 5:50-6, marketgram; weather; time; road report. 6-7, School of the Air; the Tell-Me-a-Story Lady; music. 8-9:15, program. 11:45 P. M., to 1 A. M., nighthawk frolic.

WBAF, Ft. Worth, Tex., 476-7:30-8:30 P. M., moments from the Majestic Theatre, featuring stars of the week, organ recital and Majestic Theatre orch. 9:30-10:45, concert by the Euterpean Club.

WLW, Cincinnati, 423-10:45 A. M., weather, business reports. 1:30 P. M., business reports. 3, market reports. 4, lesson in ILO; Babson reports. 8, popular program, Alvin Roehr's Music Makers; Grosley theatrical review. 8:45, concert program, through the courtesy of the Cooper Corporation.

WHO, Des Moines, Ia., 526-7:30 P. M., musical program, Drake Conservatory of Music.

CKAC, Montreal, 426-1:45 P. M., concert. 4, weather, stock reports. 4:30, 10 lessons.

KGW, Oakland, Calif., 312-1:30 P. M., N. Y. and S. F. stock reports and weather. 3, studio musical program and Parent-Teacher Association speaker. 4-5:30, dance orchestra. 5:30-6, stories. 6:45, stock reports, weather, S. F. produce news, baseball scorers and news items. 8, educational program. 10 P. M. to 1 A. M., dance music.

KFKE, Washington State College, Pullman, Wash., 330-contralto solos; piano numbers; making the water supply ready for winter; health talk; causes of failure in concrete construction.

KGW, Portland, Ore., 492-11:30 A. M., weather. 5 P. M., children's Roosevelt program. 7:15, markets, news and police reports. 8, concert orch.

WWJ, Detroit, 517-8 A. M., setting-up exercises. 9:30, "Tonight's Dinner." 9:45, Public Health Service bulletin. 10:25, weather. 11:55, time. 12 Noon, music. 3 P. M., orch.; 3:50, weather. 3:55, market reports. 7, orch.; tenor.

WBZ, Springfield, Mass., 337-11:55 A. M., time. 6 P. M., concert by trio. 7, market report. 7:05, one minute talk for voters. 7:10, "Bringing the World to America." 7:20, news. 7:30, bedtime story. 7:40, concert by trio; basso; pianist. 8:15, contralto. 8:45, piano recital. 9, concert drum corps. 9:30, harmonica selections. 9:45, popular pianist playing popular tunes. 9:55, time; weather. 11:30, dance music.

KPO, San Francisco, 423-12 M., time. 1-2 P. M., orch. 4:30-5:30 orch. 5:30-6:30, children's

(Concluded on page 20)

WOR, Newark, 405-7 A. M., gym class. 2:30 P. M., orch. 3, soprano recital. 3:15, talk by novelist. 3:30, soprano. 3:45, talk. 6:15, Cinderella Wolverine's orch. 7:15, "Sports," by "Jolly Bill" Steinke. 8, "Inventions and Patents. 8:15, joint recital. 8:45, soprano solos. 9, concert (quartet). 9:15, recital (trio). 9:45, joint recital. 10:15, two-man singing orch.

WWJ, Detroit, 517-8 A. M., setting-up exercises. 9:30, a special talk. 9:45, Public Health Service bulletin. 10:25, weather. 11:55, time. 2:30 P. M., Michigan-Wisconsin football game broadcast direct from Ferry Field, Ann Arbor. 5, foot ball scores.

WBAF, Ft. Worth, Tex., 476-2:30 P. M., play by play description of the Princeton-Notre Dame football game direct from Princeton, N. J.; Graham McNamee announcing. 4-5, orch. from Waldorf-Astoria; thrilling adventure stories; contralto; tenor; syncopators; pianist; violinist; "The Functions of Congress"; Vincent Lopez and his orch.

WEAF, New York, 492-2:30 P. M., play by play description of the Princeton-Notre Dame football game direct from Princeton, N. J.; Graham McNamee announcing. 4-5, orch. from Waldorf-Astoria; thrilling adventure stories; contralto; tenor; syncopators; pianist; violinist; "The Functions of Congress"; Vincent Lopez and his orch.

WDAF, Kansas City, Mo., 411-4-5 P. M., program by Mrs. A. W. Cook.

KGW, Portland, Ore., 492-6 P. M., church services.

WEBH, Chicago, 370-5-6 P. M., Edgewater Beach musical. 7-9, concert.

WHO, Des Moines, Ia., 526-7:30 P. M., Hibbard Cleveland, basso; Helen Birmingham, pianist; Myrtle Williams, soprano; orch.

CKAC, Montreal, Can., 425-4:30 P. M., sacred concert.

WEEI, Boston, 303-3:45-5:30 P. M., Sunday Men's Conference in the Bedford Branch Y. M. C. A., Brooklyn, N. Y. 7:20-10, musical program Mark Strand Theatre.

WBZ, Springfield, Mass., 337-10:45 A. M., church services. 8:30 P. M., vocal recital. 9, violin. 9:30, organ.

KPO, San Francisco, 423-11 A. M.-12 M., church services. 8:30-10 P. M., concert Seiger's orch.

SUNDAY, OCTOBER 26

WDAF, Kansas City, Mo., 411-4-5 P. M., program by Mrs. A. W. Cook.

KGW, Portland, Ore., 492-6 P. M., church services.

WEBH, Chicago, 370-5-6 P. M., Edgewater Beach musical. 7-9, concert.

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WBZ, Springfield, Mass., 337-10:45 A. M., church services. 8:30 P. M., vocal recital. 9, violin. 9:30, organ.

KPO, San Francisco, 423-11 A. M.-12 M., church services. 8:30-10 P. M., concert Seiger's orch.

SUNDAY, OCTOBER 26

WDAF, Kansas City, Mo., 411-3:40-4:30 P. M., trio. 5:50-6:30, weekly Boy Scout program. 5:50-6, marketgram; weather; time; road report. 6-7, School of the Air; the Tell-Me-a-Story Lady; music. 8-9:15, program. 11:45 P. M., to 1 A. M., nighthawk frolic.

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KFKE, Washington State College, Pullman, Wash., 330-contralto solos; piano numbers; making the water supply ready for winter; health talk; causes of failure in concrete construction.

KGW, Portland, Ore., 492-11:30 A. M., weather. 5 P. M., children's Roosevelt program. 7:15, markets, news and police reports. 8, concert orch.

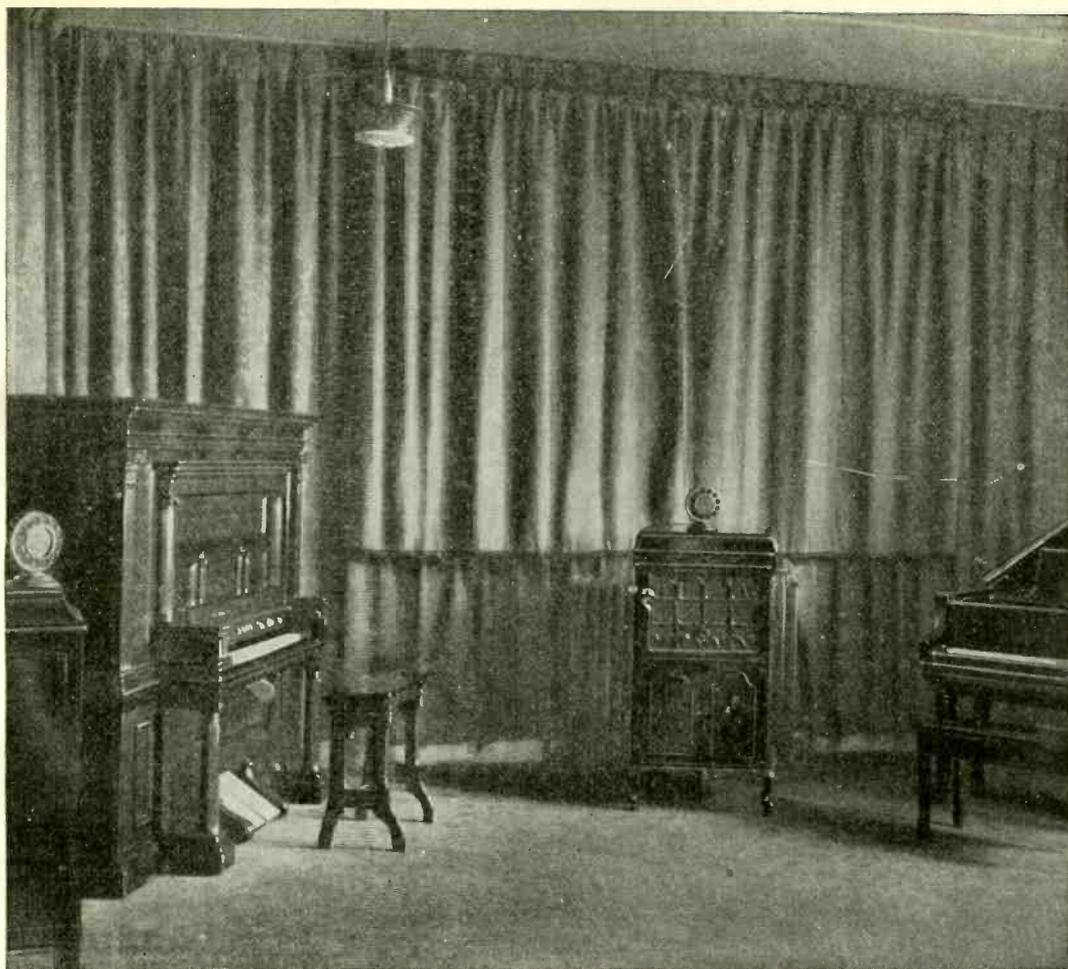
WWJ, Detroit, 517-8 A. M., setting-up exercises. 9:30, "Tonight's Dinner." 9:45, Public Health Service bulletin. 10:25, weather. 11:55, time. 12 Noon, music. 3 P. M., orch.; 3:50, weather. 3:55, market reports. 7, orch.; tenor.

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KPO, San Francisco, 423-12 M., time. 1-2 P. M., orch. 4:30-5:30 orch. 5:30-6:30, children's

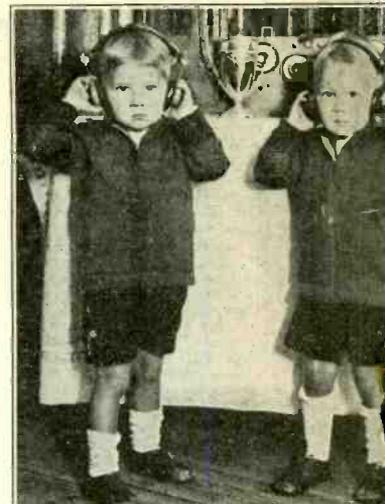
(Concluded on page 20)

A Peep Inside a Studio



THE INSIDE of the modern broadcasting studio. Two microphones are shown in the picture. Both are used at once when music is transmitted. Heavy drapes for the walls and ceiling are used to keep out external sound. Also, if there is any echo at all, it ruins the broadcast tone. The drapery prevents echoing.

