Oct. 4 **BY HAZELTINE:** *Set Can Be Too Selective* 15 Cents

RADIO WORLD

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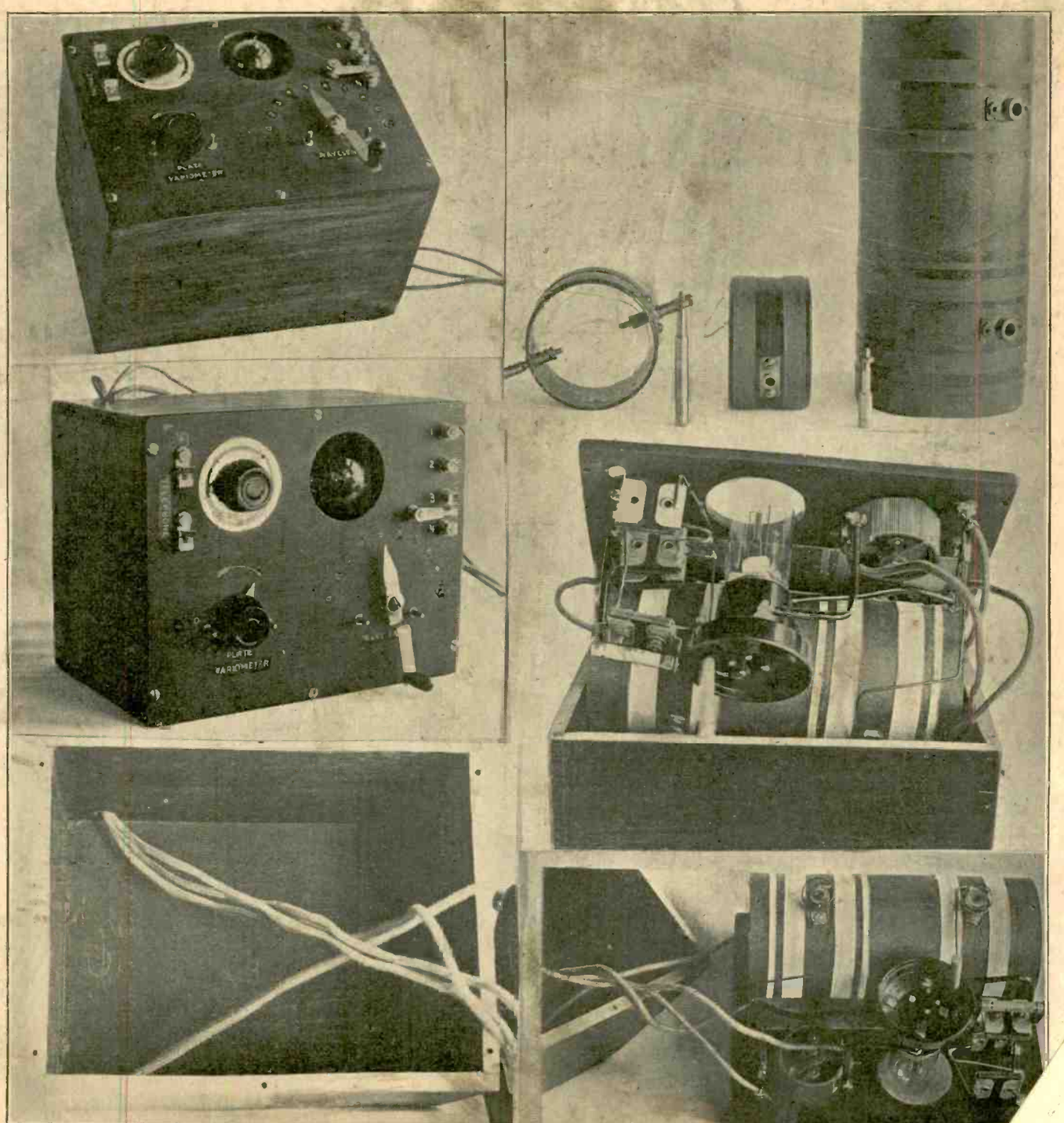
VOL. 6. NO. 2. ILLUSTRATED EVERY WEEK



AT LEFT, top to bottom, Figs. 1, 2 and 3; right, Figs. 4, 5 and 6 of dandy 1-tube set. See page 1.

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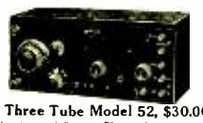

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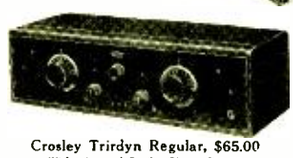

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VOLUME SIX OF

RADIO WORLD

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A Dandy 1-Tube DX Set

How to construct a Set Like an Efficient Commercial Model, Using Only a Detector Tube, However, and Omitting the AF Stage

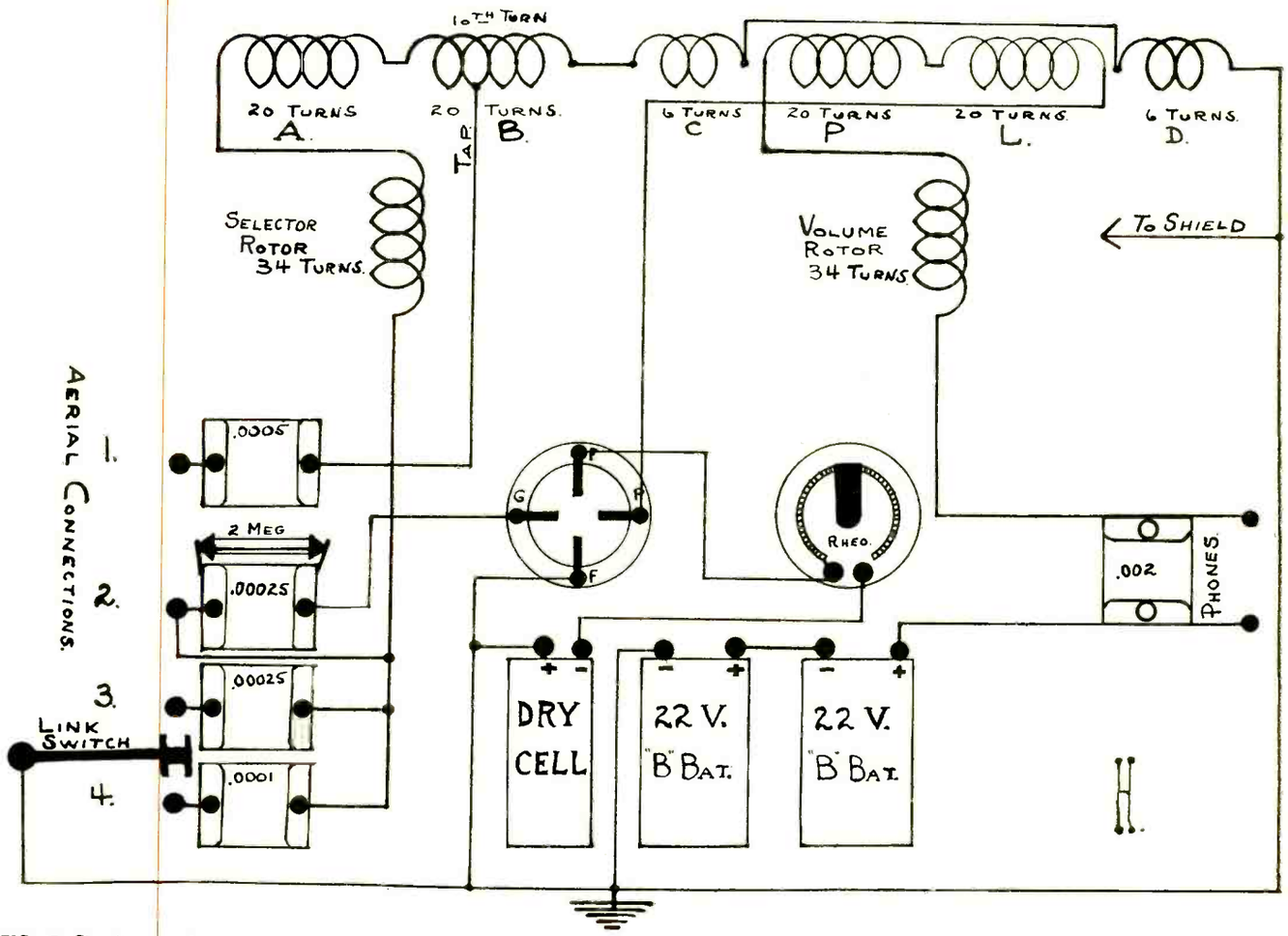


FIG. 17—Circuit network of the regenerative 1-tube set patterned after the Radiola III. This is a very efficient receiver and great for volume, DX and selectivity. Herbert E. Hayden's explicit exposition, with profuse illustrations, renders the construction of this desirable receiver an easy matter. The 11 tube is used, with 1½-volt dry cell and 45 volts of B battery. Note that no variable condenser is used in this cricuit. Inductance is always to be preferred to capacity for best quality of tone and volume.

By Herbert E. Hayden

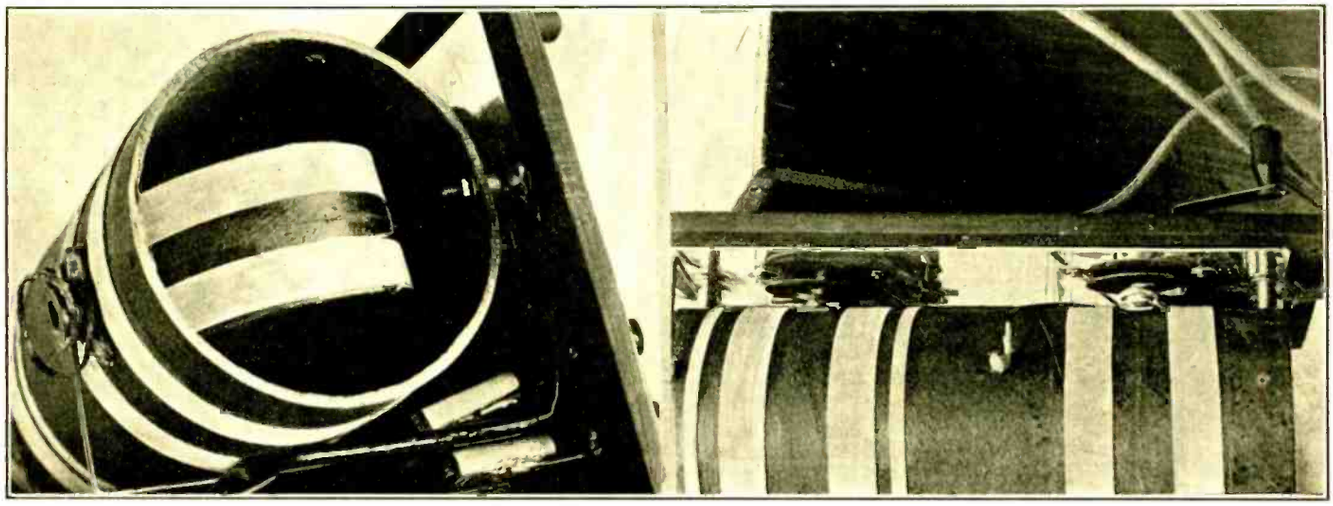
ONE of the most satisfactory Radio receivers of the 1924 season, from the viewpoint of utility, selectivity and ease of operation, is the Radiola III. The construction, mechanically and electrically, reduced to simple lines, is extremely efficient. As a DX getter it is astonishing, to say nothing of the remarkable volume from stations nearby.

The finished home-made set is shown in Fig. 1, on the front cover of this issue. While it has the same general lines of the Radiola III, only one tube is used instead of two. The one tube proved extremely satisfactory on long distance, even with several sets of head phones connected together. As one step of audio, as in the commercial set, is not enough for speaker operation, it was omitted. For speaker operation, two stages of audio-frequency are necessary, using some good make of low-ratio transformers. Hence one alone does not fit the bill.

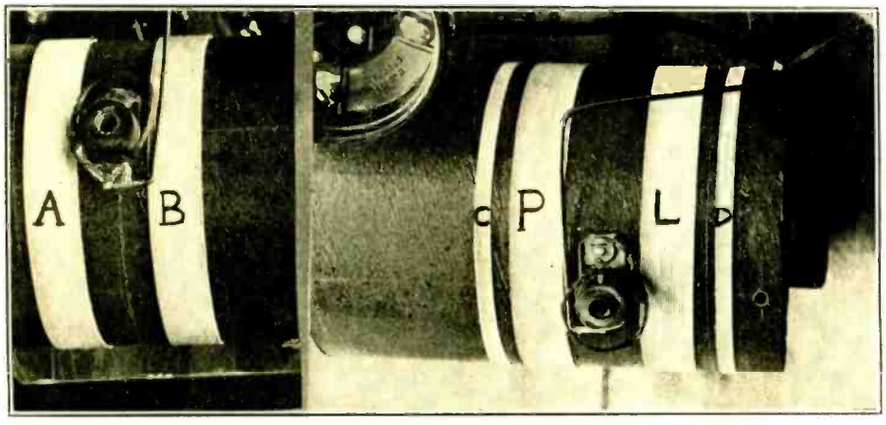
A view of the panel, showing the method of bringing the three connecting wires from the case, is shown in Fig. 2 (front cover). The case (Fig. 3) measures 8″ long, 6″ wide and 5″ deep. It was constructed of 5/16 white wood and stained walnut color.

Notice the method of bringing in the connecting wires at the extreme left lower corner, (Fig. 3). The wire running to the front of the cases connects with a

Winding and Placing Coils



THE ROTORS (Fig. 9, at left) are wound on 2½" diameter tubing, 1⅜" high, and have 17 turns each. Notice that pigtail connections are used, as these afford secure contact. The coiled pigtail may be plainly seen at left in Fig. 9. The objects at lower right in this photograph are fixed condensers. The photograph at right (Fig. 10) shows the aluminum shield, placed 1" in front of the tuner unit and connected to ground.



TWO VIEWS of the stator windings are shown in Fig. 7, above, at left. For Figs. 1 to 6, inclusive, see front cover. In Fig. 7 A has 20 turns of No. 26CCC wire, and so has B, but B is tapped at its tenth turn, or the thirtieth turn from the beginning, because A and B are a continuous winding. The tap is carried out to binding post No. 1. (See Fig. 2 on front cover).

shield (not shown), which in turn is grounded. This is very important, as is also the shield on the rear of the panel, to be described later. Four small rubber feet, otherwise known as "rubber-covered tacks," are driven into the base of the little box to avoid scratching the table.

Referring again to Fig. 2, we find that the panel, which is ¼" bakelite, has been cut to just fit evenly on top of the box.

The upper left-corner of the panel (Fig. 2) has the two Fahenstock binding posts for connection to the telephone tips with one post marked with the plus sign.

This is highly important for a good telephone set gives a much better result when the current passes through the windings in the proper direction. In the Radiola III, the "telephone tip jack" method is used, but Fahenstock posts are simpler and cheaper stock. If you can get the kind made of phosphor bronze, so much the better, as they will make a good biting contact.

Next we have the rheostat. It must be a good one. I used a General Radio rheostat with a Pacent dial on it. This is a rather queer combination, but it carries out the general idea and layout of the real thing.

Next a 2" hole is cut through the panel to provide an easy means for placing the WD11 tube in the socket. As the exact placing of the tube is not important (about 2 inches from the right hand side of panel) no dimensions are necessary as the builder will get the general idea of the construction from the illustrations.

At the extreme right-hand side of the panel (top), it will be noticed (Fig. 3) that four small binding posts have been arranged in a line and numbered 1, 2, 3 and 4. About an inch to the left, and between posts 3 and 4, another little binding post is fitted with a small brass swinging arm or "switch." A piece of stiff wire or bus-bar will do just as well. This switch serves a very definite purpose and will be described.

At the left of the panel (bottom) we have a small knob and pointer marked "Plate Variometer," which is the regeneration scheme of the outfit. The handle on the right controls the wavelength.

This arm is made of a thin piece of brass about ⅜" wide and about 1/32" thick, bent and filed into shape. It travels over the figures arranged in a 3" semi-circle.

The lettering and numbers are placed on the panel by the "transfer process."

Two switch stops are arranged both on the plate variometer control and on the wavelenfth handle and prevents the rotors from turning more than the necessary distance in either direction.

This is all there is to the top of the panel. It's a simple job and you don't need a machine shop to perform the work. This being the case let's lift the panel up (Fig. 5, front cover) and see what there is to the works. Notice the way the socket is mounted. The wiring is done with No. 14 HD copper wire and this acts as a sort of cradle suspension and kills any tube noises.

A little to the left we find the grid leak and grid condenser. Above this, and on the panel, are the three fixed condensers.

The coil is made in unit form and is placed just in back of the tube and socket. Figure 4 shows the coil and rotors hung assembled.

Fig. 6 gives a position view of the coil with its two windings. The form for the coil winding is cardboard tubing 3¼" in diameter with a ⅛" wall. It is 7½" long. The distance between the centers of the rotor

How to Operate the Switches

shafts is 4". Also pay particular attention to the method of bringing out the pig-tail connections. The pig tails are made of braided copper and make a metallic connection with the rotors.

Fig. 7 shows a close-up of the stator windings of the aerial tuning inductance, or variometer. This is accomplished by winding 20 turns of No. 26 DCC magnet wire just as you see it. The winding A has 20 turns on one side of the shaft. Then 20 turns on the other side constituted winding B, which has a tap at the tenth turn or the thirtieth turn if you want to figure from the very start of the winding A. Remember that both 20-turn windings are a continuous wire. The tap is carried out to binding post No. 1.

Continue this winding to the other end of the cardboard tubing and wind six turns alongside the first stator winding. This is coil C (Fig. 8) of the plate variometer P. Pull about six feet of magnet wire from the spool, cut it off and punch a needle hole through the tubing. Pull the wire through and wind six turns alongside the stator winding as illustrated in Fig. 8 and marked L. This is not half as complicated as it seems. Just look at the wiring diagram (Fig. 17) and the photographs before you start and everything will come out right.

The windings P and L are exactly the same as the windings A and B, that is, 20 turns each of No. 26 DCC wire, but with no taps taken this time.

The rotors are wound on cardboard tubing 2½" in diameter and 1⅜" wide and have 17 turns each side of the shaft or 34 turns in all. The same wire, No. 26 DCC, is used. This is shown photographically in Fig. 9. That is all there is to the coil, other than the connections, which are clearly shown in the circuit diagram.

Fig. 10 is a view of the aluminum shield, which is placed 1" in front of the tuner unit and grounded. This measures 3½" wide and 7½" long. It is 1/32" thick, although plain tin foil is just as good and probably easier to fasten on the panel.

Notice that two fiber washers, about as big as 50 cent pieces, are placed between the shield and the pig tails on each rotor shaft. This is done so there is no chance of accidental grounding.

In Fig. 11 we have a close-up of the WD11 tube socket and the grid leak and condenser. The springs have been soldered to the screw heads of the binding post connections. This makes a good contact and no loose connections. Of course all other connections are soldered as well. The little dowel stick has been most conveniently placed in one of the mounting holes of the socket and acts as a sort of buffer or stop when the tube is inserted in the socket, so that the wiring is not broken by the downward thrust.

In Fig. 12 we have the fixed condensers. Consult this and the circuit diagram (Fig. 17) to get the proper capacities in the right place.

To operate the set as a single-circuit place the link switch as shown in Fig. 13 and connect the aerial wire, either indoor, [about 50 feet] or outdoor, to binding post 2, 3, or 4, according to the wavelength of the transmitting station and the actual length of your aerial. Then tune by moving the wavelength handle back and forth and likewise increase the volume control. The strength of the signals will amaze you.

Under some conditions, especially in New York City, the above connection is not satisfactory, as there is a slight undertone from other powerful radiocasting stations nearby. If this is the case, disconnect the aerial, reconnect it to binding post No. 1, and move the link switch to either post Nos. 3 or 4 (Figs. 14 and 15). This changes the circuit somewhat, although the aerial is still conductively connected to the grid. Do not connect the aerial and switch as shown in Fig. 16.

Tune the set in the same manner and you will find the selectivity is equal to some of the 8-tube Super-Heterodynes.

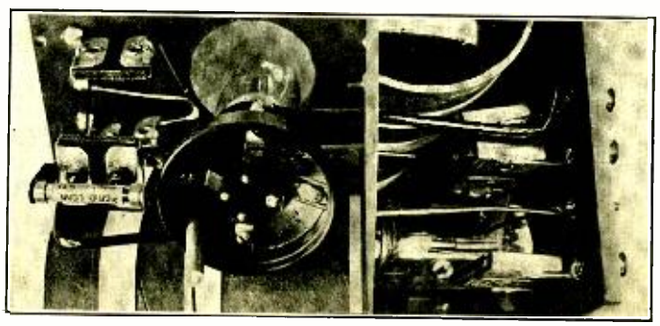
If you have a particular fancy to the 199 tube or the 201A, either of these may be substituted, but the dry cell 11 tube is recommended.

It is a peach of a set and well worth your time and effort. If it is desired to operate a loud speaker, just connect any standard two-stage amplifier and go ahead.

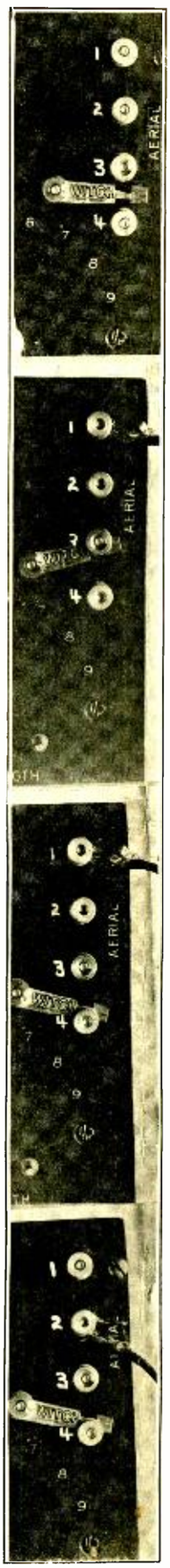
LIST OF PARTS

One bakelite panel, 6"x8".
One cabinet, 6"x8"x6" deep.
One 15-ohm rheostat.
One 11 tube.
One 11 tube socket.
1 lb. No. 26 DCC wire.
One cardboard tube 3¼"x7½".
Two cardboard tubes 2½" diameter, 1⅜" high.
Two .00025 mfd. fixed condensers.
One .002 mfd. fixed condenser.
One .0001 mfd. fixed condenser.
One .0005 mfd. fixed condenser.
Two 4" dials.
One grid leak (2 meg.)
One dozen Fahnestock clips
Lead or copper foil for shield.
One 1½-volt dry cell A battery.
One 22½-volt B battery.
100 feet aerial wire, 50 feet No. 14 insulated lead-in wire.
One pair of earphones.
Bus bar, connecting wire, solder, binding posts.

[Those who construct this circuit 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.]



A CLOSE-UP VIEW (at left, Fig. 11) of the tube socket, as seen from the bottom. As a precaution, the springs have been soldered to the socket post screwheads. The grid condenser is at left, with leak mounted thereon. The way to mount the fixed condensers is shown at right, Fig. 12.



THE switch points are numbered 1 to 4 and are to be used for different wavelengths. The Fig. numbers, top to bottom, for these photos are 13, 14, 15 and 16.

By PROF. HAZELTINE:

A Receiver May Be Too Selective to Give Good Quality Results — Some Ways of Solving Interference Problems

[*The author, Prof. Louis A. Hazeltine, of Stevens Institute of Technology, West Hoboken, N. J. is the famous inventor of the Neutrodyne and one of the world's radio geniuses.*]

THE kinds of interference experienced in radio reception may be grouped broadly into five classes. First, natural interference—that is, strays or "static"; second, artificial electrical disturbances, particularly from electric light and power circuits; third, interference from radio telegraph stations, especially spark stations or abruptly modulated continuous-wave stations; fourth, other radio telephone broadcasting stations; and fifth, radiating receivers.

To understand the nature of radio interference we must have in mind the characteristics both of the telephone broadcasting waves whose reception is desired and of the interfering waves. While we are accustomed to speak of radio waves as having each a single frequency or wavelength, this is the fact only with a continuous wave when it is not being modulated or interrupted. The modulation of a continuous wave by a pure musical note introduces two new frequencies, the "side frequencies," one above, the other below the original "carrier frequency," by the amount of the frequency of modulation. A telephone broadcasting wave modulated in the usual way by music or speech has a whole series or "band" of frequencies extending about four kilocycles above and below the carrier frequency. For reception without appreciable distortion of the music or speech, it is necessary that the receiver respond to such a band of frequencies with reasonable uniformity. This imposes the limit to the useful selectivity of a receiver.

All forms of interference ordinarily experienced also have their bands of frequencies. Static has a practically unlimited band—that is, it has components at all frequencies within the radio range. Spark stations have very wide frequency bands, the intensity of their radiation at normal frequency being not so very great in comparison with the radiation at widely differing frequencies. The interference from power lines is usually similar in having a very wide frequency band. Properly modulated continuous-wave telegraph systems have narrow frequency bands, commensurable with those of radio telephony; while unmodulated continuous-wave systems have narrower bands still, and are therefore the least likely to cause objectionable interference.

In the design of radio receivers with the view of reducing the effects of interference, we have recourse in general only to the increase in the selectivity of the receiver and to the use of directional methods of reception. Directional methods, commonly through the use of a coil aerial, are not always convenient and frequently are not applicable, for the interference may be coming from nearly the same direction as the desired signal or from several directions at once. Selectivity is attained by the use of sharply tuned circuits—that is, circuits of relatively low resistance—and by the use of a number of successively tuned circuits. The limitation to high selectivity (as I have pointed out, is the necessity of properly covering the frequency band of the signal being received, so as to avoid distortion and thus to retain satisfactory quality. This definitely limits the sharpness of tuning. It does not limit the number of circuits which may be successively tuned; and an increase in the number of such circuits will always give a corresponding increase in the selectivity against interference having narrow frequency bands. But interference having wide frequency bands simply cannot be eliminated at the receiving end. No matter how narrow the band to which the receiver responds, it will always be included somewhere in the interfering band. Thus the complete elimination of static and interference from spark stations and from power lines is scientifically impossible by any measures applicable to receivers. Even the most ideally designed receivers with the greatest refinements and a very large number of tuned circuits can be only slightly better in this respect than common commercial receivers.

The real means for eliminating interference from sources having wide frequency bands is the removal of these sources. This means the elimination of the spark method of telegraphing and the application of well-known technical methods for maintaining the purity of the waves from other transmitting stations. The elimination of the spark telegraph station is made necessary by the impracticability of narrowing its frequency band by any method known to the art. As a matter of fact, spark stations are now rapidly being replaced by continuous-wave stations; and the broadcasting section of the radio industry can view this change with much satisfaction.

