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1-TUBE SUPERDYNE

By HERMAN BERNARD

RADIO WORLD

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2-Tube Loudspeaker
Reflex Set
By Byrt C. Caldwell
A Sturdy Low-Loss
Coil
By Lt. P. V. O'Rourke
My Radio Friends
By Tim Turkey
Keeping Your Set
Working
By Feodor Rofpatkin

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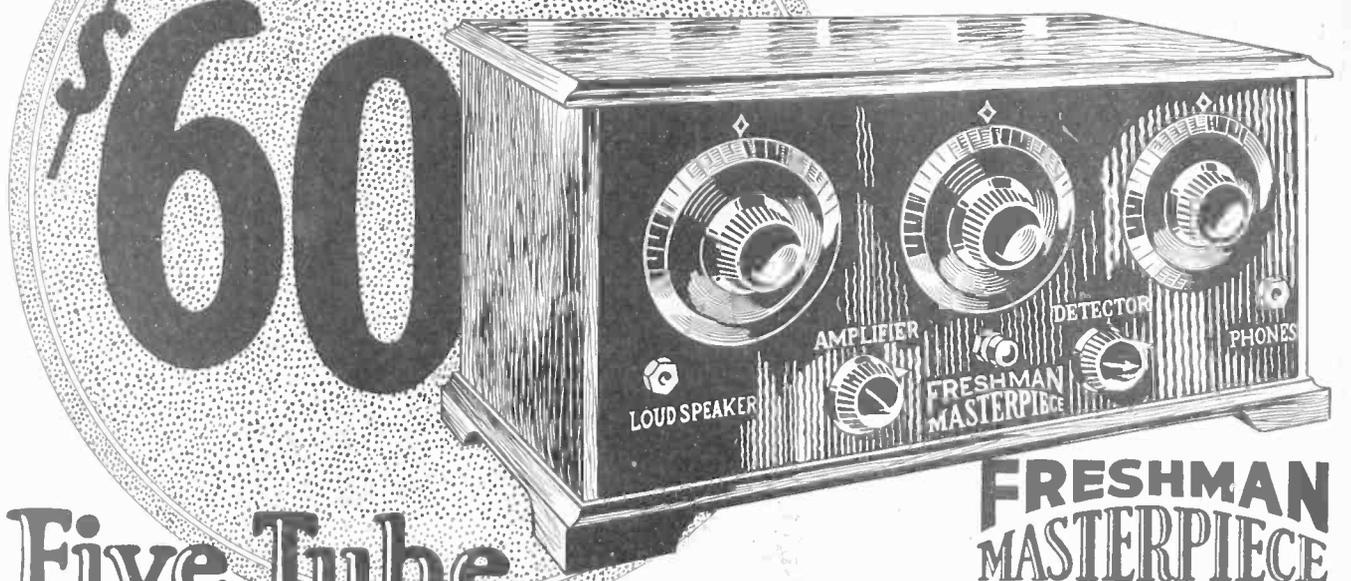
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RADIO WORLD

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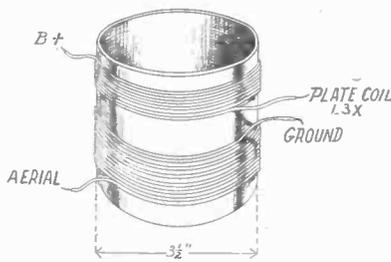
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The 1-Tube Superdyne

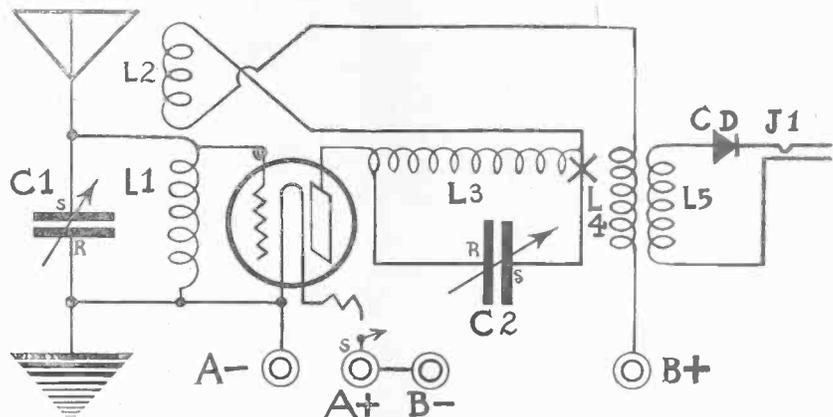
“The Set That’s Like a Dream Come True”

Thrillingly Beautiful Tone Quality, Wonderful Volume and Sensitivity and Simplicity of Tuning Mark This Delightful Set

“Something to Rave About”



THE ALL-IMPORTANT COIL (Fig. 4) shows the reverse feedback coil on top of the cylindrical form and the aerial coil at bottom. The leads must be connected exactly as shown, otherwise the Superdyne principle will not be brought into play and the set will oscillate, probably uncontrollably. The top coil is L2, consisting of 22 turns of No. 22 double cotton covered wire, and the lower coil, L1, consisting of 32 turns of the same kind of wire, both wound in the SAME direction. The beginning of the L2 goes to the P post of the iron-core RFT, and eventually to B+. The end of L2 goes to the end of the plate coil, marked X above and also marked in Fig. 1. The ground MUST go to the beginning of the lower coil, L1, and the end of that coil to the aerial. A reversal of these connections is fatal.



THE 1-TUBE BERNARD SUPERDYNE, as devised and designed by the author, uses an impedance primary, L1, thus gaining signal strength. (Fig. 1)—The strong signal is passed through the plate coil, L2, which is not in inductive relationship to any other coil. This current then is delivered first to the end of the reverse feedback coil, L3, and then is fed from the beginning of this coil to the P post of an iron-core radio-frequency transformer, thence completing the circuit to B+. L1L2 are inductively coupled, both being wound on the same tubing. The Superdyne principle of counter-electro-motive force is utilized by connecting the output of the plate coil L3 in reverse fashion. The coils L1L2 therefore are wound in the same direction, as Herman Bernard explains fully in the text. The point on L3 marked X is where the connection is made to the reverse feedback coil.

By Herman Bernard

TO those who enjoy wonderful quality of received signal, preferring that to indifferent distance reception, the 1-tube Superdyne will prove alluring. Signal quality has always been associated with the Superdyne, as attested by the many fans who have built the Superdyne that uses a tube as detector. But when quality is under discussion first award always goes to the crystal as a detector, hence when this velvety rectifier is used in a Superdyne circuit you have a wonderful quality combination, consisting of the inherent Superdyne

beauty enhanced by the absolutely distortionless rectification by a crystal.

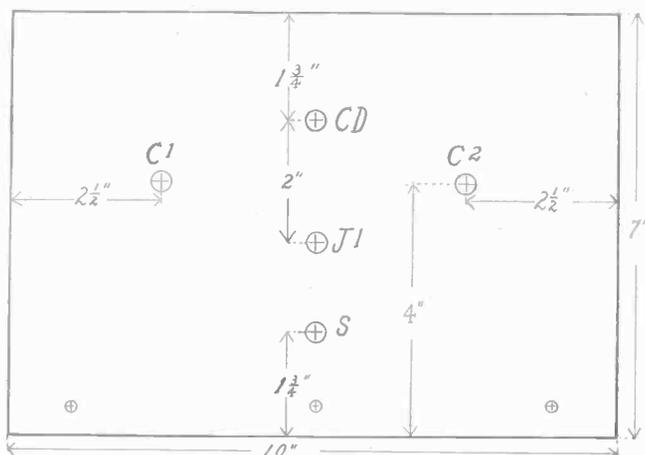
The Superdyne is a regenerative circuit in which the oscillations are suppressed by reverse feedback. The regeneration is in the radio-frequency stage. Hence if only one tube is to be used, and the Superdyne principle is to be left intact, the rectifier must be a crystal. In the Superdyne a coil is connected in series with the plate circuit and is tuned by a variable condenser. Then the current passes into the feedback coil, usually a tickler. But in the present instance instead of a tickler a stationary coil is used. It was wound on the same tubing as the primary coil L1, hence the two are in mutual

Bernard Superdyne a Wonder

THE Superdyne has justly won a place high in the ranks of radio circuits. Fans all over the United States and Canada have been thrilled by its beautiful tone quality. Many experimenters whose personal knowledge of sets encompasses every popular circuit of today say that, for tone quality, you may equal the Superdyne, but never exceed it. And only a few admit that it can be equaled. This is the laudation heaped on the Superdyne by fans themselves, and represents their own views. Their opinions were based on the Superdyne using a tube for detection.

Now we have a 1-tube Superdyne—the first one of this particular kind presented for popular attention—and it uses the crystal for rectification. With the unchallenged tonal beauty of the crystal invoked in a Superdyne circuit you have an amazingly wonderful result that gratifies the ears of the most cultured musician and most fastidious critic. Tested in RADIO WORLD's laboratory, this set produced such fine quality of signals that assembled experts uttered exclamations of amazement. They said that it was a little wonder.—EDITOR.

Non-Radiating Regeneration



PANEL LAYOUT for Bernard Superdyne (Fig. 2). The dials for the two condensers are each mounted $2\frac{1}{2}$ " from the left and right, respectively, of a 7×10 " panel. The crystal detector is $1\frac{3}{4}$ " from the top of the panel, on a central vertical line, and the switch occupies a corresponding position at bottom. The jack may be placed in between them, on the same line, since shorter leads are thus obtainable. That is due to one of the output posts being from the crystal itself.

inductive relationship. By leaving just the right distance between these two coils the regeneration never exceeds the saturation point and radiation will not result. If the coupling is too close whistles will accompany the tuning in of a station; if it is just right there will be no whistles, but the station may be tuned in only by the voice or music. Moreover this set may be logged. Hence it is like the Neutrodyne, except that the Neutrodyne has three controls while the 1-tube Superdyne has only two. In fact, so far as I know, this is the only 1-tube 2-control Superdyne ever outlined for home constructors. The elimination of one control is accomplished by the fixed coupling of the feedback coil in respect to the primary, instead of the use of a rotary coil or tickler. This method was adopted not at a sacrifice of successful adjustment just to eliminate one control but after the tickler method had been tried in this particular circuit and found to offer no advantages over the fixed coupling method.

The low-loss idea is carried out in this set. The tubing on which L_1L_2 are wound is of cardboard, while the plate coil is a 75-turn adjusted duolateral. For the coupling between the plate output and the detector

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

circuit a fixed radio-frequency transformer, generally called "untuned," is used. The cardboard form is very efficient, despite its trifling cost and compares very favorably even with spider-web and basket-weave coils from which all insulation has been removed. Cardboard suffers lower losses than hard rubber, bakelite or composition tubing, considering signals received over the entire broadcast range. The cylindrical form is better than any other for obtaining the highest inductance value, due to uniformity of spacings between turns, a dielectric consistency not so easy to attain with spider-web or other self-supporting coils, which have distending tendencies. The fixed radio-frequency transformer should be of excellent make to preserve the values achieved in the rest of the set.

The Superdyne Principle

Instead of the usual method of obtaining regeneration the Superdyne principle was used because of the marvelous quality of reception and because the set was taken out of the radiating class. Every advantage was nevertheless preserved that the conventional method of regeneration affords.

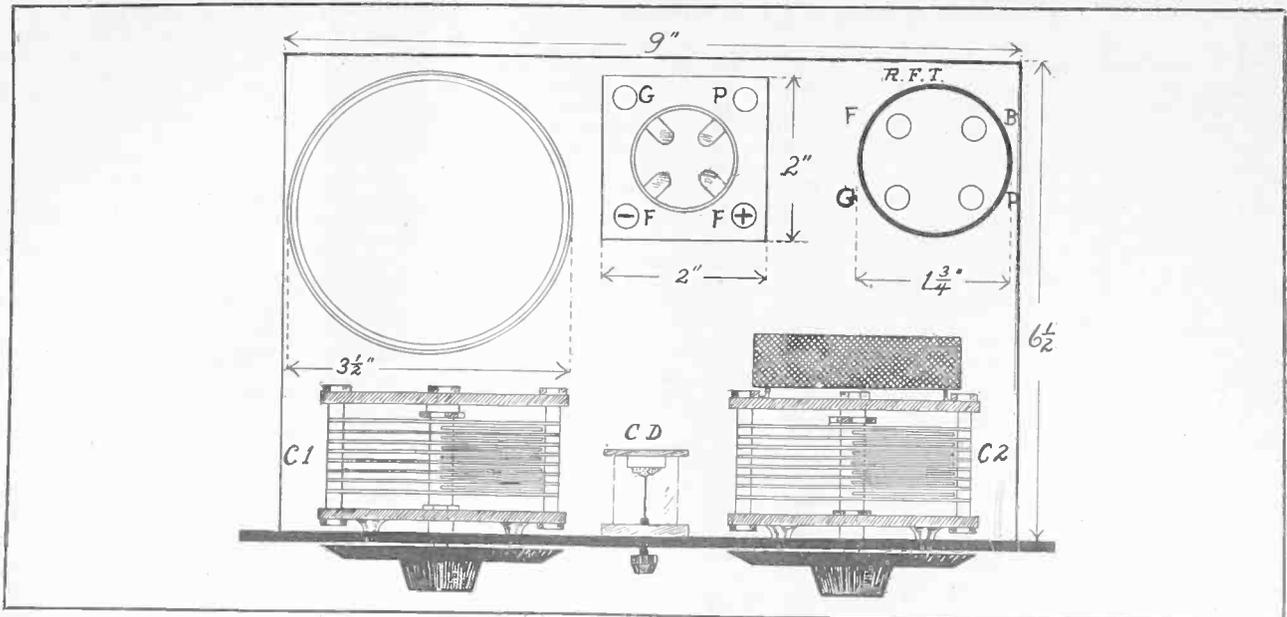
The Superdyne method consists of reversing the usual polarity of a coil, thus generating a counter electromotive force, or negative current, used for returning the radio-frequency impulses from the plate circuit of a tube to the grid circuit.

Every coil of wire has two poles, north and south. Where the current ordinarily would be fed first through one pole it is instead delivered into the other and extracted from what would otherwise be the input terminal. The polarities of all coils must be correctly determined for best efficiency in radio construction. In the Superdyne incorrect polarities are fatal. Now, in the Superdyne the reversal of current flow may be obtained in any of several ways. For instance, it may take place in the plate coil L_3 , the feedback coil L_2 being connected conventionally. The polarities may be changed in respect to the aerial coil L_1 , and the others adjusted to correspond with the Superdyne requirements. However, after numerous tests, a certain method was determined upon, and this is the one to use in the present set. If the coils L_1L_2 are properly connected and spaced apart from each other there will be no whistled beat note of a broadcasting station heard in your phones. If they are improperly connected you will have a very annoying and ineffective set. But there is nothing difficult about making this set work properly. All you need do is follow directions.

Comparative Values

With correctly polarized connections you will be able to hear stations with excellent volume. Persons used to listening on a straight 1-tube set often are

The Coil for the Quality Set



ASSEMBLY PLAN for the Bernard Superdyne (Fig. 3) showing the cylinder, at left, on which the coils L_1L_2 are wound. The socket is in the middle and the iron-core radio-frequency transformer at right. The variable con-

denser for the aerial circuit is at left, and that for the plate coil at right. The A-, A+, B- and B+ leads are lead in through the rear of the cabinet, as are the aerial and ground leads.

disappointed when a stage of radio-frequency amplification in conjunction with a crystal detector are substituted, due to a considerable drop in volume. In the 1-tube Superdyne there is no such volume decline. All local stations come in splendidly. Not much distance reception need be expected, however, for I have yet to hear of any 1-tube-and-crystal combination that is a DX getetr. Conservative experimenters usually claim a range of 100 miles for such a combination and I agree with them. The 1-tube Superdyne, however, will reach at least as far as any other 1-tube-and-crystal combination and farther than most of them.

The sensitivity of this set is exceptional. The 1-tube Superdyne is much more sensitive than any of the following 1-tube sets: 3-circuit tuner, either tuned or untuned primary; Cockaday; single-circuit regenerator and Ultra-Audion. Stations that usually came in only as whistles on a 3-circuit tuner, using an aperiodic primary, were brought in with fine volume and without any sign of the distortion that marked their occasional reception on straight 1-tube sets. The stations referred to are locals from which my home is partly shielded by a large school building that overtops my aerial. This building is mostly a steel structure. Any set that brings in WHN, WJZ and WGBS through this steel building is indeed a marvel as to sensitivity.

As to selectivity, the 1-tube Superdyne deserves a rating of "good." The set is not selective enough for persons living within less than four miles of two or more broadcasting stations that use 500 watts or more and that are on the air at the same time. Every reader will know whether he is in this class and should not build this set. All other persons, may construct the set with the assurance that if directions are followed they will get the results outlined. Those whose location requires greater selectivity may solve their problems, if they so desire, by using a tuned radio-frequency transformer coupling instead of the fixed type used in the original set. The slight gain in selectivity, however, does not warrant others in going to this added expense and introducing the third control.

The all-important coils are L_1L_2 . These are wound

on a cardboard tubing $3\frac{1}{2}$ " in diameter and 4" high. The wire used is No. 22 single cotton covered. Both windings are in the SAME direction. There is a prevalent misapprehension concerning the winding of coils for the Superdyne, that the coils must be wound in opposite directions. They may be, and then the connections thereto made in the conventional way. But if the coils are wound in the same direction, the connections may be made, so to speak, in the opposite direction, and exactly the same result is obtained. Also, the uniform-direction method simplifies the construction for the experimenter. Much confusion has arisen because of the "backhand" winding method being introduced.

About $\frac{1}{4}$ " from the top of the cylindrical form, as it stands upright on a table, punch or drill two tiny holes, just large enough to pass the winding wire. These holes are $\frac{1}{4}$ " apart, parallel with the horizontal. Starting from the outside thread 5" of one end of the wire through one of the holes, then pass the same end of the wire out through the other hole, leaving the 5" protruding from the outside circumference. To make winding more comfortable, coil the small excess and drop it inside the tubing. The winding will be from left to right as the coil is upright. Now wind $22\frac{1}{2}$ turns, so that the winding will end on the diametrically opposite side of the cylinder from the beginning. Leave 5" for later connections and secure through two small holes as formerly. This coil is L_2 . Do not mistake it for L_1 , although it occupies the relative position that an aerial coil would have in most sets. This coil L_2 is the feedback coil. Now leave $1\frac{1}{4}$ " space and make two holes as formerly, leaving 5" slack, and wind the next coil L_1 in the SAME direction as L_2 was wound. This coil has 32 turns of the same wire. Terminate as formerly. You will find that the actual total depth of wire (not counting the $1\frac{1}{4}$ ") is just about 2", giving a good proportion between depth of wire and diameter of tubing for efficient inductance.

The other coils used in the circuit are manufactured products. For the sake of space economy, a duolateral coil was used as L_3 in the plate circuit. A honeycomb
(Continued on page 31)

A Sturdy Low-Loss Coil

By Lieut. Peter V. O'Rourke

MANY experimenters who like spider-web coils because of their susceptibility to low-loss construction and the narrowness of their magnetic fields, thus making them extremely useful in successive stages of tuned radio-frequency amplification, sometimes find it difficult to devise some convenient method of mounting them. Of course, a hard rubber strip might be affixed to the variable condenser and plate, and tilted at any angle desired, the coil being tied at two or three places to this strip, but that would introduce too much insulation to be consistent with the low-loss idea. Another factor is that the experimenter desires to remove either the entire form on which the coil is wound, or at least as much as possible, because of the likelihood of any such support causing losses due to resistance and leakage paths. Still another consideration is the desirability of having a coil that is secure, one that will not lose its identity as a coil and become a mass of wire when inadvertently touched. The coil I use meets all the demands and functions with excellent efficiency, suffering losses much less than those on the conventional rubber, bakelite or composition tubings.

Low Distributed Capacity

The distributed capacity of one of these coils, as I made it, was 17.1 micro-microfarads, which is pretty low; yet another coil that I made the same way had a distributed capacity of 16.7 micro-microfarads, which is about as good as anybody can expect to make. The value of a low distributed capacity is even greater now than it ever was, with the new wavelength band of broadcasting stations being changed, so that it reaches from 200 to 545 meters, in other words, is lowered on the minimum side about 22 meters. Distributed capacity means that such capacity is ever present, like a fixed condenser shunted across the coil at its terminals, hence the actual minimum capacity of the condenser-coil combination is the minimum capacity of the condenser plus the distributed capacity of the coil. When one wants to reach the low-wave stations he may fail, due to the excess distributed capacity, which also means more resistance.