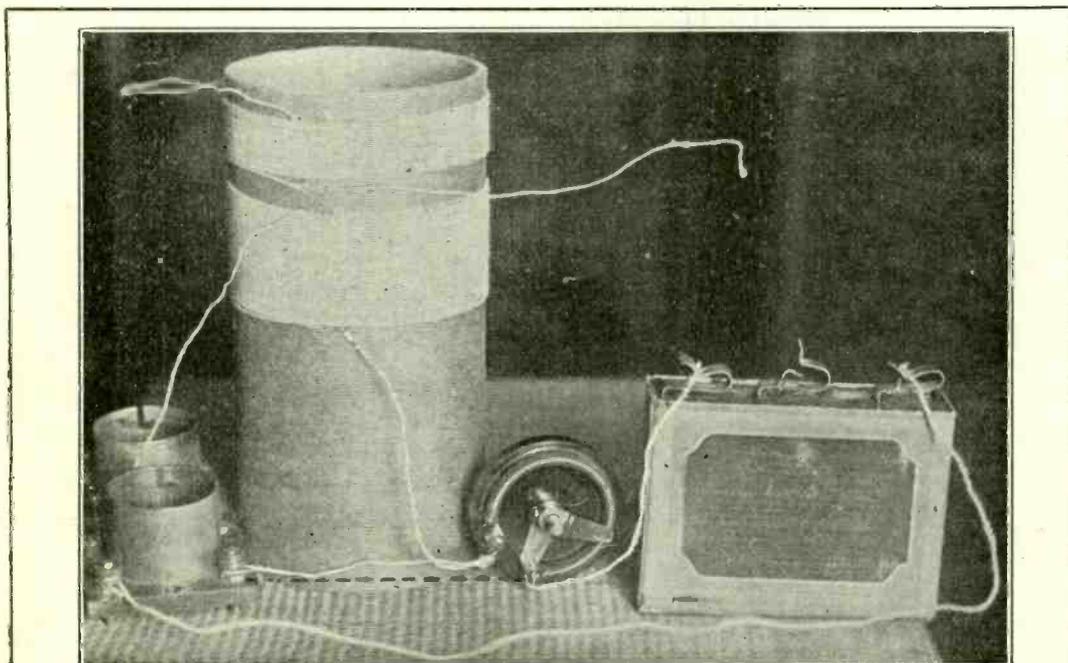
Prize Twin



DAVID and Herbert Johnson, two, of Brooklyn, N. Y. twins, winners of first honors in a twins contest, obey the man in the moon by touching their junctions to "clean up their plates," here shown. (Fotograms.)



THE CORRECT distance and posture of speaker, shown above, makes for "the voice."

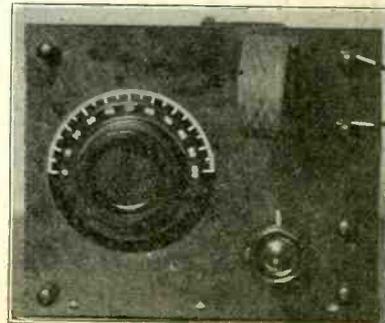


(Foto Topics)

MANY EXPERIMENTERS run into difficulties, such as critical tuning, poor volume or lack of selectivity, because they connect the grid return improperly either in radio-frequency amplifier circuits or in tube detector circuits or both. The photo shows the negative lead of a 4½-volt A battery going through the rheostat, then to the F post of the socket and to the end of the secondary. The positive lead, running across the bottom of the photo, goes direct from the battery A+ to the F+ socket post. The mistake is corrected by connecting the end of the secondary, the semi-perpendicular white wire, to the opposite or battery side of the rheostat. Thus the grid return lead does not have to encounter the high resistance of the rheostat. The dotted black line shows another mistake, for if the F- post of the socket were connected that way to the rheostat the tube would burn all the time.



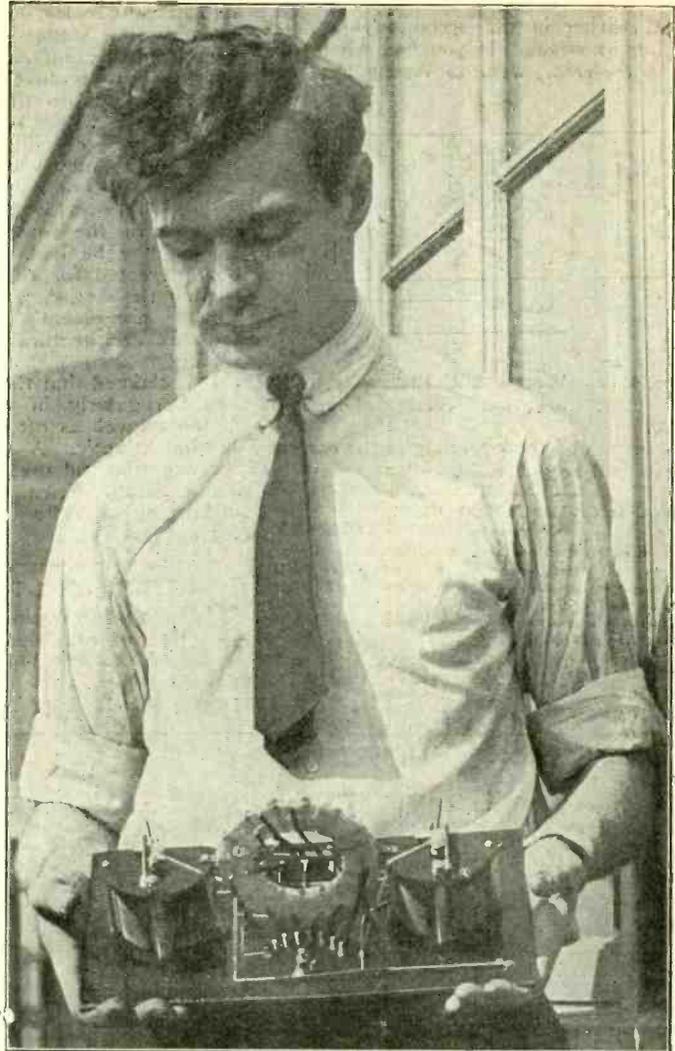
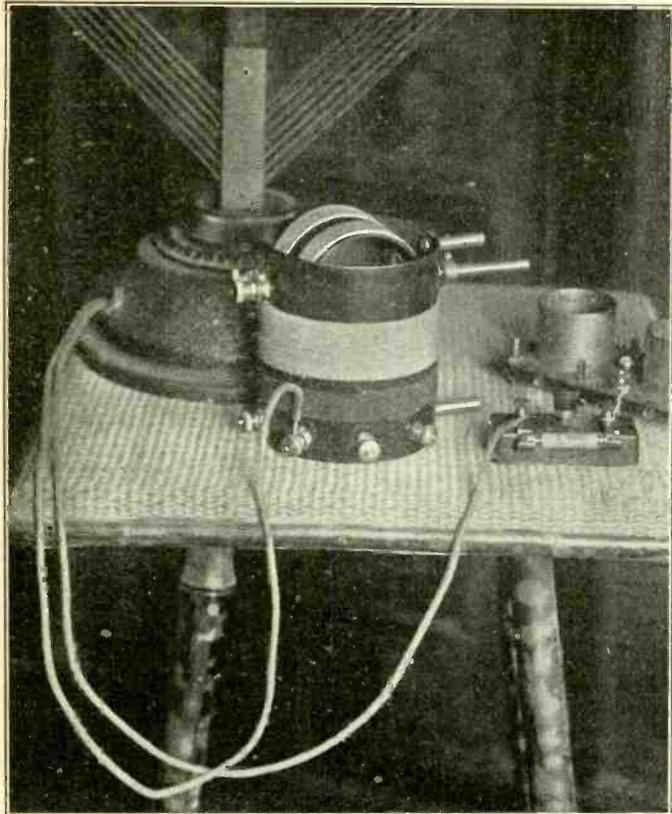
ALBERT PROTZMAN at the Polo Grounds broadcast the World Series games.



MOUNTING a honeycomb coil as shown is out of date now. Too much body capacitance.

Loop in Grid Lead

Proud of His Set



HOW A LOOP may be introduced in the grid lead to give some directional effect in tuning. The aerial and ground connections are kept intact. The grid of the detector tube goes to the grid condenser, as usual, this particular condenser being of the variable type, with clips on the side, into which the grid leak is pressed. The other side of the grid condenser goes to one of the terminals of the loop cord, the other loop cord tip going to the beginning of the secondary of the coil. In this case the coil is a familiar type used in the 3-circuit tuner. The loop may be turned in the direction of the desired station by rotating the dial until the broad side of the loop is at right angles to the station. For the loop to be effective it should be tuned by a variable condenser. Most loops require a 23-plate condenser, although some cover the band on 17 plates. This arrangement is good particularly with regenerative sets, although it will work with any other (except straight crystal set), the loop being in the grid lead of the aerial circuit. (Foto Topics.)

THE proud owner of a well-built 1-tube set used attached spiderweb in his Ultra Audion.

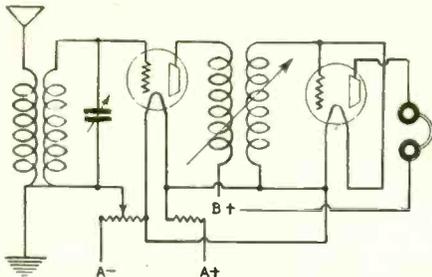


IN THE WEE SMA' HOURS, this amateur is getting real DX by lamplight, showing that modern improvements don't help DX any.

5,000 Watt Station for Crosley

WHAT'S WRONG HERE?

THE wiring in the accompanying diagram is wrong. If you find what you think is the error, write to Wrong Diagram



Editor, RADIO WORLD, 1493 Broadway, New York City. Mention Wrong Diagram No. 20.

The names of those sending in the correct answers will be published.

DOLL AND CARROUGHER JOIN MANUFACTURING COMPANY

THE Electrical Products Manufacturing Company, of Providence, R. I., and New York City, telephone, radio and general electrical products, has added Clarence E. Doll, formerly associated with the management of the Patent Electric Company, of New York City, and V. A. Carrougner, who was also affiliated with the latter concern, to their forces. Mr. Doll has become vice-president and Mr. Carrougner sales manager of the New York office, at 42 Broadway.

ABOUT Christmas-time the new WLW station will open. It will be capable of 5 kilowatt transmission. A few years ago Powel Crosley, Jr., opened up his first broadcasting station of 5 watts. Power was gradually increased until now it is necessary to remove the station outside the city limits so that there will be no interference while WLW is on the air. Only after a careful survey of the surrounding country was it decided to erect the two 200-foot antenna towers on the top of a hill overlooking Cincinnati. From the top of the towers a view of three States may be had. A special house is being erected for the resident operators so that the station may be called into action on a moment's notice. The station from an architectural viewpoint is highly pleasing.

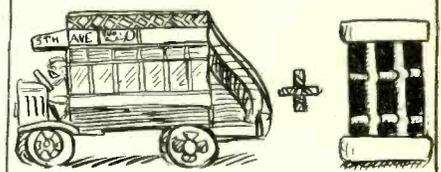
It is claimed that the new station will be heard regularly in every State in the Union as well as often on the other side of the Atlantic. A similar station, built for experimental use, was heard in Cape Town, South Africa. The station will be in keeping with the methods of Mr. Crosley and his company.

ORIGIN OF 2-TUBE CIRCUIT

THE non-oscillating reflexed regenerative set published in the October 11 issue of RADIO WORLD, the article by Brewster Lee, is the 2-tube knock-out set of the "Radio Broadcast" series.

The Weekly Rebus

NO. 15.



1. 140-FMANV.

WHAT does this rebus represent? Send answer to Rebus Editor, RADIO WORLD, 1493 Broadway, New York City. The names of those sending the solution will be published.