Interference from power lines must also be traced out and eliminated. Sometimes this comes from leaky insulation and the like, but more often it comes from apparatus connected to the power lines. Apparatus having sparking contacts, such as commutator-type motors and some household devices, and apparatus employing high-voltage discharges, such as some X-ray machines and electrical precipitators, are the chief offenders. The running down of such interference is frequently a baffling matter. It is hoped that the manufacturers of such electrical apparatus as is most likely to cause interference will develop methods, or use methods already known, for reducing such trouble. They will then confer a boon on the radio public.

Interference from static obviously cannot be eliminated at the source. We have already shown that it cannot be reduced beyond a certain limit at the receiver. The only possibility for the future minimizing of static interference in radio reception consists in increasing the power of the broadcasting stations until this overwhelms the static. Progress in this direction is also taking place, as we all know.

I have saved the subject of interference from radiating receivers for the last, because its nature and control are quite different. It consists in the radiation of a continuous wave by an oscillating receiver. It is therefore noticeable only when this wave is within the frequency band of the receiver which is being affected. It is also of relatively low power and so causes trouble only in the immediate neighborhood of the offending receiver. However, in thickly populated regions where a great number of receivers will be tuned in to the same broadcasting station, this interference has often been most objectionable. Two methods of attack are possible and both will probably have to be followed. The most obvious is the complete elimination of radiating receivers. There have been notable steps taken within the past few years in making such non-radiating receivers available to the public. It is to be hoped that all manufacturers, as far as practicable, will continue the developing of means for preventing radiation from the receivers which they supply to the public. However, even if this could be carried out to the limit, we would still have the home-made oscillating receiver to contend with. We therefore must educate the user of such a receiver either to arrange it so that it can never radiate or else to so operate it as practically to avoid oscillation. This matter of educating the public I have already referred to. It is being carried on actively in many ways; but the cooperation from the newspapers, the radio dealers, and all who come in contact with the radio user is needed.

The A B C of the Tube Circuit

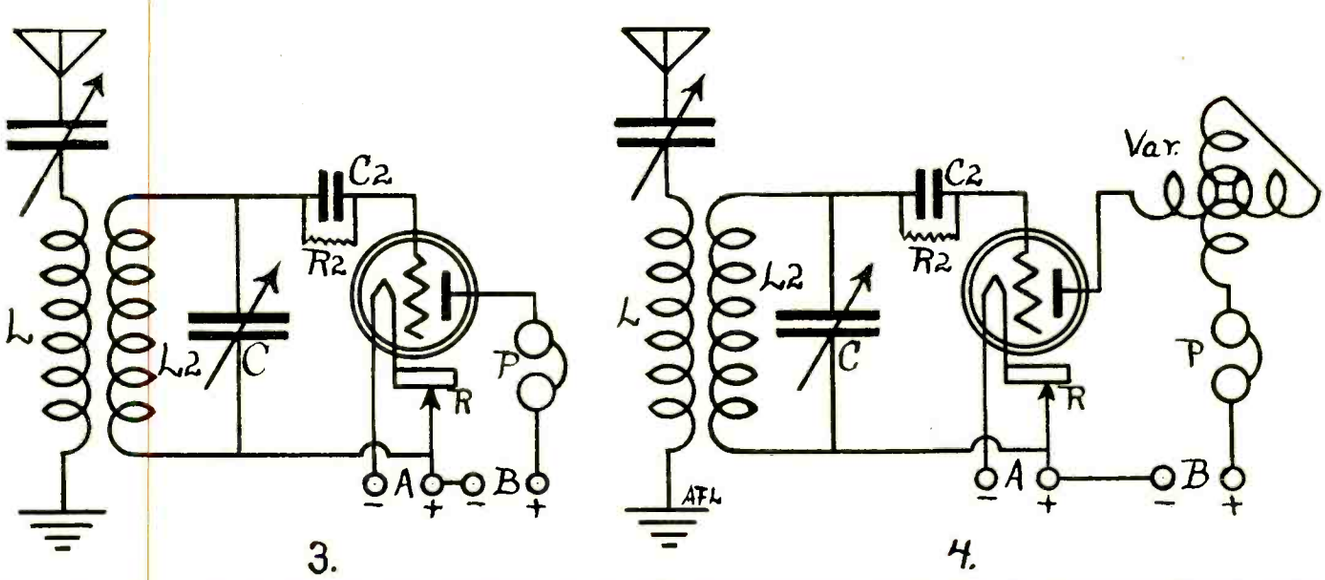


FIG. 3, simple vacuum tube detector circuit using variocoupler. R2, the leak, is optional with some types of tubes. Fig. 4 shows the addition of a variometer in the plate circuit which causes regeneration. The rest of the circuit remains the same as in Fig. 3.

By N. N. Bernstein

WITHIN the vacuum tube there are three distinct elements—the filament, which is heated by the A battery; the grid, which receives the signal, and the plate, upon which a high potential is placed.

In Fig. 1 we have a simple detector circuit using the vacuum tube. A is the antenna that goes to the grid of the tube. P is the plate upon which the high voltage is placed through the ear phones. The filament F is connected to the battery represented by A. The ground connection goes to the positive lead of the A battery. The negative pole of the B battery is also connected with the positive A.

The signal comes down the antenna and strikes the grid and is propelled therefrom by the electrons emanating from the filament. These electrons force the signals from the grid across the intervening space to the plate. Electric current flows from negative to positive.

Fig. 1 is simply a detector circuit that will respond best to signals transmitted on the natural period of the receiving antenna. C in Fig. 1 is what is known as a fixed condenser, its capacity usually being .00025 mfd. This condenser breaks up the signal from the antenna, presenting it in a suitable form to the grid of the vacuum tube.

In Fig. 2, we have identically the same circuit, with the exception, however, that we are able, by means of a coil and condenser, to tune to any wavelength we desire. Coil L is simply a coil of wire of any predetermined number of turns, and C is an air variable condenser, which tunes coil L. C 2 is the grid condenser as in Fig. 1 and functions in the same manner. As the signals travel from the antenna to the grid, they encounter the tuning circuit composed of L and C. When this circuit is tuned by varying the condenser the grid is made to respond greatest to the total wavelength of L and C and the natural wavelength of the antenna. The ground is connected, as before, to the positive A. The connection is shown at the bottom of the coil. This circuit tunes rather broadly, that is, we are not able to successfully separate signals which come in on wavelengths close together. Should one station be transmitting on 360 meters and another station on 375 meters we would not be able to tune one out to the exclusion of the other.

In order to obtain finer tuning the circuit in Fig. 3 is used. As will be immediately noticed in Fig. 3 that part of the diagram to the left of L 2 is the same as that in Fig. 2, with the exception that the antenna and ground are not connected. We have what is known as the primary circuit to the left of L 2, which consists of the antenna, variable condenser, coil and ground. In this circuit the signal is first tuned. The condenser in series with the antenna is adjusted to a station and theoretically allows that wavelength only to pass through coil L to the ground. This condenser has the effect of shortening the natural period or wavelength of the antenna. When the current goes through coil L it sets up another current in L2. Coils L and L2 are each a number of turns of wire wound in cylindrical or other form and placed in close relationship to each other.

The current induced into coil L2 from L travels through the regular path through C2 to the grid of the vacuum tube and is pushed across by the electrons to the filament of the plate and thereby produces an audible-frequency vibration in the ear phones.

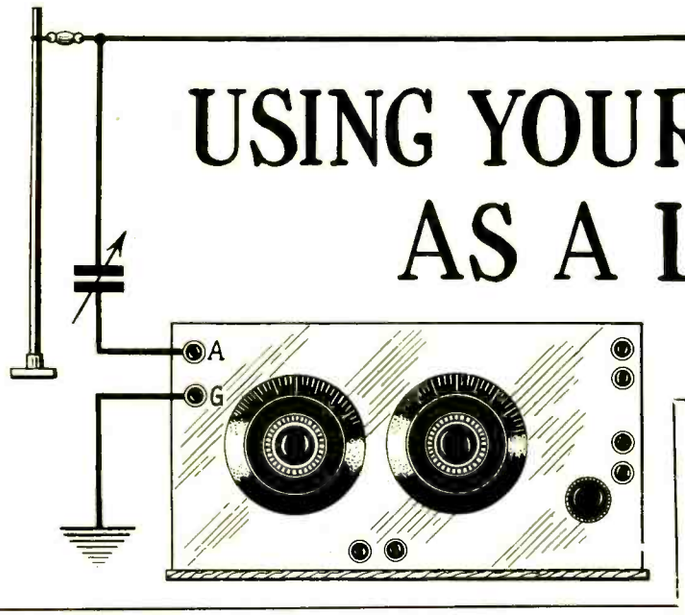
Since the primary circuit, as described, is not selective enough in itself to tune the signals and because the tube is not yet able to respond satisfactorily, the secondary circuit, composed of L2, variable condenser C, grid condenser C2 and the grid itself, should be tuned for best results. This tuning is accomplished by the variable condenser. Now a greater degree of selectivity is obtained. The circuit described in Fig. 3 is known as the simple vacuum tube detector circuit. This is not very sensitive, it being little more efficient than a very sensitive crystal circuit.

The phenomenon known as regeneration when applied to detector circuits is a means whereby we obtain almost a hundred times the amplification of the original signal. We obtain this regeneration in the plate circuit, which has heretofore only included the ear phones.

The variometer, which consists of 2 coils of wire connected in series and placed in variable inductive relation to each other, is placed between the plate connection of the tube and one side of the earphones. This inductance, when varied, will tune the plate to the same wavelength, approximately, as that to which the grid is tuned, thereby balancing them. When this bal- has been reached there will be a repeater e- tween the grid and plate in the tube, that is, t- from the grid will travel to the plate, where i- through an inductance tuned to the same

(Continued on next page)

USING YOUR AERIAL AS A LOOP



By Knolleys Satterwhite

YOUR outdoor antenna can be made into a loop antenna by the simple addition of a coil of wire attached to the end of the antenna opposite to that from which the lead-in is taken, as shown in the above diagram. This loop would have just one wire, that of the antenna itself, as the collector of radio energy. As shown in the illustration, the antenna has a coil connected to it at the end, and the other end of the coil is connected to the ground. The usual ground connection from the set is made to the water pipe as customary and the second ground connection is made to any convenient water pipe or other grounded point. A condenser must be inserted in the antenna lead in as shown, unless there is one already provided in the set itself.

The loop circuit thus formed is complete, the return lead from the set being from the ground connection at the far end of the antenna through the ground.

Any unselective set will tune very sharply with this loop arrangement, usually with increased results, because local stations may be tuned out and distant stations heard, whereas before, when the tuning was broad, the distant stations would be blocked by the local signals. The coil, illustrated in the diagram, is simply a 25 or 35-turn honeycomb. In order to protect the windings from the elements and to keep the inductance at a fairly fixed value, the coil is enclosed in two compartments. The honeycomb may be fastened to the inside of a cigar box by any convenient method, and the two leads brought out through very small holes at opposite sides. Fill up these holes with paraffin to prevent their pulling out, and also to prevent the entrance of moisture or dirt. The cigar box is then sealed all around with paraffin and placed within another box, slightly larger, and the spaces at the openings filled with sealing wax. The average experimenter has a number of old worn-out B batteries always lying around, and he may chip the sealing wax from the tops of these, melt them down in an old pot, and pour the wax around the spaces between the two boxes. Of course, be sure to draw the two connections through at opposite ends, and either provide them with two binding posts or Fahnestock clips for connection to the antenna and ground.

Possibly the best spot in which to connect the coil is right at the end of the antenna farthest from the set. Connect the ground lead to the nearest point convenient for the connection to the other end of the coil. It is not necessary to have both grounds on the water line. In fact, it is better to have the receiving set grounded to the water pipe system and the honeycomb coil grounded elsewhere.

The loop antenna may be used with any and all types of sets or circuits, be they what they may. Any set using the usual type of loop can thus get better results.

How Regeneration Functions Through Tube

(*Concluded from preceding page*)

frequency as the signal, and travel back to the grid again through the secondary circuit. Its path is across the elements of the tube.

Part of the energy of the oscillations of radio-frequency flowing in the plate circuit is repeated back to the secondary circuit. The complete process does not interfere with the action of the tube as a detector, but charges the grid condenser with increased strengh, due to the repeating action. This type of circuit, when maintained in an oscillating state will cause a flow in energy from L2 to L and out onto the antenna. This current coming from the antenna will be of the same wavelength as that to which the set itself is tuned. This is the reason that when circuits of this kind are improperly tuned, other receiving sets in the immediate neighborhood hear emitted howls and squeals. The object of regeneration is to build up the signal to the greatest possible amplitude without maintaining the circuit in a constant state of oscillation. You know that your circuit is oscillating when you hear a click in the earphones and then a hiss, howl or other noise. When tuning to a station with this circuit, first adjust the primary circuit with the variable condenser in the antenna, then tune the secondary circuit with variable condenser C, after which the variometer, which has been resting at zero on the dial, is turned slowly and carefully until the loudest signal without distortion is heard. Some slight adjustment of the primary and secondary circuit may be necessary after the variometer is adjusted to bring in the maximum signal.

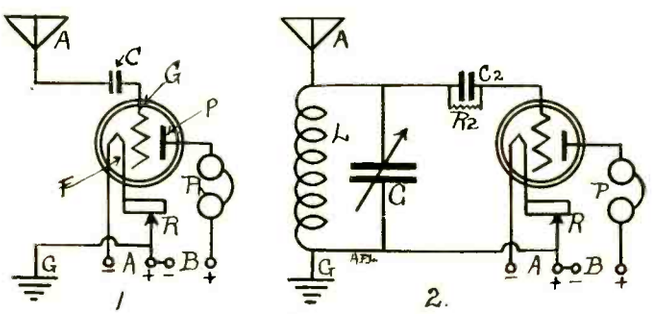
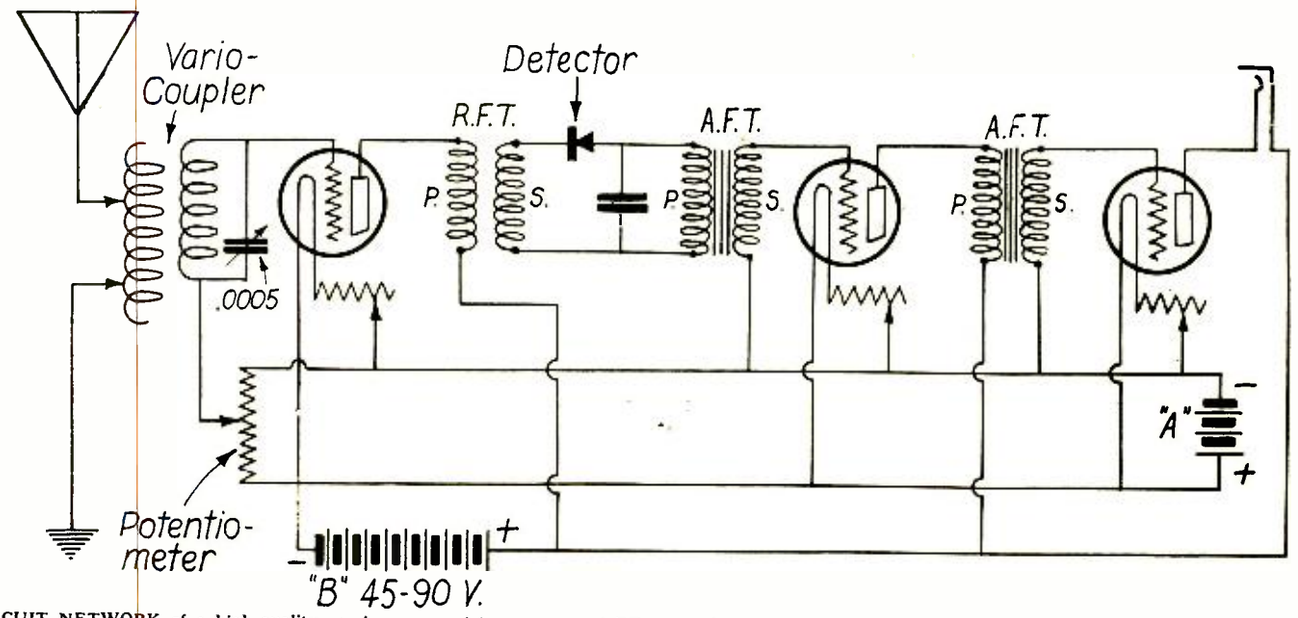


FIG. 1, A, antenna; G, grid; P, plate; F, filament; Ph, phones; R, rheostat; G, bottom, ground. In Fig. 2, L is a coil; C, a variable condenser; C2, grid condenser; R2, grid leak.

RF, Crystal Detector and 2 AF



CIRCUIT NETWORK of a high-quality receiver, comprising a stage of RF, crystal detector and two stages of AF. Its tone quality on a speaker is superb and it is one of the most satisfactory receivers that can be built. It is not a great DX-getter.

By Lieut. Peter V. O'Rourke

ANYBODY desiring a set that will operate a loudspeaker usually must have at least three tubes. A crystal detector preceded by a stage of a radio-frequency amplification constitute a receiver that gives wonderful tone quality, missing none of the rich overtones which bring the voice and music into the home with all its purity and naturalness. The two audio stages give loudspeaker volume. The set has some DX possibilities, but of course does not compare with the Neutrodyne or Super-Heterodyne in that respect, nor indeed from the viewpoint of expense. The circuit described herewith may be built for $45, including everything except the speaker.

Three devices not usually encouraged are used in this circuit, a potentiometer, a double tap switch and a fixed RF transformer. However, the crystal, because of its inherent resistance, makes selectivity difficult, hence the tap switches are necessary. Moreover they are nothing to worry about. The potentiometer supplies the correct grid bias to the RF amplifier. This gives an excellent control over the tube to prevent oscillation and is in keeping with the idea of preserving quality at all cost.

The crystal may be either fixed or adjustable. Several excellent fixed crystals are being marketed. However, I prefer the adjustable type because of the greater volume I have been able to obtain and the facility with which the greatest sensitivity may be established.

To complete the trilogy a fixed RF transformer is used. This is another "don't" in the conventional radio category but it is inserted here to appease those who want no more than two controls. However, this transformer may be of the tuned type instead, and even better results will be obtained. The fixed transformer is a commercial product, but anyone desiring to make one may do so by following directions published in RADIO WORLD, issue of September 20.

The antenna is joined to the connecting arm of one of the switches and the unit turns of a standard variocoupler are tapped and connected to the switchpoints Contact between the antenna and the coupler is made by rotating the switch arm or lever from one switchpoint to another, thus introducing more or less inductance. The other switch is connected in the same way with the ground, taps from the variocoupler being those from every ten turns. Most standard couplers are tapped in units and tens, that is, every turn is tapped at the beginning up to about eight and the rest of the turns are tapped at every tenth turn. The rotor of the variocoupler is shunted by a .0005 mfd. or 23-plate variable condenser. It is preferable that this condenser and the variocoupler be of the low-loss type If any choice must be made let the coupler be low-loss rather than the condenser, because the losses in coils are much greater than those in condensers. The end of the variocoupler rotor goes to the rotor plates of the variable condenser and to the midpoint of the potentiometer, the two extreme posts of the potentiometer, commonly called the terminals, going to A — and A +. This does not short-circuit the A battery, due to the high resistance of the potentiometer, which should be 300 or 400 ohms. The stator or immovable plates of the condenser go to the grid of the first tube at the extreme left on the diagram. The A battery wiring is completed by connecting the A — to one leg of each of the three rheostats and the other leg to the F— post on each of the sockets. The A+ goes direct from the A battery to the F+ posts on the sockets and the A+ and —B are connected.

The plate of the RF tube goes to the P post of the fixed RF transformer and the B post of that transformer goes to the B + 90 volts.

P and B constitute the primary of the RFT. The secondary of the RFT is connected as follows: The G post goes to one side of the crystal detector and the F (S2) post goes to the B (P2) post of the first audio-frequency transformer. The P post of AFT, is connected to the remaining unconnected side of the crystal. A fixed condenser, .00025 mfd., is placed across the primary of the first AFT, that is, from P to B.

Now to complete the two stages of audio-frequency amplification. The F posts, or S 2, are connected to the —A battery lead, or to the battery side of the rheostats, never to the socket binding post side. The G post of the first AFT goes to the grid of the first audio tube, that is, the second tube from the left in the diagram, and the plate of this tube goes to P or P 1 on the second AFT. The B post of this transformer is joined to B+ 90 volts. The G of the second transformer goes to the grid of the last tube. The plate of the last tube is connected to the frame or right

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A Fine 4-Tube RF Receiver

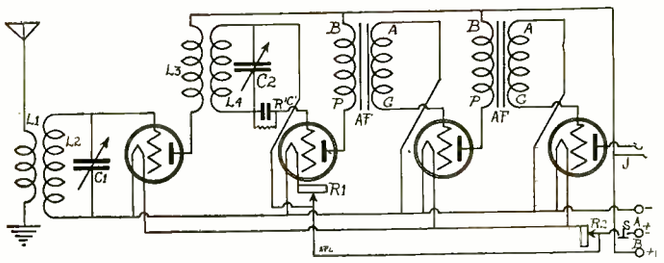


FIG. 3.—The wiring diagram for Caldwell's 4-tube set, consisting of one stage of radio-frequency, detector and two stages of audio-frequency. Radio-frequency transformers are basket-wound, low-loss type. The use of low-loss condensers increases the efficiency to make this set almost the equal of a 5-tube receiver.

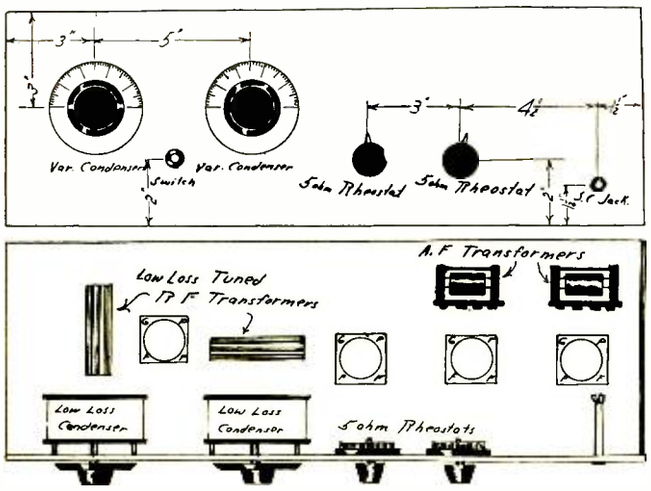


FIG. 1 (top) shows panel layout. The panel should be some high-grade insulating material 7"x21" on which are mounted the two condensers, rheostats, jack and filament switch. Fig. 2 shows the instrument layout. The RF transformers should be mounted at right angles and the audio-frequency transformers kept as far away as possible to prevent audio-frequency feed back into the radio-frequency tubes, which causes howling. This layout will give the short leads necessary for efficiency.

By Byrt C. Caldwell

ONE of the most popular receivers is the 4-tube set which employs one stage of tuned radio freuency amplification, detector, and two stages of audio amplification. There are many receivers of this type on the market. The reason for the popularity of the circuit is that it is moderately powerful, is selective, easy to tune, does not radiate, and has a low initial cost as well as a low cost of upkeep. The cost of constructing this receiver of the very best parts, exclusive of tubes, etc., is less than $30. Properly constructed, this receiver will give at least the results of the average good 5-tube Neutrodyne as to distance and volume, and almost as good selectivity, because the condensers and the tuned RF transformers are of the best low-loss design. By actual trial I have found that the substitution of two of these low-loss condensers and transformers for two of the regular Neutrodyne type has increased the selectivity of the receiver 100% and has at least increased the sensitiveness of the receiver an amount equal to an additional stage of RF.

Fig. 1 shows the layout of the panel, 7"x21". Use radion or some other high-grade rubber.

The low-loss tuned RF transformers are basket wound coils, made as follows: Draw a 3" circle on a block of wood. Mark this into 15 equal divisions and drill a ¼" hole on each of these divisions. Put 2" lengths of ¼" round rod or dowel into each of these holes. Wind the coils with No. 22 DCC wire. Exactly 65 turns are needed, and they are wound in and out of every two pegs. When the coil is finished, put collodion on the wire, but only where it crosses, both inside and outside of the coil, and when this is hard remove the pegs. Wind a layer of paper over this coil, and on top of this wind from 3 to 10 turns of the same wire in the same direction. This is the primary. If you are in a section where very good selectivity is required, such as the New York or Pittsburgh district, wind only 3 turns on the primary. If you are far from any station, you may wind as many as 10. The beginning of each winding goes to the grid, the plate and the antenna respectively. The low-loss variable condensers have a capacity of .00025 mfd. These coils and condensers exactly cover the wavelength band of the broadcasting stations.

Fig. 2 shows the arrangement of the parts on the base. It is essential that the RF transformers be kept as far as possible from all solids. They should be at least 1" away from the condensers or any other part.

Fig. 3 shows the hookup. A separate rheostat is used for the detector tube. If the 200 tube is used, the rheostat should be a 5 ohms, but if 201A tubes are used throughout it should be 20 ohms. The hookup is shown for use with 201A tubes. If the 200 tube is used the connection from the plate of the second tube to the B battery will have to be made at 22½ volts instead of at 90 as shown. It is unnecessary to use the 200 tube.

Using Tuned RF Ahead of the Crystal

(*Continued from preceding page*)

angle of the single circuit jack and the B + 90 volts is connected to the blade of the jack. No provision is made for plugging in the detector alone or just one stage of AF because persons possessing loudspeaker sets hardly ever use earphones.