Every experimenter is more or less familiar with the perforated wooden hub, about 2" in diameter, used in conjunction with dowel sticks inserted in the circumference of the hub. The result is a spider-web form, with the rods or dowels radiating from the center, and always an odd number.

How to Wind the Wire

The wire is wound in and out of the spokes or arms which the dowels now become, or is wound in and out of alternate arms. If, when the prescribed number of turns is wound, the dowels are released from the perforation in the hub, but not taken out of the winding, the coil is supported by the dowels. If tie-thread is used, linen thread being preferable, inserted where the arms are and tied with a knot at the circumference of the coil, the dowels, too, may be removed. The result is a coil that is quite efficient, yet one that is not quite so sturdy as you

might desire, and which still leaves the mounting problem unsolved.

The central block, however, is available for use. If the block and dowels were completely removed, the same form could be used over and over again for winding coils, which affords an advantage over the more usual spider-web form, where the arms must be cut away and the form thus destroyed each time a coil is made. But my method, while requiring the removal of the central block and rods from the possibility of further use for winding, employs them for support.

A Coil Easy to Place

You will then have a coil that may be screwed anywhere on the baseboard of a set, or mounted on the panel, the coil being placed at any angle desired, in respect to the panel or any other coil in the set, particularly coils of the same design. Coils may be at right angles, which will give you excellent safeguard against magnetic feedback or stray coupling, because of the restriction in the magnetic field in this form of coil. The central block that becomes the base may be secured to the baseboard with a right angle, bent to any desired degree, and thus enabling the experimenter to follow if he so desires, the angular rule made popular through its use in the Neutrodyne. The angle in that case is 57.8 degrees. However, the Neutrodyne commonly uses cylinder-wound coils, where the magnetic field is relatively wide. In using the kind of coil I am describing I did not find it necessary to follow the Neutrodyne scheme, but relied on placing the coils alternately at right angles and had no trouble.

Two holes may be drilled in the block for perpendicular mounting on the baseboard.

Using Coil in a Set

For use with a .0005 mfd. low-loss variable condenser, normally 23 plates, this coil may be wound as a radio-frequency transformer, serviceable either in the RF stages or as the coil in the detector circuit. A good 1-tube regenerative set may be made by using this coil in the aerial-grid circuit, the primary going to aerial and ground and the secondary going to the respective condenser plates and to the grid and A+ respectively, a 35-turn single coil, otherwise similarly wound, being used in the plate circuit with another .0005 variable condenser. Also the RFT type of coil, as distinguished from the single-coil impedance type just described, may be used for a stage of RF ahead of this detector circuit.

Measurements for Wire

Using No. 20 double cotton covered wire, measure off 14 feet and cut. Then measure off 46 feet of the same wire and cut. Start winding the larger length in and out of the spokes until twelve turns have been wound. You can count the turns most conveniently by using the visible windings on two adjacent arms as your guide, since the number will be twice that visible when counting on one arm, the reason being that the other turns are hidden under that arm. After having wound 13½ feet, pick up the other wire and start winding this with the continuation of the winding that you started first. The two stretches of wire are wound at the same time, side by side. Keep either one or the other on the outside all the time. When you reach within five inches of the end of the smaller stretch of wire, temporarily secure it by

making a half-hitch on one of the arms, that is, looping the wire once around the arm and under the point on the wire where the hitch was begun. Thus the wire will emerge pointing the same direction as the winding. Now you still have some more unwound wire, the remainder of the secondary. Wind until within five inches of the end and hitch as formerly. Two tiny holes may be drilled in the dowels where the windings terminate and the wire threaded through these holes for security. Also, if wire from the same spool is used for both windings some provision may be made for distinguishing the terminals. However, the position of the primary in this particular coil is such that its terminals are readily distinguishable without color differentiation. It so happened that I used white-covered DCC wire for the secondary and green-covered double silk wire for the primary, but there is no necessity for this, and the use of wire from the same spool facilitates matters. Moreover, double cotton covered is slightly better for the general purpose of this coil.

Completing the Coil

Now the spokes are gently pulled out of the central arm, although the spokes still are left in the windings. If you remove them from the windings you will run into difficulty in trying to reinsert them. As the arrangement now looks you will have the central block lying on the table all by itself, and also you will have your coil with the arms still in it. Two adjacent arms must be left in the coil. It does not matter which two they are. These two of course will be at an angle to each other. Now hold the coil upright with these two selected spokes resting on the block, in the position shown in Fig. 1. With a sharp-pointed pencil or scribe mark the points where these two arms strike the central block, which is now to be the base. With a drill of the same size as the diameter of the dowels, or a size a trifle larger, drill two holes at the correct angle, so that these two arms may be inserted in the holes. Care should be taken to drill the holes at an angle, for the tendency of the drill will be to defeat this purpose.

Proper Drilling Essential

However, doing this work the correct way is very easy, if care is exercised. If you do your drilling properly, and use a drill the same size as the dowel diameters, you will find that the dowels have to be pressed into the apertures, and that sufficient support is thus obtained to enable the coil to "stay put." If not, a speck of glue or radio cement may be used to keep the dowels in their proper place with great security. Now you still have all the dowels in the coil. Not all of them are needed. You may withdraw as many as you desire. I left eight in mine and had enough to obviate using any tie-thread. However, all may be removed and tie-thread substituted as the binding. It is advisable in such a case to use two pieces of thread through each aperture formerly occupied by a dowel. The thread is inserted at the outside circumference, through the space left where the dowel had been, and brought to the inside diameter of the coil and then around to the starting point, where a knot is made. This leaves only one-half of the winding tied at this point and the same operation is repeated for the other side or alternate winding. This doubling up process continues until two tie-threads supplant each removed dowel.

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by M. B. Sleeper. Mailed on receipt of 75c. The
Columbia Print, 1493 Broadway, N. Y. C.



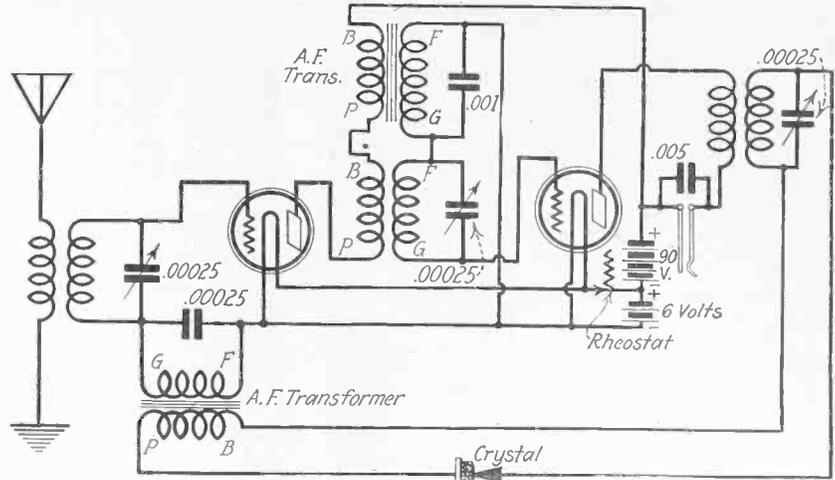
FIG. 1.—Spider-web coil, supported on the central arm, now used as its base, and the construction of which is described by Lieut. O'Rourke.

An "Ultra" 2-Tube Receiver

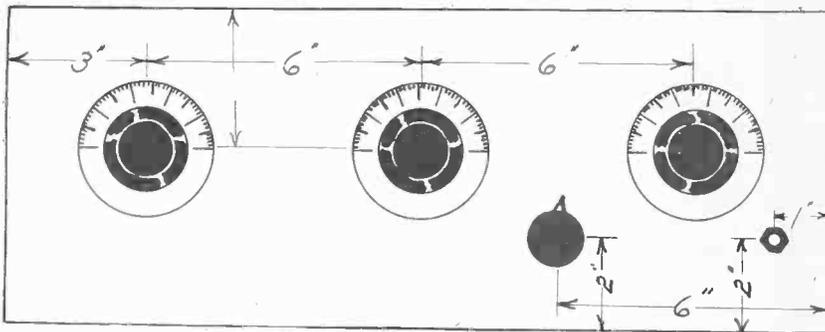
By Byrt C. Caldwell

TO obtain maximum results from any number of tubes it is necessary to use either super-regeneration or reflex. For several reasons super-regeneration is not practicable at present. Although theoretically super-regeneration uses the tube at 100 per cent efficiency, which is a higher efficiency than that attained by means of the reflex principle, the reflex method has many advantages which make it a much more desirable form of amplification.

There are many 2-tube reflex circuits. The 2-tube set seems to be the most popular now, for two is the smallest number of tubes which will operate a loud speaker satisfactorily, and to do this, the tubes must be reflexed. Of the many 2-tube reflex hook-ups some use two stages of radio-frequency amplification and one stage of audio-frequency amplification. The rest use one stage of radio-frequency amplification, and two stages of audio amplification. Experimenters



CIRCUIT DIAGRAM of Caldwell's 2-tube loudspeaker reflex.



PANEL LAYOUT for Caldwell's reflex.

seem to have kept away from trying two stages of each kind of amplification with two tubes. Of course this kind of a receiver would be more difficult to construct and operate properly than the other reflexes, but it is entirely possible to use two stages of radio, either tuned or not, and two stages of audio amplification. If this kind of receiver is carefully designed and constructed it will be the "ultra" receiver for two tubes. From what is known today about radio circuits we cannot hope to get more efficiency from a 2-tube set than what we will get from this one. Every little detail of de-

sign has been considered in the planning of this circuit. Consequently when building it the constructor is urged to follow instructions very closely.

The panel size is 7 x 18" (Fig. 2). The variable condensers must be low-loss, .00025 mfd. Three of these are required. The sockets are placed between these condensers, the audio transformers being placed directly in back of the sockets. The sockets should be of the latest design, which are very compact, and which have as little insulation as possible. The tuned RF transformers are to be wound by hand. They are wound in coils 3" in

diameter. Sixty-five turns of double cotton covered wire, No. 22, are required. A single layer of paper is wound over this, and the primary, which consists of 10 turns of the same wire, is wound in the same direction, and on top of the paper. These coils, wound as described, and used with good low-loss condensers, of the capacity named, will exactly cover the broadcast wavelength band. However, to do this it is essential that very good condensers and carefully made coils be used. The coils should be placed as shown and at least 1 1/2" from the condensers, and as far as possible from any solid material.

Fig. 1 should be carefully followed when the wiring is being done. The fixed condensers are given of a capacity which will ordinarily give the best results, although it is advisable to use one of the condenser kits, so that different capacities may be tried out. The capacities of these small fixed condensers have a great deal to do with the proper operation of a reflex set and as apparatus of different makes varies the capacities required of these condensers will vary also.

You will find when you have finished this receiver that you will have a set which will be the equal in sensitiveness and selectivity of many a 5-tube tuned RF set and that the tone will be exceedingly clear.

The Low-Loss Idea Growing

ONE of the indications of the progress of the radio art is the increased attention which is being paid to the design of the individual parts which are used in radio receiving sets. Until quite recently most of this care was focused on the design of the coils and condensers alone. However, it is now realized that there are wasteful losses in poorly designed tube bases, tube sockets and other parts as well.

A modern fairly efficient radio receiver will receive signals which have as low a pressure as .001 volts.

40,000,000 Sets to Light a Lamp!

Even in a very good antenna this will not produce an energy, of more than .0000001 watts. It is hard to imagine such a small quantity of energy, but forty million receiving sets would produce just about power enough to light one ordinary 40-watt tungsten light.

A manufacturer of vacuum tubes re-

cently greatly improved his product by eliminating the traditional metal shell which surrounds the base of his tubes. This change reduces the internal capacity of the tube and at the same time eliminates the losses from eddy currents in the metal shell itself. While the saving of power thus accomplished is quite small when expressed in figures, it becomes of importance when compared with the minute currents received on the antenna.

Low-Loss Socket

Second only in importance to the vacuum tube itself is the tube socket, for all the energy must pass through the socket before it reaches the tube. Indications are that the metal shell socket will soon become as obsolete as the single-slide tuning coil. The best radio engineering practice of today calls for the elimination of as much material as possible in the neighborhood of the parts of the radio set which carry the radio-fre-

quency current. This applies not only to metallic substances, but to insulating materials as well.

A Peep Ahead

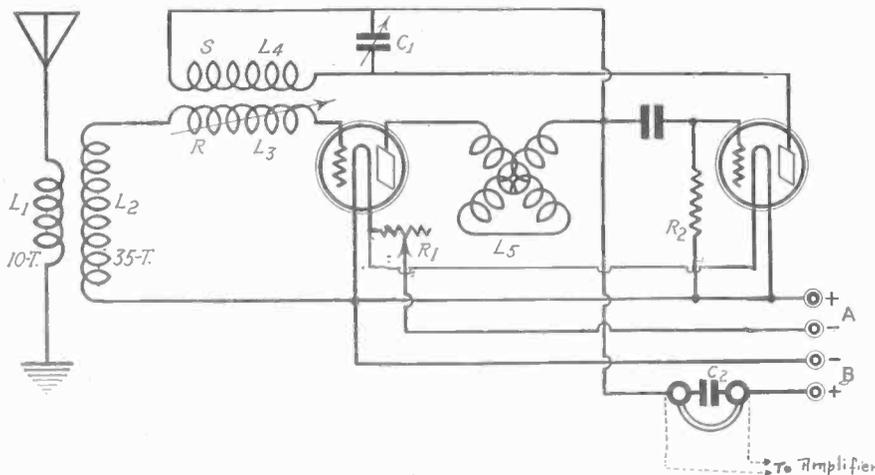
The socket of the future will undoubtedly consist merely of a comparatively thin shell of some high grade insulating material, and a base only sufficiently large to accommodate the necessary contact springs and connecting posts.

Some manufacturers are already marketing sockets of this type.

TROUBLE FROM CORROSION

OCCASIONALLY the lightning arrester will become short circuited through the effects of the weather. Corrosion will sometimes cause this. It is a good plan to look over such a device before you make up your mind that the trouble is in the set.

1,000 Miles on Two Tubes



CIRCUIT network of Gelula's DX set.

Set Works Loud Speaker on Locals — Regeneration Used in Both Tubes, Focusing on the Grid of the RF Tube.

By Abner J. Gelula

IF a non-regenerative circuit is made regenerative by placing a variable coil in the plate circuit the sensitivity of the set is increased approximately 6 times. According to this principle, and knowing that one stage of radio-frequency is equal to approximately one-half the sensitivity of regeneration, is it not reasonable to believe that two tubes can be made to operate as five, without physical reflexing?

Regeneration is equal to one and one-half stages of RF. Let us consider that the detector is operating as a detector and also as one and one-half stages of RF because of regeneration—that is, two and a half tubes. If we regenerate with the radio-frequency tube also we have the normal RF tube and the theoretical one-and-a-half tube energy due to the regeneration. This, then, equals another two and a half tubes. Total, five tubes.

Great care should be taken in constructing this set so as to control the oscillations of both tubes. Wires should be short and directly to the point. Grid and plate leads should run at right angles to each other.

Results can be only as good as the most poorly constructed part of the set. Therefore, if the entire set is constructed of the best parts and directions are followed implicitly, the result will be a set that will far surpass any 2-tube set.

What Coils to Use

As to the coils, only the approximate size may be given, because of the varying lengths of aerials and grounds. It is safe to say, though, that L2 is 35 turns for any length aerial. It is L1 that must be carefully varied so that the correct number of turns shall result. L1 will be about 10 turns for an aerial of 75 feet length; 8 turns for 100 feet and approximately 6 turns for over 100 feet. No aerial for this set should be more than 150 feet in length.

L1 is an aperiodic primary. It is wound directly over the secondary coil, with only a thin sheet of dry paper between. The wire should be No. 16 DCC, and wound so that it covers the secondary winding, that is, the turns should be separated.

L2, the secondary coil, is wound on a 4" bakelite tube and consists of 35 turns of No. 20 DCC wire. Do not shellac or varnish the coil, as this increases distributed capacity and results in a loss of

energy. L3 and L4, distinct in themselves, but physically the two coils comprise a split variometer.

Splitting a variometer is not difficult. Merely take off the end plates of the variometer and you will find that the connection between stator and rotor is made by the end of the stator winding making contact with the plate that you have just removed. This wire must be well insulated by a piece of tubing and brought out in front of the plate. The variometer is now split. There are four points of connection—(a and b) the two regular terminals (one from the stator, the other from the rotor, determine which is which), (c) the wire that has recently been brought from behind the plate, and (d) another wire to be soldered on the plate that makes the contact with the rotor. Determine this by following the winding of the rotor to the regular terminal of the binding post. The other side is the one

which makes contact through the plate. Solder the wire onto this plate.

If you are using a pig-tailed variometer, the operation is very simple. Merely clip the pig-tail and we have the four necessary connections—the two regular terminals and the two resulting from the former pig-tail.

It is imperative that the rotor be in the grid lead, the stator in the return-plate.

C1, a 23-plate variable condenser, is in shunt with this coil. The condenser should be low-loss. L5 is standard variometer. C2 is a .001 mica fixed condenser. R1 is a 6-ohm rheostat. R2 is a grid-leak of the variable type.

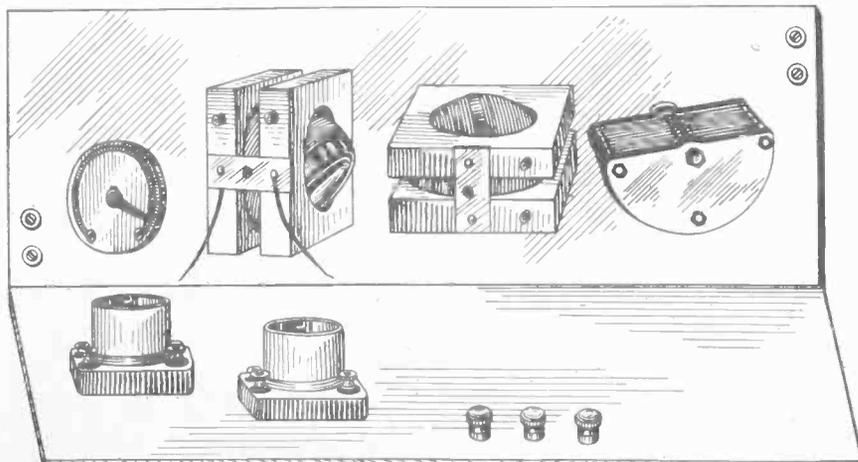
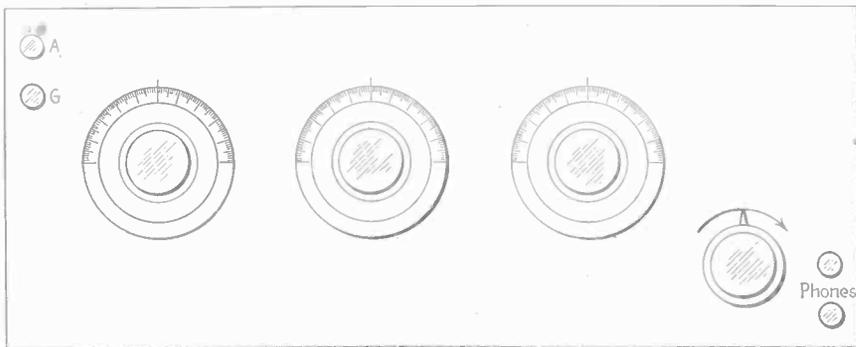
How to Tune

Tuning is not difficult. Practically the entire wavelength is controlled by means of the split variometer. L3 is very critical and should be turned very slowly. The same applies to C1. L5 acts as a stabilizer with C1. The set is operating correctly when a low hiss is heard in the phones. This signifies oscillation. C1 controls this hiss. The best results will be had when signals are brought to the "peak," that is, just before the set is brought into oscillation.

When seeking a station you may find the set oscillates. Afterwards, however, cut down the regeneration so that the signal may be brought in loud and clear.

This circuit is dedicated to the DX hound. Signals are not as clear as from some other types of circuits. This is not an insinuation that the set is not clear in itself, but upon direct comparison the difference will be noted. However, the DX advantages and volume of this circuit far outweigh the other when one is avid for DX. The set gets 1,000 miles easily. It works locals on a speaker.

Power will be in proportion to the amount of plate voltage applied. 201A tubes are advised throughout, although the 199s work beautifully.



PANEL layout (above) and assembly plan below.

RF or AF—Which Do You Want?



The
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*Information and Instruction
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PART III

THE analogy has often been made that the amplifier is to the ear as the microscope is to the eye.