H. P. Buck, Northern Trust Co., Chicago.
H. A. Cassini, 2292 B St. Hubert St., Montreal, Canada.

WLS REACHES OUT 2,400 MILES

WLS made the longest journey of its history. Lieut. L. E. Edwards, stationed at Chilkoot Banks, Haines, Alaska, 2,400 miles away, tuned in on the program of the Sears-Roebuck Agricultural Foundation's station on the evening of September 19.

Programs

Monday, October 27, Concluded from page 17

hour. 7-7:30, orch. 8-8:30, organ recital. 8:30-10, Navy Day program. 10-11, band.

Tuesday, October 28

WDAF, Kansas City, 411-3:30-4 P. M., trio. 5-5:30, special Hallowe'en program. 5:50-6, marketgram, weather, time and road report. 6-7, School of the Air; the Tell-Me-a-Story Lady; music. 11:45 P. M. to 1 A. M., nighthawk frolic.

WBAP, Ft. Worth, Tex., Star-Telegram, 476-7:30-8:30 P. M., concert. 9:30-10:45, Hawaiian music.

WLW, Cincinnati, 423-10:45 A. M., weather and business. 1:30 P. M., business reports. 3, market reports. 4, lesson in "ILO," the international language; talk, "City Charter Amendment proposed"; followed by program. 10, concert program; other features to be announced. 11:30, Crosley Arabian Nights orch.

KGO, Oakland, Calif., 312-1:30 P. M., stock reports and weather. 4-5:30, concert orch. 6:45, stock reports, weather, S. F. produce news, baseball scores and news items. 8 P. M., concert. 10 P. M. to 1 A. M., dance music.

CKAC, Montreal, Can., 425-7 P. M., kiddies' stories. 7:30, orch.

KGW, Portland, Ore., 492-11:30 A. M., weather. 12:30 P. M., concert. 5, children's program. 7:15, markets, weather, news bulletins and police reports. 8, agricultural lecture. 8:30, concert.

WWJ, Detroit, 517-8 A. M., setting-up exercises. 9:30, special talk. 9:45, pianist and popular songster. 10:25, weather. 11:55, time. 12 Noon, music. 3 P. M., orch. 3:50, weather. 3:55, market reports. 7, orch.; contralto.

KPO, San Francisco, 423-12 M., time; reading Scripture. 1-2 P. M., orch. 4:30-5:30 orch. 5:30-6:30, children's hour. 7-7:30, orch. 8-10, Program by Olympic Club. 10-11, band.

WBZ, Springfield, Mass., 337-11:55 A. M., time; weather; market reports. 6:30 P. M., orch. 7, market report. 7:10, world market report. 7:30, bedtime story. 7:40, orch. 8, "Eternal Youth." 8:15, violin recital. 9:55, time; weather; soprano recital. 11:55, organ program.

Wednesday, October 29

KGO, Oakland, Calif., 312-1:30 P. M., N. Y. and S. F. stock reports and weather. 3, musical program. 4-5:30, concert orch. 6:45, stock reports, weather, S. F. produce news, baseball scores and news items.

KFI, Los Angeles, 469-5-5:30 P. M., news bulletin. 5:30-6, news bulletins. 6:45-7:30, detective stories and orch. 7:30-8, recital. 8-9, program Evening Herald. 9-10, program Examiner studio. 10-11, dramatic program. 11-12, orch.

WDAF, Kansas City, Mo., 411-3:30-4:30 P. M., trio. 5:50-6, marketgram, weather, time and road report. 6-7, School of the Air; the Tell-Me-a-Story

Lady; music. 8-9:15, program. 11:45 P. M. to 1 A. M., nighthawk frolic.

WHO, Des Moines, Ia., 526-7:30-9 P. M., musical program Radio orch.

CKAC, Montreal, Can., 425-1:45 P. M., concert. 4, weather and stock market reports.

KGW, Portland, Ore., 492-11:30 A. M., weather. 12:30 P. M., concert. 5, children's program. 7:15, markets, weather, news bulletins and police reports. 8, concert. 10, dance music.

KFAE, Pullman, Wash., 330-7:30 P. M., cello and saxophone solos; baritone solos; poultry management in Nov.; readings.

KGW, Portland, Ore., 492-11:30 A. M., weather. 10 P. M., dance music.

WWJ, Detroit, 517-8 A. M., setting-up exercises. 9:30, "To-night's Dinner." 9:45, Public Health Service bulletins. 10:25, weather. 11:55, time. 12M., music. 3 P. M., orch. 3:50, weather. 3:55, market reports. 7, orch.; baritone.

WBZ, Springfield, Mass., 337-11:55 A. M., time; weather; market report. 6 P. M., concert by trio. 7, market report. 7:10, information concerning Civil Service examinations. 7:30, Bedtime story. 7:40, concert by trio; pianist. 8:15, Jewish program. 9:55, time; weather. 10, baritone recital. 11, orch. 11:30, songs. 11:45, orch.

KPO, San Francisco, 423-12 M., time; reading of Scripture. 1-2 P. M., orch. 2:30-3:30, orch. 4:30-5:30, orch. 5:30-6:30, orch.

Thursday, October 30

WDAF, Kansas City, 411-3:30-4:30 P. M., trio. 5:50-6, Marketgram, weather forecast, time signal and road report. 6-7, school of the air; address; the Tell-Me-a-Story Lady; music. 11:45-1, Nighthawk Frolic.

WLW, Cincinnati, 423-10:45 A. M., weather and business reports. 1:30 P. M., business reports. 3, market reports. 4, Lesson in "ILO." 8, the Virginia Entertainers, popular music; special program from College of Music. 9, concert and entertainment. 11:30, Crosley Arabian Nights.

KFI, Los Angeles, 469-5-5:30 P. M., news. 5-6, bulletins. 6:45-7, lecture. 7-8, baritone. 8-9, orch. 9-10, Examiner program. 10-11, dramatic soprano.

KGO, Oakland, Cal., 312-1:30 P. M., N. Y. and S. F. stock reports and weather. 4-5:30, concert orch. 6:45, final reading. stock reports, weather, S. F. produce news, baseball scores and news items. 8, "Tarnish." 10-1, dance music.

CKAC, Montreal, 425-4 P. M., weather and stock market reports. 7:45, talk. 8, special entertainment.

KGW, Portland, Ore., 492-11:30 A. M., weather. 12:30 P. M., concert. 5, children's program. 7:15, market, weather, news bulletins and police reports.

WBAP, Ft. Worth, Tex., 476-7:30-8:30 P. M., Quartet Music Company. 9:30-10:45, Chamber of Commerce program broadcast by remote control from Marlin, Tex.

WLW, Cincinnati, O., 423-10:45 A. M., weather forecast and business. 1:30 P. M., business reports. 3, market reports. 4, lesson in French; piano solos; recital. 10, message from the United States Civil Service. 10:30, popular program. 10:30, concert program. 11:30, Crosley Arabian Nights.

WBZ, Springfield, Mass., 337-11:55 A. M., time; weather; market report. 6, ensemble. 6:30, songs. 6:40, orch. 7, market report. 7:10, "At the Theatres." 7:30, bedtime story. 7:45, musical concert. 8:15, talk on astronomy. 8:45, readings. 9, concert (trio). 9:55, time; weather. 10, concert (violinist); (lyric soprano).

WWJ, Detroit, 517-8 A. M., setting-up exercises. 9:30, special talk. 9:45, Public Health Service bulletins. 10:25, weather. 11:55, time. 12 M., music. 3 P. M., orch. 3:50, weather. 3:55, market reports. 7, orch.; soprano. 10, dance music.

KPO, San Francisco, 423-12 M., time. 1-2 P. M., orch. 2:30-5:30, orch. 5:30-6:30, children's hour. 7-7:30, orch. 8-9, organ recital. 9-10, pianist program.

Friday, October 31

CNRM, Montreal, Can., 440-The C N R mixed quartette; address by Boulter, Secretary, Prince Edward Island Potato Growers' Association, "The Rise and Development of the Seed Potato Industry of Prince Edward Island"; baritone solo, A. Fry; Jock Hunter; recitation, Mildred Page; tenor solo, J. A. Brown.

KGO, Oakland, Cal., 312-1:30 P. M., stock reports, weather; 3, musical program. 4-5:30, Ferrera Concert Orch. 6:45, stock reports, weather, produce news, baseball scores, news.

WBAP, Ft. Worth, Tex., 476-7:30-8:30 P. M., musical program by Mrs. H. E. Nash. 9:30-10:45, Walter Collins Fiddlers.

WLW, Cincinnati, 423-10:45 A. M., weather, business reports. 1:30 P. M., market reports. 3, stock quotations. 4, French lesson; musical recital.

KFI, Los Angeles, 469-5-5:30 P. M., news. 5:30-6, news. 6:45-8, organ. 8-9, Evening Herald program. 9-10, studio program. 10-11, vocal concert. 11-12, Ambassador Hotel orch.

WHO, Des Moines, Ia., 526-7:30-8:15 P. M., musical program; pianist, baritone, guitar, banjo and mandolin artists.

KGW, Portland, Ore., 492-11:30 A. M., weather. 12:30 P. M., concert. 5, children's Hallowe'en program. 7:15, markets, weather, news, police reports. 8, popular lecture. 10:30, Hoot Owls orch.

WDAF, Kansas City, 411-3:30-4:30 P. M., trio. 5:50-6, marketgram, weather, time, road report. 6-7, School of the Air; the Tell-Me-a-Story Lady. 8-9:30, orch. 11:45 P. M. to 1 A. M., Nighthawk Frolic.

CKAC, Montreal, 425-1:45 P. M., concert. 4, weather and stock market reports. 4:30, Ilo lessons.

OFFICIAL LIST OF STATIONS

Complete, Accurate, Up-to-date

Send 15 cents for copy of Radio World, issue of Oct. 18, to Radio World, 1493 Broadway, New York City.

MR. D. X. HOUND

A Character Created
by RADIO WORLD Artist

By HAL SINCLAIR



QUESTION AND ANSWER DEPT.

DEAR MR. D. X. DO YOU THINK A TELEGRAPH POLE ON TOP OF A 15-STORY APT HOUSE IS A HIGH ENOUGH AERIAL.—FROM FANNIE' ELGIN, ILL.

NO-FASTEN A MATCH ON TOP OF POLE TO GET RIGHT-HEIGHT

The Radio Trade

Head Sets Outnumber Loud Speaker Sets by 3 to 1 in Manufacture

Tube Sets Lead Crystal Kind 4 to 1—2,601,575 Tubes Manufactured, 1923 Census Shows

WASHINGTON.

THE Department of Commerce announced that, according to the data collected at the biennial census of manufacturers, 1923, radio apparatus to the value of \$43,460,676 was manufactured during the year for sale as such.

This total includes 1,889,614 head sets, valued at \$5,352,441; 508,001 loud speakers, valued at \$5,620,961; 414,588 receiving sets of the tube type, valued at \$12,065,992, and 116,497 receiving sets of the crystal type, valued at \$550,201, together with the other items.

The manufacture of 2,601,575 radio tubes, valued at \$4,572,251, was reported separately. A part of these tubes were sold to manufacturers to complete receiving sets (and their value is therefore included in the total value of such sets, as given above) and the remainder were sold to individual purchasers for use in the construction of home-made sets.