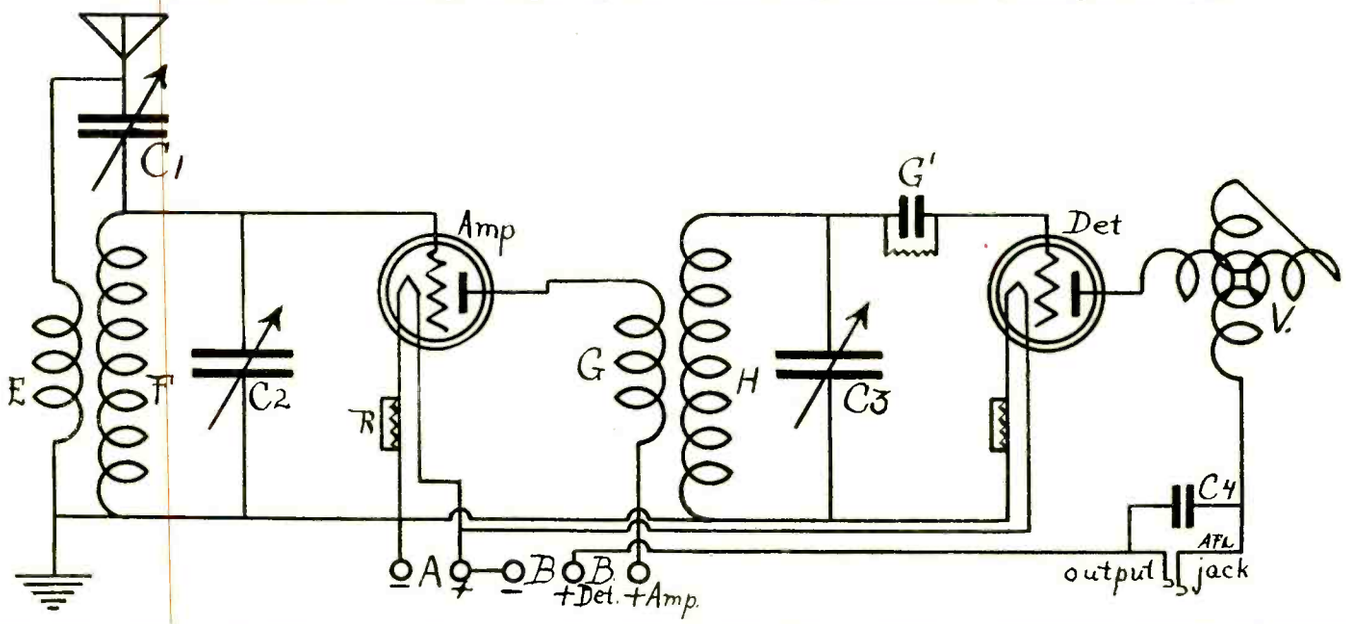
If three controls are not objectionable, and I do not find them so, the RF transformer may be of the tuned type and constructed as follows: On a bottle 3" in diameter, which need not necessarily have a circular exterior but may be hexagonal or the like, place four strips of gummed paper one inch wide, for the full length of bottle. Using No. 22 DCC wire and moistening the four strips near the point where you are beginning, wind 45 turns of wire, moistening the paper as you go along. A few inches of gummed paper protrude from each end and these are moistened and bent over the coil, affording a means of support. Then take a sheet of Empire cloth or wrapping paper about 1½" wide and wrap it over the coil, placing gummed paper with the sticky side out as formerly. Wind twelve turns of the same wire as a separate winding. The 12 turns constitute the primary and 45 turns the secondary of the RF transformer. A 23-plate condenser is connected in shunt with the secondary. It does not matter which side is connected to which. The fixed condenser still remains in the circuit.

No Neutralization

THE circuits employing two stages of tuned radio-frequency amplification require neutralization so that the tubes do not defeat the object of RF because of current playing truant, due to the inter-stage capacity among elements of the tubes. But if the coils are properly designed and low-loss, the neutralization may be omitted. The necessity of neutralization does not exist in these cases except perhaps on the low wavelengths. Only when the coils properly handle these low waves is the problem successfully solved.

Condenser Controls Oscillations

Simple Circuit Using Stage of RF and Regeneration Brings in DX



THE OSCILLATIONS in this circuit are kept under control by the condenser C1, which, when at a setting to be determined by experiment, will keep the tube at its most sensitive point. This setting may remain, hence there are three active controls in the circuit, not four. Both coils, EF and GH, are the same, E and G being 5 turns and F and H 50 turns, No. 22 DCC wire. All the variable condensers are 23-plate and must be low-loss for best results.

By Charles H. M. White
Consulting Engineer

A RECEIVER employing one stage of tuned RF amplification and a regenerative detector, making use of the variometer type of energy feedback, is a very dependable and serviceable outfit. This circuit is excellent in sensitivity and employs no potentiometer as a means of controlling the tube oscillations. One of its outstanding features is the use of the condenser C-1 as a means of controlling the oscillation of the RF amplifier tube. This condenser C-1 must have a very low loss and a very low zero capacity so that when it is set at zero, that is with no plates in mesh, it is practically out of the circuit. It will soon be discovered that this condenser C-1 does, to a certain extent, affect the tuning of the circuit, but its use permits tube No. 1 to be kept at the most sensitive point on its characteristic, thereby getting the maximum amplification without distortion. In tuning this circuit it is best not to employ any regeneration until the desired station has been clearly heard then the variometer V can be moved to give the maximum signal strength. Of course, it will be necessary then slightly to alter the adjustment of the condenser C-3 to compensate for the change of inductance in the plate circuit of tube No. 2, the detector, by the variation of V. This circuit can be made to operate with any of the modern high vacuum tubes such as the 199 or the 201A. Do not attempt to operate it with the 11 or 12 type of tubes. The best style of tube to use is the 201A since it has a good dependable amplification constant and is capable of handling more B battery voltage than the 199. If the 201A tubes be used 90 volts of B battery should be used on the amplifier tube (No. 1) and 45 volts on the detector tube (No. 2). If 199 tubes are used, 22.5 volts should be used on No. 2 and 67.5 volts on No. 1.

The wiring is easy. The radio-frequency transformers E-F and G-H are identical in specifications, the coils E and G being similar, as are F and H. The coil E is wound on one end of a 2½" tubing and has five turns, then, a space of one-half of an inch is allowed and F is wound on with 50 turns. Number 22 DCC magnet wire should be used.

A piece of tubing three inches long will suffice for each of these tuned air core transformers. In order to simplify the wiring details and eliminate two unnecessary adjustments automatic filament controls, marked R, are employed. These materially simplify the panel layout and add to the efficiency of the receiver by shortening the wiring connections. The condenser C-1, C-2, and C-3 are each 23-plate air variables of the low-loss type. The variometer V should be low-loss. The capacity of the fixed condenser C-4 will largely depend on the make of variometer used. It will vary between .001 and .005 mfd. As a general average I would say that a .002 mfd. fixed mica condenser would fill the bill. Often when audio-frequency amplification is directly added no condenser at all is needed. The unit G' should be a good grid condenser and grid leak of the variable type. In testing out your circuit, it is well to have a safety fuse on each tube to prevent possible loss from blow-out.

This set will haul in DX with little effort and with good regularity. Although four controls are on the panel only two are essential to preliminary tuning and the other two add the finishing touches, by increasing volume and selectivity. Only a very short outside or inside aerial is needed with this receiver.

The Lure of the Crystal

By Jerome Ashe

ONE hundred per cent. of the radio men that have been interested in the game for three years or more have at one time or other been the proud owners of a crystal receiving set. In the beginning crystals were the main means of receiving wireless signals. Lucky was the fan who possessed a very sensitive piece of galena. In the dark ages of wireless, a few years before the war, contention was rife between the factions boosting the silicon crystal and those using galena. These two crystals were the most popular. Distance records turned in, however, gave galena the edge on the others, amateurs reporting 1,500 and 2,000 miles frequently. Of course, this reception was of wireless code from very high-powered stations. It was a common feat to hear NAR, the Naval station at Key West, Florida, and it was a poor set, indeed, that could not pick up the time signals from NAA, near Washington, D. C., in almost any part of the United States.

Press sent out from WCC, at South Wellfleet, Mass., on a wavelength of 1,800 meters, was copied regularly up and down the Atlantic coast and by ships far out at sea, all on crystal receivers. All this work, by the way, was carried on mostly on wavelengths between 600 to 3,000 meters. Then, the receivers employed very large coils of wire, called loose couplers, and used the same circuits that are in use today. They are sometimes revived for experiments.

Crystals in those days were so popular because there was nothing else available to the amateur. Nowadays, crystals are still very popular because they produce good results and are the cheapest means of enjoying the radiocast concerts. Music and speech are reproduced by crystal sets with remarkable clarity and distinction, and if the set is not located too far away from the transmitting station, there is plenty of ear-phone volume. In some locations crystal sets may be used with an indoor antenna, but in general, a good long outdoor aerial gives the best results, it being always necessary for volume.

My Adventures with Hookups

By Neal Fitzalan

WHILE a sufficient number of circuits may produce results so different as to leave much room for the element of personal taste in making a selection, there are still enough considerations against the choice of some circuits to render them ineligible for consideration in a particular instance.

I do not see any reason, in this day and age, why a person should use the old-fashioned single-circuit regenerative set, consisting of an untapped variocoupler stator, the rotor or tickler being used to obtain regeneration. This set so greatly lacks selectivity that it ought not to be used.

An alternative is to tap the variocoupler, but even here the selectivity is not great enough for effective service in cities. The best solution, if regeneration is to be used in this form, is to have a 3-circuit tuner. By using an aperiodic primary, say 15 turns, you have all the selectivity you need, in fact usually much more than is necessary. The secondary is tuned in the usual way by a variable condenser, and the tickler provides regeneration.

There is so much misconception of the 3-circuit tuner's working qualities that it might as well be stated right now that a considerable loss of volume is sustained when this circuit is used, as compared with the single or double circuit. However, it is often necessary to have a very selective set, especially with well over 500 stations on the air in the United States, and this advantage must be enjoyed, whatever the cost. The popularity of the 3-circuit tuner is due largely to this selective quality and to the fact that only two controls are needed. If the constructor has made up his mind that the number of controls must be no more than two, and he desires a regenerative set, he should use the aperiodic primary type. With the 2-control idea conceded, it is one of the best inexpensive circuits so far. But for myself I prefer to have all three circuits tuned, for then the volume is great, the selectivity good enough and the quality of tone excellent. This circuit may be constructed of a variocoupler and two variometers, the coupler stator being tapped, one variometer being in series with the grid lead and the other in series with the plate-to-phone lead. You will notice that in this circuit there is no inductive relationship between the plate and grid. However, regeneration is achieved by tuning the plate variometer to the wave of the incoming signal, that is, the same wave to which the variocoupler and the grid variometer are tuned. The capacity between the plate and grid elements of the tube transfers the energy from plate to grid, which is the feedback. The performance of this set is on a par with that of the Neutrodyne. If not quite that much selectivity is necessary the tuning element in the aerial lead may be a variometer instead of a variocoupler. The results from the 3-variometer set are even better, if the extra selectivity of the other is waived as unnecessary, because then the aerial goes directly into the grid, that is, a continuous metallic contact between aerial and grid is established, first through the aerial variometer and next through the grid variometer. It is well known, too, that variable condensers, while necessary for the achievement of utmost selectivity, are not as good as variable inductances in building up signal strength. Inductance increases voltage while capacity retards it. For any one living in a place not endowed with several broadcasting stations the 3-variometer set is preferable, the loss in selectivity being more than made up by the gain in sensitivity.

I prefer variometers to all other inductances. Whenever energy is transferred by mutual inductance, such as between stator and rotor of a variocoupler functioning exclusively in the aerial circuit, a loss of signal strength is sustained, compared to the conductive method. If only it were selective enough, the set with a variometer tuning aerial and ground, with a variometer also in the plate circuit, would be almost ideal. Leaving out the plate variometer altogether, and tuning only aerial and ground, you would have a circuit that produced clarity, quality and volume unsurpassed by any other 1-tube circuit ever designed. However, selectivity is nil. As you are forced by conditions to have selectivity you are compelled to make corresponding sacrifices.

The 3-circuit regenerator, whether all circuits are tuned or the primary is aperiodic, may be constructed of honeycomb coils, which are very satisfactory inductances. They are low-loss. Fans these days are demanding low-loss parts more and more, both condensers and coils. The proven better results obtained from low-loss equipment has in fact started a fever for buying such type of part. Personally I do not care for the inductively tuned honeycomb coils, that is, where the mutual inductance is varied by gradually separating two coils which are inserted in special mountings. In the first place body capacity is a constant source of trouble. Also the mountings themselves offer high resistance and most of them that I have seen are a terrific drain on the signal. That is why variable condensers, tuning all three coils, are better, the coils simply being mounted somewhat behind the condensers and not being in inductive relationship.

The 4-circuit tuner is similar to the 3-circuit affair, except that it is non-radiating. It is a good performer.

In the regenerative class is the Super-Heterodyne. I have such a set myself. Calmly regarding the claims made for it from many sources I nevertheless do not think it fulfills all those claims. My contention all along has been that as the Super-Heterodyne system depends too much on a restricted tuner. The signal finally delivered can never be anything except what the tuner brings in, hence the fullest results are denied the user, unless there is some short-wave radio-frequency amplification. The Radio Corporation of America, in its new 6-tube Regenoflex Super-Heterodyne, provides one stage of short-wave RF, that is, the RF with which we are most familiar, as found in the Neutrodyne and reflexes. This tube is reflexed for one stage of long RF. But then the financial consideration arises, and while comparing the values of receivers one must not confine himself to the service values alone and disregard the monetary ones. For a man with a lot of money to spend and who can afford to be indifferent whether a complete set costs $100 or $400 the Regenoflex would perhaps be the thing, but that group of citizens unfortunately is too small to justify waiving the price consideration. I prefer to regard the radio set as a necessity, not as a luxury.

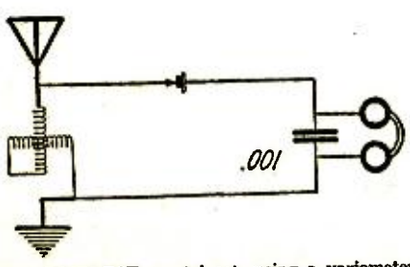
As for constructing the Regenoflex yourself, it can't be done successfully. You can make something like it, and produce a good job, if you have enough experience, but the Radio Corporation's results were obtained at a laboratory expense that precludes exact duplication. Other Super-Heterodynes, however, including the Ultradyne, may be made by the home constructor with good results.

My own idea is that the trend of radio development is along the lines of short-wave RF, not long-wave. Greater efficiency is obtained from long-wave RF, but I do not believe that is due so much to the inherent capability of the short waves to produce the better results as to the coils themselves, tubes and the circuit. I realize that it is commonly regarded that long waves are "better" than short waves, but I believe the latter simply more difficult to handle well. The Neutrodyne was a big improvement along the line of short-wave RF, because of its conservation of signal strength and prevention of the vice of inter-tube capacity coupling, due to the condenser effect among elements of the tube. The low-loss coil is also another improvement. Some early day I believe that THE coil will be designed which will do away forever with the idea that long waves are better than short ones. Meanwhile, however, there is no reason to complain, because receivers using short-wave RF are indeed excellent and usually much more economical than the others.

One must not forget, also, that the Super-Heterodyne is not a low-loss receiver,

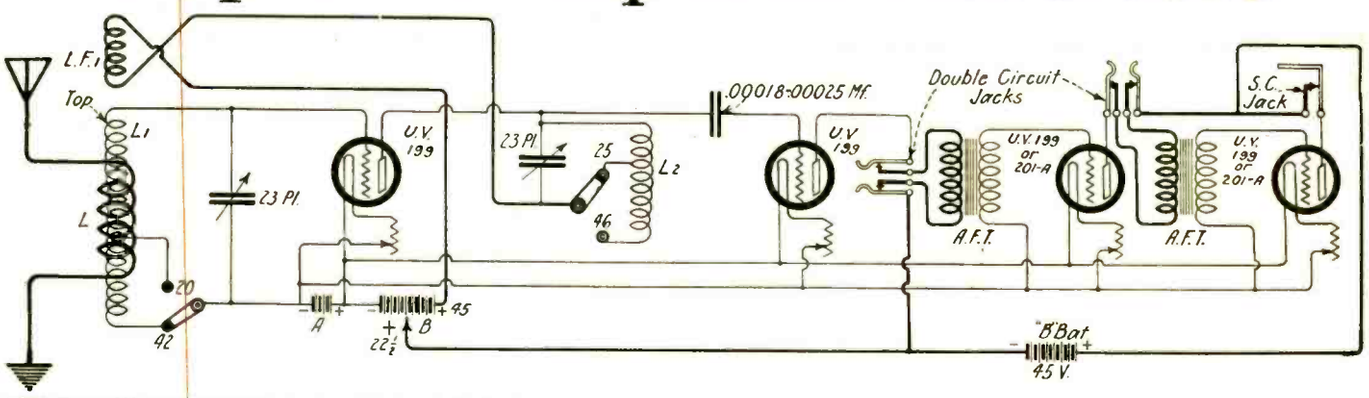
Table of Circuits

Regenerative Circuits	**Single-circuit regenerative.** **Double-circuit tickler coil regeneration.** **3-circuit honeycomb coil set.** **3-circuit, variometer grid and plate tuning.** **3-circuit, aperiodic primary, condenser tuned secondary, tickler regeneration.** **4-circuit, similar to 3-circuit arrangement.** **Super-Heterodyne.**
Radio Frequency	**Fixed radio-frequency transformer amplification.** **Tuned radio-frequency transformer amplification.** **Combination of fixed and tuned RF amplification.** **Tuned inductance RF amplification.**
Reflex Circuits	**Fixed RF amplification, crystal or tube detection.** **Tuned RF amplification, crystal or tube detection.** **Combination fixed and tuned RF amplification, crystal or tube detection.** **Straight regenerative circuit, reflexed for audio-frequency.** **Super-Heterodyne, reflexed for RF amplication.**
Regenerative and Radio Frequency	**Superdyne.**



THE SIMPLEST crystal set, using a variometer. It is not selective enough.

Expert Compares Receivers



THE FAMOUS SUPERDYNE circuit which has held the interest of thousands of fans since its inception. Coils L, L1 and LF1 compose the variocoupler, and coil L2 is the plate coil. The use of the grid leak as shown is optional, as in many cases better results are had by placing from the grid post to the positive filament post on the socket. With low loss parts this circuit is said to be the equal of a 6-tube set, and is noted for its extreme clarity.

except only so far as one may regard the use of long waves as the prevention of certain losses. The incoming signal, the one that the tuner picks up, and tuned by the dial on the wavelength condenser, as a rule is delivered direct to the oscillator, which increases the wavelength to a certain and unvaried frequency, say to 30 kilocycles. This is done by tuning with the oscillator variable condenser, which is used in conjunction with an oscillator coil. Thus a difference is struck between the wave of the incoming signal and the wave to which the oscillator is tuned. This is the heterodyning process. The new wave, but the same signal, is passed along, on the new or heterodyned wave, through fixed radio-frequency transformers, matched to pass only that wave, plus a side band to allow for the vocal or musical frequencies. Fixed transformers of any kind can not be rated as low-loss, for only a glimpse will tell you that they are surrounded with considerable insulation, and the whole low-loss theory is the elimination of unnecessary insulation.

The fixed RF transformer, called untuned, although it is tuned to cover the radiocast band of wavelengths, with a peak say around 450 meters, may be used for short-wave RF, but the same argument holds good against it. Losses must occur. This, however, is not to be construed as saying that results may not be obtained from such devices and that they should not be used. When one has a fancy for a minimum number of controls, and yet desires RF, unless he uses the heterodyning principle he has no recourse except to these fixed transformers, and a serviceable set may be made in which they are employed.

The other kind of short-wave RF transformer is the "tuned" type, that is, with a variable condenser tuning the secondary of the transformer, as in the Neutrodyne. This is the more efficient. Sometimes the "tuned" and "untuned" types are combined in a circuit with good results. Sometimes, also, a variometer is used instead of a transformer, to serve as a stage of impedance-coupled RF, or a single coil, with a variable condenser in parallel, is used for the same purpose. It is safe to say that sooner or later the experimenter reaches that stage when he incorporates RF in some form in a set and for best results it ought to be used.

In this connection it is interesting to know that adding RF does not necessarily increase selectivity, although most frequently it does. If you take the aperiodic 3-circuit regenerator and add a stage of impedance RF your set will be less selective, for then you are tuning the aerial circuit and passing a broadly-tuned aerial current onto the detector side of the circuit, and the tuning is sharpened there, but not to the same degree as in the original set without the RF. However, the selectivity is still quite sufficient and the sensitivity is greatly increased. The DX signals that were usually so husky are cleared up and greater distance is obtainable. In fact, the 3-circuit tuner may be regarded as too selective, because within one degree of the dial setting two or three different DX stations may be brought in. What happens to the harmonics of voice and music, those overtones that lend richness and naturalness to the signal product, may well be imagined. The rule to follow is to make your set as selective as your needs require, but not a whit more selective than that, for you are paying a heavy toll in loss of volume and quality when you are gaining selectivity. By the way, this is true in many Super-Heterodynes, too, because the second and third harmonics are choked off, distortion resulting.

I am not forgetting the crystal, but am omitting the simple crystal set because it does not produce enough volume to satisfy most persons, and to make a sufficiently selective straight crystal set in most instances requires about as many parts as a crystal-and-tube set, which costs only a little more. For those who enjoy the fine quality of crystal rectification a stage of tuned RF and a transformer detector circuit, low-loss parts being used, make a splendid set. If the reflex principle is used, although the life of the tube is not shortened thereby, the quality suffers somewhat. Reflex sets are rather tricky, as a rule, although experimenting with them is a fascinating pastime, and the field for improvement in home-constructed reflexes is wide. I should say that it is an engineering job to construct a set that uses more than one reflexed stage and that anybody desiring a reflex and not being much experienced as a constructor should rely on the commercial models, and not try to build his own. In the commercial sets the arguments I present against the reflex do not hold. Of course the tube may be used as the detector in a reflex set, but I have not had very satisfactory experiences with this, no more satisfactory, indeed, than with the use of regeneration in a straight RF stage. These are two circuits I would not advise anybody but the experienced to spend any time on.

Then, too, fixed and tuned RF may be combined in a reflex. Indeed, it is in reflex sets that the fixed RF transformer comes in handy, for often two controls are required in the detector to get enough selectivity, and a tuned RF stage would mean an extra control. If two stages of RF were used ahead of the crystal detector, then, with two controls in the detector, there would be the prohibitive four controls. Hence tuned-untuned RF may be used in that order. The presence of two controls in the crystal detector circuit is due to the inherent resistance of the crystal itself, which makes for broad tuning. If you can succeed with one control across the secondary, well and good, but if not a variable mutual inductance may be used, such as a variocoupler, with the condenser across the secondary, this giving the two controls.

In a class by itself is the Superdyne, although it is a regenerative set, preceded by a stage of tuned RF. The regeneration is supplied by a special plate coil, which is wound in the opposite direction to the other coils, and thus reverses the direction of the current in the feedback from the plate to grid. This gives a fine control of regeneration and oscillations may be kept down. The set usually does not function well in the beginning, for tuning experience and tests alone will reveal the difficulties to be overcome. They are not stupendous, however, and once the set is working right it will be found to be one of the best sets to build. Indeed its popularity is increasing and if the set had as much advertising as the Neutrodyne it might be even more popular with the radiocast listeners than the Neutrodyne. As it is the set is perhaps on a par with the Neutrodyne in popularity among fans who build their own sets.

The Neutrodyne, properly made, can not radiate. The Superdyne, properly made but improperly tuned, can radiate. That is one point in favor of the Neutrodyne.

All in all, the best circuit to build for minimum outlay and upkeep, with fine signal quality, must be one using a crystal detector, because the crystal is inexpensive, compared with the tube, and because of low upkeep cost. As a crystal alone is not sufficient for the needs of today, a stage of RF should precede the detector. You may add the two AF stages if you desire loudspeaker reception. Next in point of cost, and close to the crystal in point of quality, is the 3-circuit regenerative tuner, with the primary tuned, but if great selectivity is essential, an untuned primary may be used, the volume and quality being less. RF and regeneration are best combined in the Superdyne, which justly is entitled to first place if this combination is to be used, four tubes being necessary for loudspeaker operation. Somewhat more expensive is the Neutrodyne, with five tubes, but a splendid circuit indeed, and if the coils are properly made and low-loss, it need not be a Neutrodyne, that is, the neutralizing condensers may be omitted. The Super-Heterodyne is rather costly, eight tubes being commonly used.

As for the reflexes, unless only one stage of RF is reflexed, all but the most experienced constructors should let them alone. If one stage is reflexed the set would perhaps follow the straight crystal RF.

ANY "DYNE" YOU WANT

The Dynoflex, one stage of tuned RF, crystal detector and one stage of reflexed AF, Aug. 9 issue.

The Magnadyne, a Low-Loss Neutrodyne. Issues of Aug. 16 and 23.

A Low-Loss Superdyne, 5 tubes, including 3 stages of resistance-coupled AF. Issues of Aug. 23 and 30.

Lacault's Ultradyne. Issues Aug. 30 and Sept. 6. 3-Circuit Tuner. Issues of Aug. 2 and Sept. 13.

The Super-Heterodyne. Issues of May 31, June 7 14 and 21.

(Send 15 cents for each copy to RADIO WORLD, 1493 *Broadway, New York.)*

Superdyne Principle with Crystal

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.

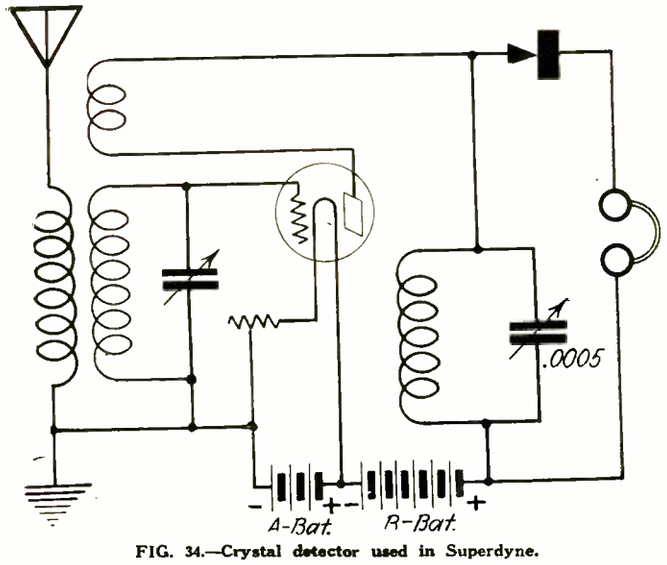


FIG. 34.—Crystal detector used in Superdyne.

SOME TIME AGO I heard that there was an experimental Superdyne circuit using one tube and a crystal detector. Will you please publish this diagram for me as I would like to make some experiments on it.—Samuel Flax, 34 E. 28 St., New York City.

Fig. 34 is the circuit. The three coils at the left are a standard 3-circuit coupler with an aperiodic primary. The coil at the right consists of 45 turns of No. 22 DCC wire wound counter clockwise, and is tuned with the 23-plate variable condenser. Preferably the crystal detector should be of the adjustable type, because this circuit is extremely critical.

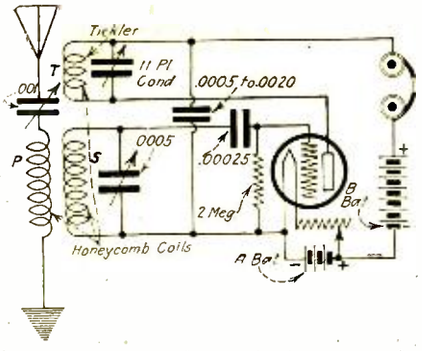


FIG. 35.—Diagram of a 3-circuit tuner using honeycomb coils.