How often the novice experimenter makes the mistake of adding audio amplification when he really desires radio. How often radio-frequency is added, when bettering the aerial and ground system would have given like results at far less expense. It is knowing how and when to add amplification that marks the knowledge of the experimenter.

Regardless of the amount of power applied, reason tells us that we cannot see anything through a microscope that isn't there. Some organism must be under the lens before greater power may be applied for the greater magnification.

So it is in the radio circuit. Regardless of the amount of amplification used, you will hear only that which the aerial absorbs, and no more.

Many experimenters add multiple stages of radio-frequency amplification (RF) in the wild hope that distance is being increased. It is, to a certain extent, but the fact that high amplification is used does not make the aerial more sensitive.

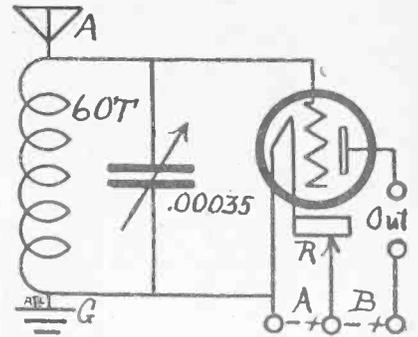
You will receive that which the aerial picks up—no more. The addition of radio-frequency amplification will step up the current to the extent that weak signals that would ordinarily not have the necessary power to act upon the detector tube or the phones, are passed through the radio-frequency amplifiers, and the minute current stepped up.

Radio-frequency and audio-frequency (AF) are two different and distinct types of amplification. Each has its own requirements and can best fulfill just a certain purpose. The two types of amplifiers are not interchangeable and great care and judgment should be used in selecting the type of amplification actually required.

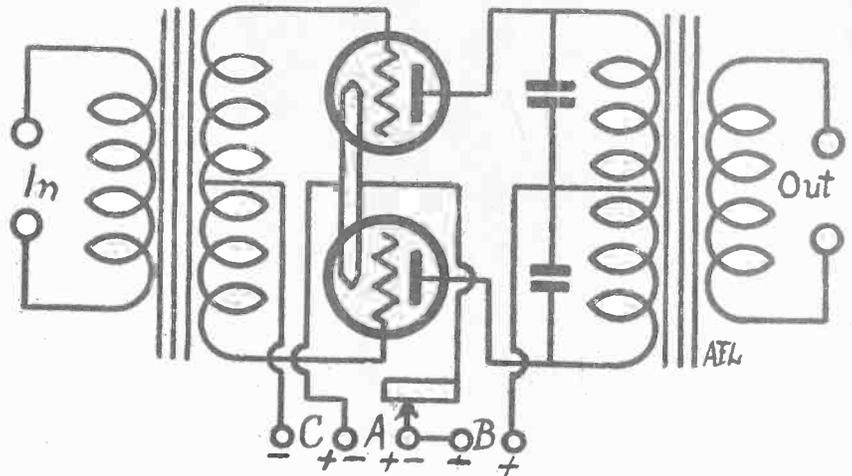
Radio-frequency is used preceding the detector, for it is the duty of RF to amplify infinitely small currents to the extent that they will actuate the detector tube. Regeneration also does this to a certain extent. It is claimed regeneration is equal to approximately one and one-half stages of radio-frequency amplification. Thus, if regeneration is used with one stage of radio-frequency amplification, we really have the power of three and a half tubes combined in two. Radio-frequency, however, does not amplify in volume to the extent that it amplifies the minute powers. Therefore, if you desire volume more than increased sensitivity, it is not radio-frequency amplification that you desire but audio-frequency.

Audio-frequency amplifies the signal after it leaves the detector tube. This type of amplification may increase the practical distance of the set, in that signals in the plate circuit of the tube (the phones), too weak to make a noticeable impression on the drum of the ear, are rendered audible. However, the signals were powerful enough to actuate the detector tube, but came through too weak to make a powerful enough impression on the phones. Audio-frequency will amplify this type of signal so that by the time it reaches the second stage of amplification it is loud enough to hear comfortably or perhaps operate a loudspeaker.

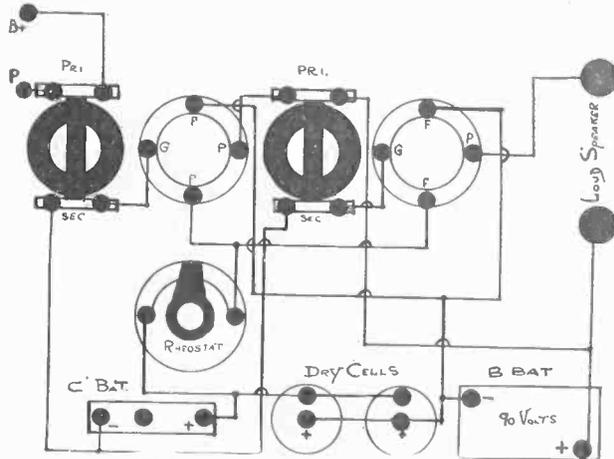
More than two stages of transformer-coupled audio-frequency amplification usually cannot be used successfully, as distortion results. Beyond the second stage it is well to use resistance coupling, as the disturbing fields of the resistance are practically nil. The resistance-coupled amplifier will give only ap-



A STAGE of impedance-coupled radio-frequency amplification, which also builds up the audio signals somewhat. This works well ahead of the 3-circuit tuner.



A STAGE of push-pull audio amplification.



TWO stages of transformer-coupled AF.

proximately one-half the step-up amplification of the transformer, but the tone is practically unimpaired, and there is practically no more distortion than the detector tube produces.

On any type of amplifier it is well not to exceed 90 volts on the plate. The tubes on the market today cannot successfully stand voltages much higher, as 90 volts is the peak of plate amplification, and voltages higher than this are wasted because no higher amplification will result.

However, before any amplification is added, especially radio-frequency, consider the aerial and ground system. Make your aerial as near ideal as is possible. See that it is well insulated. Do not try to save on the aerial wire. A saving on aerial wire now is a greater expense later. Insulate the lead-in thoroughly. Solder

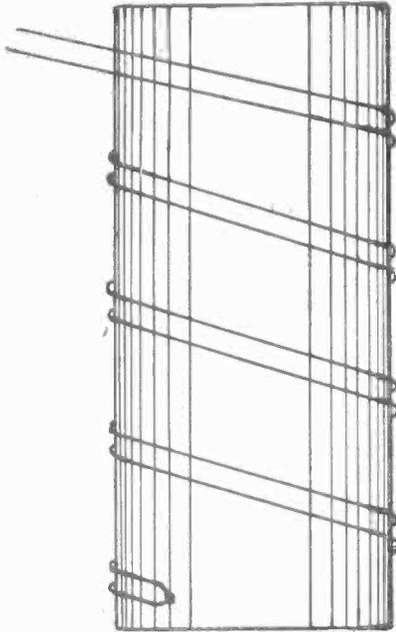
all open connections, especially the joint of the aerial and lead-in. A well installed aerial and ground system will always better the receiving range, decrease leakage noises and increase the general service of the set. Add amplification only after your aerial-ground system is of the highest efficiency that conditions allow.

4-TUBE SUPERDYNE

- 1 RF, detector tube and
- 2 transformer AF

in next week's Radio World.

Making Fixed Resistances



RESISTANCE strip winding.

By Dudley E. Foster, E. E.

Electrical Alloy Co.

IN selecting a winding for a resistance coil we must consider first the current the coil must carry, since the current determines the size wire to use, and second the number of ohms required, since the length of wire to use depends upon the resistance desired. For radio use, the resistance unit should not operate much above 100° Centigrade (212° Fahrenheit) because some of the materials used in radio sets would be injured by a higher temperature. Accordingly in the tables given herewith sizes of wire have been selected which will operate at a temperature near 100°C when the number of amperes designated for that size of wire is flowing through the resistance.

The best material for most radio resistances is an alloy of nickel and copper. This material is soft, tough, has a higher resistance than German silver and is not injured by overheating as is German silver. It also has a zero temperature coefficient which means that, unlike practically all other wire, it will not change in resistance when the coil heats up. For making resistance units enamelled wire is usually most satisfactory since it makes a more compact coil and will stand considerably more heat than silk or cotton. If a low resistance is to be made, bare wire may be used by spacing the turns.

Table I gives the information for all sizes of Ideal wire from No. 20 to No. 40 B&S Gauge which will be useful in designing a resistance coil for practically any radio hook-up. Resistances higher than .1 megohm are not ordinarily made of wire because of the length required with even wire as small as No. 40. A resistance of .05 megohms would require 1,600 feet of No. 40 Ideal.

The following example will illustrate how Table I may be used to determine a resistor winding. It is desired to construct a 500-ohm resistance which will carry .21 amperes. Table I indicates that the No. 36 wire will safely carry this current and that the resistance of No. 36 is 11.08 ohms per foot. Dividing the desired resistance 500 ohms by 11.8 we find that about 42.5 feet of wire will be needed. The column giving feet per pound will be useful in determining the weight of

wire required and from the column giving turns per inch the length of the finished coil may be calculated.

Table II gives actual winding data for the resistance and current carrying values most likely to be met with in radio. For instance, it indicates that a 200 ohm coil will carry .15 amperes and should consist of 10.8 feet of No. 38 B&S gauge Ideal wire. When the wire is closely wound on a core 1/2" diameter, the length of the coil will be .38".

Cores for winding fixed resistors may be rectangular or preferably round and may be of fiber, porcelain, mica or asbestos.

The current carrying capacity in the tables is for a single layer winding. More than one layer of winding cuts down the current carrying capacity of a given size wire approximately in proportion to the number of layers, that is, a double layer winding will carry half the current and a three-layer winding one-third the current of a single layer winding. A resistance coil may be made with very low inductance by winding it as shown in the illustration.

Table II

Ohms	Max. Amps.	Size B & S	Feet of Wire	Length Winding 1/2" core
10	1.0	26	9.7	1.25
15	.50	30	5.1	.42
20	.50	30	6.7	.55
30	.40	32	6.5	.43
40	.40	32	8.7	.57
50	.40	32	10.8	.71
60	.25	35	6.4	.30
75	.25	35	7.9	.38
100	.25	35	10.6	.50
150	.25	35	16.0	.76
200	.15	38	10.8	.38
300	.15	38	16.2	.56
500	.1	40	16.3	.47
1000	.1	40	32.6	.92
5000	.1	40	163	4.7
10000	.1	40	326	9.2

Table I

B & S Size	Ohms per ft.	Feet per pound	Turns per inch	Current in Amps.
20	.288	316	30	2.80
21	.366	400	34	2.36
22	.463	505	37	2.00
23	.580	635	42	1.68
24	.740	807	47	1.44
25	.925	1015	53	1.22
26	1.17	1280	59	1.03
27	1.47	1610	66	.87
28	1.87	2120	74	.75
29	2.32	2550	83	.65
30	2.96	3230	93	.55
31	3.73	4080	103	.47
32	4.62	5050	116	.40
33	5.88	6420	130	.35
34	7.45	8160	145	.30
35	9.42	9850	161	.26
36	11.8	13000	178	.22
37	14.6	16000	200	.19
38	18.5	20200	220	.16
39	24.2	26500	244	.14
40	30.7	33800	270	.12

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No AFT Used in 2-Control Circuit

Pictures Tell Whole Story

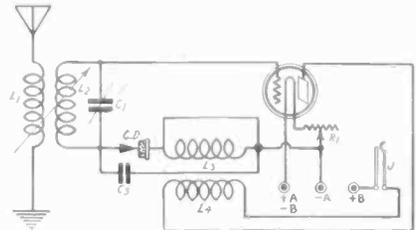


FIG. 5.—Circuit diagram of 2-control reflex that uses no audio-frequency transformer.

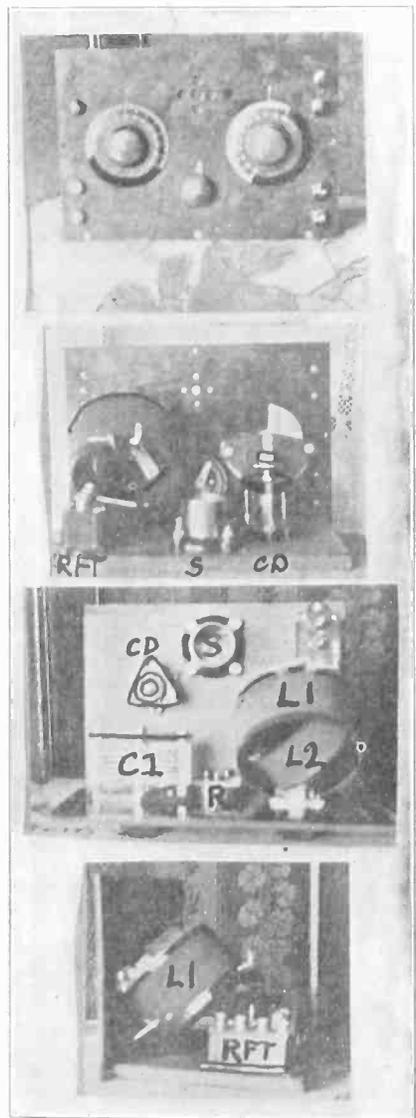


FIG. 1.—Top photo shows panel layout for a 1-tube-and-crystal reflex using no AFT. The condenser dial is at left, the coupler dial at right. There are seven binding posts. Aerial and ground are at right, bottom, and phones above them. The A— is at bottom, left, and the A+ above it, B— being on top. The rheostat is in center. Photo second from top shows rear view. The third photo from top is the assembly plan. Bottom photo shows view of set from the right side.

Keeping Your Set in Operation

By Feodor Rofpatkin

IT is one thing to build a set for successful operation and quite another to keep it in successful operation. This is especially true of sets that are not adequately protected from dirt and possible metal dust that plays havoc with open instruments. Many times you may wonder why the set worked so much better in the past, and you console yourself by saying that the "air" isn't as good as it was, or the broadcasting power is decreasing, or modulation is poor, etc., etc. But the truth is that the trouble lies nowhere else but in your set. If your set has not been opened or touched for more than six months you will find a world of difference in results after the various movable parts are cleaned or scraped.

There are usually sliding contacts in every set. Some instruments are pig-tailed, i. e., have direct contact by braided wire, while others make contact by a system known as "wiping." It is a common

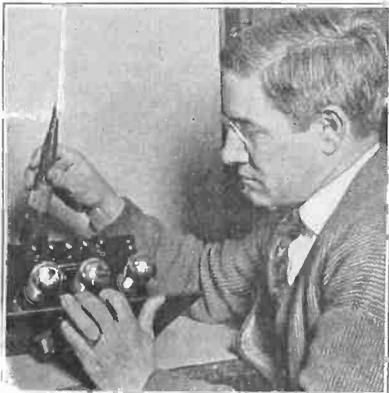


FIG. 1—Dust is injurious to any set, but especially in a Neutrodyne. The neutralization must be exact and is very critical. Dust increases the capacity of the transformer and is likely to throw the entire circuit out of neutralization. Neutrodynes when out of neutralization are uncontrollable in their oscillation. Keep the set in a tight cabinet, and dust thoroughly at least every six months.

practice for novices to place a few drops of oil on a wiping contact that is fitted too tightly. This should never be done. Oil is an insulator and raises the resistance of a contact tremendously.

With the Neutrodyne it is very important that no dust or dirt settle on the instruments. The Neutrodyne operates



FIG. 2—To prevent circuit noises clean the prongs of the vacuum tube every two months. Good contact in the vacuum tube circuit is very important, if the highest efficiency is to be attained.

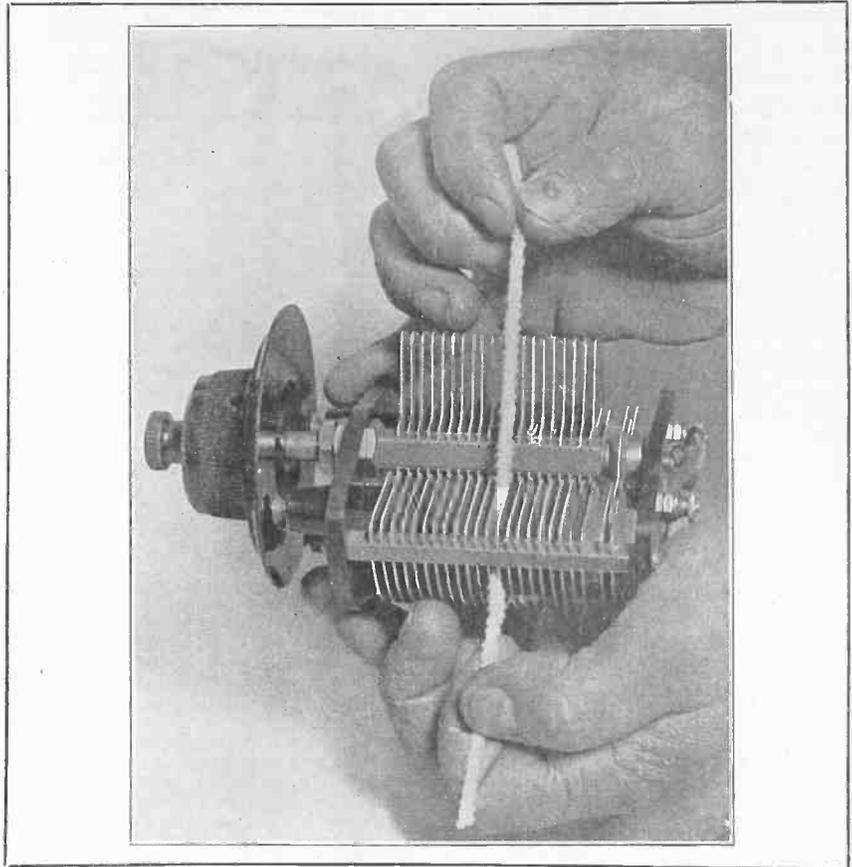


FIG. 4—The variable condenser plates must be kept clean. Dust between the plates causes noises, often mistaken for static. A pipe-cleaner saturated with alcohol will thoroughly clean the plates. However, it is necessary to dry the plates afterward with a fresh cleaner.

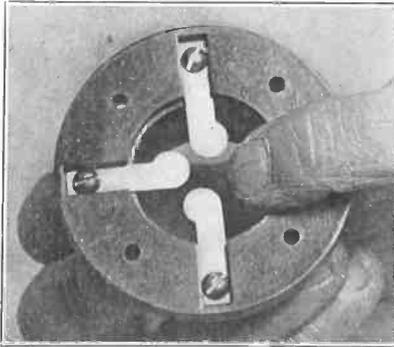


FIG. 3—The contacts of the vacuum tube socket forms the other half of the tube circuit. Placing a tube having clean prongs in a socket that has corroded contacts does little good. Both ends of the circuit must be electrically correct for best results.

on a principle of neutralization and is very critical to changes in capacity. Dust increases capacity and in a Neutrodyne a minute increase in the neutrodon or coupling capacity will cause the set to oscillate, thus spoiling the neutralization, consequently the set will no longer be a Neutrodyne, but uncontrollably oscillating. The Neutrodyne must be protected in a tight cabinet and cleaned thoroughly about every six months.

Many times so-called "static" is merely a bad connection or contact. Cleaning the prongs of the vacuum tube is much too often neglected, though poor connections here often cause crackling noises. With a piece of fine sandpaper gently rub the prongs (Fig 2) until they are bright. Thus, as far as the tubes are



FIG. 5—This shows how the lightning arrester is placed for a short-circuit test. Almost all instruments may be tested with just this apparatus—a battery and a bell or buzzer. The coil may be tested for continuity by substituting the coil for the arrester. If the bell rings coil is all right. Variable condensers and lightning arresters placed in circuit should not cause the bell to ring. A ringing bell with condenser in circuit indicates a short.

concerned, the contacts are again at maximum. It is well also to clean the socket contacts at the same time, so that the tube circuit will have good contacts throughout. (Fig. 3.)

Keeping the variable condenser plates free from metallic dust is very important. (Fig 4.) Unclean condensers are many times the cause of a noisy set. Clean between the plates frequently with a pipe-cleaner dipped in alcohol, after drying with another cleaner. This will

(Concluded on page 30)

STATIONS BALK AT WAVE BANDS

Agreement Reported in Only One of Nine Districts—Reassignment Delayed Until January 1—Classification of Stations By Numerical Grouping, Advocated By Conference, Proves Impossible.

By Carl H. Butman

DELEGATES to the Third National Radio Conference left with the idea that the new wavelengths for broadcasting would be issued forthwith, but Secretary Hoover's aides have had difficulty working out the distribution of the 53 wavelengths among the sixty-two class B stations now in existence. A tentative system based on distance between the broadcast stations has been sent to all radio supervisors with instructions to confer with local operators. Out of nine national districts, only one supervisor, R. Y. Cadmus of the Third District, headquarters at Baltimore, reports that all major station owners agree to the wavelengths assigned. Washington will get a wavelength of 491.5 meters, time on which will have to be divided by stations WRC and WCAP.