THE NEED OF EFFICIENT CONTAINERS

THE Folding Box Manufacturers National Association, educational in its scope, has for its prime object the production of artistic containers on a large scale and at a minimum of cost. It is also cooperating with the Department of Commerce and the U. S. Chamber of Commerce to eliminate waste everywhere throughout the industry and so to standardize packages as to reach the most economical scheme of production. Radio apparatus manufacturers, radio supply jobbers, radio mail order houses and dealers are all interested in carton work. The cartons are artistically printed in colors, sometimes one or two, but frequently three, four or five, and bearing the brand name or trade mark of the manufacturer of the particular product concerned. An attractive container is considered a very important link in successful merchandizing. The Association will make an imposing display of carton work at the Third Annual National Radio Exposition to point out the desirability of improving the quality of containers used for the various apparatus.

Coming Events

- OCT. 18-25.—Radio Show, Philadelphia.
- OCT. 20-27.—Radio Show, Montreal, Can.
- NOV. 3-8.—Third Annual National Radio Exposition, Grand Central Palace, New York City, under auspices of American Radio Exposition Co., 522 Fifth Ave., N. Y. C. Annual National Radio Convention in conjunction with show.
- NOV. 11-14.—Wisconsin Radio Exposition, Milwaukee.
- NOV. 18-23.—Chicago Radio Fair. They advertise "all space sold."
- NOV. 24 TO 30, INCLUSIVE—International Radio Week.
- DEC. 1-7.—Newark Radio Fair.
- DEC. 1 TO 8, INCLUSIVE—Boston Radio Exposition, Mechanics Building, Boston.

Trade Review

Acme 4-Tube Reflex

THE Gabe Radio Co., 1261 Broadway, New York City, is making up for all purchasers of Acme Kitsets ordered from them the set completely wired and assembled in a fine mahogany cabinet, ready to operate. This set works on a loop.

(Continued on next page)

New Corporations

- Priess Radio Corp., N. Y. C., equipment; 10,000 shares, common, no par value. H. Bogdish, E. F. Meisler, C. Schlitt. Attorneys, Fisher & Deimel, 331 Madison Ave.
- Liberty Radio Stores Corp., N. Y. C. (Delaware corp.), manufacture equipment; \$1,000,000. Registrar & Transfer Co.)
- Radio Securities Corp., N. Y. C.; J. Rice, D. E. Hurwitz, J. B. Arnoff. Attorneys, Nieman & Rice, 160 Broadway.
- CAPITAL INCREASE
Grimes Radio Engineering Co., N. Y. C., \$25,000 to \$100,000.
- DISSOLUTION
Dreadnaught Storage Battery Co., Depew, N. Y.

Literature Wanted

THE names of readers of RADIO WORLD who desire literature from radio jobbers and dealers, are published in RADIO WORLD, on request of the reader. The blank below may be used, or a post card or letter will do instead.

Service Editor,
Radio World,
1493 Broadway, New York City.
I desire to receive radio literature.

Name

City or town

State

- Geo. D. Damron, Box 35, Borderland, W. Va.
- C. Lammert, 71 Broadway, New York City.
- F. W. Rahrer, Anniston, Ala.
- A. M. Beritinger, 2465 Woodbine St., Brooklyn, N. Y.
- C. Monneuse, 262 Crescent St., Brooklyn, N. Y.
- J. C. Sylvester, 68 Ossipee Rd., West Somerville, Mass.
- Roy J. Zimmerman, Pine Grove, Pa.
- F. H. Heath, 28 Richton Ave., Highland Park, Mich.
- William Cause, N2, Hempstead, N. Y.
- Wylie York, 939A 9th St., Dallas, Texas.
- Roy C. Merck, Bogart, Ga.
- R. M. Homer, 5085 Enright Ave., St. Louis, Mo.
- Warren L. Wilkenson, Coatesville, Pa.
- Axel E. Nelson, Gramm, Wyo.
- J. Jendritza, Fargo, N. D.
- J. H. Boekler, Redfield, S. D.
- L. J. Lindell, 1060 Stuart Bldg., Seattle, Wash.
- Lloyd Hickman, Cellet, Ill.
- J. W. Langdon, 115 Scotville Way, Pittsburgh, Pennsylvania.
- Plumas Eureka Mines Co., Johnsville, Cal.
- Clyde Fetter, Pine Grove, Pa.
- M. S. Hall, Pine Grove, Pa.
- H. A. Bringoli, Brimerton, Wash.
- T. H. Bridgewater, 48 9th Ave., Toronto, Can.
- J. H. Warshaw, 7841 Lowe Ave., City, Ill.
- E. Winslow Baxter, 49A Arlington Rd., Woburn, Mass.
- John J. Kasul, 713 Belmont Ave., 2nd Apt., Chicago, Ill.
- Robert Klebe, 1117 Garden St., Ft. Wayne, Ind.
- Henry J. Schroeder, 1424 Whitney Bldg., New Orleans, La.
- Kenneth Huskins, Dayton, R. R. No. 1, Yarmouth Co., Nova Scotia.
- Karl Hedeon, 1821 Keystone Ave., Chicago, Ill.
- Mrs. Eurma Mesla, 73 Madison St., Geneva, N.Y.
- Harold P. Palmer, Osceola, South Dakota.
- Jack Morgan, 152 Glenurban Ave., Battle Creek, Mich.
- J. Bun Colum, Glens Falls, N. Y.
- Herbert A. Moses, 7 Leslie Pl., West Somerville, Mass.
- G. W. Pugh, Garrett, Kentucky.
- Douglass J. Roe, 5401 W. Division St., Chicago, Ill.
- Geo. H. Sund, 2215 94th Ave., Oakland, Cal.
- Emmet Critchlow, 2107 92nd Ave., Oakland, Cal.
- Russell Morris, 1702 Market St., Oakland, Cal.
- W. C. Heinlein, 310 W. 128th St., New York City.
- Edmund Nesbit, Decatur, Ala.
- Simon Kline, Barcelona, S. Y. Calle de Pedralbes 7, Spain.
- W. S. Budd, 5326 Bewick Ave., Detroit, Mich.
- Halton Weatherbee, 32 42nd St., Corona, L. I., New York.
- R. R. Spears, 63 East Ave., Utica, N. Y.
- Louis F. Meyer, P. O. Box 252, Broad Brook, Conn.
- D. Glenn Davis, 1824 Sinclair St., Ft Wayne, Indiana.
- D. P. Schuchard, 250 Bernard Ave., Tottenville, S. I., N. Y.
- H. J. Tandberg, Weldon, Sask. (Dealer.)
- Arthur E. Deek, 79 Box Ave., Buffalo, N. Y.
- S. Soler, Box 1724, Havana, Cuba.

A THOUGHT FOR THE WEEK

It takes more skill to operate a set well than to construct one poorly.

RADIO WORLD

Third Reg. U.S. Pat. Off.



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 Receipt by new subscribers of the first copy of RADIO WORLD mailed to them after sending in their order, is automatic acknowledgment of their subscription order. Changes of address should be received at this office two weeks before date of publication. Always give old address also. State whether subscription is new or a renewal.

ADVERTISING RATES

RATES—Page, 7 1/4 x 11", \$200.00; half page, 8 1/4 D. C. or 5 1/2 x 3" col., \$100.00; quarter page, 4 1/4 D. C., \$50.00; one col., 2 1/4 x 11", \$66.66. \$7.00 per inch. Per agate line, 50c. Times Discounts: 52 Consecutive Issues, 20%; 26 Times Consecutive, or E. O. W. One Year, 15%; 4 Consecutive Issues, 10%.

CLASSIFIED ADVERTISEMENTS

Ten cents per word. Minimum, 10 words. Cash with order.

Entered as second-class matter, March 28, 1922, at the Post Office at New York, New York, under the act of March 3, 1879.

OCTOBER 25, 1924

The Super-Power Obsession

AT the Third National Radio Conference, held in Washington, David Sarnoff, vice-president, stated that the R. C. A. was ready to build a 50-kilowatt broadcasting station on the outskirts of New York City. A 50,000-watt station operation even 100 miles from New York might blanket an area of more than 200 miles.

The limit is now 1,000 watts. WNYC, for instance, is now operating under this power. Cutting through a station like that to get DX is not easy. Now imagine a station of fifty times the power!

Secretary Hoover says that "there will be no monopoly of the air." Maybe the 50,000-watt idea will remain on paper. The small stations objected to it, so did many other interested parties. Some conferees objected, then reconsidered and they became willing to let the test be made—but only as a test. What that test will prove seems clear.



(Keystone)

The Radio Woman

Her activities at work and at play bring her in contact with the most absorbing phases of life, through her set.



HAVE YOU a little radio in your home? Even an opera singer has, and that is a tribute to quality reception obtainable these days. She appears to be enjoying every minute, too. Listening to another opera singer, do you think? Anyway, this radio woman's face beams with entrancement. She turns the dial as readily as she would take a bow at the opera.



ONE OF the marvelous women of the age, blind and deaf, Helen Keller, recently started a national drive for radio for poor, blind children. Miss Keller realizes the blessing that radio is to the blind. Born also mute, she finally mastered speech by her great will.

TRADE REVIEW

(Continued from preceding page)

which is furnished, and being reflexed, does the work of six tubes. It gives the utmost in selectivity, and in good locations, brings in stations 1,000 miles and over. It is operated on one control. It is doubly guaranteed, both by the Acme Apparatus Co. and the Gabe concern, and every part in the set is a genuine piece of Acme apparatus.

(Tested and approved by RADIO WORLD.)

The Filk-o-Leak

THE DX Instrument Company, of Harrisburg, Pa., manufacturers of the Filk-o-Stat, the carbon-compressed rheostat, also are marketing a fool-proof-grid-leak known as the Filk-o-Leak. The instrument is designed for panel mounting, using a single drilled hole. The leads from the leak are brought out from the back of the panel. The two terminals are made so as to allow the placing of a mica grid condenser on the leak, thus eliminating two extra wires. A peep-hole is provided on the front of the instrument for determining the amount of the resistance in circuit. Turn a knob and a number appears, showing the resistance! The Filk-o-Leak is hand calibrated.

(Tested and approved by RADIO WORLD)

Carter Vernier Rheostat

THE Carter Radio Company, of Chicago, markets an exceedingly compact and well engineered vernier rheostat. It is paneled mounted by means of a one-hole lock-nut affair, also by means of three set screws, if it is so desired. It has a remarkably even, continuous motion throughout a 330-degree rotation. It has a positive, phosphor bronze connection, clock-spring fashion, that insures permanent contact, eliminating the possibility of noisy connection due to a worn contact.

(Tested and approved by RADIO WORLD)

Big Demand for Space at N. Y. C. Exposition During Election Week

A PERIOD of remarkable development in the radio industry for 1925 is forecast in the reservations for space already made by leading radio manufacturers and distributors of sets, supplies and accessories for the Third Annual National Radio Exposition, Grand Central Palace, New York City, November 3 to 8 inclusive, said Harold Bolster, director of the Exposition. He added:

"The fact that the exposition this year will be held during Election Week will make New York City the Mecca for radio dealers from every part of the country.

"It is our purpose to make the exposition not only the occasion for the display of the new wares of the industry to the public, but also a forum for the discussion of plans and prospects by manufacturers, jobbers and retailers. The period set apart for the show is especially favorable for this purpose.

"We have set aside the time between 11 a. m. and 1 p. m. daily during the week of the show for the meeting of executives, salesmen and engineers of the industry. The public will not be admitted during these periods, in order that exhibitors may meet and talk with visiting members of the trade free from distraction."

The arrangements made for exhibitors at the Third Annual National Radio Exposition were set forth in detail by J. C. Johnson, General Manager. Both the main and mezzanine floors have been made available for the use of exhibitors.