I WOULD APPRECIATE a diagram of a 3-circuit tuner using honeycomb coils with a condenser-tuned plate circuit. — Francis J. Tietsort, 520 W 124 St., New York City.

Fig. 35 shows the diagram. A 50-turn coil is used as the primary and intercepts the antenna through a .001 mfd. (43-plate) condenser. The secondary S is a 50-turn coil shunted by a .0005 mfd. (23-plate) condenser. The tertiary is the 35 or 50-turn coil, shunted by an 11-plate condenser. A fixed condenser is connected from the phone end of the plate lead to the A—. The three coils are mounted in close inductive relationship. Any tube except Sodion may be used. The grid leak, instead of being mounted across the grid condenser, goes from the grid post on the socket to the A— post. The values of the condensers are given for the low-loss type. If a .001 mfd. condenser is not available as the antenna tuner, use a 100-turn primary with a 23-plate condenser.

• • •

I HAVE READ several issues of RADIO WORLD and have received some good information. I added one stage of radio-frequency amplification to my 1-tube set as per your hook up in the May 10 issue, using all parts as specified. I get fine results on local stations but have not been able to do any good on distant stations. I live about four miles from KDKA and fifteen miles from Pittsburgh. Those stations come in great but I have been able to pick up only two or three outside of that. On my variocoupler I have 60 turns of 18 DCC on the primary and 40 turns on the rotor, same size wire. The tubes are 1½-volt 12 type and there are two 22½-volt B batteries. What can I do to get distant stations? Also I would like to have a hookup for adding one stage of audio-frequency amplification.—Carl V. Erickson, Box 25, McKeesport, Pa.

You seem to be getting good results with your set, and the only reason that could be advanced for not getting distance is that distance weather had not arrived at the time of your attempts. You will undoubtedly get much better results during the coming winter season than you have been doing in the summer months. It would be a good idea to overhaul your set and clean up all the parts, as they are more susceptible to losses when dust and dirt accumulate on them. An article on how to build one stage of audio-frequency amplification as a unit will appear in the October 11 issue, on sale next Wednesday.

I HAVE constructed a Superdyne which works well, except as to volume. When I force it to give about the volume of a 3-tube regenerative set it has an edge. I tried inserting a 6-volt C battery but when I complete the circuit I get a spark. Does this indicate a short-circuit in my set? Also, the tubes light much brighter with the C battery on. Should this be so? The circuit is wired according to RADIO WORLD and the C battery according to the circular in the carton of the 201A tube. Should a C battery in a Superdyne be wired differently?—Dr. C. W. Liggio, 95 Amity St., Flushing, N. Y.

Suggest you place a .002 mfd. fixed condenser across the amplifier phone jack to take the edge off the voice and music. The C battery will also help a great deal if connected properly. The way you have it now is in series with your A battery, which is wrong. That is the reason why the tubes light up so much brighter with the C battery in. The C battery should be connected with the positive lead going to the G post of the audio-frequency transformer, and the negative post to the grid of the amplifier tube. Two C batteries, one for each AF amplifier, will also be an improvement. You have evidently misunderstood the wiring diagram as presented in the RCA circular. The C battery wiring for the Superdyne is the same as for any other audio-frequency circuit.

• • •

PLEASE give me the size honeycomb coils to be used in the Solodial circuit, as I prefer using them instead of spider web coils?—R. L. Sullivan, Goldville, S. C.

For the primary use a 25-turn honeycomb, for the secondary use a 50-turn coil, with a 23-plate condenser across the secondary. If you wish to use a 17-plate condenser make the secondary a 75-turn honeycomb.

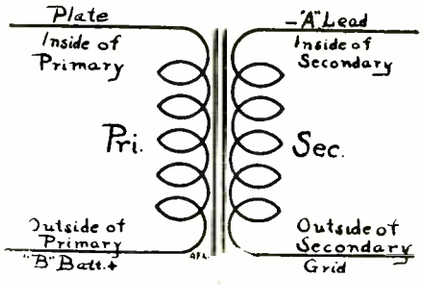
• • •

I WOULD LIKE to make a 1-tube reflex employing a stage each of both audio and radio-frequency. I have a 13 and a 23-plate condenser and a standard variocoupler, besides the transformers. Can you supply me with a circuit diagram of such a receiver which would be capable of long distance getting and good volume and selectivity?—Leon Greene, 408 Hopkinson Ave., Brooklyn, N. Y.

A circuit such as you describe was published in RADIO WORLD, issue of August 9, called the Dynoflex. You can get loudspeaker reception on local stations with this circuti, and also, now that the cool weather is here, you should be able to get very long distance results on earphones. With this circuit you may use most of the parts which you now have. The rest is easily made at home.

• • •

I AM CURIOUS to know how the audio-frequency transformer leads are brought out to the binding posts, and how those leads are marked.—T. J. Rice, 73 E. 101 St., New York City.



HOW the connections are made to an audio-frequency transformer. The plate lead, if this was the first AF, would be from the detector tube.
FIG. 40

Fig. 40 shows how the leads are connected. The plate lead is marked P, the grid lead G, the A lead F— and the B battery lead B+.

• • •

THE manufacturers of the 199 tubes state that the filament voltage is 3 volts. Does this mean that a voltmeter placed across the filament binding posts of the socket should read 3 volts when the tube is inserted and burning, or should it read 3 volts without the tube in the socket?—Wm. C. Lane, Jr., 28 Hawkins Ave., Sanford, N. C.

The voltmeter should read 3 volts when placed across the socket posts only when the rheostat is adjusted to pass 3 volts. To obtain the correct voltage, leave the tube in the socket and vary the rheostat until the voltmeter reads three. With the tube out, the voltmeter reading is of no value.

• • •

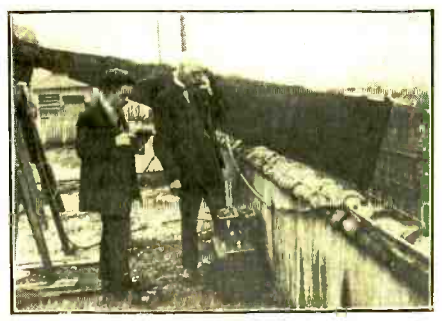
I HAVE just purchased a new set of B batteries, two 45-volt units and one 22½-volt unit, and would like to have a diagram showing me how to connect them together, and also showing where to take a tap off for the detector tube.—H. E. Spett, 746 Marcy Ave., Brooklyn, N. Y.

Fig. 39 is the diagram of how to hook up your

DX Handful

(Wide World)

WILLIAM E. SNEDAKER, a radio experimenter of Philadelphia, showing how compactly a 3-tube set can be made and still be efficient. It is a modification of the popular regenerative set, using standard parts and a special coupler. The coils have very low losses due to their spider web form of construction, and the almost entire absence of insulating material. As the photo shows, three 199 tubes are used, which helps in keeping the size of the set down so small. One dial does the tuning and regeneration is controlled by the rheostat.



(United)

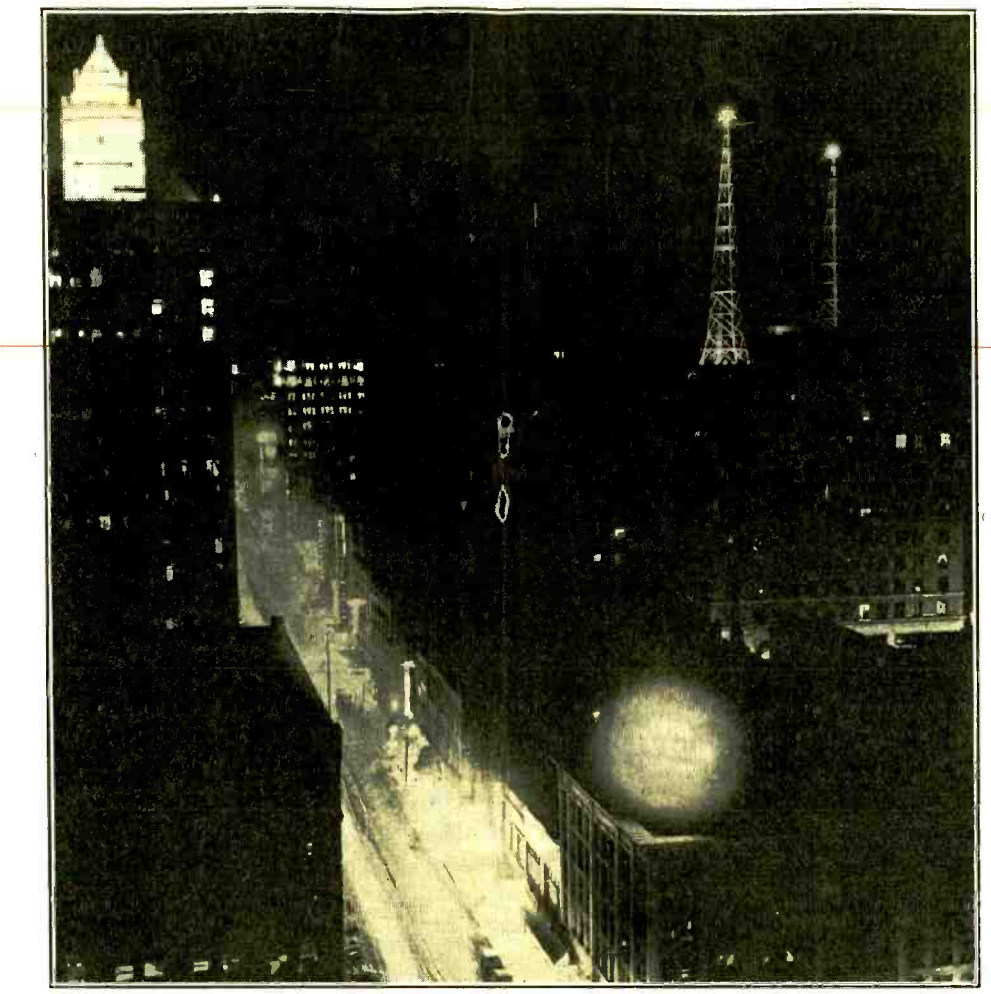
A GIANT loud speaker on the roof of a Berlin warehouse from which listeners on the street below and in adjoining buildings get the broadcasting from the local German stations. Market reports, lectures and advertising are sent over the air.

Great Volume

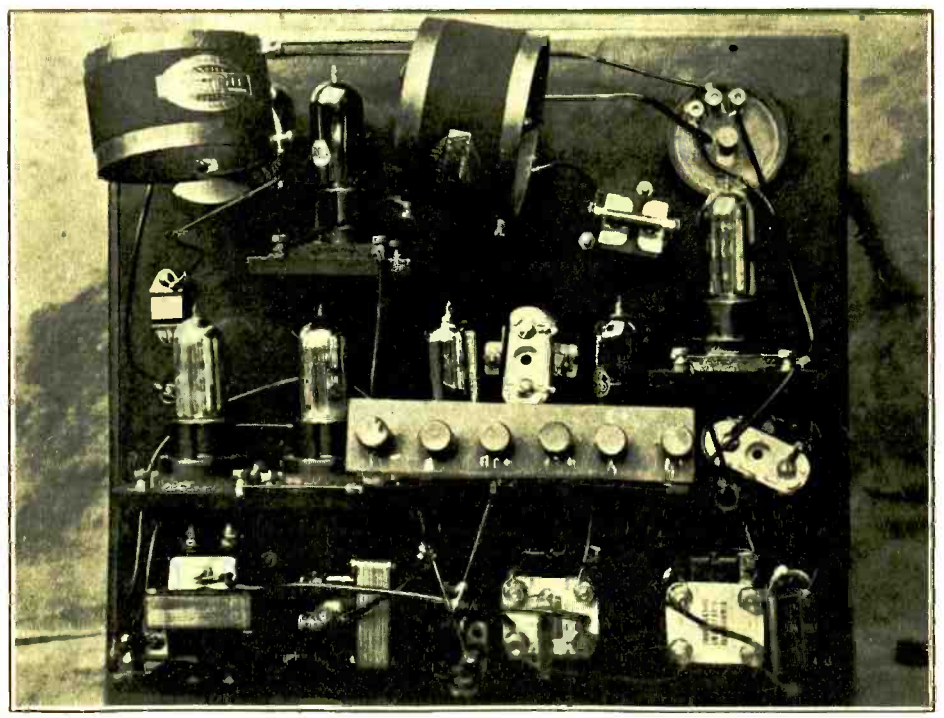
(Radio World)

CHARLES W. BELT, of 610 West Main Street, Newark, Ohio, built this 5-tube tuned radio-frequency set to fit into the bottom of a phonograph. The panel is 14"x14" and all parts are mounted on it. This gives plenty of room for all the batteries in the cabinet, which is 12" deep. Some features of this set are: no neutralizing condenser is used, a potentiometer is used on the RF tubes, only one jack used, and that is on the second audio stage. Mr. Belt reports good volume on all stations up to 500 miles away without the need of any other additional amplifier. The dial in the upper right-hand corner controls the potentiometer, the center dial tunes the first RF coil, and the third dial tunes the detector coil. The jacks are located along the bottom of the panel.

Antenna Towers at Night



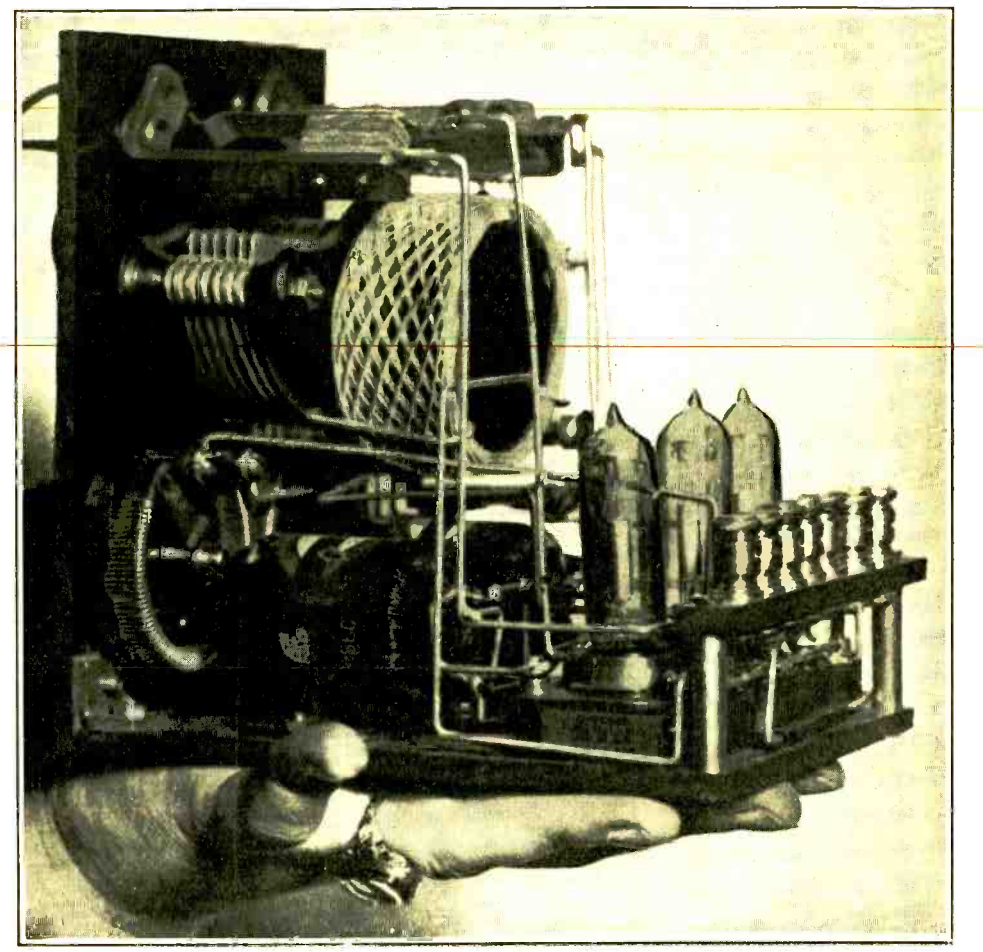
THE HUGE antenna towers of Station WHO may be seen for miles around at night and are one of the landmarks of Des Moines, Iowa. The Bankers Life Company, who operate Station WHO, are on the air regularly and their programs appear in this issue. (Kadel & Herbert)



REAR VIEW of Charles W. Belt's set, the front panel view of which appears above. All the tubed sockets are mounted directly onto the panel with soft sponge rubber cushions placed underneath as shock absorbers. By the use of these sponges, the set will be able to operate under ordinary home conditions without making a racket in the loud speaker every time someone walks across the room, though a dry-cell tube like the 11 is used. In designing the layout it was a good stunt to mount the heavy transformers at the bottom of the panel. The binding post strip is conveniently placed not too far down to permit easy access when wiring the batteries. Very short leads were obtained by the wiring method used by Mr. Belt.

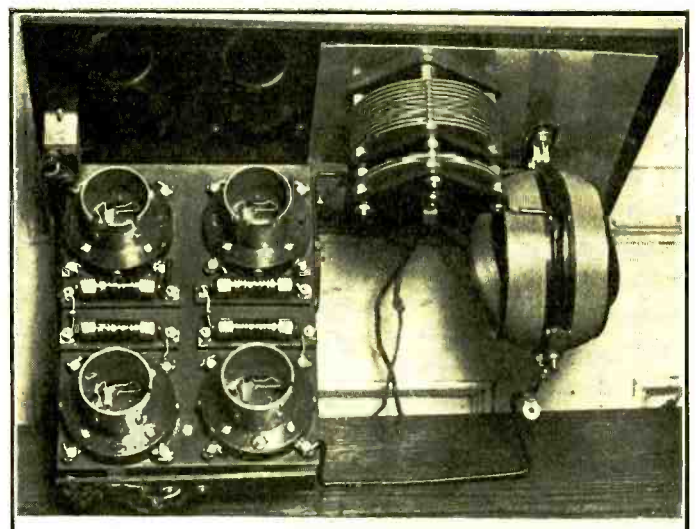
RAYMOND B. WALES, of 911 23rd St., Washington, D. C., shows the world how to make a good outdoor ground. To make sure that the earth surrounding the pipe is always a conductor of electricity, a bucketful of a copper sulphate solution, commonly called bluestone, and which is cheap, should be poured around the pipe. The solution prevents corrosion and is highly conductive. An iron pipe is used for ground connection.

Efficient 1-Coil Set

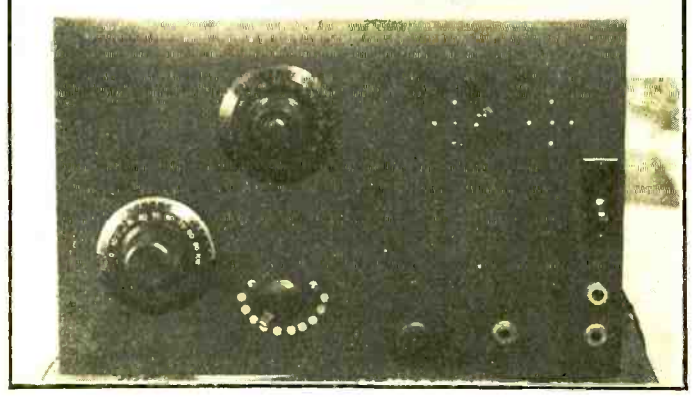


(Fotograms)

EFFICIENT small 3-tube radio receiver (above). It measures 3½" long, 5½" high and about 8" deep. The circuit used is the modified ultra audion, and operates the phone on distance and stations 300 to 500 miles away on the loudspeaker. The proud possessor of this set is P. F. McGuire, of 787 Broadway, Bayonne, N. J. All standard parts were used, and of course the tubes are the little 199's. There is room for two jacks right at the top of the panel. Next week Radio World will publish data on how to build a DX set like this one.



THIS circuit (at right) is the same as that used with the small set pictured above, with the difference that there are these stages of resistance coupled audio-frequency amplification used. The top part of the picture shows the variocoupler and tuning condenser at the right, and is entirely shielded from the panel. The sub panel with the four-tube sockets mounted on it holds the detector and amplifier tubes. The lower portion is the front panel, showing the tap switch and the two tuning dials at the left, and at the right the phone jacks and battery switch. This set produces very clear signals.



BROADCAST PROGRAMS

Thursday, October 2

KDKA, Pittsburgh, 326m, E. S. T.—12:15 P. M., concert by Scalzo's Orchestra. 6:15 P. M., dinner concert by the Pittsburgh Athletic Association Orchestra. 7:15 P. M., The Singer-time Lady. 7:30 P. M., address. 7:40 P. M., stockman reports. 8:30 P. M., musical under the auspices of Boggs and Buhl Company. 9:55 P. M., time signals; weather forecast. 11:30 P. M., concert.

KYW, Chicago, 536m, C. S. T.—5:02 P. M., news, financial and final markets. 5:35 P. M., children's bedtime story told by "Uncle Bob." 6 P. M., dinner concert broadcast from the Congress Hotel. 7 P. M., "Twenty Minutes of Good Reading," by Rev. C. J. Pernin, S. J. 7:20 P. M., musical program. 8:15 P. M., "Safety First" talk by Mr. Z. C. Elkin. 9 P. M., "At Home" program.

KFI, Los Angeles, Cal., 469m, P. T.—5 P. M., Evening Herald news bulletins. 5:30 P. M., Examiner news bulletins. 6:45 P. M., Y. M. C. A. lecture and Lilah Carlson, coloratura soprano arranging concert. 8 P. M., Ambassador Hotel Cocoanut Grove Orchestra. 9 P. M., Examiner Studio program. 10 P. M., Rhue Gill and Bess Rudisill.

WJY, New York, 405m, E. S. T.—7:30 P. M., Berlitz weekly French lesson. 8:45 P. M., talk auspices Democratic National Committee. 9 P. M., Al Reiser's Club Ferreri Orchestra.

WDAR, Philadelphia, 395m, E. S. T.—11:45 A. M., daily almanac. 12 Noon, organ recital from the Stanley Theatre; features from the Studio; Arcadia Concert Orchestra. 2-3 P. M., Arcadia Concert Orchestra; artist recital from the Studio. 4:30 P. M., artist recital from the Studio; Magazine Corner. 5 P. M., educational talks by a member of the faculty from the Pierce School. 5:45 P. M., sporting results. 7:30 P. M., Dream Daddy with the boys and girls.

WRC, Washington, 469m, E. S. T.—5:15 P. M., instruction in international code. 6 P. M., children's hour by Peggy Albion. 7:45 P. M., talk on motoring, auspices American Automobile Association. 8 P. M., song recital by Fred Eden, baritone. 8:45 P. M., song recital by Caroline Manning, contralto. 9:30 P. M., concert by the Harmonious Quartet. 9:55 P. M., time signals.

KHJ, Los Angeles, Cal., 395m, P. T.—6 P. M., Art Hickman's Concert Orchestra from the Biltmore Hotel. 6:30 P. M., children's program presenting Prof. Walter Sylvester Hertzog telling stories of American history; weekly visit of Dickie Brandon, screen juvenile. Catherine Hyatt, 8-year-old pianist. 8 P. M., program courtesy Paul G. Hoffman Company; The Russian String Quartet. 10 P. M., Art Hickman's dance orchestra.

WJZ, New York, 455m, E. S. T.—1 P. M., Nathan Abas' Hotel Pennsylvania Orchestra. 4 P. M., specialty numbers. 5:30 P. M., State and Federal agricultural reports; farm and home reports; closing quotations of the New York Stock Exchange; foreign exchange quotations; Evening Post News. 7 P. M., Bernard Levitow's Hotel Commodore Orchestra. 7:55 P. M., Colliers Weekly, by John B. Kennedy. 8 P. M., Wall Street Journal review. 8:30 P. M., Wanamaker Organ Concert. 9:30 P. M., talk auspices New York Board of Trade and Transportation. 10:30 P. M., Waldorf-Astoria Dance Orchestra.

WIP, Philadelphia, 509m, E. S. T.—6:05 P. M., dinner music program. 6:45 P. M., agriculture livestock and produce market reports. 7 P. M., Uncle Wip's bedtime stories and roll call for the children. 8 P. M., "Timely Topics for Motorists," talk by Gene Hogle. 8:15 P. M., concert by the Philadelphia Police Band. 9 P. M., recital of character songs by Joseph Hayden and Flora Ripka, pianist. 11 P. M., dance music by Harvey Marburger and his vaudeville orchestra.

WOC, Davenport, Ia., 484m, C. S. T.—10 A. M., opening market quotations. 10:05 A. M., household hints. 10:55 A. M., time signals. 11 P. M., weather and river forecast. 11:05 A. M., market quotations. 12 Noon, chimes concert. 12:15 P. M., weather forecast. 2 P. M., closing stocks and markets. 6:45 P. M., sport news and weather forecast. 7 P. M., Sandman's Visit, (Bedtime Stories by Miss Val McLaughlin). 9 P. M., orchestra program.

WEEI, Boston, 303m, E. S. T.—12 Noon, luncheon music by Dok-Eisenbourg and his Sinfonians. 2 P. M., music and educational talk. 8 P. M., program direct from WEAF, New York Studio.

WOR, Newark, N. J., 405m, E. S. T.—6:15 P. M., Albert E. Sonn, technical editor; weekly talk on "Radio for the Layman." 6:30 P. M., "Music While You Dine," Jimmie Lent and his orchestra. 7:15 P. M., resume of the day's sports with "Jolly Bill" Steinke.

WEAF, New York, 492m, E. S. T.—11-12 A. M., musical program and talks to housewives; market reports. 4-5 P. M., College Club Orchestra; children's stories. 6-11 P. M., dinner music from the Hotel Waldorf-Astoria; mid-week services under New York Federation of Churches; Daniel Scherer, violinist; Grace Richards, soprano; talk by the Bank of America; "Touring with the Packard," Charles D. Isaacson as conductor; Werner Janssen, composer-pianist; Vincent Lopez and his orchestra from Hotel Pennsylvania.

Friday, October 3

KDKA, Pittsburgh, 326m, E. S. T.—12:15 P. M., concert by Daugherty's Orchestra. 6:15 P. M., organ recital by Paul E. Fleeger. 7:15 P. M., Uncle Ed will entertain the children. 7:30 P. M., address. 7:40 P. M., stockman reports of the primary livestock and wholesale produce markets. 8 P. M., miscellaneous program. 8:30 P. M., concert by the artists from Mrs. James Stephen Martin studio, assisted by Christine Adams, celloist. 9:55 P. M., time signals; weather forecast.