Philadelphia, which has four stations, will have two wavelengths, 394.5 and 535.4 meters; while Atlantic City will have a single wave of 288.3 meters.

Complaints of Interference

The general plan of subdividing the wave band between 280 and 545 meters among the class B stations provides for a separation of from ten to 50 kilocycles. Stations in the same city will be approximately 50 kilocycles or about 34 meters apart, which should prevent serious interference when both are on the air. A re-

600,000 Children Hear Lectures by Radio in School

INSTRUCTION in the public schools by radio is now a weekly feature in California. At 9 A. M. every Monday, an instructor talks on a subject of fascinating interest to children—mostly historic adventure on the Pacific Coast. The lectures are broadcast by KGO, Oakland, Cal. The 600,000 school children in the State, seated, listen to the loudspeaker in the assembly room or classroom.

cent test in Washington, however, when WRC broadcast on 469 and WCAP, on 435 meters, brought complaints of bad interference, chiefly from crystal set owners. In reports tabulated by the Department of Commerce, twenty-five per cent of the fans claimed it was impossible to separate the two programs. In many other cities, such as in New York, Philadelphia, and Chicago, it is understood fans have little difficulty in selecting the station desired during simultaneous broadcasting.

Stations distant from each other 50 to 200 miles will use wavelengths separated by 30 kilocycles; those from 200 to 500 miles apart will have a 20-kilocycles separation, and those over 500 miles apart will operate on wave lengths differing by ten kilocycles.

Before the allocation of the Class B wave lengths is put into effect, it will be necessary to reassign wave lengths to the

present Class A stations in the new band between 200 and 278 meters, as provided in the general conference plan, and also to get the 89 active Class C stations to transfer to Class A or B, or quit so as to release the 360 wavelength. No Class C station licenses will be renewed after November 15. The new allocations will probably not be finally checked and assigned until about January 1.

Numbers Not to Be Used

Indications are that some of the conference plans cannot be carried out. For example, the classifying of broadcasting stations by numerical designations seems impossible. It looks as if the higher powered stations, known as Class B, would continue under that name, while remaining stations will be classed as A stations. The suggested designations as Classes No. 1, 2, and 3, will not be practical since existing legislation provides that Class 1 stations are public service stations; class 4 technical and training, and Classes 5, 6, and 7, amateur stations.

Furthermore the Department is said not to favor grouping all the lower-powered present A stations, numbering nearly half the present stations, into Class 3, and trying to satisfy them all with only five operating channels. The band for these stations assigned by the conference was between 202 and 207 meters; all very low wave lengths, and not capable of being picked up on many types of sets. All Class A stations, therefore, it is understood, will be assigned wavelengths between 200 and 280 meters, the more powerful having the higher wave lengths between 233 and 278 meters. Supervisors are also testing the broadcasting stations and marking their transmitters for future adjustments on the new waves, thus preparing for the final transfer, when all details are worked out.

Confidence in a solution is freely expressed.

Flammarion Ridicules Idea of Recent Mars Signals

Noted French Astronomer Believes Feat Will Be Achieved, But Thinks it May Be by Telepathy Instead of by Radio

PARIS.

THAT communication with Mars has been established according to the reports that come from Canada of mysterious messages such as "Jopp," is ridiculed by the French astronomer, Camille Flammarion, writing on what we have actually learned of our sister planet. He opens his article in "Les Annales" by simply saying that he will "ignore these pleasantries," and not become entangled in a "domain so seductive, but deceptive."

Flammarion does believe that some form of life exists on Mars, though what it is he cannot venture to say—whether the surface of the planet be a veritable Eden of superior beings, or whether it be merely a vast mushroom garden.

He admits that the civilization of Mars should be at least 200,000 years older than that of the earth, and calls attention to the possibility of the Martians having tried to communicate with us long ago, giving it up finally as a bad job.

But by what method this communication

Exports for 1925 Estimated at \$6,500,000

BASED on the August and September radio exports, which averaged over \$550,000 a month, American radio exports during 1925, may aggregate over \$6,500,000, provided the average holds in the coming twelve months. This estimate for 1925 exceeds forecasts of two months ago by about \$2,000,000.

During September, radio exports from the United States totalled \$567,434, compared with \$541,238 in August and \$297,586 in July. Up to August the average value of monthly wireless exports was around \$275,000, but in August large amounts of apparatus were exported to Australia, Canada and Japan.

might be established, the great French savant is loath to predict. Two possibilities pre-

sent themselves—that of the radio wave, and that of the unknown telepathic wave, so firmly believed in by M. Flammarion. Of communication by means of light rays or vision he is decidedly skeptical.

The Abbe Moreux, astronomer, radio inventor, student, frankly flouts all idea of communicating with Mars. It cannot be by light, or vision, he points out in a new essay on the subject, because it is always broad daylight on Mars when it is night on earth. The Martians would be looking into the sun, and could see nothing.

That the communication be made by means of radio seems hardly feasible, according to the Abbe, simply because, when we have developed so many languages on one globe, it would seem the natural thing that entirely different languages would be spoken on an entirely different planet.

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A Nut Set That Gives Great Satisfaction — to Nobody

By Eddy Current

FELLOW radio fans, here's the circuit you've been waiting for; a circuit which I personally guarantee will not suffer from interference or static. With a good deal of patience and plenty of surplus cash this set will present a really pleasing appearance.

This is a 1-tube, non-oscillating, non-regenerative, feed-bag 8-cylinder, valve-in-head circuit. Follow closely, fellow exterminators, and you will have a set that will be a knock-out—physically.

Referring to the diagram, you will note I use a loop aerial. This is done for two reasons: (1) because of its multi-unidirectional qualities, and (2) because there is no noticeable difference in results whether an outdoor antenna or a loop is used.

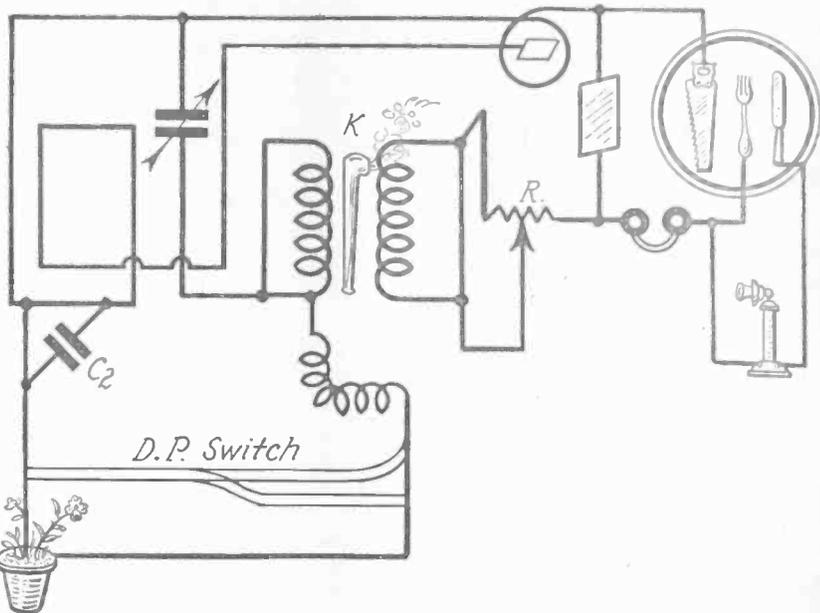
I have a .00001 mfd. high-tension steel panel. I find this is best because of the very small amount of moisture that it will absorb. Many fans have reported very unusual results with this type of panel—very unusual.

The variable condensers are all .0098546 maximum high-loss. This low-loss talk is all foolishness in my estimation, because it only causes more interference. Singular though it may seem, it is very important that condenser C2 be of a 3-foot capacity. This will enable the 12 size, 19-jewel movement to percolate correctly. To make the set more selective you will note K5 in the accompanying diagram. It is an ultra-audio, 14 karat, transformer. This arrangement will prevent the circuit from oscillating. However, if it still has such a tendency, four-wheel hydraulic brakes will stop it.

This set should be wired with No. 18 DPDT German silver wire. The set should be mounted in a fine cabinet as a redeeming feature.

When you are all ready to listen, connect the ground to the post marked G. Put the tube in the socket (rubber tube will work just as well) place the phones on the head, and listen.

If you hear anything, let me know, for you may be sure there is something radically wrong.



PERPLEXODYNE circuit as devised by Eddy Current.

DX Mice Hear Bad News; A Panic Results



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WILL you kindly send me the issue of July 5, or reprint the article on "Reducing Losses Due to Insulation"?—Henry Charles, 25 S. Richmond Ave., Atlantic City, N. J.
The July 5 issue is out of print. So many

receiver which a friend had constructed, a single-tube affair.

"Isn't it a peach?" he asked.
And it was, as far as looks were concerned. With its glistening black bakelite insulation, its shining coils and its spaghetti covered wire, it was a handsome machine.

"I got Omaha last night," he said.
"Pretty good," was the comment.

And shortly with a hacksaw the writer set to work. In the first place, the receiver was stripped of all the wiring, its beautiful glossy black, red, green and yellow spaghetti. (I heard a groan beside me.) Then the variable condensers were removed. They were of a type which were considered good before the low-loss condensers appeared. There are a number of different makes which all appear identical, and the chances are extremely good that your receiver, too, incorporates them. Both bakelite end plates were removed, and then three of the fixed plates, and three of the movable plates. Fig. 2 shows the end of the condenser from which the plates were removed. (Another groan and the complaint: "My condensers hardly cover the high wavelengths now. Why remove the plates?") And then it was explained to him that the 15 plates would cover the broadcasting band of wavelengths as certainly as did the 21 plates previously.

The hacksaw was then brought into play and all but a small part of the bakelite end plates was cut away. Fig. 1 shows how this is done. The dotted lines show the original end plate and the black portion shows the part which is left. Only enough to hold the shaft, and two of the three bolts which support the fixed plates, was left. The zigzag effect isn't for looks. You will find that this is the easiest manner in which the insulation can be cut out. Both end plates are cut in the same manner.

A piece of aluminum solder was next obtained and all of the fixed and movable plates were carefully soldered together. (This is a fairly difficult task. Although not absolutely necessary, it will improve the condenser.)

The condenser was then assembled. Washers, cut from the discarded plates, were slipped on the shafts to fill up the space. Instead of the short machine screws which hold the front insulating plate to the condensers, long ones were employed, and pieces of brass tubing, about a half inch in length, were slipped over these to hold the condenser away from the panel. The copper shielding was removed. ("You won't need that now," was the answer to my friend's protest.) The condensers were assembled right on the panel. "You now have as perfect a pair of low-loss condensers as were ever made," he was told.

His 180° variocoupler was then removed. All of the wire was removed, and with a great deal of care the tube was sawed into the shape of a grid (Fig. 3). Only the front half of the stator is shown, but the whole of that, and the rotor, too, was cut away.

A new spool of wire was taken, and both parts were rewound, the rotor as before but the stator with 50 turns, with no taps. They are not needed to cover the broadcasting wavelengths, and besides taps on a coupler lose about three-quarters of the received energy on many receivers, due to imperfect connections, panel dielectric losses, dead end losses, etc.

The receiver was now completely reassembled.

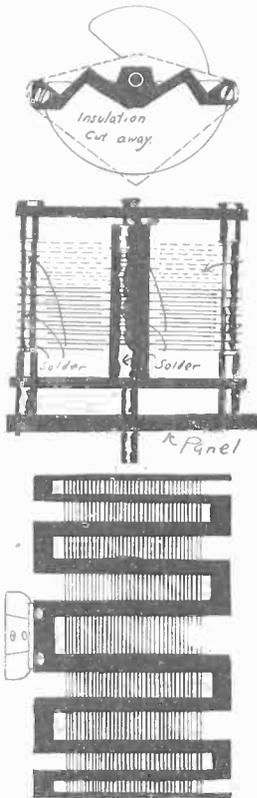


FIG. 1 (top) shows what remains of the semi-circle of insulation after a high-loss variable condenser has been converted into a low-loss type. Fig. 2 shows where plates have been removed, yet the capacity range of the condenser remains just as great (see arrow). Fig. 3 shows the front elevation of a variocoupler after more than three-quarters of the insulation has been cut away.

requests have been received for a reprint of the article that the following is republished:

REDUCING LOSSES DUE TO INSULATION By Byrt C. Caldwell

A short time ago I was asked to examine the

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RADIO WORLD, 1493 Broadway, New York City:

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

Name
Street
City and State.....

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

It was then carefully rewired. Only two or three inches of spaghetti were used in the entire set, and only in places where two wires crossed close together.

The results the receiver produced were far better than before. Stations which had never before been heard came in clear and with good volume, and distant stations which had previously been heard through a "haze" now came in strong and undistorted. And in addition the selectivity of the receiver was increased at least 100 per cent. A wavetrapp which had formerly been found necessary to tune out the locals was discarded, although these locals could now be brought in almost twice as loud.

If you have a receiver which has spaghetti-covered wires, a variocoupler, variometer, tuned radio-frequency transformer, or other like instrument which is made of insulating tubing, and condensers with a large amount of insulation, you can undoubtedly greatly improve your receiver in every way by following the suggestions given in this account. Your Neutrodyne, your Super-dyne, reflex or any other receiver can be improved. Always remember that air is the perfect insulator. The less solid insulation used, the better in every respect.

.....
WOULD a stage of audio-frequency amplification help me in getting stations broadcasting below 300 watts? 2. I can't get stations under 300 meters. Do you think a load coil would help?—L. J. Hunnicutt, Box 277, Monroe, La.

Audio-frequency will only increase your practical distance, i. e., it will only make louder that which is already in your phone circuit. Radio-frequency amplifies before detection, therefore it is better for distance reception but not for increasing volume. Audio-frequency amplifies after detection, therefore is not good for increasing distance but excellent for increasing volume. Neither AF or RF has anything to do with the detector reaching the low waves. 2. A load coil increases wavelength. Your desire is to decrease it. About 10 turns should be taken off the primary coil, or, if the coil is aperiodic, take the ten turns off the secondary. If your aerial is longer than 100 feet, cut down the excess. You may place a 43-plate variable condenser in your aerial circuit. This will facilitate tuning as well as cut down the wavelength, unless the primary is aperiodic.

.....
REFERRING to the '2-Tube Quality Reflex' in the issue of Oct. 25, will this set get DX on phones? 2. Can this set be logged? 3. About what would the cost of the parts be? 4. I will build this set if it can get WEAF and KPO.—Arthur F. Morris, California, Ky.

1. Yes. 2. Yes. 3. \$30. 4. You may get WEAF under ideal conditions, but it requires a set on the type of the Super-Heterodyne to meet your requirements.

.....
IS the potentiometer of any use in the 4-tube DX Reflex appearing in the June 14 issue of RADIO WORLD? 1. Have it set continually on the negative side and do all stabilization by rheostat. 2. Should a 200 or 201A be used for detection? Would you advise the new sodium tube?—Herbert J. Hause, 507 2nd Ave., Tarentum, Pa.

You state that the potentiometer is continually on the negative side. This shows that you can stand a higher negative grid bias. Place a C battery in circuit, regulating C battery voltage by potentiometer. 2. A 200 may be used, but the 201A will work nearly as well and draw one-fourth the current and the entire circuit will be more stable.

.....
CAN my 5-tube Atwater-Kent be operated on a loop aerial?—Ralph Hoffman, 562 Stone Ave., Brooklyn, N. Y.

Yes, for distances up to approximately 50 miles, under good conditions. See the issue of Nov. 8 for full instructions as to how it may be done.

.....
I HAVE a 4-tube set. I get locals very loud but I cannot get any DX because I cannot tune out locals. Can you suggest a circuit in which I may utilize the parts to the greatest advantage? I should like selectivity and volume.—Elmer Daniels, 18 Breman St., Buffalo, N. Y.

Try the Neutrodyne. Full instructions are in the issues of August 16 and 23, RADIO WORLD.

.....
CAN any improvement be made on the Super-dyne? If so, will you tell me where I can get it?—J. Kuser, 2208 Neptune Ave., Coney Island, N. Y.

Watch RADIO WORLD.

.....
I WAS TOLD that B batteries last from 4 to 6 months, but mine only lasted about 10 weeks. What causes them to discharge so quickly? How do you hook up B batteries?—Jake Schrage, Allison, Ia.

There can be no specified guarantee as to the life of a dry battery because there are so many factors that enter into the cause of its discharge. The average life of the B battery, kept in a cool, dry place is four to six months. Dampness soon kills a battery of the dry type. B batteries are

Stage of Regenerative RF Ahead of Detector Tube

hooked up in series by connecting the positive pole to the negative pole. If 200 tube is used, it is necessary to tap the battery at 22½ volts. Take a lead from the point on the battery reading "22½ plus," nearest to the negative lead. Thus three leads are taken from the battery—the common negative, the 22½+ and the 45+.

IF YOU resided in London and wanted to build a receiver that would enable you to receive all European stations operating on wavelength of 275 to 4,500 meters—distance 1,200 miles—what design tuner would you adopt?—G. Turner, 7 Irene Rd., London Sæ6, England.

We suggest a honeycomb tuning unit for the various wavelengths in a regenerative 3-circuit set.

I LIVE very close to KGO and KLW. Is there anything that will make my set more selective?—Jesse C. Petusen, Jr., 549 33rd St., Oakland, Cal. You are in a very bad position considering interference. Use a wave-trap. A 43-plate variable condenser in shunt with a 35-turn honeycomb coil, the whole placed in series with the antenna lead, will help.

CAN I build a 3-tube Neutrodyne in one cabinet, using two 201As and one 200, and place the amplifier in another cabinet, using type 11 tubes? Would the type 11 tubes make the set oscillate?—Rev. Walter G. Barlow, Ewell P. O., Smith's, Md.

Yes, this may be done without any ill effects to the Neutrodyne. The type 11 tubes, unless properly mounted, will give a metallic ringing sound when vibrated.

HOW can I add two stages of audio amplification to a 3-circuit set?—Anthony DeVilo, Bronx Union Y. M. C. A., New York City. See the Radio Primer in this issue.

WHAT number of plates should the condensers be in Byrt C. Caldwell's 4-tube set of Oct. 4 issue of RADIO WORLD? 2. What ratio for the audio transformers? 3. Must I use 90 volts of B battery for the loudspeaker? 4. Is the switch of the push-pull type?

1. 23 plates. 2. First stage 6 to 1, second stage 3½ to 1. 3. 45 to 90 volts. 4. Yes.

CAN the coils of the Superdyne be wound honeycomb style? Would this improve results?—A. J. Brookshaw, 1013 N. 18th St., Camden, N. J. It is not necessary, although you may do so with success.

WHAT are the wavelengths of WGI, WIL, WSB and WGY?—S. T. Bortorff, 16 S. Phenix, Tulsa, Okla.

WGI, 485; WIL, 360; WSB, 429; WGY, 380. I have a selectoform outfit which howls badly when I get any station outside of KDKA. Can you suggest a remedy?—Jerry Dunn, Pittsburgh, Pa.

No doubt you have built your set without care. It is vitally necessary that the parts be arranged correctly so that the magnetic fields will not react upon each other. See that all transformers are at right angles to each other and that the coupling coils are correctly placed.

WHERE can I get a binder for the issues of RADIO WORLD?—Jos. P. Baranowski, 2118 Ash St., Erie, Pa.

This office will send you one on receipt of \$2. However, we believe that you will be able to buy one cheaper in your city from any large stationer.

CAN you tell me how I can add amplification to my set so that it will operate a loudspeaker?—R. W. Stroehde, Hay Springs, Neb. See the Radio Primer in this issue.

I CANNOT get over 1,300 miles on my set. I should like to get greater distances. Is there any addition I can make?—Alfred Fowler, 3406 Clinton St., Alta Vista, Burnale, B. C., Canada.

You are getting very good distant reception now. We would not advise any additions or changes in the set. It require a very good outfit to duplicate your reception. You might better it, however, by considering your aerial and ground system. Aerial 100 feet long, 15-20 feet of lead-in, well insulated, may be considered ideal. Cold water pipe, good firm connection, is excellent for ground.

IN reference to the 1-tube set by Herman Bernard in the issue of Aug. 23 RADIO WORLD, is it practical? 2. What sort of antenna is necessary? 3. I have a certain audio-frequency amplifying transformer. Shall I get another of the same make, or of different manufacture? 4. Can I control 3 tubes with the same rheostat?—W. S. Hinman, V. M. 1, Lexington, Ky.