Exhibitors will share in the proceeds of the event to the extent of 50 per cent. of the net profits. The division will be made in proportion to space.

Admission will be fifty cents, children's tickets 30 cents. Set building and assembling contests for school children will be held.

How Do Your Wife and Radio Get Along?

The Radio Widow Is No More for Women Are Fans Extraordinary

By Richard Barton Hill

HAVE you a wife and a radio in your home? If so, how do they get along? Are they sworn enemies, as the joksmiths would have us believe? Does the wife spend two-thirds of her time protesting against the home being turned into a laboratory and workshop, picking up solder and wires from the parlor floor and wiping up battery acid from the library table?

No. Not any more. Nowadays friend wife is as much interested as the husband in the wizardry and blessings of radio.

Why shouldn't she be? Radio's place is in the home, generally speaking, and in the great majority of American homes, wives are in a position to enjoy radio even more than the men folk.

Women are more dependent than men upon the radio to keep them in touch with the outside world and to bring them the good things of music, lectures, home decoration, fashions, public addresses and all the other cultural and entertainment features with which the radio has enriched modern home life. Furthermore the woman has more time to listen in between tasks (yes, I hear the dissent) than the average husband whose leisure is largely confined to the evening hours.

Radio has a universal appeal for all classes of women, whether housewife or lady of leisure. There is always a program in the air somewhere which will appeal to her or to her guests. It is rapidly assuming an indispensable place in the home. To women in homes remote from urban centers it is little short of a necessity.

The main reason why radio has become so popular with women is that it is no longer a complicated maze of wires and controls such as she used to see her husband struggle with in the early days when he strewed the house with paraphernalia and profanity. Circuits have been developed which require fewer operations and controls than ever before.

The "radio widow," who supposedly sits home and mopes and mourns while her husband neglects her and all her outside social life to listen to the radio, is a new stock in trade for the joksmith. But already it is evident that such "widows" seldom exist except in the funny pictures.

In the average family one would be more likely to find the women as ardently interested in the radio as the men. If there is any real rivalry with the radio, the man is more apt to be the loser than the woman. A sales agent of the Bristol Company confessed to me the other day that on a recent trip he took his set along with him. He had been gone only a few days before he received a letter from his wife. "Please send the set back right away," she wrote, "though you may stay as long as you like. Love and kisses from Mamie."

BRAINARD FOOTE—noted radio authority, describes his favorite receiver in Radio World, issue of October 18. One stage of impedance RF, one transformer RF stage, crystal detector and two audio stages. Four tubes. Great quality set. Send 15 cents for copy of issue or start your subscription with that number. Radio World, 1493 Broadway, N. Y. C.

"ADDING ONE STAGE OF AF" explained in Radio World, issue of Oct. 18. Send 15 cents. Radio World, 1493 Broadway, N. Y. C.

The Radio Primer

(Concluded from page 13)

page. In the case of the variometer, however, minimum will be at 180 degrees or at 100 on the dial.

A split variometer is one in which the two windings are kept separate, that is, not joined end to end. Hence the split variometer is really a variocoupler and, like it, has four terminals. A tapped variometer is one in which a connection is made to the set from the point where the stator and rotor windings are joined. Connections are made also to the two variometer may be said to have three connecting points. A variometer is never tapped at more than the one point. The variocoupler, alone among variable inductances, has a series of taps.

A variometer may be placed in series with the plate lead of a detector tube. That makes the set regenerative, the feedback from plate to grid being accomplished through the self-capacity of the tube elements.

A variometer, using as a tuning element in a detector or radio-frequency amplifying circuit gives greater signal strength than a variocoupler or an RF transformer, which consists of two coils on the same tubing, one the primary, the other the secondary. This is because conductive or direct transfer of energy is greater than by mutual inductance, where the energy has to pass through the air to the adjoining coil.

Another feature of the variometer is that the magnetic fields created, the electrical energy flowing in a restricted area about the windings, may be returned to each other either in a positive or negative manner. When both fields are flowing in the same direction the mutual inductance is positive. If the dial is correctly mounted, as explained heretofore, the positive fields would be represented by the 180° variation from 0 to 100, shown also by the black arrow, (Fig. 3). The negative mutual inductance is represented by the dotted line. Usually little difference is noticeable whether positive or negative mutual inductance is used. The stations that come in at certain dial readings, like 30, 50, etc., will also come in at corresponding points on the unnumbered part of the dial. The negative or reverse flow when used in a detector plate circuit gives the Superdyne effect of counter electro-motive force, as it is called.

Construction Course at Iowa State College

A RADIO construction course will be given at Iowa State College, beginning at 1:00 p. m., Monday, November 17, and closing at 12:00 o'clock Saturday, November 22. This course is open to anyone interested in radio who wishes to spend a week on the construction of a receiving set. There are no fees of any kind for the course, the only requirement being that each person furnish the parts necessary for the set he decides to build. The course is under the Engineering Extension Department, Iowa State College, Ames, Iowa. Personal attendance is necessary. This is not a broadcast feature.



MAGNAVOX Vacuum Tubes

THESE Amplifier and Detector Tubes are a most important contribution to the efficiency of radio reception.

As radio frequency amplifiers Magnavox Type A Tubes are especially useful, having less than one-half the internal capacity of ordinary tubes.

The Magnavox Detector Tube is free from microphonic noises and will operate without a grid leak.



Type A and Type D—Six-volt storage battery tubes with standard base \$5.00

Magnavox Radio Products are sold by good dealers everywhere. Catalog on request.

THE
MAGNAVOX
COMPANY

New York: 350 West 31st Street
San Francisco: 274 Brannan St.

Canadian Distributors: Perkins Electric Limited,
Toronto, Montreal, Winnipeg

The Wonders of the 3-Circuit Set

RESULTS EDITOR:

I READ in RADIO WORLD a letter from a fan in the Middle West who said that he had built a 3-circuit tuner as rec-

ommended by your magazine and that he thought it was a "wow." When he said that, he said a lot, but he didn't tell all the story. Just to show you what that 3-circuit baby can do you have to try it in Providence. There are four local stations here, 261, 273, 286 and 360 meters respectively. As a rule when any two of them are on the air one will interfere with the other.

It so happened that on last Tuesday night the whole caboodle of them were on at once for a few minutes and three were on together for over an hour. It is a safe bet that the crystal sets had a poor time of it.

I live within a mile of all of the stations. With this little set using an Acme low-loss condenser, a Bradleystat and one 201A tube with an indoor aerial, I repeatedly tuned in first one and then another without getting a peep of interference, although the difference in the dial settings for the three lower stations was so slight that I had to use the vernier. The volume from each with the one tube was sufficient to operate the speaker. As DX comes in nice and pretty, what more could I ask for?

V. C. SLATTERY,
Providence, R. I.

The reference is to the following letter published in the October 4 issue:

"Having completed the 3-circuit hook-up by Herman Bernard in the August 2 issue, and finding it a 'wow' and performing to queen's taste, I wish to compliment you.

"H. W. HARMAN.

"537 12th Ave., Wauwatosa, Wis."

WANTED
Representatives, jobbers, dealers in every City, County, State and Country (correspondence confidential), to handle our new line of radio receiving sets—The Ultra Synchrodyne VII and The Paraco VIII. Something worth your while. Stanley's Perpetual Radio Bulb Fuse.
THE STANLEY RADIO COMPANY
2847 Lorain Avenue Cleveland, Ohio

RADIO CABINETS
Shipped knock-down. Each joint fitted. Hinges attached. Oak cabinets unsealed. Guaranteed perfect. Add parcel post charges & remittances. Send for literature.
7 x 12... \$1.30
7 x 14... 1.80
7 x 16... 1.85
7 x 21... 2.10
7 x 24... 2.35
7 x 26... 2.60
Radio Cabinet Co.
1504 Vine St., Philadelphia, Pa.
DEALERS' DISCOUNT

ACME for amplification

The "Goode"
Two-o-One
A
Le Ton d'argent

Guaranteed



BY MAIL ONLY
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Postpaid

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AMPLIFIER-DETECTOR
RADIO TUBE**

GUARANTEED SATISFACTORY

All "GOODE" Tubes Sold Direct to the Consumer—No Dealer Profits.
ONE—"Goode" Detector-Amplifier. **\$2.39**
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(All Postage Prepaid)

The "Goode" Two-o-One A Tube amplifies or detects. It is a quarter ampere, five volts, standard base silvered tube.
Send express or postal money order or New York draft to—
The Goode Tube Corporation
Incorporated
OWENSCRO KENTUCKY

\$4.00 COD SPECIAL
INTRODUCTORY PRICE
For a limited time only, and to introduce this new and superior Storage "B" Radio Battery to the Public, we are selling it for \$4.00. Regular Retail Price is \$6.00. You save \$2.00 by ordering NOW. A finer battery cannot be built than the **World Storage "B" Battery** (12 CELLS—24 VOLTS)

To ten million homes with Radio Sets—and to countless millions of prospective buyers—this WORLD Storage "B" Battery brings a new conception of battery economy and performance. Here is a battery that pays for itself in a few weeks—will last for years and can be recharged at a negligible cost. And you save \$2.00 by ordering now.

A Superior Battery Equipped With Solid Rubber Case Has heavy duty 2 1/8 in. x 1 1/4 in. x 1 1/4 in. plates and plenty of acid circulation. Extra heavy glass jars allow ready observation of charge and prevent leakage and seepage of current. It holds its charge, while idle, at constant voltage. You will find this battery a boon to long distance reception. It does away with a great many noises so often blamed on "static." Mail your order today.

SEND NO MONEY
Just state number of batteries wanted and we will ship day order is received. **EXTRA OFFER:** 4 batteries in series (96 volts), \$15.00. Pay Expressman after examining batteries. 5 per cent discount for cash in full with order. Send your order NOW and save \$2.00.

WORLD BATTERY COMPANY
Makers of the famous World Radio "A" Storage Battery
1219 S. Wabash Ave., Dept. 82, Chicago, Ill.
SAVE \$2.00 BY ORDERING NOW!

NEUTRODYNE KIT \$19.75
Complete kit of licensed Neutrodyne parts including panel, tube sockets, rheostats, jack, fixed condensers and grid leak. Neutroformers complete with variable condensers and neutrodions. Every part included even to screws and wire. Easy read plans.
Send No Money Pay the Postman Order by Postcard
RADIO SURPLUS STORES
HELENA MONTANA

"ONE STAGE OF RF AHEAD OF THE 3-CIRCUIT TUNER," by Herman Bernard. Send 15 cents for the October 18 issue of RADIO WORLD, or start your subscription with that number. RADIO WORLD, 1493 Broadway, New York City.

Improved Radio Reception Through Scientific Tube Tuning
Are You Getting DX?
2c stamp to Dept. RW 1011 brings you this book.
This book will help you get more! It tells how to get greatest DX; clearest signals; most volume.
DX INSTRUMENT CO.
Harrisburg, Pa.

The Ultimate Radio Receiver
THE FLEX-O-DYNE CO.
1674 Broadway (At 52nd St.)
New York, N. Y.
Circle 4569

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MICROTOR
Infinitesimal Control of Condensers and Rotors
1 Division of MICROTOR Knob turns Retor 1-5400 Revolution.
Controls standard dials to and including 4" dia. Easy, Universal application.
50c Postpaid, on receipt of cash.
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The most complete compilation of radio information ever made.

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1133 Broadway New York City

CRAM'S LATEST POCKET MAP in 3 colors, with 16-page log, 40c. The Columbia Print, 1493 Broadway, N. Y. C.