KYW, Chicago, 536m, C. S. T.—5 P. M., news, financial and final markets; Dun's review and Bradstreet's weekly review of Chicago trade. 5:35 P. M., children's bedtime story told by "Uncle Bob." 6 P. M., dinner concert broadcast from the Congress Hotel. 6:30 P. M., program broadcast from KYW's studio. 8:30 P. M., midnight revue. 9:30 P. M., "Around the Town with KYW in Chicago" (stage revues). 9:45 P. M., midnight revue.

KFI, Los Angeles, Cal., 469m, P. T.—5 P. M., Evening Herald news bulletins. 5:30 P. M., Examiner news bulletins. 6:45 P. M., Aeolian organ recital. 8 P. M., Evening Herald, Carl Edward Hatch arr. concert. 9 P. M., program from Examiner Studio. 10 P. M., Chief Yowlache, baritone and Margaret Johnson, violinist, in American Indian program. 11 P. M., Ambassador Hotel Cocoanut Grove Orchestra.

WJY, New York, 405m, E. S. T.—8 P. M., "Chats with the Editor," Ernest A. Zadig, of the New York Telegram and Evening Mail.

KSD, St. Louis, 546m, C. S. T.—8 P. M., broadcasting concert by 6th Infantry Band, direct from Jefferson Barracks.

WDAR, Philadelphia, 395m, E. S. T.—2-3 P. M., Arcadia Concert Orchestra; playlet by members of the National School of Elocution and Oratory. 4:30 P. M., dance program. 5:45 P. M., sporting results. 7:30 P. M., Dream Daddy with the boys and girls. 8 P. M., "Turning the Pages," a book review; "WDAR Walter Greenough Players," artist recital from the Studio. 10 P. M., meeting of the "Morning Glory Club" from 10 P. M. to 1 A. M.; artist recital by Esther Patsy Riven, soprano; Howard Lanin's Dance Orchestra. 1 A. M., features from the Studio.

WRC, Washington, 469m, E. S. T.—3 P. M., Fashion Developments of the Moment prepared by "Women's Wear." 3:10 P. M., song recital by Arthur McCormick, baritone. 3:20 P. M., "Beauty and Personality" by Elsie Pierce. 3:25 P. M., current topics by the editor of "The Review of Reviews." 3:35 P. M., piano recital. 3:50 P. M., The Magazine of Wall Street. 4 P. M., song recital. 5:15 P. M., time signals and weather forecasts. 6 P. M., stories for children by Peggy Albion.

KHJ, Los Angeles, Cal., 395m, P. T.—6 P. M., Art Hickman's Concert Orchestra. 6:30 P. M., children's program presenting Prof. Walter Sylvester Hertzog telling stories of American history; weekly visit of Richard Headrick, screen juvenile; bedtime story by Uncle John. 8 P. M., program courtesy of the Globe Ice Cream Company. 10 P. M., Art Hickman's dance orchestra.

WJZ, New York, 455m, E. S. T.—4:30 P. M., Hotel Astor Organ Recital; Leo Riggs, organist. 5:30 P. M., State and Federal agricultural reports; farm and home reports; closing quotations of the New York Stock Exchange; foreign exchange quotations; Evening Post news. 7 P. M., Lafayette Hotel Orchestra. 8 P. M., Wall Street Journal review. 8:25 P. M., Looseleaf Current Topics, Dr. William H. Allen. 8:40 P. M., specialty numbers. 9:15 P. M., "Charles Dickens," George Laval Chesterton.

WIP, Philadelphia, 509m, E. S. T.—1 P. M., luncheon music by the Gimbel Tea Room Orchestra. 1:30 P. M., weather forecast. 3 P. M., popular program direction of Harry Link. 6 P. M., weather forecast. 6:05 P. M., dinner music by the Jordan-Lewis Dance Orchestra. 6:45 P. M., agriculture livestock and produce market reports. 7 P. M., Uncle Wip's bedtime stories and roll call for the children of Uncle Wip's Kiddie Klub.

WOC, Davenport, Ia., 484m, C. S. T.—10 A. M., opening market quotations. 10:05 A. M., household hints. 10:55 A. M., time signals. 11 A. M., weather and river forecast. 11:05 A. M., market quotations. 12 Noon, chimes concert. 12:15 P. M., weather forecast. 2 P. M., closing stocks and markets. 6:45 P. M., sport news and weather forecast. 7 P. M., Sandman's Visit, (bedtime stories by Miss Val McLaughlin). 7:20 P. M., educational lecture under the auspices of the Scott County Farm Bureau. 8 P. M., musical program.

WEEI, Boston, 303m, E. S. T.—12 Noon, luncheon music by Dok-Eisnbourg and his Sinfonians. 2 P. M., music and educational talk. 7 P. M., Big Brother Club. 8 P. M., program direct from WEAF, New York Studio.

WAAM, Newark, N. J., 263m, E. S. T.—8 P. M., Newark Radio Trio. 8:15 P. M., Irving Porter. 8:30 P. M., Miss Adele Grassgreen, soprano. 8:45 P. M., Newark Radio Trio. 9 P. M., Dan Nemeth and Bob Buchanan. 9:30 P. M., Catello's Radio Entertainers. 10 P. M., surprise program. 10:30 P. M., Catello's Radio Entertainers.

WOR, Newark, N. J., 405m, E. S. T.—6:30 P. M., "Man in the Moon" stories for the children; Josephine Lawrence and William F. B. McNeary. 7 P. M., joint program by the Rev. Edmont Hains, baritone, Evangelist and Pastor of Brick Church, Parsippany, New Jersey, and John A. Scott at the piano. 7:15 P. M., resume of the day's sports with "Jolly Bill" Steinke.

WEAF, New York, 492m, E. S. T.—11-12 A. M., musical program; talk by Major Bradley Martin on "Visiting a Kindergarten"; market and weather reports. 4-5 P. M., Club Program for women with songs by Lulu C. Phillips, lyric soprano. 6-10 P. M., dinner music from the Rose Room of the Hotel Waldorf-Astoria; children's stories by Blanche Elizabeth Wade; "The Happiness Boys," Billy Jones and Ernest Hare; B. Fischer and Company's Astor Coffee Orchestra.

Saturday, October 4

WBZ, Springfield, Mass., 337m, E. S. T.—7:05 P. M., market reports by the United States Department of Agriculture at Boston. 7:30 P. M., bedtime story for the kiddies. 7:40 P. M., concert by the Hotel Kimball Trio; Jan Geerts, violinist and director; Arnold Janser, cellist; Lloyd Stoneman, pianist, Springfield. 8:15 P. M., concert by Vesta String Quartet and Orchestra. 9:30 P. M., concert by Bertha Wells, reader and trombonist, and by Beatrice Clough, soprano and pianist. 9:55 P. M., time signals; weather reports.

KDKA, Pittsburgh, 326m, E. S. T.—3 P. M., Pitt-Lafayette football game from Forbes Field. 6:15 P. M., dinner concert by the Westinghouse Band. 7:15 P. M., the children's period—The Radio Rhymster. 7:30 P. M., address. 7:45 P. M., The World's Uniform Sunday School Lesson, by C. C. Johnson. 8 P. M., baseball scores; sport review by James J. Long, sport writer. 8:30 P. M., concert by the Westinghouse Band, double mixed quartet from the Westinghouse Community Chorus. 9:55 P. M., time signals; weather forecast.

KYW, Chicago, 536m, C. S. T.—5 P. M., news, financial and final markets. 5:35 P. M., children's bedtime story told by "Uncle Bob." 6 P. M., dinner concert broadcast from the Congress Hotel. 8:05 P. M., talk by Vivette Gorman. 8:10 P. M., Youth's Companion—stories, articles and humorous sketches. 8:35-11:30 P. M., late show.

KFI, Los Angeles, Cal., 469m, P. T.—5 P. M., Evening Herald news bulletins. 5:30 P. M., Examiner news bulletins. 6:45 P. M., dance orch. & Basil Webb, lect. on India. 8 P. M., Aeolian Trio. 9 P. M., program from Examiner Studio. 10 P. M., Packard Radio Club. 11 P. M., Ambassador Hotel Cocoanut Grove Orchestra.

KSD, St. Louis, 546m, C. S. T.—7 P. M., orchestra and specialties, broadcast direct from Missouri Theater.

WDAR, Philadelphia, 395m, E. S. T.—11:45 A. M., daily almanac. 12 Noon, organ recital from the Stanley Theatre; features from the Studio; Arcadia Cafe Concert Orchestra. 2-3 P. M., Arcadia Concert Orchestra; artist recital from the Studio. 4:30 P. M., dance program by the Cotton Pickers. 5:45 P. M., sporting results and special announcements. 7:30 P. M., Dream Daddy with the boys and girls.

WRC, Washington, 469m, E. S. T.—5:15 P. M., instruction in international code. 6 P. M., Children's Hour by Peggy Albion. 7:45 P. M., bible talk. 8 P. M., song recital by Edith Dunn, soprano. 8:45 P. M., song recital by Roy Bashaw, tenor. 9:55 P. M., time signals.

KHJ, Los Angeles, Cal., 395m, P. T.—6 P. M., Art Hickman's Concert Orchestra. 6:30 P. M., children's program presenting Prof. Walter Sylvester Hertzog telling stories of American history. Helene Pirie, screen juvenile; Vondelle Dar, screen juvenile; bedtime story by Uncle John. 8 P. M., program presented through the courtesy of the May Co. 10-11 P. M., Art Hickman's dance orchestra.

WJZ, New York, 455m, E. S. T.—5:30 P. M., State and Federal agricultural reports; farm and home reports; closing quotations of the New York Stock Exchange; foreign exchange quotations; Evening Post News. 7 P. M., Waldorf-Astoria dance orchestra. 8 P. M., Vincent Desantis, violinist; Alfred Rosinger, accompanist. 9:30 P. M., religious program by Cantor Arthur Green and choir. 10:30 P. M., Hotel Astor dance orchestra.

WIP, Philadelphia, 509m, E. S. T.—6 P. M., weather forecast. 6:05 P. M., dinner music by the St. James Hotel Orchestra. 6:45 P. M., agriculture livestock and produce market reports. 7 P. M., Uncle Wip's bedtime stories and roll call for the children. 8 P. M., special concert by the Westminster Mixed Quartet. 9 P. M., recital by the Lyric Trio, Dorothy Powers, harpist, Florence Haenle, violinist and Ernestine Bacon, soprano; Flora Ripka, accompanist. 10:05 P. M., dance music by the Hotel St. James Orchestra. 11:05 P. M., organ recital by Karl Bonawitz.

WOC, Davenport, Ia., 484m, C. S. T.—10 A. M., opening market quotations. 10:05 A. M., household hints. 10:55 A. M., time signals. 11 A. M., weather and river forecast. 11:05 A. M., market quotations. 11:10 A. M., agricultural bulletins. 12 Noon, chimes concert. 12:15 P. M., weather forecast. 12:17 P. M., closing markets. 6:45 P. M., sport news and weather forecast. 7 P. M., Sandman's Visit (bedtime stories by Miss Val McLaughlin). 9 P. M., orchestra program.

WOR, Newark, N. J., 405m, E. S. T.—8 P. M., contralto solos by Marion Adam. 8:15 P. M., report of the U. S. Commission to the Virgin Islands by Jefferson S. Coage. 8:30 P. M., contralto solos by Marion Estelle Adam. 8:45 P. M., concert by the David Margulies Trio. 9 P. M., fifteen minutes of Indian literature by Harendranath Maitra. 9:30 P. M., Mary Rexanna Loomis, only woman president of a radio college, talking on "The International Language Which the Use of Radio is Bringing About." 9:45 P. M., an hour of novelties.

WEAF, New York, 492m, E. S. T.—4-5 P. M., Bruno Brothers Orchestra. 6-11 P. M., dinner music from the Rose Room of the Hotel Waldorf-Astoria, New York City; boys' stories; Gladys Hawkins, jazz pianist and Albert Pierson; banjoist; Mme. Aileen d'Orme Baker, dramatic soprano; string quintette from the Steamship Presi-

One Stage of Push-Pull AF

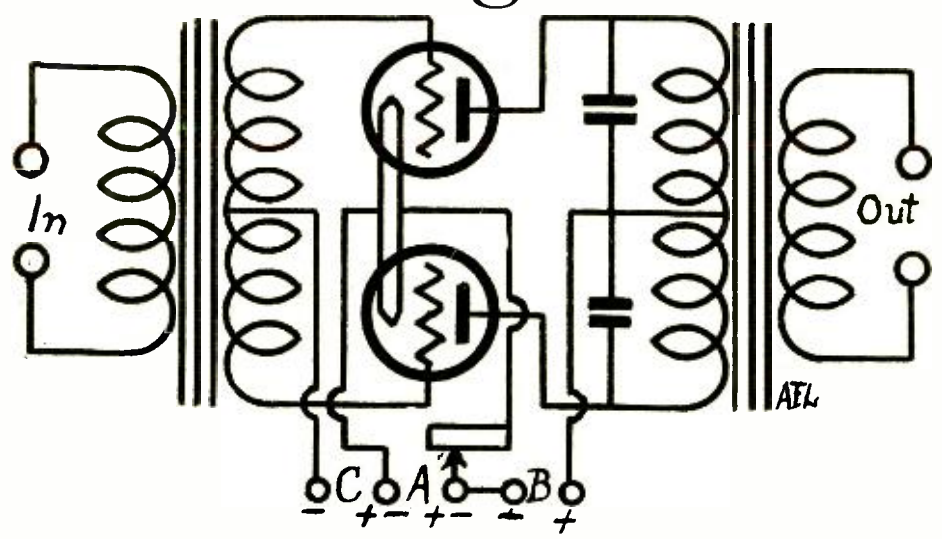


FIG. 38.—Push-pull power amplifier circuit asked for by Frank Baertich of Troy, Indiana. The transformers are purchased in pairs and are matched. Ninety volts are used on the plate and one rheostat controls both tube filaments.

RADIO WORLD'S

Radiocast 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.

I HAVE a 3-tube regenerative set operating a Magnavox R3 loudspeaker. I would like to have a diagram showing me how to make a power amplifier that I can hook in between the set and loudspeaker for special occasions. The set already has two stages of audio.—Frank Baertich, Troy, Ind.

In Fig. 38 you have the circuit diagram of one stage of push-pull audio-frequency amplification. Two 201A tubes are used in conjunction with the regular 6-volt battery and one 10-ohm rheostat controls both tube filaments. The fixed condensers are .001 mfd. This amplifier may be used with as high as 150 volts with no distortion or howl. If the unit is built into a cabinet two single-circuit jacks may be used, one for the input from the receiving set, and the other for the loudspeaker. You will find that only one step of audio-frequency amplification on the receiver will be enough to operate the loud speaker with plenty of volume. The second stage will be used for very large rooms or for very weak stations.

• • •

MY SET is a 5-tube Neutrodyne, built with Fada parts with 6½ inch spacing between neutroformers. The transformers are 3½-to-1 in the first stage of audio-frequency and an All-American 3-to-1 in the second stage. In tuning, all three dials are practically together up to 370 meters. After that there is a difference in the tuning of the middle dial so that when I am listening to a station like KSD, St. Louis, the first and third dial show a marking of 81 while the second dial shows 68 or 69. I have, so far as possible, checked the angle of the neutroformers and am unable to see any error in that connection. What is my trouble? I have eliminated the installation of the two .006 mfd. fixed condensers. Would this have any effect on the tuning? Chicago stations come in very clearly, but the outside stations are not as clear as they might be.—J. W. Elliott, 1124 Miller Ave., Oak Park, Ill.

From your description the set seems to be working well. The majority of Neutrodynes do not tune exactly in step all the way across the dial readings. Nevertheless that is no sign that the set is not functioning properly. The angle and spacing of the neutroformers are satisfactory, since you do not complain of oscillation. The only trouble that may be present is probably in the condenser tuning the second neutroformer. If this is the old type of solid end plate condenser, change it for a low-loss condenser. After the change you may find reception so much improved that you will want to install low-loss instruments throughout.

• • •

WILL YOU kindly tell me if it injures the tubes to turn the rheostats on full force suddenly? I have heard that it shortens the life of the filament.— Gladys L. Rettig, 109 Knox Place, Joliet, Ill.

Turning the tubes on suddenly does no harm, in fact, many research men claim that the sudden flow of current increases the electron flow by forcing the thorium in the filament to the surface. This is true, provided the tube is burned at its rated capacity. However, if you put the entire six volts on the filament, it will be detrimental to the life of the tube. The rheostat may be set at the best operating point and left there, a battery switch being used to turn the current on and off.

• • •

WHICH SIDE of the C battery goes to the grid of the tube?—J. F. Lee, Evanston, Ill.

The negative lead goes to the grid.

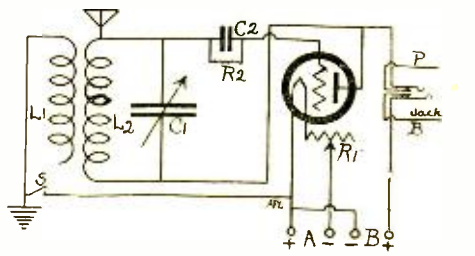


FIG. 36.—Wiring diagram of the Solodial, single-control circuit.

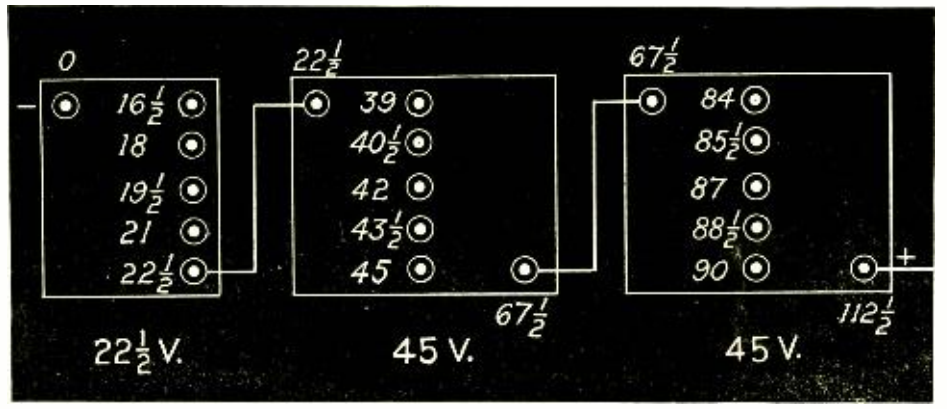


FIG. 39 shows how the connections come from the audio-frequency transformer.

volts. The tap for the detector may be taken anywhere from the 16½-volt tap up to the 67½-volt tap, according to the tube used.

• • •

I DESIRE a diagram of a 1-tube set you can log.—George Gallico, 20 E. 190 St., New York City.

The circuit diagram, Fig. 37, has the following constants. C1, 23 plates, L1, 75-turn honeycomb coil from which five turns are removed; L2, 35 or 50-turn honeycomb, C2, 11 or 13-plate condenser. This set should not be used in congested areas.

• • •

IN BUILDING my radio antenna, is it necessary to use bare wire, or is it possible to use insulated wire? I have a lot of old telephone line on hand that came out of a building that was torn down. Has the age of the wire any effect on the reception of signals?—Fred H. Jones, Leonia, N. J.

It is not necessary to use bare wire. Insulated wire is in fact considered superior to the bare wire because the covering prevents oxidization of the copper. Not less than size 16 wire should be used. The age of the wire makes no difference as long as the surface of the wire itself is clean. The insulated telephone wire may be used.

• • •

HOW CAN I improve the selectivity and quality of reception on my 3-tube set. I wish to tune out local stations and get the DX stations that transmit on almost the same wavelength, but I find that I cannot entirely eliminate the local signal.—J. E. Hughes, Central Falls, R. I.

It seems you get fairly good selectivity now, but you want to do an impractical thing. As you make the set tune sharper, you destroy its ability to properly cover the frequencies which travel on the carrier wave thereby lowering the quality of reception. The broader the tuning is the better the quality of reception on any receiver. Since quality is always more desirable than long distance unintelligible signals, it would be much better to amplify the signal at radio-frequency first.

PLEASE publish a circuit diagram of the Solodial.—Al Michael, 654 Peck St., Bronx, N. Y.

This circuit, a product of the RADIO WORLD laboratory, is given in Fig. 36. L1 may be a 25-turn honeycomb coil and L2 a 75-turn coil from which 5 turns are removed, and which is shunted by a 23-plate low-loss condenser, C1. Try putting the grid leak from the grid post of the socket to the F— post instead of across the grid condenser. S is a switch to cut in regeneration. If regeneration is desired all the time, leave the switch out and connect the ground to the A +

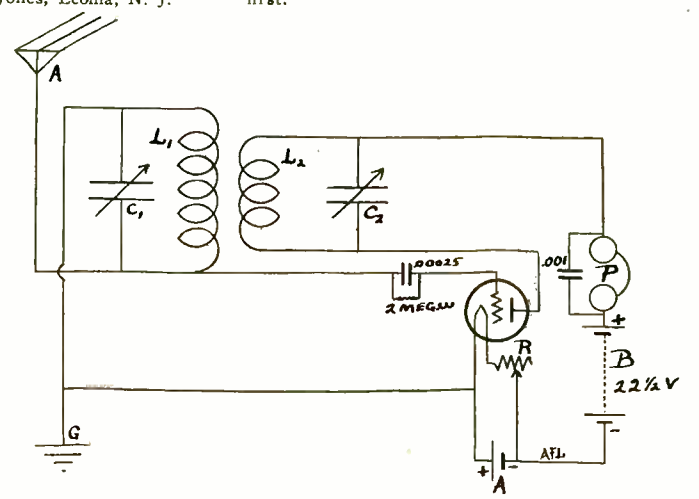


FIG. 37.—Circuit of a 1-tube set you can log.

One Stage of Push-Pull AF

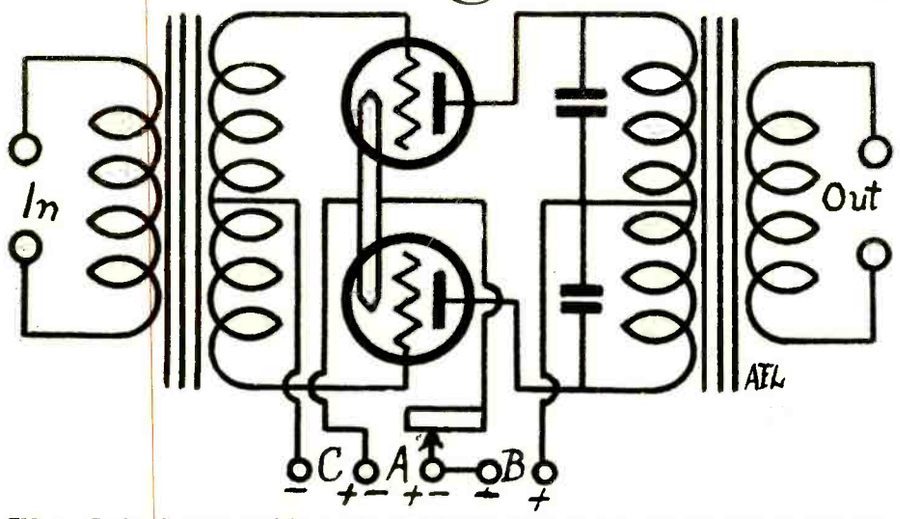
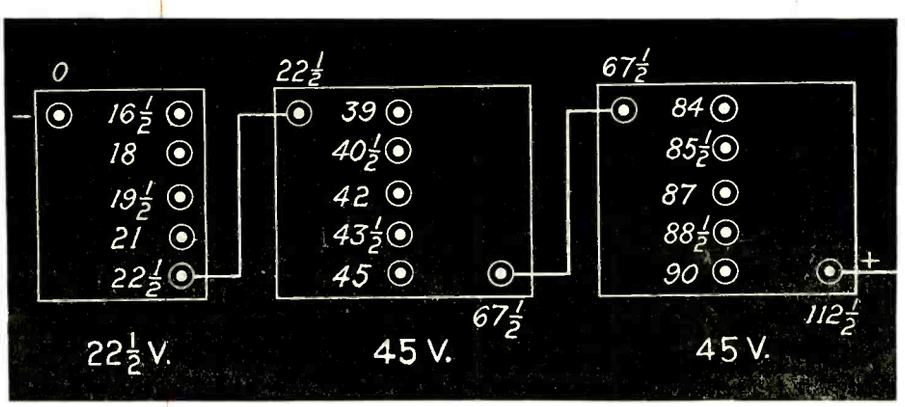


FIG. 38.—Push-pull power amplifier circuit asked for by Frank Baertich of Troy, Indiana. The transformers are purchased in pairs and are matched. Ninety volts are used on the plate and one rheostat controls both tube filaments.

set of B batteries. The plus of the 22½-volt unit goes to the minus of the one 45-volt unit, the plus of this 45-volt unit goes to the minus of the other 45-volt unit. The minus lead is at the point marked 0, and the positive lead is marked 112½ volts. The tap for the detector may be taken anywhere from the 16½-volt tap up to the 67½-volt tap, according to the tube used.



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* * *

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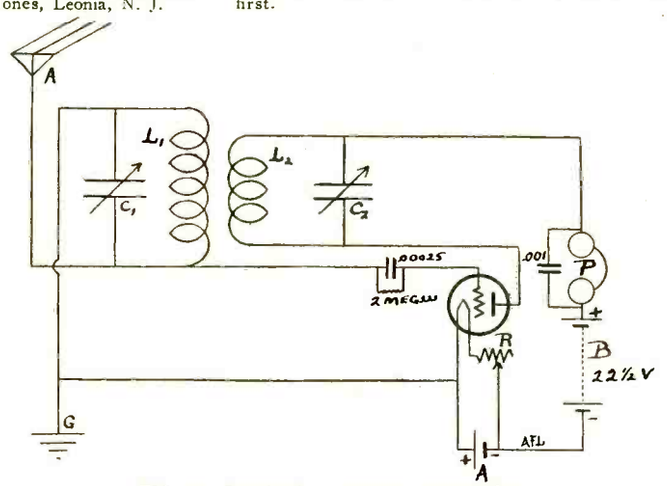

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Radiocast University

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WILL YOU kindly tell me if it injures the tubes to turn the rheostats on full force suddenly? I have heard that it shortens the life of the filament.—Gladys L. Rettig, 109 Knox Place, Joliet, Ill.

Turning the tubes on suddenly does no harm, in fact, many research men claim that the sudden flow of current increases the electron flow by forcing the thorium in the filament to the surface. This is true, provided the tube is burned at its rated capacity. However, if you put the entire six volts on the filament, it will be detrimental to the life of the tube. The rheostat may be set at the best operating point and left there, a battery switch being used to turn the current on and off.

* * *

WHICH SIDE of the C battery goes to the grid of the tube?—J. F. Lee, Evanston, Ill.