1. Yes. 2. 100 feet, well insulated. 3. Transformers may be of the same make, but the ratios should

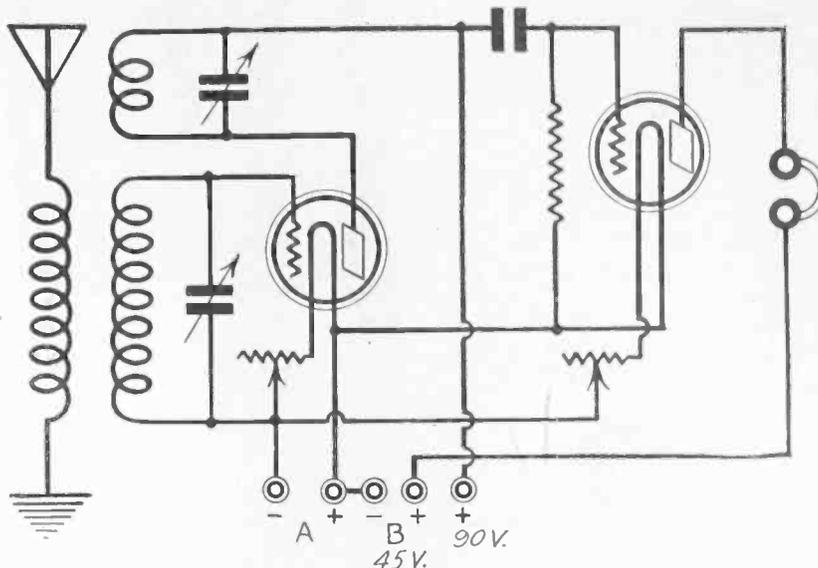


FIG. 4, showing a stage of regenerative RF ahead of a detector tube.

be different for the succeeding stages—6 to 1 for first stage, 3½ to 1 for second stage. 4. No, not in this set, as one rheostat (in detector) controls regeneration and must be vernier.

I DESIRE to try regeneration in the radio-frequency stage, with a non-regenerative detector tube. Please publish hook-up.—James Doyle, Peekskill, N. Y.

See Fig. 4. The aerial is tuned with a 23-plate condenser, across the secondary of an RFT having 42 turns of No. 22 DCC wire, with a 10-turn primary. The plate coil, 35 turns, need not be in inductive relationship to the grid coil. The plate condenser has 23 plates. The detector tuning arrangement is the same as in the RF stage.

I GET a continuous crackling noise in the receivers on my Neutrodyne. Some experts have told me it is a result of an overhead powerline. Is there any possible way to clear up this disturbance?—G. S. Warren.

Some report that placing an ordinary iron-core choke coil in series with the aerial eliminates this sort of interference. Be sure that it is a power line, however. It may be a loose connection in your set, worn out B batteries or a bad tube. Look around.

WHEN I place my fingers lightly upon the binding posts of the aerial and ground signals come in fine and the DX can't be surpassed. But as soon as I remove my fingers I can hardly hear locals. Can you please help me?—John D. Kopp, Mildred, Kan.

Try placing a variable resistance across the binding posts. Also try a .001 fixed condenser across them.

Lickson, 5438 Fulton St., Chicago, Ill. No.

CAN a fixed condenser be used in place of a variable condenser? 2. Must separate A and B batteries be used for the Metaform in the June 21 issue of RADIO WORLD. 3. Will it work ahead of a reflex using untuned primary?—Heanicha, 1308 Washington Blvd., Chicago, Ill.

In places where a condenser is necessary a fixed condenser may be used, but with a loss of control. We would not advise it. 2. No. 3. Yes, but be very careful in building the amplifier for this use. You already have radio-frequency in the reflex and additional radio-frequency may cause trouble due to interaction between the fields of the coils.

WITHOUT touching my set I get first one station, then another and then another, alternately. The stations that come in this way are all around 236 meters. Can you suggest a remedy?—A. H. Klingbeil, 258 Prospect St., Ashtabula, Ohio.

If your aerial swing too violently, the wavelength may change as you mention. See that the aerial is taut. See that the lightning arrester is not shorted.

New Broadcasters

Call	Stations	Meters	Watts
KFRM	—James F. Boland, Fort Sill, Okla.	263	50
KFRN	—M. Laurence Short, Hanford, Cal.	224	5
KFRO	—Curtis Printing Co., Ft. Worth, Tex.	246	50
WFBQ	—Wynne Radio Co., Raleigh, N. C.	252	50
WSAB	—Southeast Mo. State Teachers College, Cape Girardeau, Mo.	275	100
CLASS B			
WGBS	—Gimbel Brothers, Inc., New York, N. Y.	316	1000
TRANSFERRED CLASS C TO CLASS A			
WCAO	—Sanders & Stayman Co., Baltimore, Md.	275	50
WNAW	—Henry Kunsman, Fort Monroe, Va.	240	5
WRM	—University of Illinois, Urbana, Ill.	273	500
TWELVE QUIT AIR			
Twelve Class A Broadcasting Stations were deleted as follows:			
KFHD	—Utz Electric Co., St. Joseph, Mo.		
KFOQ	—Ora William Chancellor, Galveston, Texas.		
KFQS	—Dickinson-Henry Radio Laboratories		
KUY	—Coast Radio Co., El Monte, Calif.		
WABE	—Y. M. C. A., Washington, D. C.		
WDBU	—Somerset Radio Co., Skowhegan, Maine.		
WEAR	—The Evening News Pub. Co., Balto., Md.		
WFAB	—Woese, Carl C., Syracuse, N. Y.		
WHAK	—Roberts Hardware Co., Clarksburg, W. Va.		
WLAH	—Woodworth, Samuel, Syracuse, N. Y.		
WPAM	—Auerbach & Guettel, Topeka, Kansas.		
WTAJ	—Radio Shop, The, Portland, Maine.		

RADIO WORLD'S

Broadcast University

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

CAN I use a 30-ohm rheostat on a 201A tube? Will this give me fine control?—Thos. Crowe, 114 Market St., Chicago. Yes. Finer but not better; 20-ohm rheostat preferable.

WOULD it be practical to add a stage or two of radio-frequency amplification to the set described by Herbert E. Hayden in the issue of Oct. 4 (The Dandy 1-Tube DX SET)?—Ross

BROADCAST PROGRAMS

The time given in programs is Eastern, Central, Mountain or Pacific, depending on the station's location.

Thursday, November 13

KFDY, Brookings, S. D. 273 (C. S. T.)—8 P. M., violin solos by Anne Coughlan. 8:15, "Election After-thoughts," A. S. Harding. 8:25, "Producing Winter Eggs," G. L. Stevenson. 8:30, violin solos. 8:45, "Water—What We Find In It," B. A. Dunbar. 8:55, violin solos.

WQJ, Chicago, 448 (C. S. T.)—11 A. M., Erna Bertrams, "How to Select Lamb and Veal." Mrs. Eleanor Chalmers, New York style talk. 3 P. M., "Hot Breads." Charles T. Wolf. "Lines and Materials," 7, Williams and His Rainbo Garden Orchs.; Kathryn Snyder, reader; Manuel Rodriguez, tenor; Mrs. Lydia Lochner, contralto; Marion Henry, accompanist. 10, Williams and His Rainbo Skylarks; Axel Christensen, pianologue; Grace Wilson, contralto; Hill, Hirsch and Gorny, harmony singers; Edna Solomon, contralto; Rosemary Hughes, soprano; Will Rosister, "The Daddy of Them All"; Gail Bandell, contralto.

WHAS, Louisville, 400—4 P. M., Alamo Theater Orch., Harry S. Currie, conductor; police bulletins; weather; "Just Among Home Folks"; readings, news. 4:55, local livestock, produce and grain market. 5, time. 7:30, concert by Mrs. J. E. Harmon, Jr.; International Sunday School lesson; weather talk; news; time.

WMC, Memphis, Tenn., 500—12:30 P. M., Skyline Serenaders. 8:30, The Hotel Chisca Orch., Frank Pappalardo, director.

WDAF, Kansas City, Mo., 411—3:30 P. M., radio trio. 5:50, marketgram; weather; time; road report. 6, (School of the Air): address, Edgar Allan Linton, talk on world travels; reading, Miss Cecile Burton, popular poems and essays; The Story Lady; music, The Hanlein-Knutson Ensemble. 11:45, Nighthawk Frolic.

WCBD, Zion, Ill., 345, (C. S. T.)—male quartet, Barton, Bull, Paxton and Thomas; baritone solo, G. R. Sparrow; contralto solo, Florence Farrar; soprano solo, Mrs. H. E. Mayfield; trombone solo, Daniel Mason.

WJAX, Cleveland, 390 (E. S. T.)—7:30 P. M., Hayworth and Ponce de Leon Orch. 8, Fred Matthews, bass; Olga H. Squires, contralto; Maxine Render, mezzosoprano; the Magic City Trio; piano, Annabelle Jackson.

WCCO, St. Paul, 417 (C. S. T.)—9:30 A. M., news. 10:45, home service. 2 P. M., woman's hour. 4, magazine hour. 5:30, children's hour. 6:30, Sam Heiman's Golden Orchs. 7:30, lecture hour. 8, classical program. 9, weather report. 10, Third Regiment Band.

WEAO, Columbus, O., 360—8 P. M., chimes concert of hymns; Ann Charles, violin; Ethel Ames Harris, cello; Guendolyn Almy, piano; Gladys Shawaher, soprano; Marguerite Brenholds, accompanist; C. A. Northrup, saxophone; Mabel Colwin, accompanist.

WEEL, Boston, 303 (E. S. T.), 1 P. M., Boston Chamber of Commerce. 6:30, Renard and Mansion Inn orch. 7, Big Brother Club. 7:30, talk, David S. Hickey. 7:40, Mr. Horner, cornetist, and Miss Geiamar, pianist. 8:30, Kay, Kriss and Ollie trio. 9, New York Studio.

WOR, Newark, N. J., 405 (E. S. T.)—7 A. M., morning gym class. 2:30 P. M., Marjorie Eaton, pianist. 2:45, Mrs. Elizabeth Longfield, soprano; Mrs. Stephens-Allen, accompanist. 3, H. Nevill-Smith, baritone; Harold Geuther at the piano, Italian songs. 3:15, Marjorie Eaton, pianist. 3:30, Elizabeth Longfield, soprano. 3:45, baritone. 6:15, Albert E. Sonn, "Radio for the Layman." 6:30, Jimmie Lent and his famous society orch. 7:15, resume of the day's sports by "Jolly Bill" Steinke.

Friday, November 14

KSD, St. Louis, Mo., 546 (C. S. T.)—8 P. M., Gustave Lehleitner, baritone; Hugo Hagen, pianist.

WQJ, Chicago, 448 (C. S. T.)—11 A. M., Fred Mann and His Sunday Dinner. 3 P. M., Sarah Place, of the Infant Welfare Society, talk. Mrs. Harry T. Sanger, travelogue. 7, Williams and His Rainbo Garden Orch. Ingram Cleveland, violinist; Edith Sackett, accompanist; James J. Whalen, tenor. 10, Williams and His Rainbo Skylarks; Paul Lougher, tenor; Langdon Bros., steel guitar duets; Nubs Allen, contralto; Lew Butler, singing; Zeigler Sisters, harmony singers.

WJY, New York City, 405 (E. S. T.)—7:30 P. M., Wynne's Greenwich Village Inn Orch. 8:15, "General Education," Judge Thomas W. Churchill. 8:45, "Twelve Tests of a Good Father," by Rev. James Lee Ellenwood. 9:15, Radio Franks. 9:30, Looseleaf Current Topics, William H. Allen. 10, "Taxes," by Frank Shevit. 10:10, Hotel St. George Trio.

WJZ, New York City, 455 (E. S. T.)—10 A. M., Menu, Mrs. Julian Heath. 10:20, book review. 10:40, Arts and Decorations. 10:50, Eleanor Gunn's fashion talk. 1 P. M., Hotel Ambassador Trio. 4, Hotel Astor organ. 5, "Designing Costumes for Theatre," by Charles Le Maire. 5:15, Florence Steele, contralto. 5:30, State and Federal agricultural reports; foreign exchange quotations; news. 7, Savarin Ensemble. 8, Wall Street Journal review. 8:10, NYU Air College;



MARION STEHLIK, creator of fashions (at right), "telling the world" through WFBH, Hotel Majestic, New York City, what's new in women's wear. Beatrice Roberts, the "Miss Manhattan" at the Atlantic City Beauty Pageant, wears a gown designed by Miss Stehlik. Miss Roberts won first prize in "The Most Beautiful Gown" contest in connection with the pageant. (Wide World.)

"Geology," Prof. J. Edmund Woodman. 8:30, Yale-Princeton Glee Club concert direct from Princeton University.

KHJ, Los Angeles, 395—12:30 P. M., news, music. 2:30, musicale. 6, Hickman's Concert Orch. 6:30, children's program. 8, program through Santa Ana Lion's Club. 10, Art Hickman's Dance Orch.

WEAF, New York City, 492 (E. S. T.)—11 A. M., musical program, "Putting the Garden to Sleep" by Leonard Barron; market and weather. 4 P. M., Vera De Rose, soprano; Peter De Rose, pianist; children's stories by Elizabeth McCarrick. 6, music; children's stories, "The Happiness Candy Boys." Astor Coffee Orch. Aline Hurrah, lyric soprano.

WGY, Schenectady, N. Y., 380 (E. S. T.)—11:55 A. M., time. 12:30 P. M., stock market. 12:40, produce market. 12:45, weather. 2, music and talk, "Home Lighting Effects," Walter A. Bowe. 6, produce and stock market; news. 6:30, stories for children. 7, International Sunday School lesson. 7:45, health talk; WGY Orch. 7:55, travelogue by Dr. Sigel Roush.

WRC, Washington, D. C., 469 (E. S. T.)—3 P. M., Fashion developments. 3:10, song recital. 3:20, "Beauty and Personality," by Elsie Pierce. 3:25, Current Topics. 3:35, piano recital. 3:50, the Magazine of Wall Street. 4, song recital. 6, stories for children by Peggy Albion.

WMAQ, Chicago, 447.5 (C. S. T.)—12:25 P. M., Y. M. C. A. Forum. 4, English diction by Mrs. Alexandra Jenkins. 4:30, pupils of Bush conservatory. 6, organ. 6:30, Hotel LaSalle Orch. 8, weekly Wide-Awake Club. 8:30, musical geography. 9, Christian Endeavor topics. 9:15, Hyde Park Girls Glee Club.

WOO, Philadelphia, 509 (E. S. T.)—11 A. M., organ. 11:30, weather. 11:55, time. 12 M., Tea Room Orch. 5:10 P. M., sports results and police reports. 5:15, organ and trumpets. 7:30, sports results; police reports; A. Candelori and Hotel Adelphia Orch. 8:30, Fox Theatre Studio. 9:10, Helen D'Iorio, soprano; Harry Snelson, tenor; Harriette G. Ridley, accompanist. 9:55, time. 10:02, weather. 10:03, organ, Mary E. Vogt. 10:30, Vincent Rizzo and Hotel Sylvania Orch.

WBZ, Springfield, Mass., 337 (E. S. T.)—11:55 A. M., weather; market report. 6 P. M., Westinghouse Philharmonic Trio. 7, market report. 7:05, bedtime story. 7:15, current book review prepared by the Court Square Book Store. 7:30, "Musical Appreciation." 9:55, time; weather; 10, Rosamond Young, soprano; Lucille Orell, cellist, accompanied by William E. Weston. 11, Westinghouse Philharmonic Trio; Margaret E. Smith, lyric soprano; Helen Boch, accompanist. 11:30, McEnelly's Singing Orch.

WLW, Cincinnati, 423 (C. S. T.)—10:45 A. M., weather; business reports. 1:30 P. M., market. 3, stock quotations. 4, French lesson; recital by pupils of Leo Stoffregen.

WIP, Philadelphia, 560 (E. S. T.)—1 P. M., Tea Room Orch., Ray Steen, director. 1:30, weather. 3, "Canned Foods Week," Mrs. Anna B. Scott. 3:15, "The Philadelphiaans," under direction of Jos. McGrath. Miss Augusta Withersop, soprano; Miss Dorothy Power, harpist; Mr. J. V. Loughran, presenting topical songs. 6, weather. 6:15, Harvey Marburger and Vaudeville Orch. 6:45, livestock and produce market reports. 7, Uncle Wip's bedtime stories.

WDAR, Philadelphia, 395 (E. S. T.)—11:45 A. M., almanac. 12:02 P. M., organ; Arcadia Concert Orch. 2:3, Arcadia Concert Orch.; playlet by National School of Elocution. 4:30, dance program. 5:45, sporting results. 7:30, Dream Daddy. 8, "Turning the Pages"—a book review; WDAR Walter Greenough Players. 8:30, football talk. 9, play by the WDAR Studio Players. 10, meet-

ing of the Morning Glory Club; Arcadia dance orch. 1, features from the studio.

WCCO, St. Paul, 417 (C. S. T.)—9:30 A. M., news. 10:45, Betty Crocker, "Counting the Calories." 2 P. M., woman's hour. 2:30, musical program. 4, magazine hour, "New Blood." Banning. 5:30, children's hour, Tess Cooperman. 6, sport hour. 6:30, dinner concert, Sam Heiman's Golden Pheasant Orch. 7:30, lecture hour. 8:30, musical program. 9, weather.

WOR, Newark, N. J., 405 (E. S. T.)—7 A. M., WOR morning gym class. 2:30 P. M., Henry Johnson, tenor. 2:45, Pearl Hussey, lyric soprano. 3, Henry Johnson, tenor. 3:15, soprano. 3:30, Stanley's orch. 6:15, resume of the day's sports by "Jolly Bill" Steinke. 6:30, "Man in the Moon" stories by Josephine Lawrence. 7, father and son week program by A. T. Morrill.

WEEL, Boston, 303 (E. S. T.)—6:30 P. M., Dok Eisenbourg and his Sinfonians. 7, Big Brother Club. 7:30, musicale. 7:45, Thomas Connoly, baritone; Miss Margaret O'Donnell, accompanist. 8, musicale. 8:30, Jean Livingston Sherburne, soprano. 9, program, studio.

Saturday, November 15

WBZ, Springfield, Mass., 337 (E. S. T.)—11:55 A. M., weather. 2:15 P. M., Howard-Brown football game, announced by Paul Waitt. 6, Leo Reisman's ensemble. 6:30, Copley Plaza Orch. 7, market report. 7:05, bedtime story. 7:30, Hotel Kimball Trio. 8, National Concert Party, composed of Elize Biron, violinist; Florence Andrew, reader; Beth Charlton, soprano and pianist. 9, concert by F. Elva Whitmore, presenting violin and mandolin soloists. 9:55, time. 11:30, Leo Deisman Orch.

PWX, Havana, Cuba, 400 (E. S. T.)—Professor Juan Gonzales and his students.

KSD, St. Louis, Mo., 546 (C. S. T.)—8 P. M., St. Louis Symphony Orch., Rudolph Ganz, conductor. 11:30, Varsity Club Orch.

WQJ, Chicago, 448 (C.S.T.)—11 A. M., Speaker from the First District Illinois Federation of Women's Clubs; Madame Peggy Richter, "Correct English." 3 P. M., "Koffee" Klatsch; special musical features. 7, Williams and His Rainbo Garden Orch.; Albert M. Tilton, Jr., tenor; Marie Watson Tilton, accompanist; Muriel Keapealy, soprano; Robert Menslaer, pianist. 10, Williams and His Rainbo Skylarks; Jerry Sullivan, writer of "Dad," "Whistle"; Sandy Meek, Scotch tenor; The Melodians—Laurie, Eddie, and Bennie; Russian Boyars Quintet; other radio artists.

WJZ, New York City, 455 (E.S.T.)—2 P. M., play by play description of the Yale-Princeton football game by J. Ennis Brown, noted football authority, and J. Andrew White, famous sport announcer, direct from Princeton. 7, Waldorf-Astoria Dance Orch. 8, talk by J. C. Harper. 8:15, entire performance of "Marjorie," featuring Elizabeth Hines, musical comedy success, direct from 44th St. Theatre.

KHJ, Los Angeles, 395 (P. S. T.)—12:30 P. M., news and music. 2:30, program presenting Charlie Wellman and Helene Smith. 6, Art Hickman's Concert Orch. 6:30, children's program presenting Prof. Walter Sylvester Hertzog telling stories of American history; Helene Pirie, screen juveniles; bedtime story by Uncle John. 8, program by Los Angeles Investment Co. 10, Art Hickman's Dance Orch.