The Loop for Reception

NOT all radio receiving sets can operate with a loop instead of an outside antenna, and not all sets which can use a loop get the best results with it, due to location or shielding. But when a loop can be used, and where no special difficulties arise because of location or other unusual circumstances, loop reception offers advantages. Most aerials pick up the most energy from the direction in which the aerial is pointed. This peculiar property of an aerial is taken advantage of in a loop, which can be rotated at will, thereby increasing the amount of energy from the station desired and decreasing that from the station not desired.

The benefit of the directional effect can be obtained with a loop in a few seconds.

Static is not yet conquered, but the loop controls or minimizes it. A loop will not pick up a large amount of static, which an outside aerial does.

If a loop is used only one control may be required. By turning a single dial the operator can select stations at will without further adjustments. Women appreciate the advantages of a loop, because they are sightly.

Loops make it easier to locate the causes of trouble in a set when such develop.

Wherever a loop can be used, there is very much to recommend it over an outside aerial. Even when distance is desired, sets operating on a loop and having efficient, low-loss condensers get exceedingly satisfactory results. It is not

thought much of a trick nowadays to get the west coast now and then on a good four or five-tube reflex sets, says Acme Co.

HARP TUBES

\$1.00

REGULAR PRICE \$3.75

6 V., 1/4 Amp. Det.

Royal Mfg. Co.
206 BROADWAY
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Something Entirely New!
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10 IMPORTANT FEATURES
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- 3—Absolutely 100% sensitive. No searching for sensitive spot.
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- 7—It is ALWAYS READY—no adjustments of ANY kind needed.
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LOW LOSS TUNERS

MAKE A

3-TUBE RIVAL AN 8-TUBE SUPER

NO METAL—HEAVY WIRE WOUND ON AIR.

Why miss all the advantages of perfect radio reception, true radio economy and general efficiency? Buy Original Globe Coils for better results.*

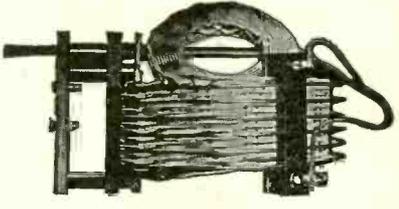
Change your set into a Low Loss and get Exceptional and Efficient Response.

Old type coils with metal parts, small wire and wound on tubing are obsolete. Insist on Globe and get the best.

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Stations to Be Reclassified

(Continued from page 12)
 today practicable over a large portion of the United States. It believes that nationwide broadcasting by interconnection of stations deserves every encouragement and stimulation, and to that end recommends the appointment by the Secretary of Commerce of a continuing committee which will give consideration to the working out of the necessary plans for its full accomplishment.

Higher Power

Some confusion has arisen from the general use of the term "higher power," while as a matter of fact there is a sharp distinction in its significance in two entirely different fields; one, the increase in power

in all stations, the other the so-called "super-broadcasting" stations.

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for the owners of small sets and for those whose homes are far from great centers of population. The true mission of broadcasting will not be realized until its service is
 (Continued on next page)

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 Types 201-A, WD-12, UV-199
\$2.59 each



Absolute Guarantee
 We guarantee to refund your money or replace the Gold-Tones if you are not fully satisfied within 10 days after receipt of same—subject to filament lighting.
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And other Products of Merit

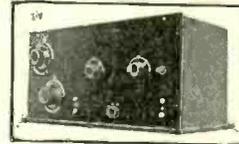
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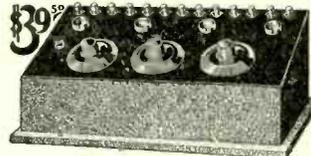
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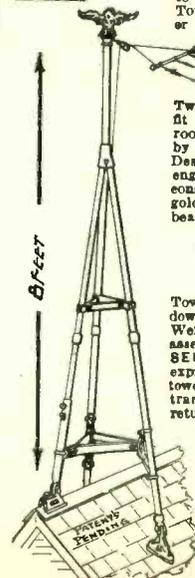
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Operates on a 6 volt storage battery with a plate voltage from 45 to 150 V. Current consumption is .28 amp., equivalent to 201A or C. 301A tubes.

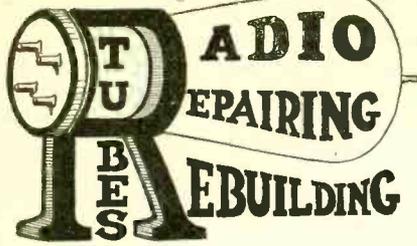
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(Continued from preceding page)

available to each one of them at all times as it is now available in our larger cities. It has been conclusively demonstrated by experimental work during the past year that by the use of higher power only can static and other kinds of interference be overcome, and that some general increase over the 1000 watt limitation now imposed is therefore very desirable. This is especially true as to transmission during the summer and day time. Many listeners have crystal sets and many located in the agricultural regions who are largely dependent upon radio for their immediate contact with the markets, weather reports and news, are not now able to receive such signals continuously. In order that they may have a continual and dependable service an increase of power should be allowed to the stations upon which they are dependent with due regard to distance and interference with other stations.

This, however, presents entirely different considerations from those involved in the

(Continued on page 30)

Federal Standard RADIO Products

Over 130 standard radio parts, each bearing the Federal iron-clad performance guarantee.

Write for Catalog.

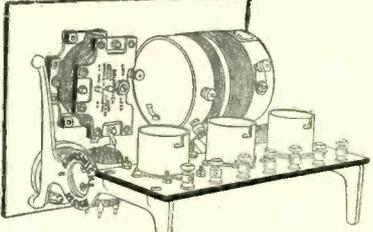
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3 Tubes

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Kit enables you to build set equal to any factory product. The mounting brackets, a recent improvement, bear our own name. The low-loss condenser and coil work in perfect conjunction. All outside metal parts gold plated. Panel and dial engraved in gold.

LIST OF PARTS

1 Drilled 7 x 10 Radiolite Mahogany Panel, Engraved in Gold.	2 30-Ohm Shaktol Bakelite Rheostats.
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1 Triplod Mounting Socket.	1 Set of 7 Instrument Finish Binding Posts completely mounted.
2 Premier Hebeberg Audio Transformers.	1 Special Blue Print for this circuit. Not an ordinary hook-up, but in clear picture form any child can understand and make.
4 Brunswick Underlign Foundation Brackets.	All packed in handsome box.
2 Brunswick Jacks with Gold-Plated Fronts: 1 for phones; 1 for loud speaker.	
1 Freshman Mica Grid Condenser.	Complete Only
1 Standard Glass-Enclosed Grid Leak.	\$27.95 C. O. D.

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Everything needed to operate after building is listed here—

3 Type 201-A Tested Tubes.....	\$10.35
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2 45-Volt Extra Large Enco "B" Batteries.....	6.50
1 pr. 3000-ohm Head Phones and Cord.....	3.75
1 Phone Plug, Double.....	.90
1 Antenna Equipment.....	1.50

Complete outfit (Parts Also Sold Separately).....\$34.25

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(A) Complete Building Kit.....\$27.95

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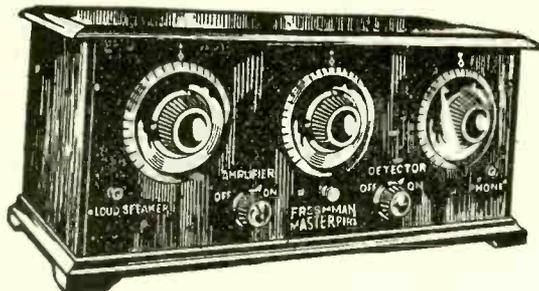
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DRY BATTERY TUBES

equally as well as storage battery tubes because the FRESHMAN MASTERPIECE is balanced within itself and

Does Not Require Neutralizing or Balancing Condensers

We have made the great discovery that U. V. 199 and other dry battery tubes give practically the same marvelous results as are obtained with storage battery tubes.



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Real enjoyable radio with plenty of volume and great distance.

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A 5-tube tuned radio frequency set, costing only sixty dollars, that is the equal, if not the superior, to any 5-tube set in existence, regardless of price. Not only the simplest set in the world to operate, but so selective that stations once logged can be brought in night after night at the same dial settings.

All genuine Freshman Masterpiece Sets have a serial number and trademark riveted on the sub-panel. The Receiver is not guaranteed if number has been removed or tampered with.

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A 2-TUBE and Crystal Reflex, by Byrt C. Caldwell, described in Radio World, issue of Oct. 11. Send 15 cents. Radio World, 1493 Broadway, New York City.

FALL BUYERS' NUMBER OF RADIO WORLD dated September 27 sent on receipt of 15c.

Cold Waves More Than Double the Strength of Signals

WASHINGTON.

COLD waves affect radio transmission, according to recent observations taken at the Bureau of Standards, on day-

light signals from the long-wave transatlantic stations at New Brunswick and Tuckerton, N. J. The signal strength was found to be quite uniform during most of the year, as was to be expected from the moderate distance of transmission, but with the coming of the cold waves the signals rose to more than twice their normal strength.

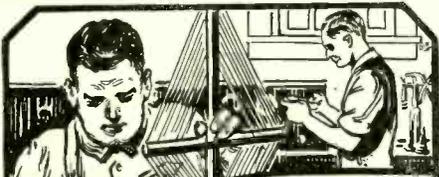
At the same time there were deviations of many degrees in the apparent directions of the sending stations, as indicated by the radio compass, even in the forenoon when long-wave compass bearings are generally free from errors.

The end of the series of cold waves did not at once restore transmission conditions to the uniformity of autumn and early winter but left a condition of instability which persisted through the comparatively mild cold of February and early March. During this time the signals frequently fluctuated, going to high values for a few hours and then returning to normal without any obvious connection with weather conditions. After March 19 these irregularities entirely ceased and transmission again became normal.

Observations on other long-wave stations indicate that these large variations do not occur at a distance of 50 km, that they are large at 250 to 300 km, and are again less at 400 to 700 km.

There is at present no definite explanation of this phenomenon. The cause is evidently atmospheric and the connection with the cold waves suggests that either the part of the atmosphere concerned with the signal variations lies much be-

low the Heaviside layer (80 or 100 km) or that whether phenomena are correlated with atmospheric action at much greater heights than has been hitherto supposed.



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 Genuine New Radiotron or Cunningham Tubes
 UV-199—200—201A—WD-11—12..... **\$3.39**
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 2 1/2 Volt large size \$1.68—4 1/2 Volt \$3.00 also \$3.85
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NATH. BALDWIN HEADSET
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Every Neutrodyne Receiver requires audio transformers which are especially built for this circuit. Build right by selecting SUPERTRANS first! Greatest volume. Least distortion.

The Supertran is shielded to prevent damage to the coil in mounting.

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6-Volt 11 Plate, \$12.25	6-Volt 60 Amps. 6 \$ 8.50
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Special 2-Volt Storage Battery for W.D.11 and 12 tubes. Will run 200 hours on one charge. Rechargeable. \$5.00.
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 proves satisfactory World performance. Mail this ad with your name and address and we will ship battery day order is received; and give you a 45-Volt "B" Battery and Hydrometer Free with each battery purchased. Write today.

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COMPLETE INDEX OF RADIO WORLD, January 5 issue to September 20, inclusive, published in the October 18 issue. Send 15 cents to RADIO WORLD, 1493 Broadway, New York City.



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NEW HOWARD 5-TUBE NEUTRODYNE

This Remarkable Set has Created a Sensation Among Radio Enthusiasts.