The negative lead goes to the grid.

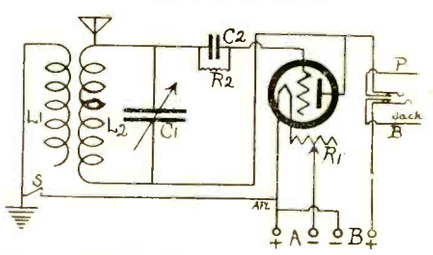


FIG. 36.—Wiring diagram of the Solodial, single-control circuit.

DX Handful

(Wide World)

WILLIAM E. SNEDAKER, a radio experimenter of Philadelphia, showing how compactly a 3-tube set can be made and still be efficient. It is a modification of the popular regenerative set, using standard parts and a special coupler. The coils have very low losses due to their spider web form of construction, and the almost entire absence of insulating material. As the photo shows, three 199 tubes are used, which helps in keeping the size of the set down so small. One dial does the tuning and regeneration is controlled by the rheostat.

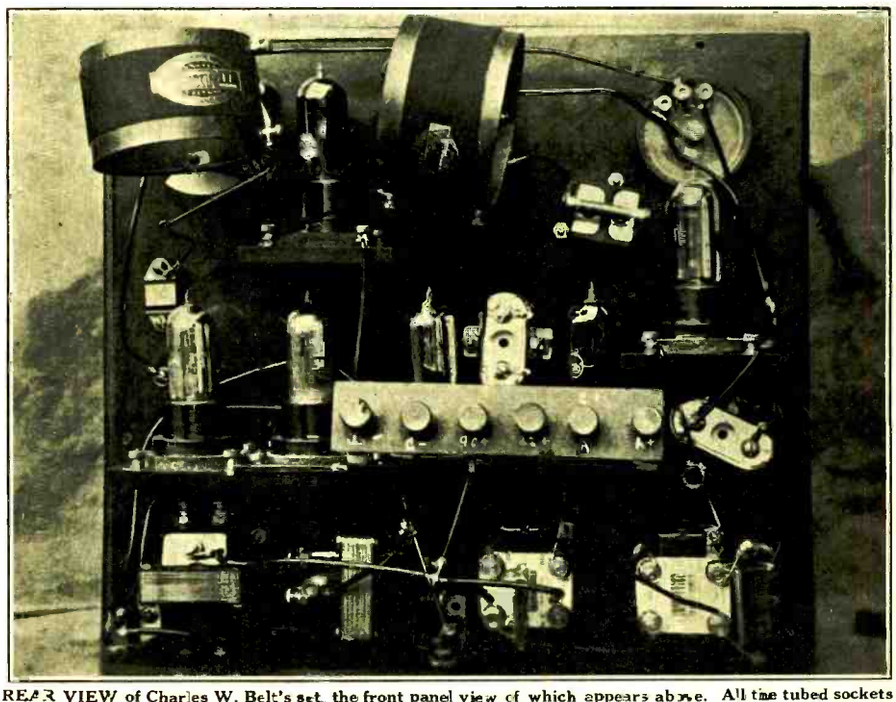
(United)

A GIANT loud speaker on the roof of a Berlin warehouse from which listeners on the street below and in adjoining buildings get the broadcasting from the local German stations. Market reports, lectures and advertising are sent over the air.

Great Volume

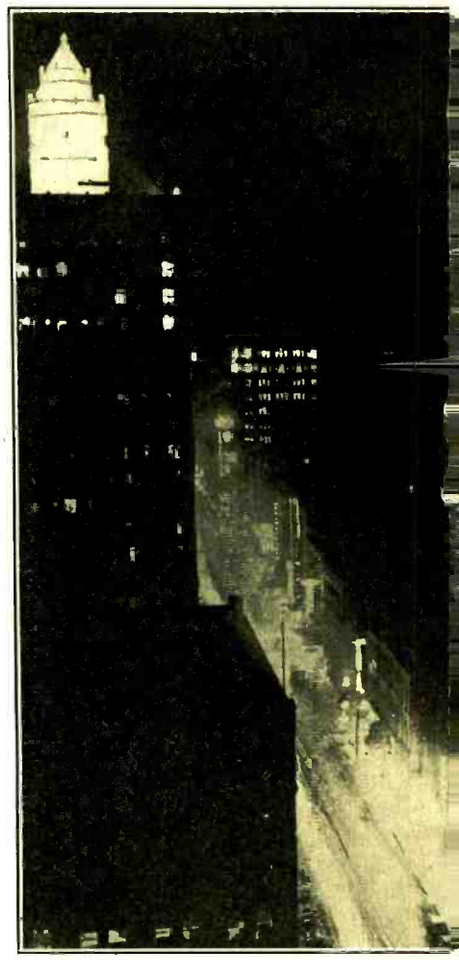
(Radio World)

CHARLES W. BELT, of 610 West Main Street, Newark, Ohio, built this 5-tube tuned radio-frequency set to fit into the bottom of a phonograph. The panel is 14"x14" and all parts are mounted on it. This gives plenty of room for all the batteries in the cabinet, which is 12" deep. Some features of this set are: no neutralizing condenser is used, a potentiometer is used on the RF tubes, only one jack used, and that is on the second audio stage. Mr. Belt reports good volume on all stations up to 500 miles away without the need of any other additional amplifier. The dial in the upper right-hand corner controls the potentiometer, the center dial tunes the first RF coil, and the third dial tunes the detector coil. The jacks are located along the bottom of the panel.



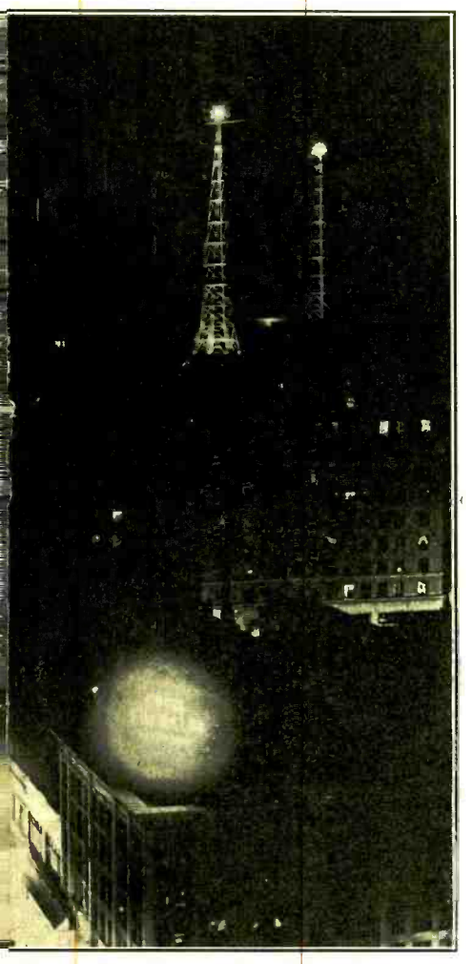
REAR VIEW of Charles W. Belt's set, the front panel view of which appears above. All the tubed sockets are mounted directly onto the panel with soft sponge rubber cushions placed underneath as shock absorbers. By the use of these sponges, the set will be able to operate under ordinary home conditions without making a racket in the loud speaker every time someone walks across the room, though a dry-cell tube like the II is used. In designing the layout it was a good stunt to mount the heavy transformers at the bottom of the panel. The binding post strip is conveniently placed not too far down to permit easy access when wiring the batteries. Very short leads were obtained by the wiring method used by Mr. Belt.

Antenna To



THE HUGE antenna towers of Station WHO ma the landmarks of Des Moines, Iowa. The Banker the air regularly and their programs appear in th

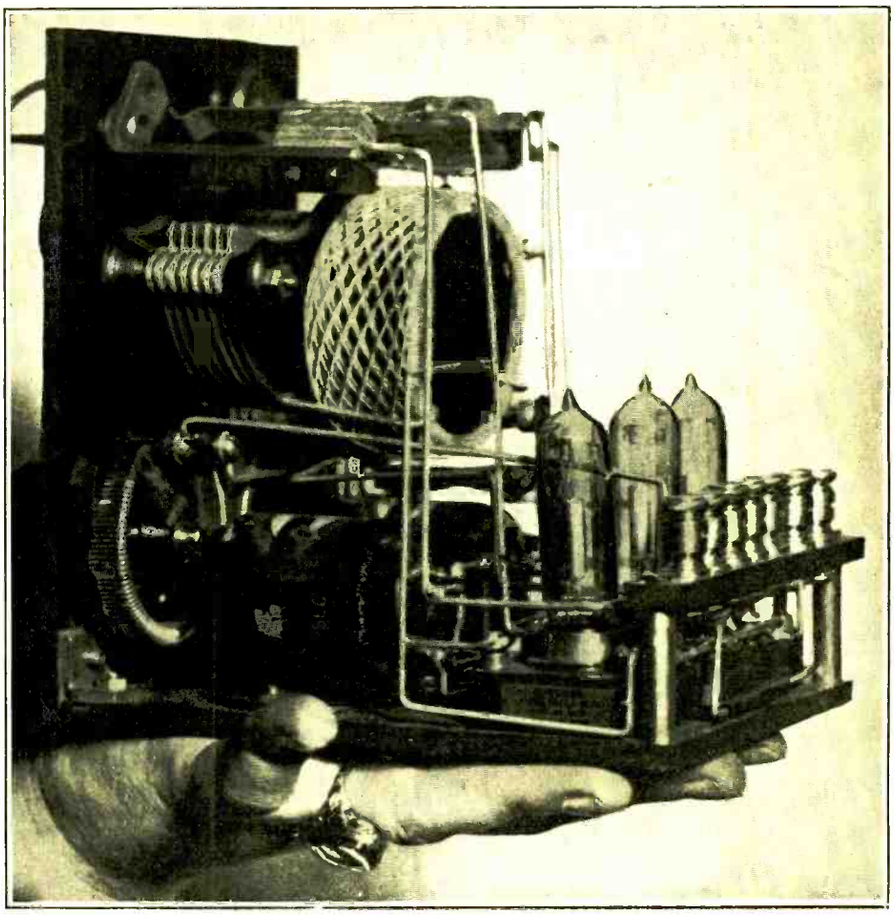
vers at Night



y be seen for miles around at night and are one of s Life Company, who operate Station WHO, are on is issue. (Kadel & Herbert)

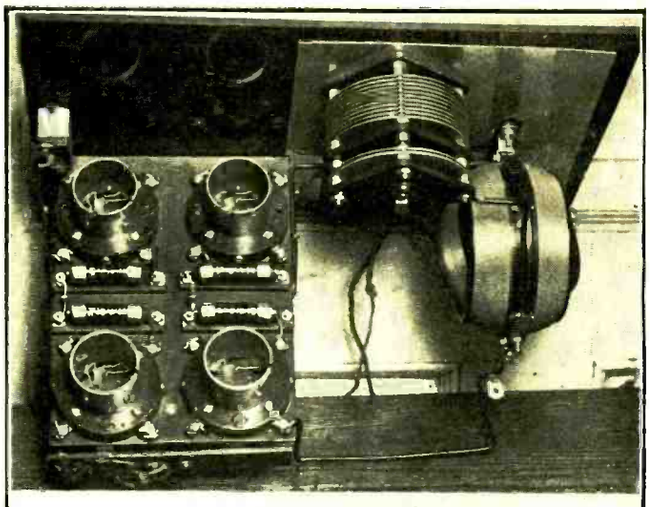
RAYMOND B. WALES, of 911 23rd St., Washington, D. C., shows the world how to make a good outdoor ground. To make sure that the earth surrounding the pipe is always a conductor of electricity, a bucketful of a copper sulphate solution, commonly called bluestone, and which is cheap, should be poured around the pipe. The solution prevents corrosion and is highly conductive. An iron pipe is used for ground connection.

Efficient 1-Coil Set

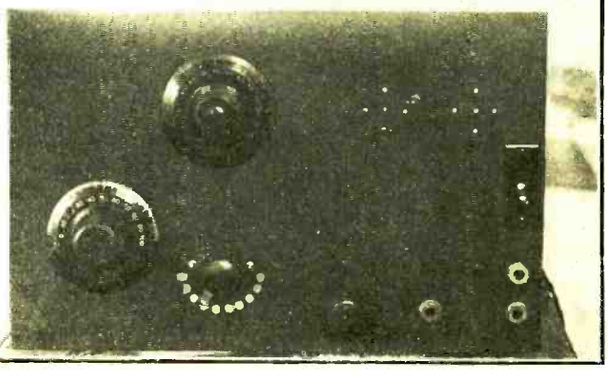


(Fotograms)

EFFICIENT small 3-tube radio receiver (above). It measures 3½" long, 5½" high and about 8" deep. The circuit used is the modified ultra audion, and operates the phone on distance and stations 300 to 500 miles away on the loudspeaker. The proud possessor of this set is P. F. McGuire, of 787 Broadway, Bayonne, N. J. All standard parts were used, and of course the tubes are the little 199's. There is room for two jacks right at the top of the panel. Next week Radio World will publish data on how to build a DX set like this one.



THIS circuit (at right) is the same as that used with the small set pictured above, with the difference that there are these stages of resistance coupled audio-frequency amplification used. The top part of the picture shows the variocoupler and tuning condenser at the right, and is entirely shielded from the panel. The sub panel with the four-tube sockets mounted on it holds the detector and amplifier tubes. The lower portion is the front panel, showing the tap switch and the two tuning dials at the left, and at the right the phone jacks and battery switch. This set produces very clear signals.



BROADCAST PROGRAMS

Thursday, October 2

KDKA, Pittsburgh, 326m, E. S. T.—12:15 P. M., concert by Scalzo's Orchestra. 6:15 P. M., dinner concert by the Pittsburgh Athletic Association Orchestra. 7:15 P. M., The Singer-time Lady. 7:30 P. M., address. 7:40 P. M., stockman reports. 8:30 P. M., musical under the auspices of Boggs and Buhl Company. 9:55 P. M., time signals; weather forecast. 11:30 P. M., concert.

KYW, Chicago, 536m, C. S. T.—5:02 P. M., news, financial and final markets. 5:35 P. M., children's bedtime story told by "Uncle Bob." 6 P. M., dinner concert broadcast from the Congress Hotel. 7 P. M., "Twenty Minutes of Good Reading," by Rev. C. J. Pernin, S. J. 7:20 P. M., musical program. 8:15 P. M., "Safety First" talk by Mr. Z. C. Elkin. 9 P. M., "At Home" program.

KFI, Los Angeles, Cal., 469m, P. T.—5 P. M., Evening Herald news bulletins. 5:30 P. M., Examiner news bulletins. 6:45 P. M., Y. M. C. A. lecture and Lilah Carlson, coloratura soprano arranging concert. 8 P. M., Ambassador Hotel Cocoanut Grove Orchestra. 9 P. M., Examiner Studio program. 10 P. M., Rhue Gill and Bess Rudisill.

WJY, New York, 405m, E. S. T.—7:30 P. M., Berlitz weekly French lesson. 8:45 P. M., talk auspices Democratic National Committee. 9 P. M., Al Reiser's Club Ferreri Orchestra.

WDAR, Philadelphia, 395m, E. S. T.—11:45 A. M., daily almanac. 12 Noon, organ recital from the Stanley Theatre; features from the Studio; Arcadia Concert Orchestra. 2-3 P. M., Arcadia Concert Orchestra; artist recital from the Studio. 4:30 P. M., artist recital from the Studio; Magazine Corner. 5 P. M., educational talks by a member of the faculty from the Pierce School. 5:45 P. M., sporting results. 7:30 P. M., Dream Daddy with the boys and girls.

WRC, Washington, 469m, E. S. T.—5:15 P. M., instruction in international code. 6 P. M., children's hour by Peggy Albion. 7:45 P. M., talk on motoring, auspices American Automobile Association. 8 P. M., song recital by Fred Eden, baritone. 8:45 P. M., song recital by Caroline Manning, contralto. 9:30 P. M., concert by the Harmonious Quartet. 9:55 P. M., time signals.

KHJ, Los Angeles, Cal., 395m, P. T.—6 P. M., Art Hickman's Concert Orchestra from the Biltmore Hotel. 6:30 P. M., children's program presenting Prof. Walter Sylvester Hertzog telling stories of American history; weekly visit of Dickie Brandon, screen juvenile. Catherine Hyatt, 8-year-old pianist. 8 P. M., program courtesy Paul G. Hoffman Company; The Russian String Quartet. 10 P. M., Art Hickman's dance orchestra.

WJZ, New York, 455m, E. S. T.—1 P. M., Nathan Abas' Hotel Pennsylvania Orchestra. 4 P. M., specialty numbers. 5:30 P. M., State and Federal agricultural reports; farm and home reports; closing quotations of the New York Stock Exchange; foreign exchange quotations; Evening Post News. 7 P. M., Bernard Levitow's Hotel Commodore Orchestra. 7:55 P. M., Colliers Weekly, by John B. Kennedy. 8 P. M., Wall Street Journal review. 8:30 P. M., Wanamaker Organ Concert. 9:30 P. M., talk auspices New York Board of Trade and Transportation. 10:30 P. M., Waldorf-Astoria Dance Orchestra.

WIP, Philadelphia, 509m, E. S. T.—6:05 P. M., dinner music program. 6:45 P. M., agriculture livestock and produce market reports. 7 P. M., Uncle Wip's bedtime stories and roll call for the children. 8 P. M., "Timely Topics for Motorists," talk by Gene Hogle. 8:15 P. M., concert by the Philadelphia Police Band. 9 P. M., recital of character songs by Joseph Hayden and Flora Ripka, pianist. 11 P. M., dance music by Harvey Marburger and his vaudeville orchestra.

WOC, Davenport, Ia., 484m, C. S. T.—10 A. M., opening market quotations. 10:05 A. M., household hints. 10:55 A. M.. time signals. 11 P. M., weather and river forecast. 11:05 A. M., market quotations. 12 Noon, chimes concert. 12:15 P. M., weather forecast. 2 P. M., closing stocks and markets, including weekly report of wool market. 6:45 P. M., sport news and weather forecast. 7 P. M., Sandman's Visit, (Bedtime Stories by Miss Val McLaughlin). 9 P. M., orchestra program.

WEEI, Boston, 303m, E. S. T.—12 Noon, luncheon music by Dok-Eisenbourg and his Sinfonians. 2 P. M., music and educational talk. 8 P. M., program direct from WEAF, New York Studio.

WOR, Newark, N. J., 405m, E. S. T.—6:15 P. M., Albert E. Sonn, technical editor; weekly talk on "Radio for the Layman." 6:30 P. M., "Music While You Dine," Jimmie Lent and his orchestra. 7:15 P. M., resume of the day's sports with "Jolly Bill" Steinke.

WEAF, New York, 492m, E. S. T.—11-12 A. M., musical program and talks to housewives; market reports. 4-5 P. M., College Club Orchestra; children's stories. 6-11 P. M., dinner music from the Hotel Waldorf-Astoria; mid-week services under New York Federation of Churches; Daniel Scherer, violinist; Grace Richards, soprano; talk by the Bank of America; "Touring with the Packard," Charles D. Isaacson as conductor; Werner Janssen, composer-pianist; Vincent Lopez and his orchestra from Hotel Pennsylvania.

Friday, October 3

KDKA, Pittsburgh, 326m, E. S. T.—12:15 P. M., concert by Daugherty's Orchestra. 6:15 P. M., organ recital by Paul E. Fleeger. 7:15 P. M., Uncle Ed will entertain the children. 7:30 P. M., address. 7:40 P. M., stockman reports of the primary livestock and wholesale produce markets. 8 P. M., miscellaneous program. 8:30 P. M., concert by the artists from Mrs. James Stephen Martin studio, assisted by Christine Adams, celloist. 9:55 P. M., time signals; weather forecast.

KYW, Chicago, 536m, C. S. T.—5 P. M., news, financial and final markets; Dun's review and Bradstreet's weekly review of Chicago trade. 5:35 P. M., children's bedtime story told by "Uncle Bob." 6 P. M., dinner concert broadcast from the Congress Hotel. 6:30 P. M., program broadcast from KYW's studio. 8:30 P. M., midnight revue. 9:30 P. M., "Around the Town with KYW in Chicago" (stage revues). 9:45 P. M., midnight revue.

KFI, Los Angeles, Cal., 469m, P. T.—5 P. M., Evening Herald news bulletins. 5:30 P. M., Examiner news bulletins. 6:45 P. M., Aeolian organ recital. 8 P. M., Evening Herald, Carl Edward Hatch arr. concert. 9 P. M., program from Examiner Studio. 10 P. M., Chief Yowlache, baritone and Margaret Johnson, violinist, in American Indian program. 11 P. M., Ambassador Hotel Cocoanut Grove Orchestra.

WJY, New York, 405m, E. S. T.—8 P. M., "Chats with the Editor," Ernest A. Zadig, of the New York Telegram and Evening Mail.

KSD, St. Louis, 546m, C. S. T.—8 P. M., broadcasting concert by 6th Infantry Band, direct from Jefferson Barracks.

WDAR, Philadelphia, 395m, E. S. T.—2-3 P. M., Arcadia Concert Orchestra; playlet by members of the National School of Elocution and Oratory. 4:30 P. M., dance program. 5:45 P. M., sporting results. 7:30 P. M., Dream Daddy with the boys and girls. 8 P. M., "Turning the Pages," a book review; "WDAR Walter Greenough Players," artist recital from the Studio. 10 P. M., meeting of the "Morning Glory Club" from 10 P. M. to 1 A. M.; artist recital by Esther Patsy Riven, soprano; Howard Lanin's Dance Orchestra. 1 A. M., features from the Studio.

WRC, Washington, 469m, E. S. T.—3 P. M., Fashion Developments of the Moment prepared by "Women's Wear." 3:10 P. M., song recital by Arthur McCormick, baritone. 3:20 P. M., "Beauty and Personality" by Elsie Pierce. 3:25 P. M., current topics by the editor of "The Review of Reviews." 3:35 P. M., piano recital. 3:50 P. M., The Magazine of Wall Street. 4 P. M., song recital. 5:15 P. M., time signals and weather forecasts. 6 P. M., stories for children by Peggy Albion.

KHJ, Los Angeles, Cal., 395m, P. T.—6 P. M., Art Hickman's Concert Orchestra. 6:30 P. M., children's program presenting Prof. Walter Sylvester Hertzog telling stories of American history; weekly visit of Richard Headrick, screen juvenile; bedtime story by Uncle John. 8 P. M., program courtesy of the Globe Ice Cream Company. 10 P. M., Art Hickman's dance orchestra.

WJZ, New York, 455m, E. S. T.—4:30 P. M., Hotel Astor Organ Recital; Leo Riggs, organist. 5:30 P. M., State and Federal agricultural reports; farm and home reports; closing quotations of the New York Stock Exchange; foreign exchange quotations; Evening Post news. 7 P. M., Lafayette Hotel Orchestra. 8 P. M., Wall Street Journal review. 8:25 P. M., Looseleaf Current Topics, Dr. William H. Allen. 8:40 P. M., specialty numbers. 9:15 P. M., "Charles Dickens," George Laval Chesterton.

WIP, Philadelphia, 509m, E. S. T.—1 P. M., luncheon music by the Gimbel Tea Room Orchestra. 1:30 P. M., weather forecast. 3 P. M., popular program direction of Harry Link. 6 P. M., weather forecast. 6:05 P. M., dinner music by the Jordan-Lewis Dance Orchestra. 6:45 P. M., agriculture livestock and produce market reports. 7 P. M., Uncle Wip's bedtime stories and roll call for the children of Uncle Wip's Kiddie Klub.

WOC, Davenport, Ia., 484m, C. S. T.—10 A. M., opening market quotations. 10:05 A. M., household hints. 10:55 A. M., time signals. 11 A. M., weather and river forecast. 11:05 A. M., market quotations. 12 Noon, chimes concert. 12:15 P. M., weather forecast. 2 P. M., closing stocks and markets. 6:45 P. M., sport news and weather forecast. 7 P. M., Sandman's Visit, (bedtime stories by Miss Val McLaughlin). 7:20 P. M., educational lecture under the auspices of the Scott County Farm Bureau. 8 P. M., musical program.

WEEI, Boston, 303m, E. S. T.—12 Noon, luncheon music by Dok-Eisnbourg and his Sinfonians. 2 P. M., music and educational talk. 7 P. M., Big Brother Club. 8 P. M., program direct from WEAF, New York Studio.

WAAM, Newark, N. J., 263m, E. S. T.—8 P. M., Newark Radio Trio. 8:15 P. M., Irving Porter. 8:30 P. M., Miss Adele Grassgreen, soprano. 8:45 P. M., Newark Radio Trio. 9 P. M., Dan Nemeth and Bob Buchanan. 9:30 P. M., Catello's Radio Entertainers. 10 P. M., surprise program. 10:30 P. M., Catello's Radio Entertainers.

WOR, Newark, N. J., 405m, E. S. T.—6:30 P. M., "Man in the Moon" stories for the children; Josephine Lawrence and William F. B. McNeary. 7 P. M., joint program by the Rev. Edmont Hains, baritone, Evangelist and Pastor of Brick Church, Parsippany, New Jersey, and John A. Scott at the piano. 7:15 P. M., resume of the day's sports with "Jolly Bill" Steinke.

WEAF, New York, 492m, E. S. T.—11-12 A. M., musical program; talk by Major Bradley Martin on "Visiting a Kindergarten"; market and weather reports. 4-5 P. M., Club Program for women with songs by Lulu C. Phillips, lyric soprano. 6-10 P. M., dinner music from the Rose Room of the Hotel Waldorf-Astoria; children's stories by Blanche Elizabeth Wade; "The Happiness Boys," Billy Jones and Ernest Hare; B. Fischer and Company's Astor Coffee Orchestra.

Saturday, October 4

WBZ, Springfield, Mass., 337m, E. S. T.—7:05 P. M., market reports by the United States Department of Agriculture at Boston. 7:30 P. M., bedtime story for the kiddies. 7:40 P. M., concert by the Hotel Kimball Trio; Jan Geerts, violinist and director; Arnold Janser, cellist; Lloyd Stoneman, pianist, Springfield. 8:15 P. M., concert by Vesta String Quartet and Orchestra. 9:30 P. M., concert by Bertha Wells, reader and trombonist, and by Beatrice Clough, soprano and pianist. 9:55 P. M., time signals; weather reports.

KDKA, Pittsburgh, 326m, E. S. T.—3 P. M., Pitt-Lafayette football game from Forbes Field. 6:15 P. M., dinner concert by the Westinghouse Band. 7:15 P. M., the children's period—The Radio Rhymster. 7:30 P. M., address. 7:45 P. M., The World's Uniform Sunday School Lesson, by C. C. Johnson. 8 P. M., baseball scores; sport review by James J. Long, sport writer. 8:30 P. M., concert by the Westinghouse Band, double mixed quartet from the Westinghouse Community Chorus. 9:55 P. M., time signals; weather forecast.