WEAF, New York City, 492 (E.S.T.)—1:45 P. M., play by play description of the Princeton-Yale football game direct from Princeton. N. J., Graham McNamee announcing. 4, Bruno Brothers' Dance Orch. 6, music from Hotel Waldorf-Astoria; boys' stories; May Singhi Breen, banjoist, and Peter De Rose, pianist; Josiah B. Free, baritone; talk on "Fifth Avenue's 100th Birthday," by J. R. Pollock; Vincent Lopez and His Orch. from Hotel Pennsylvania.

WGY, Schenectady, N. Y., 380 (E.S.T.)—11:55 A. M., time. 12:30 P. M., stock market. 12:40, produce market. 1:45, running story football game, Yale vs. Princeton, at Princeton, described by J. Andrew White. 9:30, Phil Romano's Orch.; popular songs; football results.

CKAC, Montreal, 425 (E. S. T.)—7 P. M., kiddies' stories in French and English. 7:30, Mount Royal Hotel Orch. 8:30, special studio entertainment. 10:30, Mount Royal Hotel Orch.

WRC, Washington, D. C., 469 (E.S.T.)—6 P. M., children's hour by Peggy Albion. 7:45, Bible talk. 8, musical program. 9, "Eiland Song Cycle," by Von Fleitz. 9:55, time; weather. 10:30, dance program.

WMAQ, Chicago, 447.5 (C.S.T.)—2 P. M., broadcasting football game from Stagg field. 6, Dudley Church Athletic Association. 8, Hotel LaSalle Orch. 8:40, radio photologue, by Julian Arnold. 9, Chicago theatre revue.

WOO, Philadelphia, 509 (E.S.T.)—11 A. M., organ. 11:30, forecast. 11:55, time. 12 M., Orch. 5:10 P. M., sports results, police reports. 5:15, organ, trumpets; R. C. O. Band. 9:55, time. 10:02, weather.

WLW, Cincinnati, 423 (C.S.T.)—10:45 A. M., forecast; business reports. 1:30 P. M., market reports. 11:30, Crosley Arabian Nights; Castle Farm Lange McKay Orch.

WIP, Philadelphia, 509 (E.S.T.)—1 P. M., organ. 1:30, weather. 1:45, "Canned Foods Week," by Mrs. Anna B. Scott. 3, play by play description of the football game between the University of Pennsylvania and Penn State College, broadcast direct from Franklin Field. 6, weather. 6:05, Hotel St. James Orch. 6:45, livestock and produce market reports. 7, Uncle Wip's bedtime stories. 8, "Philadelphia Bridges," by Dr. Geo. Rosenparthen. 8:15, first concert, by the newly organized WIP Male Quartette. Thomas Morris, first tenor; John S. Clothier, second tenor; Aubrey S. Cummings, baritone; Harry Efrey, base. 9, "Com-

munity Value of Good Music," by William C. Hammer. 9:15, Thomas Staubech Trio. 10:05, Art Coogan and his Club Madrid Orch. 11:05, organ, by Karl Bonowitz.

KDKA, E. Pittsburgh, Pa., 326 (E.S.T.)—9:45 A. M., stockman reports; market review and agricultural items. 11:55, time. 12, weather; stockman reports. 1:30 P. M., Daugherty's Orch. 2:30, Pitt-W. J. football game. 6:30, dinner concert by Westinghouse Band. 7:15, "Wimble, the Wanderer," for the radio children. 7:30, sport review, by James J. Long. 7:45, feature. 8, "Father and Son-partners," J. J. Davey. 8:15, feature. 8:30, concert by the Westinghouse Band; Alice Smith, soprano; F. Robert Coe, baritone; R. V. Zahner, violinist; Frederick Lotz, accompanist. 9:55, time; weather.

WCCO, St. Paul, 417 (C.S.T.)—9:30 A. M., news. 10:45, home service, Betty Crocker. 2 P. M., University of Minn. and Illinois football game. 8, sectional American humor, John Seaman Gurns. 8:30, Great Northern Glee Clubs; Edward F. Flynn. 9, weather. 10:30, Joe Peyer's St. Paul Athletic Club Orch.

WDAR, Philadelphia, Pa., 399 (E.S.T.)—11:45 A. M., Almanac. 12, organ; features from the studio; Arcadia Concert Orch, Feri Sarkozi, director. 2 P. M., Arcadia Concert Orch; artist recital. 4:30, Cotton Pickers, direction of Wilbur De Paris. 5:45, sporting results. 7:30, Dream Daddy.

WEEL, Boston, 303 (E. S. T.)—2:30 P. M., Princeton vs. Yale game at Princeton.

WOR, Newark, N. J., 405 (E. S. T.)—7 A. M., gym class. 2:30 P. M., William Dawson, tenor. 2:45, Hulsman instrumental trio. 3, tenor. 3:15, Hulsman instrumental trio. 3:30, the Canadian orch. 6:15, Lafferty's Canary Cottage Inn orch. 7:15, resume of the day's sports by "Jolly Bill" Steinke. 8, New York Hebrew Orphan Asylum band. 8:45, William J. Flynn. 9, Russell E. Lanning Studios. 9:20, "International Sports" by Captain Percy Creed. 9:35, cello recital by Mathilda Zimble; Sybil Rochmes at the piano. 9:50, Louise Keller, soprano. 10:05, Lenning Studios. 10:25, cello recital. 10:35, Louise Keller, soprano. 10:45, "Tinkles of 1924," presented by Craftsman's Club.

Sunday, November 16

WLW, Cincinnati, O., 423 (C. S. T.)—9:30 A. M., Sunday school. 11, services of the Church of the Covenant, Dr. Frank Stevenson, minister. 7:45 P. M., services of the First Presbyterian Church, Dr. Frederick McMillan, minister. 8:45, Western and Southern orch., William Kopp, director.

CKAC, Montreal, 425 (E. S. T.)—10:30 P. M., "S. S. Paris" orch.; solo by Mrs. Maubourg-Roberval; talks by Baron de Vitrolles and Senator C. P. Beaubien, dedicated to amateurs of France.

WOO, Philadelphia, 509 (E. S. T.)—2:30 P. M., Bethany Sunday school. 6, sacred recital on organ; Clarence K. Bawden at the console. 7:30, evening services from Bethany Presbyterian Church; organ recital, Caroline Quigg at console; sermon, Rev. Dr. A. MacLennan.

WHAS, Louisville, 400 (C. S. T.)—9:57 A. M., organ. 10, church service, First Christian Church, Rev. Dr. E. L. Powell; Florence Montz, organist; Chester E. Solomon, choir director; Vesper service of First Unitarian Church, Rev. Dr. Lon R. Call, pastor; soprano soloist, Mrs. Velda Grant Kelleher; accompanist, Reginald Billin.

WIP, Philadelphia, 509 (E. S. T.)—10:45 A. M., Holy Trinity Church, Rev. Floyd W. Tomkins, rector. 4 P. M., services from Y. M. C. A.

WCCO, St. Paul, 417 (C. S. T.)—10:20 A. M., Plymouth Congregational Church, Rev. H. P. Dewey. 4:10 P. M., House of Hope Presbyterian Church, Rev. H. C. Swearingen. 7:45, Hennepin Avenue Methodist Church, Rev. Lucius H. Bugbee, pastor. 9, weather; classical program.

KGW, Portland, Ore., 492 (P. S. T.)—6 P. M., services by Portland Council of Churches. 7, Colburn concert orch.

WCAE, Pittsburgh, Pa., 462 (E. S. T.)—3 P. M., People's Radio Church services. 4, piano recital by Prof. Otto Kaltels. 6:30, concert from William Penn hotel.

WEEL, Boston, 303 (E. S. T.)—3:45 P. M., Sunday men's conference, Y. M. C. A., Brooklyn, N. Y. 7:20, Mark Strand Theatre, music.

WBZ, Springfield, Mass., 337 (E. S. T.)—10:55 A. M., church services from the South Congregational Church, Rev. James Gordon Gilkey, pastor. 8:30 P. M., program by members of the West Newton Music School, presenting Mary Sheean, Anna Blackmore, Lucille Dewing, sopranos; Muriel Anderson, Teresa Caruso, 2nd sopranos; Katherine Donahue, contralto; program arranged by Alice White Hay. 9:30, organ, E. Rupert Sircom, organist; Frances Burr Mitchell, soprano; Aimee Spurr, mezzo-soprano.

Monday, November 17

WCBD, Zion, Ill., 345 (C. S. T.)—8 P. M., Esther Wiedman and Pearl Ludlow, and Mrs. Evelyn Depew, vocal trio; Mrs. Esther Cook Rendall, soprano soloist; Mr. Chester S. Bagg, baritone soloist; Edwin Wedekind and Kenneth Taplin, cornet; Alexander Depew and Erwin Rendell, flute; Alexander Depew, flute; George Beam, marimba; Mrs. Hester Robinson, reader; Olive Wright, piano soloist.

KGW, Portland, Ore., 492 (P. S. T.)—11:30 A. M., weather. 5 P. M., children's program. 7:15, markets, weather, news and police reports. 8, The Oregonian concert orch.

WLW, Cincinnati, O., 423 (C. S. T.)—10:45 A. M., weather and business reports. 1:30 P. M., business reports. 3, market reports. 4, lesson in "ILO," Babson reports. 8, Roerr's music makers; Crosley theatrical review. 8:30, Mrs. H. Neale Walters, soprano; Mrs. A. T. Strother, accom-

panist; Marjorie Steen, violin obligatos. 8:50, featuring the Cooper orch. and male quartet.

WDAF, Kansas City, Mo., 411 (C. S. T.)—3:30 P. M., Star's radio trio. 5, Boy Scout program. 5:50, marketgram, weather, time and road report. 6, address, message from Roger W. Babson, statistical expert and "doctor of business"; The Story Lady; The Hanlein-Knutson ensemble. 8, popular program. 11:45, Nighthawk Frolic.

WHAS, Louisville, 400 (C. S. T.)—4 P. M., Alamo Theatre orch., Harry S. Currie, conductor; police bulletins; weather; "Just Among Home Folks"; readings; late important news bulletins. 4:55, local, livestock, produce and grain market. 5, time.

WWJ, Detroit, 517 (C. S. T.)—8 A. M., calisthenics. 9:30, "Tonight's Dinner." 9:45, Public Health Service bulletins, talks of general interest. 10:25, weather. 11:55, time. 3 P. M., Detroit News orch. 3:50, weather. 3:55, market. 8:30, Miss Lucile Lincoln, soprano; Scottie Provan, Scotch entertainer; Raymond Seeger string quartet; F. Eugene Wilson, baritone.

WFAA, Dallas, Tex., 476 (C. S. T.)—12:30 P. M., address, Dr. J. D. Boon, astronomer. 8:30-9:30, Belcanto male quartet.

WCAE, Pittsburgh, 462 (E. S. T.)—12:30 P. M., news; weather. 3:30, news; library news. 4:30, stock market; The Sunshine Girl. 6:30, dinner concert. 7:30, Uncle Kaybee. 7:45, special feature. 8, music chat by Mrs. Ethel Davis. 8:15, radio dancing lesson by Arthur Murray. 8:30, musical program by the Sequilla Club. 11, flight of the mythical dirigible; the Press-Kaybee and concert by Johnson's Pennsylvanians.

WHAZ, Troy, N. Y., 380 (E. S. T.)—9 P. M., Richard Reece, tenor; William H. Russell, violinist, and string trio; talk on bond investments by Charles A. MacArthur. 10:30, Young's dance orch.

WBZ, Springfield, Mass., 337 (E. S. T.)—11:55 A. M., time, weather, market report. 6 P. M., Westinghouse Philharmonic trio. 7, market report. 7:05, bedtime story. 7:15, "Bringing the World to America." 7:30, third lesson of a course in modern American literature. 8, L. H. Wagner program. 8:30, selections composed by John H. Densmore, arranged by Bessie Poole, presenting vocal solos. 9:30, concert by the Westinghouse Philharmonic trio.

Tuesday, November 18

KGW, Portland, Ore., 492 (P. S. T.)—11:30 A. M., weather. 12:30 P. M., concert. 5, children's program. 7:15, markets, weather, news and police reports. 8, agricultural lecture. 8:30, High School Glee Club.

WCAE, Pittsburgh, 462 (E. S. T.)—12:30 P. M., news; weather reports. 3:30, news. 4:30, stock market; The Sunshine Girl. 6:30, concert from William Penn Hotel. 7:30, Uncle Kaybee. 7:45, special feature. 8, Mrs. John Conrad, soprano; Mrs. Julia Saam, soprano, and co-operating artists. 9, Eveready entertainers.

WLW, Cincinnati, O., 423 (C. S. T.)—10:45 A. M., weather and business reports. 1:30 P. M., business reports. 3, market reports. 4, lesson in "ILO," by Fred Smith; recital by pupils of William Kyle. 10, Ohio Rubber male quartet and instrumental trio of violin, flute and celeste; Howard Evans, accompanist.

WDAF, Kansas City, Mo., 411 (C. S. T.)—3:30 P. M., The Star's radio trio. 5, weekly child talent program. 5:50, marketgram, weather, time and road report. 6, The Story Lady; radio piano lessons, Maudeffen Littlefield; Hanlein-Knutson ensemble. 11:45, Nighthawk Frolic.

WHAS, Louisville, 400 (C. S. T.)—4 P. M., Alamo Theatre orch., Harry S. Currie, conductor; police bulletins; weather; "Just Among Home Folks"; news. 4:55, livestock, produce and grain markets. 5, time. 7:30, Carl Zoeller's melodists; news; time.

WWJ, Detroit, 517 (C. S. T.)—8 A. M., Calisthenics. 9:30, "Tonight's Dinner." 9:45, Fred Shaw, pianist and songster. 10:25, weather. 11:55, time. 3 P. M., News orch. 3:50, weather. 3:55, market reports. 8:30, New orch.; Charles F. Seeger, baritone; Kalman Feké, tenor.

WFAA, Dallas, Tex., 476 (C. S. T.)—12:30 P. M., artists from a Dallas theatre. 8:30, vocalist, G. Hayden Jones, and assisting artists. 11, organ and features.

Wednesday, November 19

PWX, Havana, Cuba, 400 (E.S.T.)—Concert by the Band of the Cuban Navy.

WCAE, Pittsburgh, Pa., 462 (E.S.T.)—12:30 P. M., news; weather. 3, piano recital by Fred Rosenfield. 3:30, news. 4:30, stock market; Uncle Kaybee. 6:30, dinner concert from Wm. Penn Hotel. 7:30, the Sunshine Girl. 7:45, special feature. 8, special feature. 8:15, special feature. 8:30, program by artist-pupils of Prof Joseph Moore.

WLW, Cincinnati, Ohio, 423 (C.S.T.)—10:45 A. M., weather and business reports. 1:30 P. M., business reports. 3, market reports. 4, lesson in "ILO," by Fred Smith; program for the "Shut Ins"; musical service. 8, the Chubb, Steinberg Orch. 8:55, concert, Formica Band and Orch., under the direction of Walter Esberger; from Madame Berta Gardini Reiner Conservatory of Music; solos and duets by Mildred Bartlett and Dorothy Dugger.

KGW, Portland, Ore., 492 (P.S.T.)—11:30 A. M., children's program. 1:30 P. M., markets, weather, news, and police reports. 7:15, markets, weather, news. 10, George Olsen's Metropolitan Orch.

CKAC, Montreal, 425 (E. S. T.)—12:30 P. M., teurs; H. Maurice Jacquet, Farasian pianist-organist-composer; Madame Andrée Jacquet, harp-

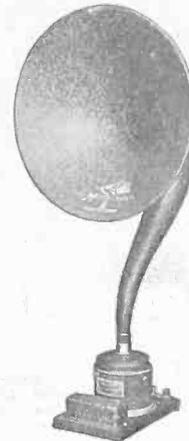
(Concluded on page 25)



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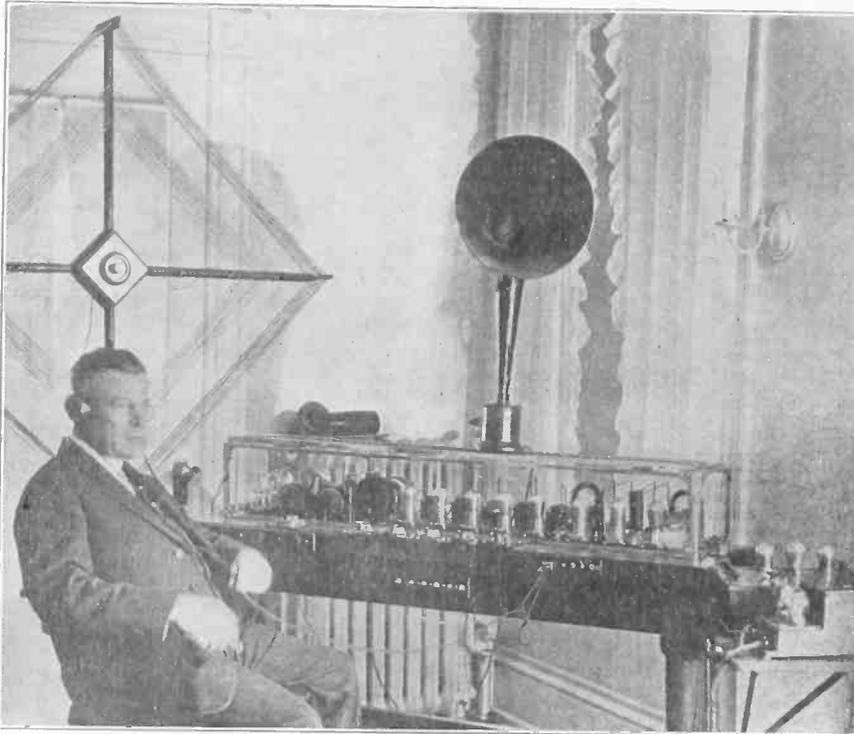
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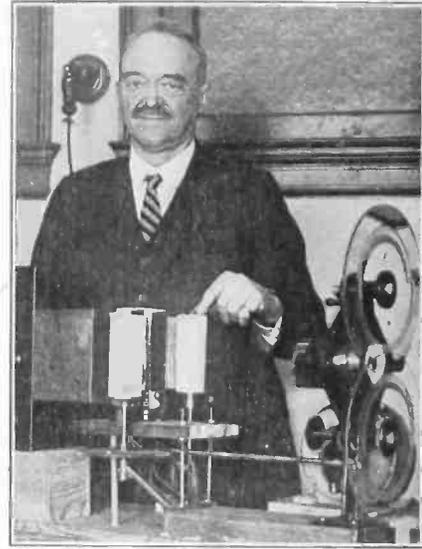


WORLD'S LARGEST fan set, is the claim of H. H. Elmer (above), of Syracuse, N. Y., proud possessor of an 18-tube Super-Heterodyne. He was captivated by the theory that short-wave radio-frequency amplification ahead of a super-abundance of intermediate-frequency amplification would produce wonderful DX. He has heard Mexico City, the Catalina Islands, Bordeaux and Rio de Janeiro, to mention only a few. The list of stations he has heard fills the family album and part of the neighbor's coal bin. Mr. Elmer designed the set himself. It works even when there's company to dinner. (Wide World.)



BETTY PIERCE, actress, who has made a great hit in the role of a half-breed in "White Cargo," in New York City, enjoys relaxation in her dressing-room by listening in on the radio. She has a handsome Operadio set, which suffers nothing in comparison with the beautiful bouquet of flowers that graces the scene. (Foto Topics.)

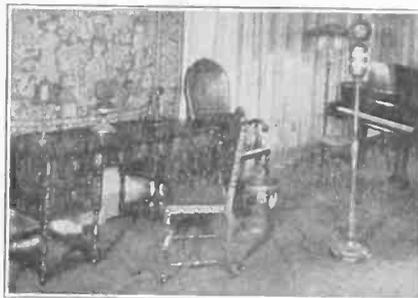
Radio Ticker



SENDING NEWS, business forms and regular letters by radio is the accomplishment claimed for the invention of C. Francis Jenkins, of Washington, D. C. (above with his invention). The news copy is sent direct from a typewritten roll of thin copy paper in a continuous transmission by a selenium cell actuated by the black and white on the paper and transmitted through prismatic rings. The operation is automatic. (Henry Miller.)



A SUPER-HETERODYNE has no constructional terrors for girl students in the laboratory of Hunter College, New York City. The college course includes radio, both theoretical and practical branches. The girls are started off with a 1-tube hookup, but, as in the evolution of all radioists, they develop DX appetites which only the multi-tube sets can appease. Prof. Turner, instructor, is showing 'em how. (Foto Topics.)