Beautiful Walnut Cabinet with Special Howard Neutrodyne, Tube Sockets and Rheostats.

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 Other Patents Pending

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Crystal AF Amplification Being Tested by U. S.

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undergo a slight expansion or contraction when an electrical voltage is applied to them, and vice versa produce a slight voltage when compressed or pulled. Such crystals (quartz and rochelle salt) were developed during the war as submarine detectors, since when placed under water they respond to the sound vibrations produced by the propeller of a submarine. Any piece of quartz crystal has certain natural frequencies of vibration, like a tuning fork, except that the frequency is very high. A piece of quartz crystal 1 or 2 inches long has a natural frequency of the same order as the frequencies of currents used in radio communication. American investigators have found that the frequency of vibration of the piece of quartz is extraordinary constant, and that it is very useful as a radio standard.

oscillator has many valuable applications in radio work. Means of producing audio as well as radio frequencies are being worked out. The crystals can be used to control or determine the frequency of a transmitting station and to hold it strictly constant. This will mean:

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Keep a permanently bound record of all stations you have received and how you received them. Radio Record 5 1/2" x 14"—500 lines. All broadcasting stations listed, and indexed with space for new stations—\$1.00 Postpaid.

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Mail orders solicited and promptly attended to.
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Clinton-Hill Station Newark, N. J.

HEADQUARTERS for the SUPERDYNE

David Killoch Company

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Low Loss

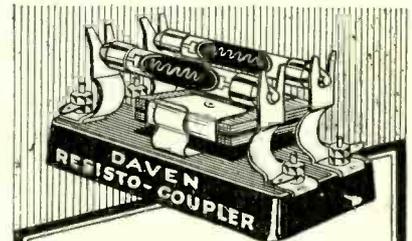
Parts increase quality and distance. You can convert your present variable condensers and variocouplers into the low-loss type very easily and without any expense.

How this is done is explained by Dennis J. O'Flaherty in RADIO WORLD, issue of July 5, 1924, in an illustrated article, "Avoiding Losses Due to Insulation."

If you want to make an entire variocoupler yourself you will find it easy by following directions given by Byrt C. Caldwell in his illustrated article, "A Low-Loss Tuning Coil," in the August 2 issue. 15c a copy. Order both today, 30c. Or start subscription with either number. Radio World, 1493 Broadway, N. Y. C.

The quartz crystal may be used as a standard in numerous ways. In one method it forms an auxiliary condenser in a resonance circuit, and when the current in the circuit is made to have a frequency equal to that of natural vibration of the crystal there is a definite power absorption from the circuit. In another method the quartz crystal, in association with a small electron tube, acts as an oscillator or generator of a current the frequency of which is that of mechanical vibration of the piece of crystal. As the frequency thus produced is accompanied by numerous harmonics, the crystal is a standard giving several radio frequencies. It is thus a supplement to the wave meters which have hitherto been used as standards of radio frequency. It appears to be a standard of greater constancy than the best wave meters.

Studies being made by the Bureau of Standards indicate that such a quartz



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—and is inevitable with so fine and worthy a product. But an imitation rarely satisfies.

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Get from your dealer the DAVEN "RESISTOR MANUAL," a practical handbook on Resistance Coupled Amplification. By Zeh Bouck. Price25c

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"Resistor Specialists"
Newark, N. J.

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Latest master-product of the Paramount Radio Corporation.

Spider-web wound with silk over phosphor-bronze wire, mounted on a genuine Bakelite frame (lowest in dielectric losses) the **PARAMOUNT LOOP** gathers and sends direct to the receiver every electron of current, giving, to a surprising extent:

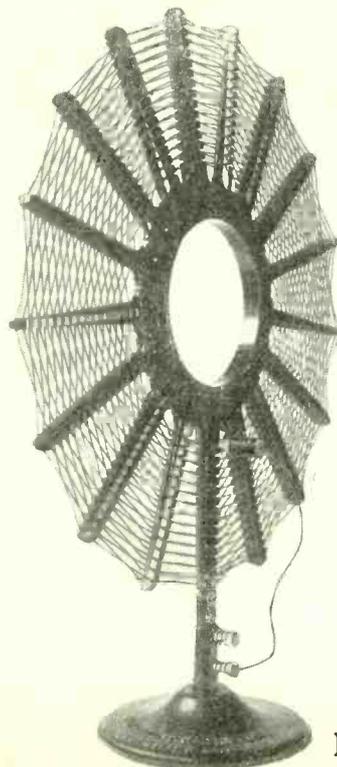
Greater Volume! Greater Clarity!
Greater Receivability!
Greater Directional Effect!

If not obtainable at your nearest Radio Shop, we will fill your order direct upon receipt of money order covering regular retail price—\$12.

"A Loop Eventually—Why not the Best?"

PARAMOUNT RADIO CORPORATION
23 CENTRAL AVENUE NEWARK, N. J.

Jobbers and Dealers, Get In On This!



Patent Pending

Super-Power Test Approved

(Continued from page 27)

so-called "superpower" stations which contemplate the use of power up to 50,000 watts. The conference has been strongly urged to

recommend the abolition of all limitation on power, but it refuses to do so. There has been no experience in this country and little anywhere else in the world with broadcasting by stations of such power. In the absence of actual knowledge of their effect or usefulness, the conference refuses to recommend any authorization of the general issue of licenses for stations of this character. The conference does recommend that experimentation should be allowed but that this experimentation be carried on under strict limitation, so that it be without interference with the service of any other stations or with the reception now enjoyed by listeners. Only after such experiments have been made will it be possible to determine whether such broadcasting will interfere with the existing system or whether it will be in public interest.

The conference is unalterably opposed to any monopoly in broadcasting.

Allocation of Wavelengths

It is recommended that the Department of Commerce set a time (November 15 tentatively suggested) after which no licenses of the present Class C (833 kilocycles, 360 meters) will be renewed. This will make possible a very material gain in the number of channels available for Class 1. Frequencies between 790 and 870 kilocycles (380 and 345 meters) are not at present assigned. Furthermore, no frequencies above 970 kilocycles (309 meters) are now assigned to Class B stations. In view of the contemplated further elimination of ship transmissions on 1000 kilocycles (300 meters) it will be possible to assign Class B frequencies up to a considerably higher limit. It is

now recommended that broadcasting stations be divided into three classes, as follows:

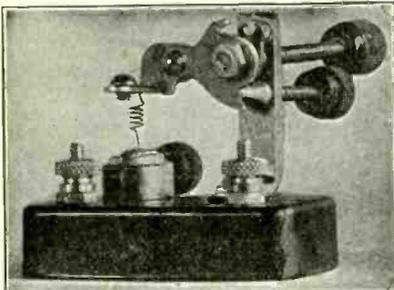
Class	Kilocycles	Meters	Number of Channels
1	550 to 1070	545 to 280	53 plus 10
2	1090 to 1400	275 to 214	32
3	1420 to 1460	211 to 205	5

The above recommended frequency limits involve practically no change in the number of channels available for Class 2 Stations (old Class A), there being 32 channels as against 31 channels heretofore.

It is recommended that all broadcasting stations which use less than 100 watts power be assigned frequencies in Class 3. This

(Concluded on next page)

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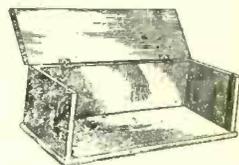
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Federal	Stasco, 30 Ohms	.79	Erla Reflex	3.95
Ditograph			Rasla RT6	3.00
Brandes			Rasla CR	3.25
Baldwin Type C			Owl	.65
Ambassador			UV 1714	3.60
N. & K.			RR 1716 Super-Het.	6.75
Scientific				
	SOCKETS	\$0.79		
	Fada	.35		
	Tillman	.50		
	DeForest	.75		
	Hoosick Falls	.40		
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	Federal	.89		
	General Radio	.60		
	Workrite, 199			
	TRANSFORMERS—PUSH PULL	\$9.90		
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	Thordarson	3.20		
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	TRANSFORMERS—RADIO	\$3.50		
	Acme, R-2, 3, 4			
	CHARGERS			
	Rectigon, 2 Amp.	\$15.40		
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Brooklyn, N. Y.

Less Radiation, Experts Request

(Continued from preceding page)
 provision should result in great improvement in the service rendered by Class 2 (old Class A Stations) since they will be relatively free from local interference produced by the stations of very small power which, on the average, furnish a grade of program which is of only local and limited interest.

It is recommended that manufacturers and organs of publicity make a concerted effort to make the higher frequencies of

Class 2 and those of Class 3 actually available to the public through encouragement of the design and use of receiving sets to cover this range. It is possible by the use of various expedients to reach these frequencies with most of the receiving sets in use, and it would be highly desirable that manufacturers so design receiving sets that the higher frequencies will be less crowded together on the dials.

Interference

Part of the disturbance from electrical devices is practically inevitable and must be regarded, like atmospheric disturbances, as part of the inherent limitation of radio reception. In other words, the limitation upon radio reception is not only the distance and the power of the transmitting stations, and the sensitiveness of the receiving set, but also the omnipresent background of slight electrical disturbances which drown out signals below a certain intensity. This background of electrical disturbances is the underlying reason why reception from local stations is inherently superior to reception from distant stations.

The ratio of signal energy to the energy of other electrical disturbances present is of first importance in this regard and it is to be expected that the tendency toward higher power stations will have considerable effect in reducing instances of interference.

A detriment to radio reception is interference from radiating receivers. No type of receiver necessarily radiates of itself, but certain types may do so when improperly constructed or operated. These are types in which local oscillations either are produced continuously or may occur temporarily during adjustment. Even these types will not radiate when the oscillation is prevented from reaching the antenna circuit by the interposition of a one-way repeater tube, and they will ordinarily radiate too weakly to cause considerable interference when used in conjunction with a coil antenna instead of an open antenna.

It is recommended that manufacturers and home-builders take steps to eliminate or at least minimize interference, particularly as follows:

(a) Particularly for receivers to be used in congested areas, preference should be given, as far as permitted by conditions of

economy and convenience, to receiver types which cannot radiate or can radiate only weakly.

(b) Receivers which continuously oscillate should be provided either with means for preventing the oscillations from reaching the antenna circuit or else with a coil antenna, or with both.