KYW, Chicago, 536m, C. S. T.—5 P. M., news, financial and final markets. 5:35 P. M., children's bedtime story told by "Uncle Bob." 6 P. M., dinner concert broadcast from the Congress Hotel. 8:05 P. M., talk by Vivette Gorman. 8:10 P. M., Youth's Companion—stories, articles and humorous sketches. 8:35-11:30 P. M., late show.

KFI, Los Angeles, Cal., 469m, P. T.—5 P. M., Evening Herald news bulletins. 5:30 P. M., Examiner news bulletins. 6:45 P. M., dance orch. & Basil Webb, lect. on India. 8 P. M., Aeolian Trio. 9 P. M., program from Examiner Studio. 10 P. M., Packard Radio Club. 11 P. M., Ambassador Hotel Cocoanut Grove Orchestra.

KSD, St. Louis, 546m, C. S. T.—7 P. M., orchestra and specialties, broadcast direct from Missouri Theater.

WDAR, Philadelphia, 395m, E. S. T.—11:45 A. M., daily almanac. 12 Noon, organ recital from the Stanley Theatre; features from the Studio; Arcadia Cafe Concert Orchestra. 2-3 P. M., Arcadia Concert Orchestra; artist recital from the Studio. 4:30 P. M., dance program by the Cotton Pickers. 5:45 P. M., sporting results and special announcements. 7:30 P. M., Dream Daddy with the boys and girls.

WRC, Washington, 469m, E. S. T.—5:15 P. M., instruction in international code. 6 P. M., Children's Hour by Peggy Albion. 7:45 P. M., bible talk. 8 P. M., song recital by Edith Dunn, soprano. 8:45 P. M., song recital by Roy Bashaw, tenor. 9:55 P. M., time signals.

KHJ, Los Angeles, Cal., 395m, P. T.—6 P. M., Art Hickman's Concert Orchestra. 6:30 P. M., children's program presenting Prof. Walter Sylvester Hertzog telling stories of American history. Helene Piric, screen juvenile; Vondelle Dar, screen juvenile; bedtime story by Uncle John. 8 P. M., program presented through the courtesy of the May Co. 10-11 P. M., Art Hickman's dance orchestra.

WJZ, New York, 455m, E. S. T.—5:30 P. M., State and Federal agricultural reports; farm and home reports; closing quotations of the New York Stock Exchange; foreign exchange quotations; Evening Post News. 7 P. M., Waldorf-Astoria dance orchestra. 8 P. M., Vincent Desantis, violinist; Alfred Rosinger, accompanist. 9:30 P. M., religious program by Cantor Arthur Green and choir. 10:30 P. M., Hotel Astor dance orchestra.

WIP, Philadelphia, 509m, E. S. T.—6 P. M., weather forecast. 6:05 P. M., dinner music by the St. James Hotel Orchestra. 6:45 P. M., agriculture livestock and produce market reports. 7 P. M., Uncle Wip's bedtime stories and roll call for the children. 8 P. M., special concert by the Westminster Mixed Quartet. 9 P. M., recital by the Lyric Trio, Dorothy Powers, harpist, Florence Haenle, violinist and Ernestine Bacon, soprano; Flora Ripka, accompanist. 10:05 P. M., dance music by the Hotel St. James Orchestra. 11:05 P. M., organ recital by Karl Bonawitz.

WOC, Davenport, Ia., 484m, C. S. T.—10 A. M., opening market quotations. 10:05 A. M., household hints. 10:55 A. M., time signals. 11 A. M., weather and river forecast. 11:05 A. M., market quotations. 11:10 A. M., agricultural bulletins. 12 Noon, chimes concert. 12:15 P. M., weather forecast. 12:17 P. M., closing markets. 6:45 P. M., sport news and weather forecast. 7 P. M., Sandman's Visit (bedtime stories by Miss Val McLaughlin). 9 P. M., orchestra program.

WOR, Newark, N. J., 405m, E. S. T.—8 P. M., contralto solos by Marion Adam. 8:15 P. M., report of the U. S. Commission to the Virgin Islands by Jefferson S. Coage. 8:30 P. M., contralto solos by Marion Estelle Adam. 8:45 P. M., concert by the David Margulies Trio. 9 P. M., fifteen minutes of Indian literature by Harendranath Maitra. 9:30 P. M., Mary Rexanna Loomis, only woman president of a radio college, talking on "The International Language Which the Use of Radio is Bringing About." 9:45 P. M., an hour of novelties.

WEAF, New York, 492m, E. S. T.—4-5 P. M., Bruno Brothers Orchestra. 6-11 P. M., dinner music from the Rose Room of the Hotel Waldorf-Astoria, New York City; boys' stories; Gladys Hawkins, jazz pianist and Albert Pierson; banjoist; Mme. Aileen d'Orme Baker, dramatic soprano; string quintette from the Steamship Presi-

dent Wilson and Vittorio Tosso, baritone of the same ensemble; Vincent Lopez and his orchestra from the Hotel Pennsylvania.

Sunday, October 5

KYW, Chicago, 536m, C. S. T.—10 A. M., Central Church service from Orchestra Hall, Chicago; Dr. F. F. Shannon, pastor. 1:30 P. M., Studio chapel service will be broadcast from KYW's studio in the Commonwealth Edison Building, Chicago. 7 P. M., the services of the Chicago Sunday Evening Club broadcast from Orchestra Hall, Chicago.

WHO, Des Moines, Ia., 526m, C. S. T.—7:30-9 P. M., musical program given by The Bankers Life Radio Orchestra; Miss Myrtle Williams, soprano; Miss Helen Birmingham, accompanist and pianist.

WIP, Philadelphia, 509m, E. S. T.—10:45 A. M., morning service broadcast direct from the Holy Trinity Church, Rev. Floyd W. Tomkins, D. D., rector.

WQJ, Chicago, 448m, C. S. T.—10:30 A. M., Dr. Preston Bradley's sermon and the services of the People's Church. 8-10 P. M., Ralph Williams and his Rainbo Garden Orchestra in concert; Langdon Brothers, steel guitar duets; Maria Dneprova, Russian soprano; Marion Morgans, prima donna: "Around the Rainbo" Company; programme by the Hinshaw Conservatory.

KGW, Portland, Ore., 492m, P. T.—6 P. M., church services sponsored by Portland Council of Churches.

WEEI, Boston, 303m, E. S. T.—7:20 P. M., special musical program direct from Mark Strand Theatre, through WEAF, New York City.

WLAG, Minneapolis, Minn., 417m, C. S. T.—8 P. M., classical program, by MacPhail Trio; Wm. MacPhail, violin; Carlo Fischer, cello; Mrs. Wm. MacPhail, piano.

WGY, Schenectady, N. Y., 380m, E. S. T.—10:30 A. M., service of the Madison Avenue Reformed Church, Albany, N. Y., sermon by the Rev. Richard E. Locke. 7:30 P. M., service of the Madison Avenue Reformed Church.

WHAS, Louisville, Ky., 400m, C. S. T.—9:57 A. M., organ music. 10 A. M., church service auspices Fourth Avenue Presbyterian Church; the Rev. Dr. Charles W. Welch, pastor; William E. Conen, organist and choir director; Miss Esther Metz, soprano; Mrs. Virginia Shafer Herrick, contralto; Williams Layne Vick, tenor; William G. Miller, baritone. 4-5 P. M., concert by the Bel Canto Mixed Quartette.

KPO, San Francisco, 423m, P. T.—11 A. M., undenominational and non-sectarian church services. Soloist will be Mabel Turner Payne, soprano. Organ selections by Theodore J. Irwin. 8:30 P. M., concert by Rudy Seiger's Fairmont Hotel orchestra.

Monday, October 6

WHAZ, Troy, N. Y., 380m, E. S. T.—9 P. M., one man minstrel show by Will H. Wade, entire change of program; solos and Leavenworth orchestra.

WHO, Des Moines, Ia., 526m, C. S. T.—7:30-9 P. M., musical program given by Jessie Porter Simpson, mezzo soprano; Helen Birmingham, acc.; Mr. Stewart Watson, baritone; Mr. Vernon Sheffield, pianist and acc., and artists from Drake University, under dir. of Dean Holmes Cowper. 11:15-12 P. M., organ recital given by Mr. L. Carlos Meier.

WFAA, Dallas, Tex., 476m, C. S. T.—12:30 P. M., address, Dr. J. D. Boon, chair of astronomy, depadtment of physics, Southern Methodist University. 8:30 P. M., Lone Star Five orchestra, Ray Ogden, manager.

KFAE, Pullman, Wash., 330m, P. T.—7:30 P. M., violin solos, Raymond Howell, Pullman; How to Study (No. III), Dr. G. A. Coe; Typhoid Fever (No. III), U. S. Public Health Service; Farm Outlook for October, R. N. Miller, Extension; results of State College highway tests, Dean H. V. Carpenter.

WQJ, Chicago, 448m, C. S. T.—11 A. M. to 12 M., home economics program under the direction of Helen Harrington Downing; the Rev. Fred Harrison, book review. 3 to 4 P. M., Helen Harrington Downing, director of home economics, "School Lunches"; Madame Huntingford, "The Care of the Skin."

KGW, Portland, Ore., 492m, P. T.—11:30 A. M., U. S. weather forecast. 5 P. M., children's program. 7:15 P. M., markets, weather, new bulletins and police reports. 8 P. M., opening concert of KGW winter season.

WBAP, Fort Worth, Tex., 476m, C. S. T.—7:30 P. M., moments rom the Majestic Theatre, featuring stars of the week. 9:30 P. M., concert by Miss Elena Munster, of Dallas, and assisting artists.

WLAG, Minneapolis, Minn., 417m, C. S. T.—9:40 A. M., weather report and market quotations. 10:30 A. M., market quotations. 10:45 A. M., home service, Betty Crocker. 11:30 A. M., market quotations. 1:30 P. M., market quotations and weather report. 2 P. M., world series. 3:30 P. M., market quotations. 4 P. M., magazine hour. 5:30 P. M., children's hour. 6 P. M., sport hour. 6:30 P. M., surprise program. 8 P. M., lecture program. 8:30 P. M., concert. 9 P. M., weather report.

WMC, Memphis, Tenn., 500m, C. S. T.—12:30 P. M., noonday program by the Skyline Serenaders. 8:30 P. M., Fred Hughes, tenor, and the Hotel Gayoso orchestra.

WGY, Schenectady, N. Y., 380m, E. S. T.—11:55 A. M., time signals. 12:30 P. M., stock market report. 12:40 P. M., produce market report. 12:45 P. M., weather report. 12:50 P. M., report on farm movement of lettuce, from the New York State Dept. of Fams and Markets. 2 P. M., music and talk, "Color and Personality." 6 P. M., produce and stock market quotations; news bulletins. 7:45 P. M., program by WGY orchestra, assisted by Lillian Rosenthal, soprano.

WHAS, Louisville, Ky., 400m, C. S. T.—4 P. M., selections by the Alamo Theatre orchestra; Police bulletins; weather forecast for Kentucky, Indiana and Tennessee; "Just Among Home Folks," a humorous column; readings; late news bulletins. 4:55 P. M., local livestock, produce and grain market reports. 5:00 P. M., Central Standard time.

Tuesday, October 7

WFAA, Dallas, Tex., 476m, C. S. T.—12:30 P. M., address, DeWitt McMurray, in a medley of humor, pathos and wisdom. 8:30 P. M., musical recital presenting Mrs. LaRue Nelson, soprano, and Miss Inez Hudgins, pianist. 11 P. M., Adolphus Hotel orchestra playing in Bambooland ballroom.

WQJ, Chicago, 448m, C. S. T.—7 P. M., dinner concert by Ralph Williams and his Rainbo Garden orchestra; the Cambridge Sisters (Hazel, Ruby and Jeanette); Walter McPeek, dramatic readings and monologues; Sheppard Levine, tenor. 10 P. M. to 2 A. M., Ralph Williams and his Rainbo Skylarks.

KGW, Portland, Ore., 492m, P. T.—11:30 A. M., U. S. weather forecast. 12:30 P. M., concert. 5 P. M., children's program. 7:15 P. M., markets, weather, news bulletins and police reports. 8 P. M., agricultural lecture provided by Oregon Agricultural College extension service. 8:30 P. M., premier concert sponsored by Northwest Musician.

WBAP, Fort Worth, Tex., 476m, C. S. T.—7:30 P. M., dance program by Fernsley Moore's Black and Gold Serenaders orchestra. 9:30 P. M., concert.

WLAG, Minneapolis, Minn., 417m, C. S. T.—9:40 A. M., weather report and market quotations. 10:30 A. M., market quotations. 10:45 A. M., home service, Betty Crocker. 11:30 A. M., market quotations. 1:30 P. M., market quotations and weather report. 2 P. M., world series. 3:30 P. M., magazine hour. 5:30 P. M., sport hour. 6:30 P. M., dinner concert.

WMC, Memphis, Tenn., 500m, C. S. T.—12:30 P. M., noonday concert by the Skyline Serenaders. 8:30 P. M., program arranged by Miss Maude Mooreland, and Fred Hughes, tenor. 11 P. M., organ recital by Harry O. Nichols.

WGY, Schenectady, N. Y., 380m, E. S. T.—11:55 A. M., U. S. Naval Observatory time signals. 12:30 P. M., stock market report. 12:40 P. M., produce market report. 12:45 P. M., weather report. 12:50 P. M., report on farm movement of lettuce from the New York State Dept. of Farms and Markets. 2 P. M., music and talk, "The Fascinating Process of Candle Making." 6 P. M., produce and stock market quotations; news bulletins. 7 P. M., dinner music by Hotel Ten Eck Trio, Albany, N. Y. 7:45 P. M., program by WGY orchestra.

WHAS, Louisville, Ky., 400m, C. S. T.—4 P. M., selections by the Alamo Theatre orchestra; police bulletins; weather forecast for Kentucky, Indiana and Tennessee; "Just Among Home Folks"; readings; late news. 4:55 P. M., local livestock, produce and grain market reports. 5 P. M., Central Standard time. 7:30 P. M., concert by Carl Zoeller's melodists.

CKAC, Montreal, 425m, E. S. T.—4 P. M., weather and stock market reports. 7 P. M., kiddie's stories in French and English. 7:30 P. M., Rex Battle and his Mount Royal Hotel concert orchestra, featuring Benjamin Scherzer, Canada's foremost violinist. 8:30 P. M., White Star Line S. S. orchestra, in latest English compositions. 10:30 P. M., Joseph C. Smith and his Mount Royal Hotel dance orchestra, featuring saxophone specialties by Ted Brown and Alex Lajoie.

KPO, San Francisco, 423m, P. T.—2:30 P. M., organ recital by Theodore J. Irwin. 4:30 P. M., Rudy Seiger's Fairmont Hotel orchestra. 5:30 P. M., children's hour stories by Big Brother of KPO. 7 P. M., Rudy Seiger's Fairmont Hotel orchestra. 8 P. M., U. S. Army band. 10 P. M., E. Max Bradfield's versatile band.

Wednesday, October 8

WHO, Des Moines, Ia., 526m, C. S. T.—7:30 P. M. to 9 P. M., dance program given by the Bankers Life Radio orchestra, W. L. Marsh, dir.

WFAA, Dallas, Tex., 476m, C. S. T.—12:30 P. M., musical program by entertainers from Dallas theatres.

KFAE, Pullman, Wash., 330m, P. T.—7:30 P. M., baritone solos, Paul E. Christen, Butte, Mont.; piano, Miss Bernice Metz, Everett; fire prevention in Washington, Lincoln Lounsbury, Extension; care of the feet, U. S. Public Health Service.

KGW, Portland, Ore., 492m, P. T.—11:30 A. M., U. S. weather forecast. 12:30 P. M., concert by Bill Darby's orchestra of Cotillion Hall. 5 P. M., children's program. 7:15 P. M., markets, weather, news bulletins and police reports. 8 P. M., program by Rose City Concert Company. 10 P. M., dance music by George Olsen's Metropolitan orchestra of the Hotel Portland.

WBAP, Fort Worth, Tex., 476m, C. S. T.—7:30 P. M., concert offered by the School of Music of the Texas Christian University. 9:30 P. M., concert of dance music.

WGY, Schenectady, N. Y., 380m, E. S. T.—11:55 A. M., time signals. 12:30 P. M., stock market report. 12:40 P. M., produce market report. 12:45 P. M., weather report. 12:50 P. M., report on farm movement of lettuce, from the New York State Dept. of Farms and Markets. 6 P. M., produce and stock market quotations; news bulletins; baseball results. 6:30 P. M., "Adventure Story."

A THOUGHT FOR THE WEEK

—Never tune out a girl who is a poor singer to tune in a man who is a good one. Be chivalrous.

RADIO WORLD

Trade Reg. U. S. Pat. Off.

THE LINK CONNECTING RADIO FAN, DEALER, JOBBER, DISTRIBUTOR AND MANUFACTURER.

IRVING HOFFMAN

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ADVERTISING RATES

RATES—Page, 7¼x11", $200.00; half page, 3¼ D. C. or 5⅛x3" col., $100.00; quarter page, 4⅝ D. C., $50.00; one col., 2¼x11", $66.66. $7.00 per inch. Per agate line, 50c. Times Discounts: 52 Consecutive Issues, 20%; 26 Times Consecutively, or R. O. W. One Year, 15%; 4 Consecutive Issues, 10%.

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OCTOBER 4, 1924

Radio's Terminology

LIKE all sciences, radio makes its own terminology. Sometimes it tries to make it along some special line, without knowing whether usage will ultimately support it, as with the word "radiocast," and doesn't succeed. The word "aperiodic," on the other hand, has never had the electrical meaning that radio has given it, yet the untuned primary is "aperiodic" in radio and will remain so. It may take a few years for radio to have its own undebated dictionary. Then again the day may never arrive!

LOUD SPEAKER ON ONE TUBE

Actually Accomplished by RADIO WORLD'S *Dynoflex Circuit*

Fans who made the set from diagrams and data published in RADIO WORLD, issue of Aug. 9, are enthusiastic over their great success and letters of congratulations are received by RADIO WORLD daily. Send 15 cents for Aug. 9 issue, or start your subscription with that number. RADIO WORLD, 1493 Broadway, N. Y. C.

The Big Conference *This Week*

THE RADIO WEDDING

"None But the Brave"

Code Operator on Job All the While That Station Broadcasts

FEW radio listeners know that behind the scenes in a radiocasting station there is a licensed code operator whose only duty during the period the station is on the air, is to listen in for distress signals.

While music and addresses are going out from an adjoining room, he sits at a receiving set that is tuned to 600 meters, the wavelength of ship and coast stations. At the first signal of distress he notifies the engineer in charge and the broadcasting stops at once, the air is left free for the unobstructed transmission of SOS signals.

On Friday, September 19, shortly before 10 p. m., while WGY, the Schenectady, N. Y., station, was in the midst of a dance program from Albany, an SOS was picked up from a ship at sea. Instantly WGY left the "air."

Third National Radio Conference, To Be Held in Washington on October 6, Will Take Up Acknowledgments.

WASHINGTON.

IS everything suitable for broadcasting? Should there be any censorship over material put on the air by private broadcasters? These are questions which are very likely to be raised at the Third National Radio Conference to be held in Washington October 6.

Most radiocasters like to acknowledge congratulatory telegrams, which in general has been banned, being considered private, point-to-point service and not strictly radiocasting. But the question of whether a station is not entitled to do this is sure to be asked at the conference. Some advocate the granting of at least a few minutes during an evening's program to acknowledgments addressed to individuals. Others say this would become a bore to 999 out of a thousand listeners, unless there was some news in it, such as thanking the fan the greatest distance from the station who reported, or acknowledging the first telegram received following a certain number.

The last radio conference agreed to refrain from broadcasting advertisements and it is believed further regulations, thought desirable by a majority conference vote, can be enforced by a voluntary agreement to keep the air clean and free from objectionable matter, without any form of Governmental censorship.

The names of thirteen representatives of as many radio interests throughout the country have been received by Secretary Hoover in reply to his invitation to the conference, and about fourteen more are expected. The list of acceptances to date is as follows: Edward A. Davies, Philadelphia, Gimbel Bros. (Third Radio Dist.); L. L. Lee, Washington, U. S. Shipping Board; Hiram Percy Maxim, Hartford, Conn., Am. Radio Relay League; W. G. Logue, N. Y. C., Independent Wireless Tel. Co.; W. E. Harkness, N. Y. C., A. T. & T. Co.; Harold R. Kible, Chicago, Am. Farm Bureau Federation; David Sarnoff, N. Y. C., Radio Corporation of America; A. N. Goldsmith, N. Y. C., Broadcasting Engineers; E. F. McDonald, Jr., Chicago, Nat'l Ass'n of Broadcasters; R. G. Callvert, Portland, Ore., The Oregonian (Seventh District); Adam Stein, Schenectady, N. Y., Amer. Inst. of Elec. Engrs.; Lambdin Kay, Atlanta, Ga., Atlanta Journal (Fourth Dist.), and A. H. Halloran, San Francisco, Editor "Radio" (Sixth Dist.)

The total number of members of the advisory committee planned by Secretary Hoover now appears to be twenty-seven.

Fleece Underwear Used for Speakers

FLEECE-LINED underwear fabric for use as loudspeaker horns is opening up a new market for underwear manufacturers. It is reported that several mills in the Mohawk Valley and at least one plant in the South are participating in this new business.

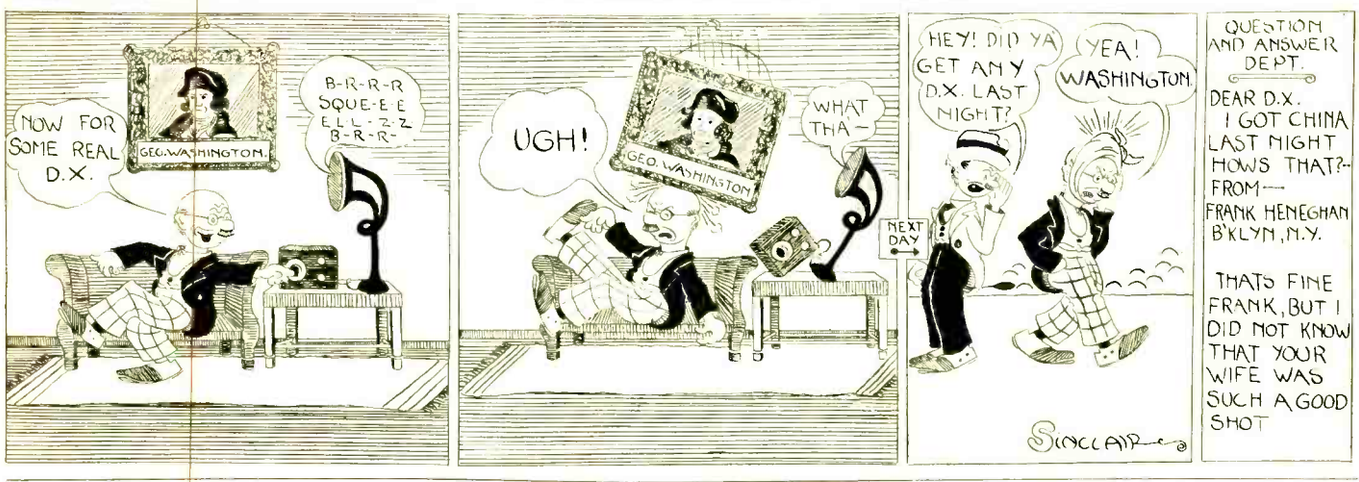
The fabric is cut and sewed by the mill in the shape of the desired loudspeaker, a special seam being used to prevent the junction in the fabric being unduly prominent in the finished horn.

Current quotations on the raw material for the loudspeaker manufacturer approximate $1.50 per dozen for a ten-inch bell, the diameter of the horn opening.

MR. D. X. HOUND

A Character Created by RADIO WORLD *Artist*

By HAL SINCLAIR



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 .....

Ivan M. Carlson, 2527 Ross St., Dallas, Tex.
Justin O. Hines, Cisco, Cal.
W. A. Holleman, 3604 Eastern Av., Cincinnati, O.
Wylie York, 939 West St., Dallas, Tex.
C. A. Gordon, 3305 Broadway, Everett, Wash.
Alois Lustig, Official of Radio, 40/1074 Zborovski Str., Post. Dep., Prague, Czecho-Slovakia.
W. O. Jenkins, Leaksville, N. C.
G. D. Damron, Borderland, W. Va.
Theodore Davis, 354 East 65 St., Los Angeles.
C. R. Chambers, 17 Boggs Ave., Pittsburgh, Pa.
M. S. Cook, 2104 N. Missouri Ave., Springfield, Mo.
Arthur Feihn, 124 View St., New Haven, Conn.
James Richmond, 296 Lime St., Riverside, Cal.
Wm. S. Swain, 227 New Main St., Yonkers, N. Y.
G. H. Fisher, 917 Liberty St., Pittsburgh.
Kirk L. Taylor, Loraine, Texas.
Kenneth L. Hinsman, 107 Sly St., Elmira, N. Y.
L. A. Turnage, Sonoco Prods. Co., Hartsville, S. C.
Vernon Carr, Pierson Hotel, Norman, Okla.
Peter Lambert, 626 E. 14 St., N. Y. C.
Asa Lemley, 703 Ohio Ave., Erwin, Tex.
Geo. F. Tacha, dealer, Jennings, Kans.
A. M. Frothingham, Roosevelt Park, Newark Ave., Detroit, Mich.
Mark A. Mangan, 707 Gerhart St., Cumberland, Md.
R. Gordon, 650 Center St., Waukegan, Ill.

Walnart's New Condenser

THE Walnart Electric Mfg. Co., 1251 West Van Buren Street, Chicago, will shortly place a new type of low-loss condenser on the market. Metal end plates will be used and some unique features will be incorporated.

New Corporations

Altown Corp., Buffalo, N. Y., made radio equipment, 100 shares common stock, no par value. R. W. Snow, M. H. Donoher, W. B. Weaver. Attorney, F. J. Knorr, Albany.

Pinkerton Radio Corp., N. Y. C., $5,000. T. N. Pinkerton, M. Hallamm, P. Murray. Attorney, T. P. Hall, 309 Broadway.

R. B. Rose Co., N. Y. C., made radio machines, 250 shares preferred stock, $100 each; 550 shares common stock, no par value. A. Butler, R. B. Rose, S. Marks. Attorney, W. L. Berk, 70 W. 40th St.

Franklin Radio Corp. of America, Philadelphia, make radios, $50,000. By Corporation Guarantee & Trust Co.