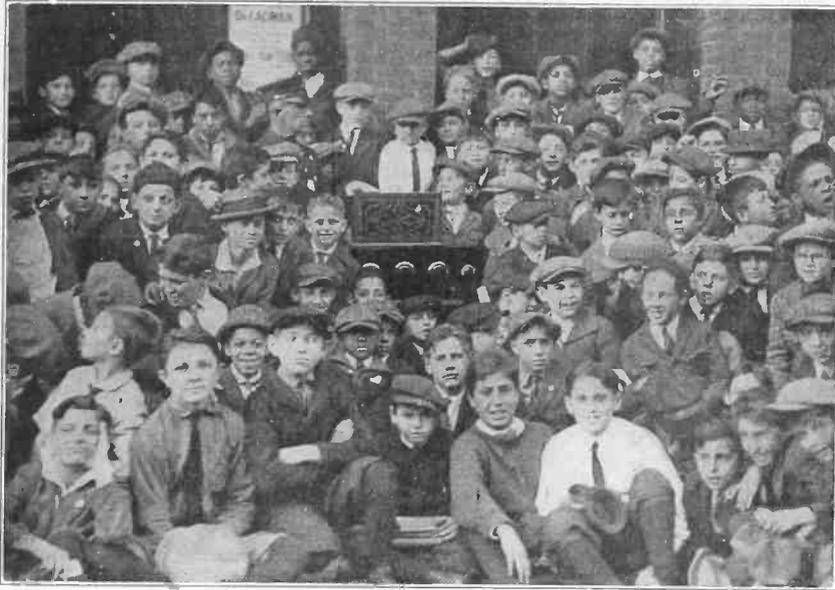


THE STUDIO and office of Fred Smith, studio director at WLW, the Crosley station in Cincinnati. An antique tapestry from France adorns the wall. The furniture, also antique, was imported from France and Spain.



THE FIRST artist to broadcast from WGBS, the station of Gimbel Bros., New York City, was Dorothy Miller, shown above, while being permitted the enjoyment of this honor. (Kadel & Herbert.)

Set Saves the Day



POLICE COMMISSIONER ENRIGHT, of New York City, proved to be "a popular guy" with the juvenile citizenry of Brooklyn, when he made an address at the Bedford Branch Y. M. C. A. in the Y. M. C. A. \$5,000,000 campaign. This crowd of lads couldn't squeeze into the hall, hence the drive had to limp along without their help. Nevertheless, as the speech was broadcast, the youngsters got hold of a set and heard the Commissioner via radio, this not being exactly DX, as the "Big Chief" was only fifteen yards away. (Foto Topics.)

Bon Voyage



JACK BINNS (at right), noted figure in the radio, and whose fame has been secure ever since he flashed the memorable message from the SS. Republic, bids farewell to the ZR3 radio operator and sends him o'erseas with a U. S. set. (John Wanamaker, N. Y.)



"WHAT can I do to eliminate the hum from my set?" experimenters ask once in a while. Especially if the circuit is such that the aerial goes right into the grid, the set may be sensitive to such a hum as placing the table lamp right near it may, under some circumstances, produce. However, if due regard were paid to electrical refinements, even this position of the lamp would not cause the hum. Therefore—what?

THE GIRL stenographer said the coat was the chief point of interest in this photo; the office boy said it was the face (beautiful countenance of Viola Dana, movie actress); while the technical editor said it was the 4" dial. You settle it. (Kadel & Herbert.)

International Radio Week Committees Named

The Radio Trade

ALL over the country plans have been laid for the gigantic celebration of International Radio Week by fans and trade. The event will be held from Monday, November 23, to Sunday, November 30. Special programs will be featured by stations, international broadcasting by the United States and Great Britain will be conducted, and the trade will undertake a special advertising and sales campaign. All the big radio manufacturers are united to make the week a great success and the jobbers and dealers are co-operating.

International Radio Week is the development of the National Radio Week idea, an annual event first proposed by RADIO WORLD. Successive national radio weeks proved so successful that they were superseded by the International Week, radio meanwhile having grown so tremendously as to make the enlargement imperative.

The International Radio Week is being conducted under the auspices of the National Radio Trade Association, 1133 Broadway, New York City.

Committees have been appointed to take charge of International Radio Week activities in the various towns and cities. The city chairmen are:

W. H. Beaven, 1323 Age-Herald Bldg., Birmingham, Ala.
 Gilfillan Bros., Inc., 1815 W. 16th St., Los Angeles, Calif.
 H. Earle Wright, H. Earle Wright Co., 131 Eighth St., San Francisco, Calif.
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 Radial Co., 654 Grand Ave., New Haven, Conn.
 Sprague Electrical Supply Co., 39 Spring St., Waterbury, Conn.
 W. B. Osmond, L. P. Moore Co., 447 Shipley St., Wilmington, Del.
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 Phillips Radio Laboratories, Grand Rapids, Mich.
 R. B. Gile, Continental Radio Co., 527 Marquette Ave., Minneapolis, Minn.
 C. H. Ritter, Northwestern Electric Equipment Co., 174 E. Sixth St., St. Paul, Minn.
 A. B. Church, The Schmelzer Co., Kansas City, Mo.
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 E. E. Cummings, General Supply Co., 144 North Thirteenth St., Lincoln, Neb.
 H. B. Noyes, Auto Electric and Radio Corp., 2813 Harney St., Omaha, Neb.
 I. Rodman, Garod Corp., 120 Pacific St., Newark, N. J.
 Raven, Raven Radio, Inc., 8 Learned St., Albany, N. Y.
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Trans-Ocean Schedule for Radio Week

BEGINNING Monday night, November 24, American Broadcasting stations, practically every class B station in the country, co-operating, will send out special programs for listeners in foreign countries between 10 and 11 P. M. Eastern Standard Time. This continues to include November 30.

During the same period, the British Broadcasting Corporation stations will send special programs for American listeners between 11 and 12 P. M., Eastern Standard Time. American high power stations will observe quiet hours during this period each night of this week.

Re-broadcasting of programs from Dutch, Swiss, German, and French stations will also be part of the broadcasting from the British stations.

Australian, Hawaiian and New Zealand stations will also transmit for the benefit of West Coast listeners during the quiet hours on this continent.

POWEL CROSLY, Jr., Chairman,
International Radio Week Committee.

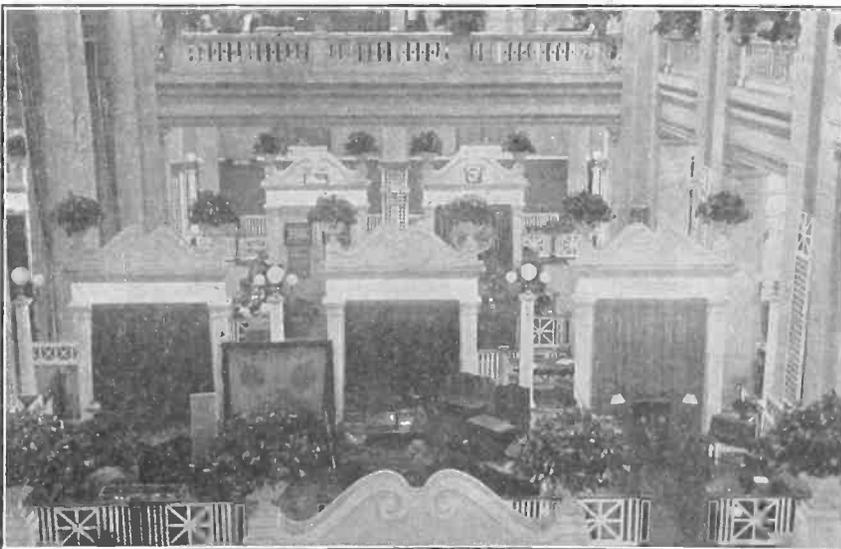
Crowds Flock to Exposition in New York City

THE entire third floor of Grand Central Palace, New York City, was a busy spot on Election Night, when the National Radio Exposition Frolic was held in conjunction with the third annual national radio show. Stars of the opera, stage and screen co-operated with prominent trade associations in presenting an exceptional program. Several of the foremost orchestras including "Roxy" and his entertainers and Vincent Lopez furnished music for the dancing and evening's gaieties.

Plans for the Frolic were furthered by committees representing the National Radio Trade Association, American Radio Association, Talking Machine & Radio Men, Inc., and Radio Jobbers' Salesmen's Association. On the committee of patrons and in charge of the arrangements were: Daniel Frohman, Otto H. Kahn, Elsie Ferguson, J. Andrew White, Blanche Bates, Madge Kennedy, E. H. Sothorn, Gloria Swanson, Laurence A. Nixon, Francis L. Robbins, Jr., Harold Bolster, Robert M. Catts, Dr. Lee De Forest, Fannie Hurst, and Mrs. Edward Vickers. The proceeds were devoted to the Wounded Veterans Radio Fund and the Actors' Fund of America.

N. N. Bernstein, well-known radio writer and supervisor of the frolic, whose excellent work was largely responsible for the success of the fair, was in charge. A full report of the fair itself will be published in RADIO WORLD next week.

Third National Radio Show



A GLIMPSE of part of the interior of Grand Central Palace, New York City, during the third National Radio Show.
(Foto Topics)

60 Independents Hail German Patent Release

By E. F. McDonald, Jr.

President, Zenith Radio Corporation

ONE of the historical events in the radio patent field took place when the Navy Department was authorized to issue licenses to approximately sixty independent radio manufacturers under 129 German patents seized by the Alien Property Custodian during the World War.

Early in 1923 application for the patents had been filed, but no decisive action was taken. Recently the co-operation of Congressman Fred Britten, of Chicago, the National Association of Broadcasters, and the Radio Manufacturers' Association was enlisted. Through the joint efforts of these what had grown to be considered a hopeless cause was quickly matured into a successful issue of wide-reaching importance.

History of the Title to Patents

The majority of the patents and applications involved were originally owned by the Telefunken Company, a German corporation, among which patents is the controlling patent covering tuned radio-frequency—the well-known Wilhelm Schloemilch and Otto Van Bronk patent. Under a series of contracts, the first dated February 21, 1913, substantial rights in these patents and applications were assigned by the Telefunken Company to the Atlantic Communication Company, a German corporation organized under the laws of the State of New York.

Under the provision of the Trading With the Enemy Act, as amended, the Alien Property Custodian seized all right, title and interest in and to these letters patent and applications, which remained in the Telefunken Company, and simultaneously took over the Atlantic Communication Company.

Purchase of Patent by Secretary of the Navy

Under the provisions of the Trading With the Enemy Act, as amended, the Alien Property Custodian on February 5, 1919, sold to the Secretary of the Navy, representing the United States, all right, title and interest in and to the said patents, which had been vested in the Atlantic Communication Company and acquired by him from it. Next day the Custodian also sold to the Secretary of the Navy all right, title and interest in and to the patents and applications which had remained in the Telefunken Company, after the assignment to the Atlantic Communication Company, and which have been acquired by the Custodian.

These sales were outright, without any limitations whatsoever and covered all the rights acquired by the Government. The sale expressly includes "The sole and exclusive right, license and authority to manufacture or cause to be manufactured within the United States, its territories and dependencies, and within the Republic of Cuba—; and the right to sell and install, to use and to grant the right to use —."

Legality of Purchase by Government

There is no question about the legality of sales of this nature. Title to property so acquired vests in the United States. The Attorney-General has so decided. It is also established that the grant of a revocable, non-exclusive license to use patents valuable to the manufacture of radio apparatus, is well within the discretion of the Secretary of the Navy. On August 5, 1920, the Secretary of the Navy granted to The International Radio Telegraph Company a non-exclusive, irrevocable license, without royalty, to make, use and sell for the purposes, and to the extent which the Department has a right to do, the inventions covered by the patent.

Attitude of the Independent Manufacturers

The theory on which the independent manufacturers requested grant of license was that such grant would tend to advance the welfare of the people of the United States, and would promote a healthy competition in the manufacture and sale of radio apparatus; that to withhold such license would tend to injure the public welfare by tending to promote monopoly contrary to the policy declared by the Sherman Act; that the denial

Radio Rod Locates Oil and Gold in Earth, He Says

BERLIN.

AGE-OLD belief in the efficacy of the divining rod for locating wells has received the blessing of German science at the hands of William Pastor, an engineer of Leipsic. Pastor has announced the invention of a "radio emanator" or electric divining rod with which it is possible to determine, he asserts, the presence of oil, water, coal or ore down to a depth of twenty miles beneath the surface.

At the same time, the Prussian Geological Bureau has issued a warning against false hopes aroused by reports that oil had been discovered in Pomerania through use of divining devices.

The average German peasant would never think of sinking a well without calling in the village mystic to exercise a little clairvoyance over the best site, and it has been easy to make the people believe oil can be found in that way.

of the license to the applicants would make the International Radio Telegraph Company, the only licensee, which would be inconsistent with Governmental policy as to monopoly, or the principle of equality of opportunity on which this Nation is founded.

Special Consideration for the Grant

As a part consideration for granting the said license, the independent radio manufacturers agreed to grant to the United States of America, represented by the Secretary of the Navy, a non-transferable, non-exclusive license under United States letters patent which they now own or may hereafter own during the term of the agreement, to make or have made for it and use for governmental purposes, apparatus utilizing or embodying the inventions of their patents, but not for sale.

Summary Action After Long Delay

Recently the cause of the approximately sixty independent radio manufacturers was brought to the fore. The manufacturers had waited for over a year for "something to turn up." It was a lightning-like procedure from first to last.

Willis H. Taylor, Inc., one of the country's foremost patent attorneys, claims that this grant of license by the Navy Department to the independent radio manufacturers will completely change the complexion of patent litigation.

One of the chief obstacles to the greatest development of the industry is thus removed. The complexities of the radio patent situation are now much minimized. The difficulties incident to the Government sharing the use of these patents with only one American manufacturer, are permanently obviated. In fact, the monopolization effected by one exclusive license amounted to unwarranted discrimination, and manifestly did injury to the radio industry.

Reflex Sets Also Covered by the Patents, Says Grimes

MANUFACTURERS of reflex sets hail as one of the greatest developments in the industry the decision by Attorney-General Stone permitting the Navy to issue licenses based on the German reflex patents of Schloemilch and Von Bronk, which were among the foreign owned patents taken over by the Navy during the war. For over a year and a half independent manufacturers

whose products incorporated the reflex or radio frequency idea in any form have sought to have these basic patents given to the public. The decision accomplishes this purpose in a manner satisfactory to the industry.

In commenting on the decision David Grimes, president of David Grimes, Inc., of 1571 Broadway, New York City, said:

"The decision of the Attorney-General gives the Navy Department the right to license American manufacturers under the Schloemilch and Von Bronk patents and removes a question mark from the radio industry. All radio frequency and reflex manufacturers have been operating under his patent with no assurance of its continuance. The decision of the Attorney-General settles this point.

"The only recompense desired by the Navy for such a license is a return agreement on any patent of value to the Navy. There should be no objection to this and there will probably be a flood of license applications in addition to many already on file.

"It is a very important and highly favorable decision to the independent manufacturers and marks the end of a long fought battle, because the patent of Schloemilch and Von Bronk have the same relation to the radio industry as the basic patents of Bell had to the telephone industry."

WESTINGHOUSE WAS ONLY FIRM LICENSED UNDER THE PATENT WASHINGTON.

THE announcement by the Navy Department that a number of German radio patents were to be offered to American radio manufacturers on a new cross-licensing plan, has resulted in applications from many houses interested in radio apparatus. Under the law existing in 1920, the Secretary of the Navy licensed The International Radio Telegraph Co. to use the German patents, seized by the Alien Property Custodian, including the famous reflex circuit of Schloemilch and Von Bronk, with the understanding that the Westinghouse Company could make and sell such apparatus. Since that date, however, other firms have applied for licenses under the same patents and the Attorney General recently ruled that the Naval Secretary might issue general non-exclusive, non-transferable but revocable licenses. This may put several new receiving sets on the market, incorporating the reflex feature, but to date no licenses have been issued.

FRED HUBER NEW PRESIDENT OF WASHINGTON ASSN.

FRED HUBER, manager of the radio department of Lansbury & Bro., was elected president of the Radio Merchants' Association of this city at a meeting held on Tuesday in Harvey's. The annual election of officers was marked by much spirited balloting and keen interest in the outcome. A. S. Dreisner was named vice-president. Roland Cragge, formerly of Denton & Cragge and now connected with the Broadcast Shop, secretary.

The Board of Directors for the coming year will consist of the above named officers together with Frank Chase of the National Electric Supply Co., and D. Tillett of the E. R. Keen Co. A vote of thanks was tendered William P. Boyer, retiring president of the association.

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A THOUGHT FOR THE WEEK
PERHAPS radio is only in its infancy,
but it seems to be getting ready to put
on long trousers.

RADIO WORLD



TELEPHONE LACKAWANNA 6976, 2068
PUBLISHED EVERY WEDNESDAY
(Dated Saturday of same week)
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NOVEMBER 15, 1924

Greater Need for Low-Loss Parts

NOW that the broadcasting
wavelength band is to be re-
duced to a 200-meter min-
imum, whereas it has been 222
meters, the advantage of using low-
loss parts becomes of even greater
importance. On the high waves it
does not make so much difference,
but on the low ones, particularly
from 350 meters down, the increased
resistance resulting from losses
through insulation and absorption
cut the signal strength very sharply,
sometimes more than 25 per cent.
The resistance goes up and the effi-
ciency goes down.

Although the 100-watt stations
will be on the lower waves, it is
sometimes desirable to tune them in
in preference to higher-powered sta-
tions, because of some special inter-
est their programs may have for the
listener.

Those using high-loss apparatus
may convert it into low-loss without
much trouble, while those about to
buy parts for a new set will prefer
to select low-loss condensers, coils
and sockets.

Some Friends of Mine—and Yours

By Tim Turkey

EVERYBODY who has friends has
radio friends, because almost every-
body is interested in radio.

The folks either have a set or are about
to buy a set or
they're dead. Those
who have a set also
are about to buy an-
other, because the
radio industry is get-
ting every day more
and more like the
automobile trade.

Used radios will
soon rank with used
cars.

People will get new
radio sets because
it's "the thing" to do,
fashionably speaking.
Styles of cabinets
will sway the women
into deciding that it's
time for a new set,
though the old one



TIM TURKEY

may be so new yet that there hasn't been
time for a real DX test yet. But when
the women folk decide, that ends it.

* * *

EVERYBODY knows the fellow who
has a crystal set, the simplest kind of
a set you can build, and who tells you
it's a wow and excels any Super-Hetero-



THERE'S NOTHING that compares with a
crystal set in Jim Crawley's opinion.

dyne or Neutrodyne. Of course you can
use only earphones, and if you hooked
up two stages of audio-frequency ampli-
fication, which ordinarily would work a
speaker, you couldn't get enough volume
out of the outfit to make a dent on a
guy with a detective's ear. Also, all sta-
tions within 30 meters of one another come
in with impartial volume, so that any-
body with a complex ear can almost tell
what's going on at any one of them. But
I tell Jim Crawley—that's his name—he
has a wonderful set and that if ever a
broadcasting station is built within a
block of his home, if he points his aerial
in the right direction and uses two stages
of power amplification, he may be able to
work the speaker.

* * *

NOW, Ed. Connersway, another friend
of mine, has an 8-tube Super-Hetero-
dyne that he made himself, after a month's
experience, and I must say that he did get
it working fine one night when I wasn't
there. His wife, a truthful woman, told
me of several occasions when hubby got
the set percolating something swell. One



WHEN THE 8-tube Super-Heterodyne won't
work for company, Ed. Connersway always has an
excuse, but never a real reason. "Sets that won't
work for company are the worst examples of
bashfulness I ever came across," says Tim
Turkey.

night Eddie must have had some remark-
able results, so he decided to invite a
gentleman friend up to the house the next
night to get a look-in at something won-
derful. But it was the same old story.

Sets that won't work for company are
the worst examples of bashfulness I ever
came across.

So Eddie said: "This set works fine, but
tonight something w-w-went wrong. I'm
not so sure what it was—er—I guess the
batteries are a little low tonight." What
a grand feeling it must be, thought Eddie,
to know enough about radio to be able to
make the set work before the company
departs in the kind of an automobile you
wished you owned. What a razz party
such departing company must enjoy at
the expense of the host of a few minutes
before, all during the ride home. One
says:

"Eddie, the big boob, he's so proud of
a set that won't work that I wonder
what'd happen if he'd be able to restrain
himself if it ever worked, just once!" An-
other chirps: "No wonder Eddie and his
wife get along so well. He's so easily
satisfied. Gets very enthusiastic over
failures."