(c) Receivers which may oscillate temporarily during adjustment should be arranged so that such oscillation can readily (Concluded on next page)

Valuable Recent Numbers of Radio World

Complete your file if you have missed any summer numbers of Radio World while on your vacation. Do not fail to get the following numbers:

- June 14—How to Build a Set Like King George's. By Chas. H. M. White.
A Super-Power 4-Tube Reflex. By Byrt C. Caldwell.
- June 28—Nineteen Ways to Erect an Antenna. By P. E. Edelman.
- July 12—A 1-Tube Set That You Can Log. By Herman Bernard.
- July 19—Loops. By E. J. Bongart.
- July 26—A New 4-Tube Reflex Super-Heterodyne. By Chas. H. M. White.
1,500 Miles on 2-Tubes. By Herman Bernard.
- Aug. 2—The 3-Circuit Tuner, Using Your Present Variocoupler. By Herman Bernard.
- Aug. 9—Dynoflex, a 1-Tube Loud Speaker Set. Crystals as Oscillators and Amplifiers. (Part I). By Neal Fitzalan.
- Aug. 16—A Low-Loss Neutrodyne (Part I) Using Radio World's Highly Efficient Home-Made Dynocoils. By N. N. Bernstein. How to Build a Unit to Light Your Amplifier Tubes on AC. By Brainard Foote. Crystals as Oscillators and Amplifiers. (Part II, Conclusion). By Neal Fitzalan.
- Aug. 23—A Low-Loss, 1-Dial, 1-Tube Set. A Selective Crystal Set. By Herman Bernard.
Completing the Low-Loss Neutrodyne. (Part II). By Walter Scott, Jr. Use and Care of a Storage Battery. By N. N. Bernstein.
- Aug. 30—Low-Loss Antenna and Ground. Has the Same Effect as Adding an Extra Tube. How to Make a Wavemeter. By Brainard Foote. Lacault's Ultradyne (Part I). By Byrt C. Caldwell.
- Sept. 6—The Simplified Neutrodyne. By J. E. Anderson.
New Radio Corporation Super-Heterodyne. By Walter Scott, Jr. Use and Care of a Storage Battery. By N. N. Bernstein.
- Sept. 13—Tubeless Set Works Speaker. The Reflex Masnadyn. Low-Loss 3 Circuit Tuner. By Neal Fitzalan.
- Sept. 20—Tubeless AF Amplifier. Making a Fixed RF Transformer. A Handy Experimental Layout. By H. Bernard.
- Sept. 27—The Best Set for Your Location. A 1-Tube No-Crystal Reflex. A 2-Tube One Control Crystal Reflex. How to Construct 3 Stages of Resistance A. F. The 4 Most Popular Circuits. Complete List of Radiocasting Stations. How to Construct a Telephone Relay for Tubeless AF. By A. F. Lapierre.
- Oct. 4—A Dandy 1-Tube DX Set. The A B C of the Tube Circuit. A Fine 4-Tube RF Receiver. By Herbert E. Hayden. By N. N. Bernstein. By Byrt C. Caldwell.
- Oct. 11—Recipes for Cooking Up Some Stunts in Your Home. 1-Dial DX Set Works Speaker. A Low-Loss 2-Tube Reflex. Non-Radiating Regeneration. By Herman Bernard. By Brainard Foote. By Wainwright Astor. By Byrt C. Caldwell.
- Oct. 18—4-Tube Quality Set, My Favorite Receiver. RF Ahead of the 3-Circuit Tuner. 1-Tube DX Set Costs \$14 Complete. A Great Low-Loss Coil. By Herman Bernard. By Wainwright Astor. By Byrt C. Caldwell.

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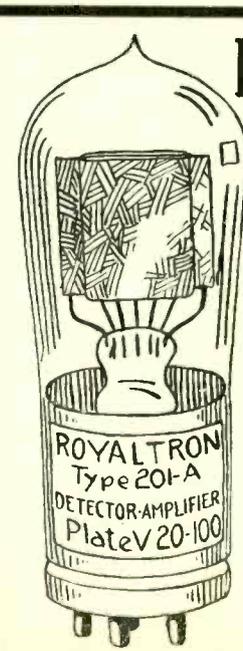
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Taking No Chances On Super Power

(Concluded from preceding page)

be avoided by proper manipulation. It is further recommended that the Department of Commerce, through its own publications and by continued cooperation with radio magazines, newspapers and other publishing agencies, conduct a campaign of education, directed to the owners of receivers which can radiate, instructing them in the nature of the interference which they cause and in the proper methods of operation to minimize or eliminate interference. Con-

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Hang between walls close to ceiling—Cage type—Displaces outside Antenna
DISTANCE-SELECTIVE-NOT A LOOP
but a full size aerial with 112 feet stranded copper wire in a compact form
NOT AFFECTED BY WIND, RAIN, SNOW OR LIGHTNING
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WINDING A LOOP ON A PHONOGRAPH RECORD, by Herbert E. Hayden, Sept. 13 issue Radio World, 15 cents.

siderable fear now exists among broadcast listeners and owners of existing broadcasting stations that the use of appreciably higher power in broadcasting stations over that now permitted may adversely affect the reception of a large number of listeners. The benefits to be gained by the general public from such action seem, however, to warrant the development of such a service in an experimental way subject to careful observation of results and its cessation if the benefits expected are not attained without equal detriment in other directions. By reason of the lack of data in this field, it seems unwise to limit this experimental work by restrictions on the power employed, the variation of power with seasons or hours of the day, or the progressive use of increasing power as results seem to warrant. It does appear essential, however, to locate such stations at such distance from populous centers that such centers will not be subjected to intensity of signals in excess of that now produced by authorized stations in their midst. From such data as are now available, it is believed this object will be attained if the station is so located with respect to populous centers that the distance between it and the boundary of such community will not be less than the quotient obtained by dividing the product of antenna current in amperes times effective antenna height in meters by a constant tentatively set at 100. Experience may make it advisable to modify this constant but it seems sufficiently conservative to serve for the initiation of this experimental work.

PRE-AMPLIFIER

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Makes Distant Stations Sound Like Local Ones

THE TWITCHELL PRE-AMPLIFIER is a Powerful Radio Frequency Amplifier attachable to any make of receiving set. It brings in many distant stations which you cannot hear without it. Brings in with tremendous volume these you now hear only faintly. Makes your set selective. Prevents re-radiation.

Price, complete with tube, prepaid

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Diagram of circuit, \$1.00

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City and State

Station Has Right to Broadcast Copyright Music, Court Holds

FEDERAL JUDGE KNOX, in New York City, denied a motion by the American Society of Composers, Authors and Publishers for an injunction restraining WGY, Schenectady, N. Y., from broadcasting copyright music. The judge held that singing or playing a song before the microphone is not a "performance" by the station, whatever may be said of the singer's or player's act. Judge Knox in his opinion said: "By means of the radio art he (the broadcaster) simply makes a given performance available to a great number of persons who,

but for his efforts, would not hear it. So far as practical results are concerned, the broadcaster of the authorized performance of a copyrighted musical selection does little more than the mechanic who rigs an amplifier or loud speaker in a large auditorium to the end that persons in remote sections of the hall may hear what transpires upon its stage or rostrum. Such broadcasting merely gives the authorized performer a larger audience and is not to be regarded as a separate and distinct performance of the copyrighted composition upon the part of the broadcaster. When allowance is made for the shrieks, howls and sibilant noises attributable to static and interference, the possessor of a radio receiving set attuned to the station of the broadcaster of an authorized performance, hears only the selection as it is rendered by the performer. The performance is one and the same whether the 'listener in' be at the elbow of the leader of the orchestra playing the selection, or at a distance of a thousand miles."

used to provide for the transmitter being worked close to the fundamental wavelength of the antenna in order that it may radiate efficiently.

The antenna consists of a four wire flat top supported by 137 feet above the roof by steel masts. A lead is brought from this directly to the transmitter on the eighth floor of the store. Brackets are used to keep the lead in free from the building. The steel frame of the building is used as a ground.

Storage batteries furnish the power supply for the transmitter. A 900-cell battery, with a current capacity of 20 ampere hours, furnishes 1600 volts for the main plate supply.

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MOUNTED, UNMOUNTED, BULK
Packed under your own label if desired.
Dealers and Jobbers—Write us for lowest prices on Quality Crystals.
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\$15 Set Gets 2,000 Miles
The Essex Radio Special, the receiving set with a conscience, gets you more distant stations clearer and sweeter than sets costing ten times its price. \$15 Set complete with cabinet, without tube or batteries. \$20 Set complete with cabinet, tube and batteries.
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Describes fully the complete line of radio frequency sets, regenerative sets (licensed under Armstrong U. S. Patent No. 1,113,149) and parts.
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1000 MILES ON A LOOP!
THE FAMOUS **ACME**
4-tube REFLEX
Known nationally for its wonderful Selectivity, Volume—Clarity of Tone and DX Qualities.
4 TUBES REFLEXED GIVE RESULTS OF SIX.
Many of our customers tell us that this set gives them better satisfaction than Super-heterodynes and other high-powered sets.
We will build this set for you, using a genuine ACME KIT—KIT assembled and wired in beautiful mahogany cabinet ready to operate, with loop.
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THIS IS WHAT YOU WOULD PAY FOR THE KITSET ALONE
This Set Retail Would Cost \$125
Absolutely and Unqualifiedly Guarantee Satisfaction
The KITSET is Guaranteed by Us and ACME APPARATUS CO.
Days' Trial—Refund if Not Satisfactory
LABE RADIO CO.
Broadway New York City
Mail Orders Given Prompt Attention

Gimbel Station in N. Y. Opens Oct. 26

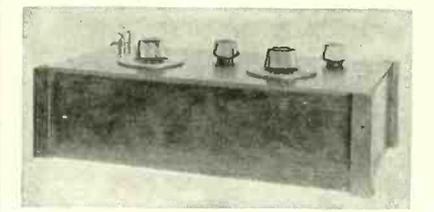
BECAUSE of the success Gimbel Brothers met with its broadcasting station WIP in the Philadelphia store, the New York store will also have its own broadcasting station, which will begin its program on Sunday evening, October 26. This new station which is to have the call letters WGBS, will operate on a wavelength of 316 meters (949 kc.). The transmitter proper is the Western Electric type 1B, consisting of two 250-watt oscillator tubes and two modulator tubes of the same rating. The oscillators are arranged in a Meissner circuit slightly altered to provide a separate circuit for the suppression of harmonics. The plate and grid coils are mounted in inductive relation to a variometer consisting of a few turns of heavy wire by means of which the antenna circuit is tuned. Fixed series condensers are

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Holds Bus Wire Like Clip!
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that some radio weeklies seem to give some big manufacturers, who are determined to get their high prices at all hazards, all the better of it, and seem to freeze out the other fellows. This does not seem right to me, hence I enjoy this opportunity of praising your fairness. It is not the province of a magazine, which should be an agency mindful only of the welfare of its reading public, to constitute itself the instrumentality of any clique. I feel safe in my supposition that you do not allow yourself to be bought off and allow me to add my little meed of encouragement of your independent conduct.

I have compared prices steadily for a year and a half, during all which time I have been a constant reader of RADIO WORLD, and I find that the prices of articles advertised in your magazine are indeed fair. That has nothing to do with you primarily, as the price is the manufacturers' or distributors' business, but you let it remain their business, which is the salutary thing, and do not allow yourselves to become the tool of the huge-profit clique. As one who has bought hundreds of dollars' worth of goods from your advertisements on the strength of their ads in your magazine, I can truly attest to the fact that quality of products has been uniformly high, thus squelching the familiar deceitful alibi.

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1. Title and scope of the proposed address are to be submitted before scheduling the feature on the program.
2. Date and hour are to be fixed by the Wednesday of the week preceding the proposed address.
3. All addresses are to be read from typewritten copy and only in exceptional cases are addresses to be permitted to exceed twelve minutes in length.
4. This typewritten copy is to be submitted to you at least three days prior to the time set for the address.
5. While no strict censorship is desired, the typewritten copy is to be read in advance to prevent the broadcasting of anything objectionable,

uninteresting or of an advertising nature.

6. When in doubt, consult me. Maj. General John F. O'Ryan, Transit Commissioner, who was in controversy with Mayor Hylan (both Democrats) over traction policies, submitted his proposed speech for a 30-minute broadcast, which he demanded as his right, as the Mayor used up 30 minutes voicing his own views and attacking O'Ryan.

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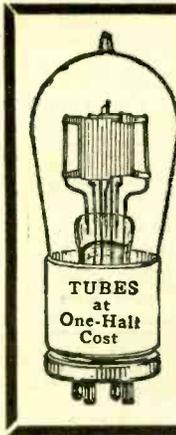
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