A DX SET ON 5" x 5" PANEL, 1-Tube Regenerator," by Herman Bernard. Sept. 13 issue of Radio World. Send 15 cents or start your subscription with that number. Radio World, 1493 Broadway, N. Y. C.

The Radio Trade

Radio World's Fair Gorgeous Success

RADIO fans filled Madison Square Garden and overflowed into the Sixty-ninth Regiment Armory all during the Radio World's Fair in New York City, which ended Sunday. In spite of some rain, the floor of Madison Square Garden was crowded like the Times Square subway station in the rush hour. Thousands circulated through the first gallery which was also devoted to radio exhibits. The fair was a gorgeous success from every viewpoint.

Radio manufacturers from all over the United States and many parts of Europe were among the exhibitors. About 200 American firms were represented and twenty-five European. There were exhibitors from England, France, Belgium, Germany and Italy. Two booths were occupied by representatives of Japanese manufacturers.

The sensational growth of radio which has raised the industry from a feeble experiment a few years ago to a $350,000,000 enterprise today was reflected in the 225 exhibits, although many were not completed in time for the opening. The feature of the fair was the solidity of its offerings. There was nothing that purported to be sensational of revolutionary on display. The novelties were in the shape of refinements of existing types of radio equipment, indicating that the experimental stage had been left far behind and that the industry has reached a stable equilibrium.

In a way it was a style show. Many of the most interesting booths had displays of 1925 models, in which the radio equipment was concealed under or blended with the finest cabinet-making. There were reproductions of Sheratons and Chippendales, which unexpectedly turned out to be receiving sets.

The Garden was dressed up fittingly as a background for the latest in radio luxury. The booths were bits of fine architecture, richly draped, furnished with Persian rugs, costly divans and period furniture.

There were many inventors at the show. Conrad Schickerling, the tube maker, installed apparatus for making tubes before the eyes of the spectators. Officers and technicians of the United States Navy had an exhibit where they demontsarted the wireless range-finding and direction-finding apparatus which enables a ship to fix its position by radio. Bernays Johnson entered an apparatus for taking telephoned speech on phonograph records and later broadcasting them; and a new device by which crystals are made to talk,

(Concluded on next page)

Coming Events

OCT. 4-11—Radio and Electrical Exhibition by the Radio Institute, 309 West Cordova St., Vancouver, B. C.

OCT. 14 TO 19, INCLUSIVE—Southwestern Radio & Electrical Exposition, Parkmoor Building, Dallas, Texas. Mailing address, Adolphus Hotel, Dallas.

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. 24 TO 30, INCLUSIVE—International Radio Week.

DEC. 1 TO 8, INCLUSIVE—Boston Radio Exposition, Mechanics Building, Boston.

Business Opportunities Radio and Electrical

Rates: 40c a line; Minimum, 3 lines.

I CONTROL MICA MINE NOW profitably producing; need capital for machinery; extraordinary opportunity; easily investigated. Box A, Radio World.

EXPERIENCED RADIO MERCHANDISING expert seeks additional capital and services to finance exceptional electrical, radio retail; opportunity in wealthy New England city. Box B, Radio World.

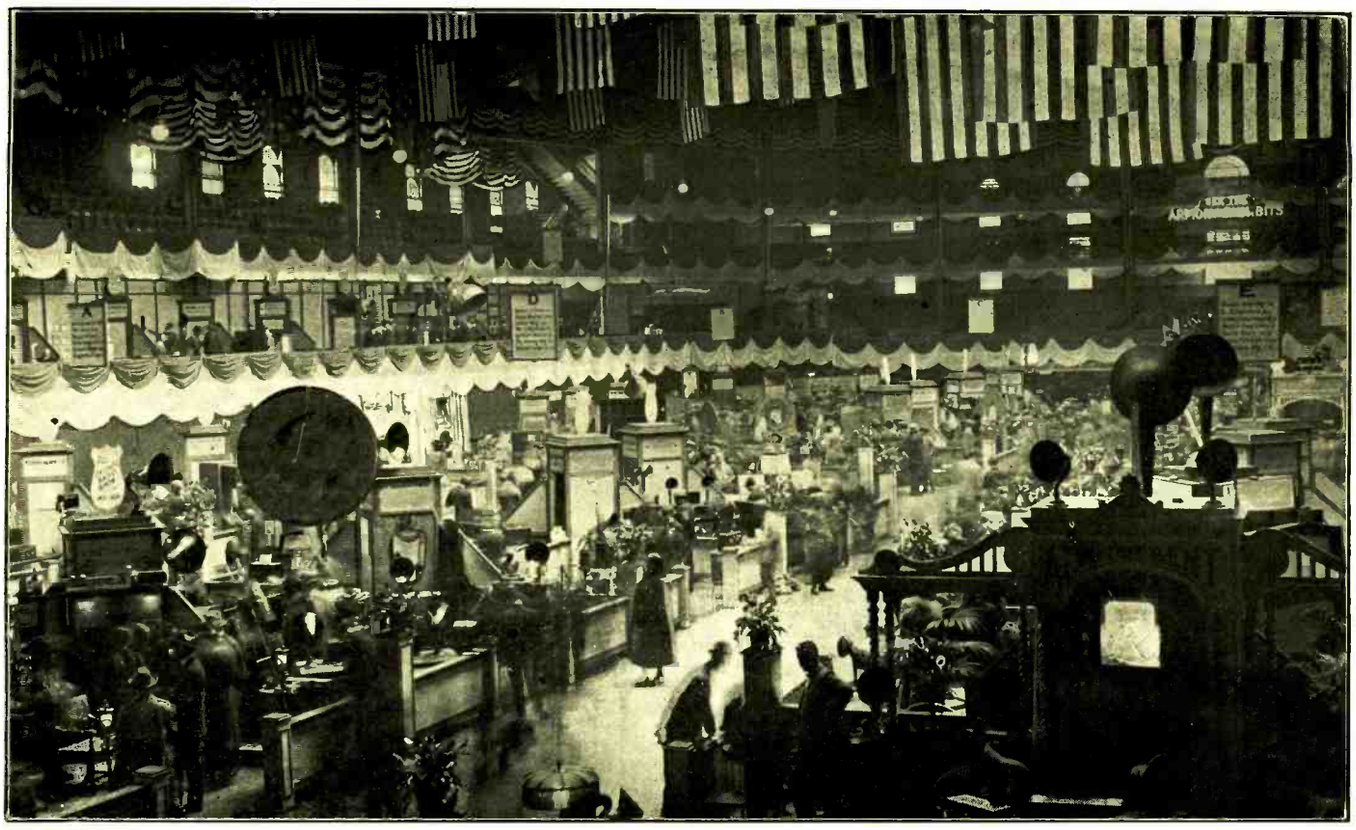
$15,000 FOR ESTABLISHED BROADCASTING station; wonderful possibilities; profits. Box C, Radio World.

FINANCIER WANTED, BASIC NATURAL reproduction radio loud speaker. Box D, Radio World.

RADIO AND ELECTRICAL CONTRACTING firm seeks additional capital with or without executive services. Box E, Radio World.

INVENTORS—HAVE YOUR MODELS MADE at Herman's, 64 Lafayette St., N. Y. C., Phone Franklin 1485.

Privileged 150,000 See Fair



(Kadel & Herbert)
HERE is a quiet view of the interior of Madison Square Garden during a rest period at the first Radio World's Fair, with a few obliging employes stimulating deeper interest in exhibits than in pay day. But when the doors were opened to the public it was a different story—a scene unphotographable. So great were the crowds that during the seven days of the fair both the police and fire departments had to be pressed into service, so that the excluded crowd would not rush their way into the teeming Garden. During the show 150,000 persons managed to enjoy the privilege of getting inside, but each night that 15,000 to 25,000 persons entered, from 5,000 to 10,000 couldn't get in. The attendance was one of the greatest sensations in the long history of the doomed Garden and in point of popularity the greatest radio fair ever held.

(Concluded from preceding page)

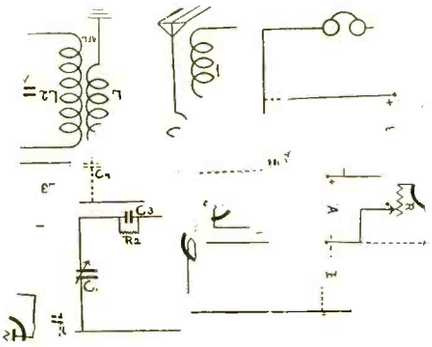
or rather to transmute electrical waves into speech through the piezo-electric effect, or the faculty of certain crystals for producing current when pressure is applied to them.

There was an interesting amateur exhibit in which the latest developments in short-wave radio were demonstrated. The apparatus ranged from the cheapest types to the costliest.

CRYSTAL SET WORKS LOUD SPEAKER, says Bernays Johnson, noted engineer (above), demonstrating his invention at the first annual Radio World's Fair, Madison Square Garden. He is adjusting the catwhisker while tuning in. His invention is the white circular geared device on the phonograph, to which the sound box is attached. The signals are amplified mechanically, as in the telephone relay. (Kadel & Herbert)

Scrambled Diagram

CUT out the sections of the diagram and piece them together to make a circuit diagram. Then paste up the pieces. Send in your solution to Scrambled Diagram Editor, Radio World, 1493 Broadway, New York City. The names of those sending in the correct solution will be published.



MARCHING ONWARD

NEXT week's issue of RADIO WORLD, dated October 11, on sale Wednesday, October 8, will contain, among others, the following articles:

My Favorite Receiver, by Herbert E. Hayden, first of a series by noted radio authorities, each describing a different hookup, each one the author's favorite. Mr. Hayden's is the 3-circuit tuner-vario-coupler and two variometers, hence all circuits tuned. It is a great DX getter.

A Loud Speaker Set on a 7"x7" Panel, by Neal Fitzalan.

Radio-Frequency for Beginners, by N. N. Bernstein, Technical Editor.

A Dozen Practical Novelties for Experimenters, by Herman Bernard. Illustrated with photographs.

Improving the Neutrodyne, by Charles H. M. White.

Coils, by Knolleys Satterwhite.

One Stage of AF, by Wainwright Astor.

A Low-Loss 2-Tube Reflex, by Byrt C. Caldwell.

Radio Industries Give Banquet

DONALD B. MacMILLAN, Arctic explorer, thanked the radio industry for having made it possible for his expedition, frozen in the ice of North Greenland for fifteen months, to communicate with the outside world. He was the principal speaker at the first annual dinner of the Radio Industries at the Waldorf. The other speakers were W. E. Harkness, Vice-President, American Telephone and Telegraph Company; David Sarnoff, Vice-President and General Manager, the Radio Corporation of America; U. J. Herrmann, Managing Director, the Radio World's Fair, and Prof. Louis A. Hazeltine, Chairman of the Committee of Engineers on Radio Interference and inventor of the Neutrodyne. The toastmaster was Paul B. Klugh, Executive Chairman of the National Association of Broadcasters.

Prof. Hazeltine spoke along the lines published elsewhere in this issue.

Mr. MacMillan spoke warmly of the publicity his Arctic expedition had received because of the radio and told of the comfort of receiving music and news by radio, particularly during the four sunless Winter months when the Bowdoin was frozen in the ice. He said that the expedition had received more than 100,000 words by radio from Nauen, from a station in England and from Canada, Alaska, the United States and Mexico.

The aurora, declared Mr. MacMillan, had no effect on the radio. He thought it strange that in Winter the Bowdoin heard no radio signals from the east coast, whereas in the Fall he heard the eastern stations distinctly. The broadcasting stations on the Pacific Coast were heard distinctly in the north, he said, and related the thrill it gave him to hear almost every Wednesday night for several weeks the voice of his sister, two nieces and several friends.

"I heard them just as distinctly as you hear my voice in this room tonight," he added.

White Now Magnavox Chief in Mid-West

THOMAS A. WHITE, assistant manager of the New York City office of The Magnavox Company, has been made manager of the company's Chicago office, one of the most important positions in the company and one to which he was promoted in recognition of excellent work. The Chicago managership carries with it control and distribution of sales in the entire Middle West.

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

Spans Continent On 54 Meters

By Washington Radio News Service

WASHINGTON.

DR. A. H. TAYLOR, of the Naval Research Laboratory, who has been experimenting with transmission, recently spanned the continent with a 54-meter wave.

A few days later he was surprised to get a letter from Rio de Janeiro, stating that his 54-meter transmitter at Bellevue had been heard also in that distant city.

This last report is especially interesting as the distance is 4,780 miles over land and sea and difficulty has frequently been found in getting radio messages over the part of South America which projects eastward into the Atlantic.

On the West Coast, Stanley T. Runyon, operator of station 6 AGE, reported the reception of Dr. Taylor's transmissions on July 14.

These confirmations that short-wave transmissions are reliable for long distances comes as an inducement to amateurs to try out the lower wavelengths, especially since the Department of Commerce has just opened several bands for their use below 200 meters. One of the bands includes the wavelength used by the naval expert.

Dr. Taylor transmits on 54 meters on Monday, Wednesday and Friday nights at 8, 9, 10 and 11, and at half past these hours, on 100 meters.

Radio Mysteries Explained

The Radio Manual, by Orrin E. Dunlap, Jr., B. S., published by Houghton Mifflin Co., 2 Park St., Boston. Price, $2.50.

HIS newspaper experience, enhancing a natural gift of lucidity, has enabled Orrin E. Dunlap, Jr., to write a very valuable book that explains the theory of radio for the benefit of the wholly uninitiated. Also those having some smattering of radio knowledge will find "The Radio Manual" an authoritative source of information.

Mr. Dunlap is radio editor of "The New York Times" and his book is virtually a sequenced answer to all the major queries that have poured into his office for two years. Thus he has the great advantage of having sounded out the radio beginners as to the points of greatest interest and mystery. He unveils the radio monument with considerable skill.

"The Radio Manual" is one of the best books ever published for informing the layman what radio is about, for giving him, besides, an accurate insight into its history and for supplying a large element of practical experimenters with a faithful background of knowledge. This is the work that thousands have been seeking.

Mr. Dunlap was senior Marconi operator and a U. S, Navy operator and has had years of splendid experience as an experimenter. He has illustrated his excellent volume with his own diagrams and besides there is an interesting array of photographs. The book itself has 242 pages. With an excellent little radio dictionary and a thorough index, the total number of pages is brought up to 267.

An example of the clarity of Mr. Dunlap's treatment is the following excerpt (p. 118):

AMPLIFYING CRYSTAL DETECTORS

Audio-frequency or radio-frequency amplifiers may be used in connection with a crystal detector. One stage of radio-frequency amplification ahead of a crystal detector operates most efficiently, but if more stages are added there is likely to be a reduction in signal strength. A crystal set used with a radio-frequency amplifier is much more selective than when the amplifier is not employed. It has been found more satisfactory to use carborundum, silicon or iron pyrites, instead of galena, in such a circuit, because such detectors are not easily jarred out of adjustment. Reproduction of music from a crystal and one stage of radio-frequency amplificaton is extremely clear, chiefly because there are no noises caused by the operation of a crystal detector.

Audio-frequency amplification may be used in conjunction with a crystal set or with a crystal and a radio-frequency amplifier. It is not practical to use more than two audio amplifiers with a crystal detector. The audio amplifier unit is added to the crystal set by connecting the primary of the first amplifying transformer where the phones are used in the crystal circuit. The audio amplifiers will give volume to the signals, but will not increase the range of the crystal detector. Radio-frequency amplification will increase the crystal's range.

HOOK-UPS FOR EVERYBODY—Henley's 222 Radio Circuit Designs, $1.00, postpaid. The Columbia Print, 1493 Broadway, N. Y. C.

WINDING A LOOP ON A PHONOGRAPH RECORD, by Herbert E. Hayden, Sept. 13 issue. Radio World, 15 cents.

Snodgrass Wins in Popularity

HARRY M. SNODGRASS, announcer of station WOS, Jefferson City, Mo., won the popularity honors in the poll conducted by RADIO WORLD, getting 2,476 votes, or 169 more than the MacDowell Sisters, of station WFAA, Dallas, Texas. Roxy (S. L. Rothafel) finished third, 182 votes behind the MacDowell Sisters.

All during the balloting no mention was made as to what the reward would be. A gold medal, suitably inscribed to record the honors won by Snodgrass, will be presented to him by RADIO WORLD. This medal is being specially struck by one of the best jewelry firms in the world.

The contest aroused a nationwide interest among radio fans, and during its course the fluctuations in positions occupied by the contestants were numerous. At one time Roxy was first, at another time the MacDowell Sisters took the lead, but for the last several weeks Snodgrass had been leading by a comfortable margin.

THE TALLY

H. M. Snodgrass	WOS	2476
MacDowell Sisters	WFAA	2307
Roxy (S. L. Rothafel)	WEAF	2125
Little Symphony Orchestra	KDKA	1084
Old Time Fiddlers	WOS	993
Thornton Fisher	WEAF	869
Cafe Boulevard Orchestra	WJZ	845
Wendell Hall (touring)	WEAF	836
Dody Reimer	WLAG	801
Vincent Lopez Orchestra	WEAF	740
Edward M. Smith	WGY	693
Jerry Sullivan	WDAP	665
Night Hawks Frolic	WDAF	656
The Harmony Girl	WDAP	628
Jack Nelson	WDAP	604
Henry Field	WOAW	585
Jack Chapman	WDAP	558
Howard Lannin	WDAR	472
The Hired Hand	WBAP	464
Alabam Club Orchestra	WHN	448
Little Club Orchestra	WGY	407
Ernie Rogers	WSB	340
Bob Miller	WMC	332
Desert Orchestra	KZN	318
Coon Sander's Orchestra	WDAF	300
Mary Vogt	WOO	216
Prison Band	WOS	212
Ford Rush	WLS	205
Happiness Boys	WEAF	203
The Hotel Astor Band	WJZ	156
Dr. Cadman	WEAF	112
A. E. Sonn	WOR	109
Eveready Battery Orchestra	WEAF	107
Uncle John	KHJ	106
KGO Players	KGO	82
Harry Richman	WHN	81
Leo Reisman Orchestra	WBZ	68
Bernie and His Bunch	WGI	62

ALTHOUGH there are 8,000,000 square miles of territory in Russia with a population of 130,000,000, there are not more than a dozen amateur receiving stations in that country, says a dispatch from Moscow. This is due to the non-manufacture of sets in Russia, prohibitive import duty, native ignorance and the refusal of the Soviet Government to permit the general use of radio.

A Great Season Under Way

REPORTS from all over the country indicate that this Fall and Winter will constitute the greatest trade season in radio history. In the East enormous activity is being shown and orders are reported as "very good." The Mid-West, the South and the West send most encouraging reports, too. A new class of home set makers has sprung up over the Summer, and a growing demand for factory-made sets is strongly in evidence. Big selling campaigns are about to be started.

Gross-Brennan Act As Eastern Sales Agents

GROSS-BRENNAN, INC., consisting of Benjamin Gross and Herbert A. Brennan and a competent staff, has established Eastern headquarters, through which manufacturers and distributors of al radio products may in effect have an office, just as if it were their own, and be represented in all sales activities. The office of Gross-Brennan, Inc., is at 342 Madison Avenue, New York City. The name of all clients of Gross-Brennan, Inc., will appear in the lobby directory in the office building and in the telephone directory. The address may be included in all advertising. One of the features of the service are frequent reports on trade conditions, keeping clients informed of market reactions. The corporation's in come is based on a percentage of sales.

Mr. Gross, who is 34, organized the Radoi Stores Corporation in 1922 and was president and manager. He organized the Radio Jobbers' Association of New York. He is a graduate electrical engineer and personally known to the jobbers and dealers in the East. He has been fifteen years in the electrical industry.

Mr. Brennan is 31 and also has an enviable record. He spent eight years in the talking machine business, four of them as Talking Machine Co. He has been three years in the radio industry and was sales manager and treasurer of Lloyd Wireless Telephone Corp., later sales manager of the Cutting & Washington Radio Corp. He is a director of the National Radio Trade Association, of which Mr. Gross is vice-president.

Shakespeare From WLS

"THE MERCHANT OF VENICE," the first Shakesperian play to be adapted to radio, will be given under the supervision of the WLS theater group during the first week of October over the Sears-Roebuck Agricultural Foundation's station. The play is now being rebuilt by H. D. Saddler, playwright, and director of the theater to fit the "sound" idea. If Shakespeare proves popular by air a group of the old classics will be given.

With the opening of the opera season, the WLS Theater plans to give over one evening a week to the presentation of the big scenes of the most popular operas. No performance will take more than thirty minutes. A short synopsis will be given of the scenes not presented. Later in the winter a series of plays written around the modern farmer and his family will be prepared for the entertainment of farm listeners.

SWEEPING THE COUNTRY—Superdyne Circuit in RADIO WORLD July 5, August 23 and 30. Send 45c or start your subscription with any number.

Broadened Tuning Kills Distortion in Detector

IF a set is so selective that it tunes out stations one or two meters apart it is usually too selective to produce good tone quality and volume. This is because the overtones that supply the richness to voice and music are excluded. They travel as side bands, or the envelope of the carrier wave, and if they are excluded from reception the result is distortion.

In transmission two distinct actions occur. A wave of a certain wavelength (frequency) is generated at the transmitting station. This is the carrier wave or frequency. Upon this wave is then impressed the music or voice, which have their own frequency varying from 50 to 5,000 cycles per second. The impressing of the music upon the carrier wave is equivalent to broadening the frequency of the carrier wave by the sum of the musical frequency and also decreasing the frequency of the carrier by the difference between those factors. In other words, when music is being transmitted on 400 meters, the frequency of the wave of the station is not 750,000 cycles per second but varies from 745,000 to 755,000 cycles per second. Converted into meters, it would be from 397 to 403. The receiver should be so designed that it will take care of this variation in frequencies.

If, however, the receiver is one which has been designed to be ultra-selective, and if when tuned to 400 meters it will only permit the passage of a side band of one meter, which is equivalent at this frequency to 2,000 cycles, notes which have increased and decreased the carrier frequency by a value greater than 2,000 cycles will not be heard with the result that the music will be distorted. The higher notes have been completely cut off.

Lauds Low-Loss Aerial

RESULTS EDITOR:

I HAVE just tried out the Low-Loss Antenna described by Neal Fitzalan in your magazine for August 30. Using 7-strand tinned copper wire 30 feet from ground, the results obtained by far exceeded my expectations. In less than 20 minutes I tuned in CYB, Mexico City; WGY, WHB and others. Summer static in Cuba practically shuts us out from the States and to hear even one station, although only 250 miles away, is something to write home about. But here comes the best part: Owing to lack of time I have not yet soldered any connections, just loosely twisted the leads on. Until I can fix the lead-in wire (which is rubber insulated), it remains resting on the masonry! I live right in the heart of Havana and am surrounded by high buildings, power lines, trolley wires, etc. This antenna shows great promise for the coming Winter. The set I used was a Cockaday 4-circuit tuner—1 Detector and 2 Audio. Parts follow: Precision Coil, Gilfillan and Cardwell condensers, Bradleystat, 2 Filkostats, Dubilier condensers, Amplex Griddenser, Fada sockets, Amsco Potentiometer, All-American Transformers, Daven Grid leak, UV200 and 2 UV201A tubes. Kind regards to Mr. Fitzalan and thank him for his article.

JAMES D. BOURNE,
Aguiar 12, Havana, Cuba.

* * *

RESULTS EDITOR:

HAVING completed the 3-circuit hookup 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., Wanwatosu, Wis.

New Patents Granted

1,503,250. Paul E. Sabine and William F. Friedman, Geneva, Illinois, assignors to Paul E. Sabine. Invention relates to mechanical means for sending and receiving wireless messages and to a new method of carrying out this operation, the purpose being to simplify the work and increase the speed of such transmission of messages; it also relates to apparatus for wireless relaying of signals from one wire system to another.

1,503,324. Robert Herzog, Berlin, Germany, assignor to C. Lorenz. Invention relates to a method of obtaining an extraordinarily uniform burning of the electric arc with the aid of a self-induction, this self-induction being connected in series with the arc and made very large.

1,503,308. Cornelius D. Ehret, Philadelphia, Pa. Invention relates to the electrical transmission of high frequency electrical energy, either through the natural media or over a line wire or wires connecting separated stations, for transmitting signals or messages, or for other purposes.

1,502,860. Douglas S. McCrum, Saranac Lake, N. Y. Invention relates to a variable condenser that will be extremely simple and durable in construction as well as efficient in operation, and wherein readily and cheaply produced parts are utilized, which may be quickly assembled or taken apart for repair.

1,502,813. Lloyd Espenchied, New York, assignor to American Telephone and Telegraph Co. Invention relates to high frequency multiplex signaling systems and more particularly to a radio terminal circuit arrangement embodying the use of a common translating circuit adapted both to modulate the transmitted current and to demodulate the high frequency received current.

Why a Good Condenser is Vital in a Loop

THE infinitesimal amount of energy received by a radio loop, as described at a recent meeting of the American Chemical Society, illustrates the importance of the condenser in a receiving set.

A calculation made of the amount of power picked up by a loop one foot in diameter in a laboratory in New York State receiving radio impulses from San Francisco indicated that it was equal to only one-billionth of a fly power. The energy set free by a house fly climbing up the wall is equal, according to the computation, to the amount of energy the loop would receive in a continuous period of thirty-five years.

Loop reception depends to a great extent upon the variable condenser used across the terminals of the loop for tuning. To be efficient the feeble energy must not be wasted. A high-loss condenser is as bad as a leaky hose. It is like a hose pipe full of pin holes, resulting in very little water being left by the time it reaches the nozzle. A low-loss condenser may be compared to a tight hose, with all the energy flowing through the condenser as all the water does through the hose.

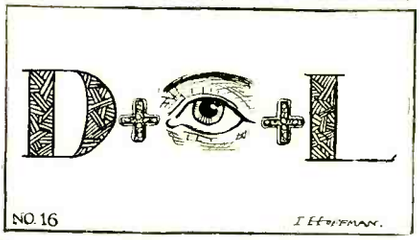
If a condenser, which in a loop set is placed between the loop and the amplifier, has high losses, it has little chance to pass enough energy through to the amplifier to build up an audible signal.

High resistance in any part used in a radio set results in a loss of received energy. During recent months the value of low-loss condensers has been emphasized. A number of manufacturers are placing new low-loss condensers on the market. One company, for example, has gone so far into the subject that it silver-plates the plates to reduce resistance, a cover is provided to exclude dust and moisture, a pigtail connection is used and hard rubber insulation of low dielectric loss further helps to prevent losses.

With low losses and sharp tuning, practically all the currents on the antenna or loop can be utilized.

The Weekly Rebus

TRY to solve this rebus. Send your answer to Rebus Editor, RADIO WORLD, 1493 Broadway, New York City.



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