* * *

THEN there's the type of fellow, like
Hen Ritchlock, who is a fiend for mak-
ing sets. He gets them all to work, because
he follows the radio magazines and learns
also from experience. You can look
through his window as you're walking
home from the movies almost any night
(Concluded on page 35)



HEN RITCHLOCK is a fiend for making sets
and tearing 'em apart.

RESULTS

WHAT Results Did You Obtain from Constructing Sets or Parts Following Data Published in Radio World? Write to Results Editor, Radio World, 1493 Broadway, New York City

RESULTS EDITOR:

I CONSTRUCTED the 2-tube set described by Lieut. Peter V. O'Rourke, in the Sept. 20 issue of RADIO WORLD ("Preceding Regeneration with RF"). I used a Pathe Plusiformer for the RFT, a Continental low-loss variable condenser, an Air King 3-circuit tuning coil, Federal No. 65 AFT. I was skeptical about being able to combine RF with regeneration, but I assure you the result was a complete success. I have read your magazine for some time and have tried a number of circuits with more or less success, but this one is all I could wish for. It is selective, it reproduces clear, rich, natural tones; is easy to tune, and is very economical on both A and B batteries. I operate it at the lowest possible A battery current, using 201A tubes.

The set also has quite a noticeable drop in static as compared to others I have tried in the same evening.

The most remarkable thing is this. It behaves when I have company in to hear it. I wish to thank you and Lieut. O'Rourke for this splendid advance in radio, for I am convinced it is a great many steps in the right direction.

M. J. SHANNON,
1024 Fernwood Ave.,
Toledo, O.

RESULTS EDITOR:

I HAVE raved so over Herbert T. Hayden's hook-up in RADIO WORLD, Oct. 4, that two of my friends insist in having a copy of it. Enclosed you will find 30 cents.

W. H. BOORMAN,
319 Watson Ave. Lyndhurst, N. J.

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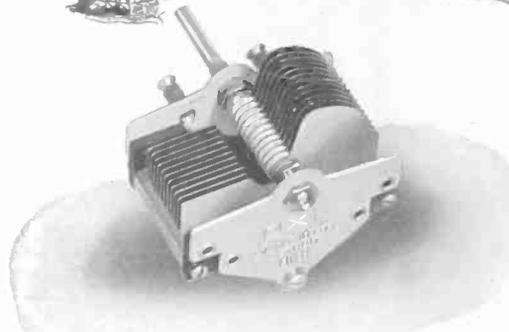
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If your dealer cannot supply you we will furnish direct. Send money order.

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Brief History of Interconnected Broadcasting in the U. S.

LARGEST RADIO STORES IN AMERICA



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Write for your FREE copy today!

THE use of wires in interconnecting broadcasting stations grew out of a desire on the part of program managers to introduce into their programs events which could not be brought to the studio. The first notable use of telephone wires over any appreciable distance was between Chicago and New York when the Princeton-Chicago football game, played in Chicago in the fall of 1922, was broadcast from a station in New York. Coincidentally, the first use of telegraph wires to bring a program to a broadcasting station was in the fall of 1922 when the World Series, played at the Polo Grounds in New York, was broadcast from a station in Newark, New Jersey.

At about the same time the first experiments in radio interconnection were undertaken between Pittsburgh and Cleveland; but being distinctly experimental in character, no definite requirement was met and no definite schedule arranged. The first systematic interconnection of broadcasting stations by space radio was inaugurated in September, 1923, between Pittsburgh and Hastings, Nebraska, this interconnection being accomplished without interference to other broadcasting stations or other radio services, by means of short wave transmission.

wire interconnection, broadcast by from two to eight stations. This development was notable in several respects:

First: The programs were internationally available, as European listeners had no difficulty in picking up and listening to the British stations;

Second: This was an example of a combination of wire and radio interconnection;

Third: This international distribution of a program was accomplished without interference to other radio services. It should be mentioned that various stations in the United States also picked up this transmitted program and rebroadcast it for general distribution over the United States.

The Wills-Firpo Fight

Another notable example of development of international interconnection by radio occurred recently when the Firpo-Wills contest, obviously of intense interest to Argentina, was broadcast from the ringside in the usual manner, employing wire interconnections from the ringside to the broadcasting station at Pittsburgh and transmitted by short wave radio to South America where every word spoken by the announcer at the ringside was clearly received and rebroadcast.

Service Expanded

In the case of wire interconnections the earlier service was limited to supplying a program to one distant station over a limited distance, but this means of interconnection has since been expanded to include stations from New York to San Francisco, and as far south as Havana, Cuba, and from one to a total of eighteen broadcasting stations simultaneously provided the same program or public event.

By means of radio interconnection, programs produced in this country have been transmitted to England and South American countries where wire line interconnection was impossible. The programs, transmitted on short waves, were picked up and broadcast by long waves, in some instances, with the assistance of

The first radio interconnection of more than two broadcasting stations occurred in 1923, when the speeches at a dinner in New York City, were picked up and delivered to a local New York broadcasting station, which transmitted the program on its customary wave length. Simultaneously this program was conveyed to Schenectady over telegraph wires and broadcast on both short and long waves. The short wave was picked up at Pittsburgh and again rebroadcast on short and long waves. This short wave transmission was picked up at Hastings, Nebraska, and rebroadcast on its usual long wave; and in the final step, Oakland, California, picked up the Hastings transmission and rebroadcast on its usual long wave.

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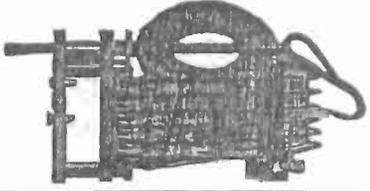
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*Legal Action Pending

At present, certain telephone and telegraph wire facilities are available and in use. As examples, the Boston studio and the Springfield station are interconnected by means of telegraph wires; a station in New York and a station in Schenectady, and likewise stations in Washington and New York, are similarly connected by telegraph wires. This service is now in daily use and programs are broadcast simultaneously from these interconnected stations. On numerous occasions within the last year, events of public interest, two of the most recent being the National Defense Test Day exercises last month and the address of the Secretary of Commerce at the opening of this conference this week, have been distributed to over a dozen broadcasting stations by means of telephone wires; these speeches and exercises were thus made available to all

(Concluded on next page)

Clear-O-Dyne
Four and Five Tube Sets
No set of an equal number of tubes will do more, yet the price is very moderate.
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KEEP ABREAST OF THE LATEST RADIO DEVELOPMENTS
RADIO WORLD
1493 BROADWAY NEW YORK CITY

Programs

Wednesday, November 19

(Concluded from page 17)
 ist; Yvette Lamontagne, cellist; Leslie Taylor, violinist; Ruby Green, soprano. 1:45, Mount Royal Hotel concert. 4, weather, stock reports.
WDAF, Kansas City, Mo., 411 (C.S.T.)—3:30 P. M., Star's radio trio. 5:50 marketgram, weather; time, and road report. 6, speaker under the Health Conservation Association; speaker from the Meat Council; the Story Lady; music, the Hanlein-Knutson Ensemble, Hotel Muehlebach. 8, Second Missouri District of Federated Music Clubs. 11:45, Nighthawk Frolic.
WHAS, Louisville, Ky., 400 (C.S.T.)—4 P. M., Alamo Theatre Orch; police bulletins; weather; "Just Among Home Folks"; readings; late news. 4:55, local livestock, produce, and grain market reports. 5:00, time. 7:30, Keith Kannard and His Kentucky Ramblers; late news.
WWJ, Detroit, 517 (C.S.T.)—8 A. M., exercises. 9:30, "Tonight's Dinner." 9:45, Public Health Service bulletins; talks of general interest. 10:25, weather. 11:55, time. 3:50 P. M., market. 8:30, News Orch.; Templeton Moore, tenor. 9:30, Jean Goldkette's Orch.
WFAA, Dallas, Tex., 476 (C.S.T.)—12:30 P. M., address, DeWitt McMurray; a medley of humor, pathos, and wisdom.

Thursday, November 20

KGW, Portland, Ore., 492 (P.S.T.)—11:30 A. M., weather. 12:30 P. M., Civic Music Club. 5, children's program. 7:15, markets, weather, news, and police reports.
WFFA, Dallas, Tex., 476 (C.S.T.)—12:30 P. M., Charles E. Osborn, physical director, Y. M. C. A., on "Doing Your Stuff." 8:30, recital. 11-12, Adolphus Hotel Orch.
WWJ, Detroit, 517 (C.S.T.)—8 A. M., calisthenics. 9:30, "Tonight's Dinner." 9:45, Public Health Service bulletins. 10:25, weather. 11:55, time. 3 P. M., News Orch. 3:50, weather. 3:55, market reports. 8:30, News Orch.; Graeme Gillies, bass; Mme. Homer DuBard, soprano. 10, Jean Goldkette's Orch. 11, News Orch.
WDAF, Kansas City, Mo., 411 (C.S.T.)—3:30 P. M., the Star's radio trio. 5:50, marketgram, weather, time, and road report. 6, Edgar Allan Linton, sixteenth of a series of talks on world travels; Miss Cecile Burton, popular poems and essays; the Story Lady, Hanlein-Knutson Ensemble. 11:45, Nighthawk Frolic.
WLW, Cincinnati, Ohio, 423 (C.S.T.)—10:45 A. M., weather and business reports. 1:30 P. M., business reports, 3, market reports. 4, lesson in French by Madame Teimpidis; piano recital by Adelaide Apfel. 10, message from U. S. Civil Service. 10:03, Doherty Melody Boys. 10:30, Milnor Instrument Trio; Marian Manship, soprano; accompaniments by Mme. Thuis and Milnor Instrument Trio; Senator Schultz in comic Radario, "Organization."
KFDY, Brookings, S. D., 273 (C.S.T.)—8 P. M., Girls' Glee Club. 8:15, "Let Winter Time Be Milking Time," by H. M. Jones. 8:25, "Our Winter Birds," by E. C. O'Roke. 8:30, Girls' Glee Club. 8:45, "The Thanksgiving Dinner," by E. B. Huskins. 8:55, Girls' Glee Club.

Radio Prospects

(Continued from preceding page)

radio listeners throughout the United States.

International Broadcasting

We listened with great interest to the remarks of Captain P. P. Eckersley, of the British Broadcasting Company, and particularly to his suggestion of the possibility of an extension of the development of simultaneous broadcasting in Great Britain and the United States, making programs produced in one country available at the same time to the other.

We appreciate the wonderful possibilities of such a plan, and can imagine the interest with which such a development would be received by the listening public. We recommend that this suggestion also be referred to the continuing committee hereinbefore mentioned for their consideration.

From the report of Sub-Committee No. 7 (S. B. Davis, chairman) to the Third Radio Conference, recently held at Washington.

Radio Manufacturers Listed in New Book

CLASSIFIED lists of all American manufacturers of everything used in the construction, operation and maintenance of radio equipment will be outstanding features of the Radio Trade Directory, which will make its initial appearance soon under auspices of the McGraw-Hill Book Company, New York, publishers of industrial and engineering publications. Lists of makers of raw and semi-finished materials, parts, accessories and supplies and machinery and tools used in the industry also will be featured in the directory.

NEW BOOKS

HENLEY'S WORKABLE RADIO RECEIVERS

Published by Norman Henley Co., \$1.00.

A REALLY fine radio handbook has been recently published by The Norman Henley Publishing Co., 2 West 45th St., New York City. It contains 193 pages of valuable information on all the popular types of circuits, from the simple crystal to the Super-Heterodyne. It also contains a chapter on the "Ultimate" receiver, a ponderous affair. It is written in non-technical language and contains a list of symbols, tables and other information for the beginner.

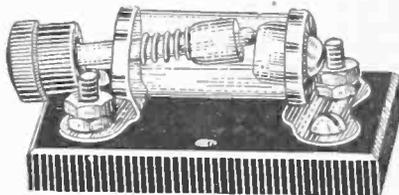
John E. Anderson, engineer on the staff of RADIO WORLD, and Elmer H. Lewis, are the editors of the manual. 140 pages are devoted to building receivers. 20 pages are devoted to a discussion of commercial types of receivers, theory and practice.

FRESHMANN MASTERPIECE 5-TUBE RECEIVER

Equipped with self-balanced, Low Loss, Tuned Radio Frequency Unit, completely wired, in genuine solid Mahogany Cabinet, with piano hinged cover, \$57.00

Kodol Receivers, completely wired, in cabinet. Picks up stations 1,000 miles away on one tube and no antenna, when conditions are right. Add tubes and increase distance and volume to 3,000 miles on loud speaker. Operates on storage of dry batteries.—	
One Tube Set	\$9.50
Two Tube Set	17.10
Three Tube Set	26.80
Four Tube Set	30.88
Portable One Tube Set	15.20
Portable Two Tube Set	21.38
One Tube Amplifier	14.40
Two Tube Amplifier	17.10
Complete Knockdown Standard Receiver Parts	\$42.50
5 Tube Freshmann Masterpiece	81.05
8 Tube Remier Super-Heterodyne	68.40
5 Tube Fada Neutrodyne	76.00
5 Tube Freed-Elsemann Neutrodyne	57.00
4 Tube Acemeflex	61.75
SPECIAL:—With each order for any of the above sets we will furnish necessary tubes—Cunningham or Radlotron—at \$3.00 each, without sets, \$3.65 each.	

THE EARTH RADIO COMPANY
 1436 Plaisance Court, Dept. W., Chicago, Ill.



THESE two units should go into the construction of your one tube Superdyne set described in this issue. A superior crystal detector (\$1) and a compact jack (80c) with almost zero capacity.

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S. HAMMER RADIO CO.

303 Atkins Ave., Brooklyn, N. Y.

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Is the Date of RADIO WORLD'S Annual

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Issued at a time when the American Radio Buying Public is spending its money lavishly for radio gifts. RADIO WORLD'S HOLIDAY GIFTS NUMBER will have a list of notable contributors, a special Holiday Cover in colors, and many special features, and will have a larger sale than usual, as there will be no advance in the price per copy.

A really great advertising medium for those having anything to sell to RADIO WORLD'S tremendous army of readers throughout the North American continent.

For Special Positions, Wire or Phone Immediately

Advertising Manager, Radio World, 1493 Broadway, N. Y. C.

Phones: Lackawanna 6976-2063

Sea Terms Used in Studio

WHILE broadcasting may be only 36 months old, many of the words used by station operators are descended from the

vocabularies of seamen of remote times. The necessity for ship to ship and ship to shore communication perhaps furnished much of the incentive to develop radio. Nearly all broadcasting operators have been to sea as ship radio operators. And it is natural that in the control room at KGO, the General Electric Pacific Coast station, visitors are inclined to feel as if they are on board ship from remarks made by operators. Here operators refer to the floor as the "deck." Walls are spoken of as "bulkheads." Windows are called "ports." Operators do not work so many hours; they simply "stand watches." Standing the "600 meter watch," means to listen in with a special receiver during the time KGO is on the air for SOS signals from ships in distress. The book recording transmission and changes of apparatus is called the "log." There is no clock in the KGO control room. But there is a real ship's "hack" chronometer, all rigged up in gimbels to take care of the swaying of the ship, in the regular little brown mahogany case. Even the record of the chronometer's variation is called the "chronometer log." This shows its "daily rate," which means simply the daily loss or gain in fractional seconds. Even

radio listeners often hear over the air the ancient bos'en's warning, "stand by!"

Make \$100 Weekly—Sell RADIO

Demonstrate once—results mean sure sale. Coast to Coast, lowest prices, attractive four tube instrument \$39.50. Big commission to you. Exclusive territory to proven salesman. Territory going fast. Write today for large illustrated book No. 100. Don't fail to give name of your county.

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Send broken and burned out tubes parcel post. Repaired tubes returned parcel post, C.O.D.

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Are You Getting DX?

Improved Radio Reception Through Scientific Tube Tuning

This book will help you get more DX with less gear. It shows how to get greater DXs clear-cut, steady, more volume.

DX INSTRUMENTS
Harrisburg, Pa.

Decision Awaited in \$2,000,000 Suit of De Forest vs. U. S.

WASHINGTON.

THE suit of the DeForest Radio Telephone and Telegraph Company, now known as the DeForest Radio Company, against the United States to obtain compensation for the alleged infringement of patented inventions by the General Electric Company and the Moorhead Laboratories in manufacturing vacuum tubes for use by the Government, was taken under advisement following argument today in the Court of Claims. Damage to the extent of \$2,000,000, is alleged.

DAVID JACOB LEASES BUILDING FOR ASSEMBLY WORK
Louis Carreau leased the Building 191 Bowery, New York City, for Herbert T. King to David Jacobs for five years for wholesale radio assembly business.

RADIO

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THE TWITCHELL PRE-AMPLIFIER is a Powerful Radio Frequency Amplifier attachable to any make of receiving set.

It brings in many distant stations which you cannot hear without it.

Brings in with tremendous volume those you now hear only faintly.

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The "Goode" Two-o-One A Tube amplifies or detects. It is a quarter ampere, five volts, standard base silvered tube.

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The PARAMOUNT LOOP

Latest master-product of the Paramount Radio Corporation.

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

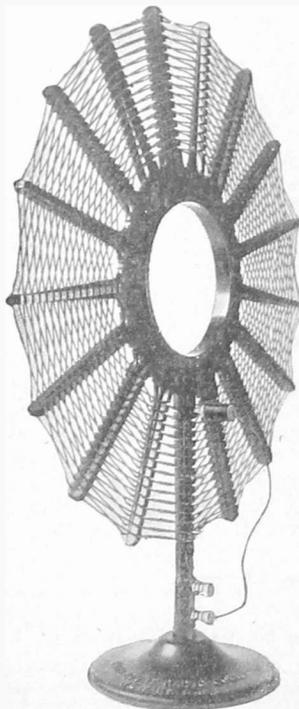
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\$25 FOR THE BEST JOKE

WHAT is the best radio joke you ever heard? For the one best joke submitted RADIO WORLD will pay \$25.

The test closes November 15. Your submission must be received at our office by that time. The judges will be S. A. Rothafel, (Roxy), WEA, New York City; Ben Garetson, station director, WGN, Chicago; N. T. Granlund, station director, WHN, New York City; Arthur T. Nelson, Commissioner, State Marketing Bu-

reau, WOS, Jefferson City, Mo., and George D. Hay, assistant station director, WLS, Chicago.

Send in your jokes NOW! Send in as many as you want. Be sure to write only on one side of the paper and to give your

name and address. Send jokes to Best Joke Editor, RADIO WORLD, 1493 Broadway, New York City.

The judges will decide the winner. As it is possible several readers will submit the same joke, the one having his joke published first will be entitled to it as his or her entry.

GIRL WINS RADIO LITERATURE TEST CONDUCTED BY KFAE

FRANCESMAE TEST at Bellingham Normal, Wash., won the prize novel given listeners to a recent KFAE radio broadcast from the State College of Washington, for the best list of titles and authors of books reviewed in the regular weekly book chat. Other reports received included those of Harry Kalintz, San Francisco; Harry Katz, Pittsburgh, Pa.; A. R. Hargraves, Boston, Mass.; Elverton Stark, Tacoma, and L. E. Rogers and James Dougherty, Moscow, Ida.

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By Herbert E. Hayden

In Radio World, issue of October 4. Send 15 cents or start your subscription with that number.

RADIO WORLD, 1493 Broadway
New York City

A Cry for Help

Editor, RADIO WORLD:

I HAVE a 5-tube Sada Neutrodyne and a 3-tube Haynes-Griffin set. I live on the southeast corner of West 69th Street and Broadway, which is known as a "bad spot." Despite this all last fall and winter I was able from 6 to 10 p. m. to get forty out-of-town stations, including Hastings, Neb., and Miami, Fla. This winter, on account of the many new stations in New York City, I am unable to get, within these hours, anything but local stations. Will some of your readers kindly write me what set is so selective that it will cut through this local interference, or better still, will some of your readers demonstrate a set which will do so and I will pay them cash the same night if they can bring in a dozen stations outside of New York City and Newark during these hours. Perhaps wave traps would help. I have never tried them and would be glad to be advised about them. I will appreciate the thoughtful courtesy of any of your readers who wish to write me.

ARTHUR LESLIE,

1926 Broadway, New York City.
c/o Macfadden Publications, Inc.

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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. Fifteen cents a copy.

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

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PATENTS—Write for free Guide Books and Record of Invention Blank before disclosing inventions. Send model or sketch of your invention for our prompt Examination and Instruction. No charge for the above information. Radio, Electrical, Chemical, Mechanical and Trademark experts. Victor J. Evans & Co., 294 Ninth, Washington, D. C.

LOW-LOSS INDUCTANCE FORMS—Linen impregnated Bakelite. Lowest dielectric losses and highest insulation qualities. Diameter 4 1/4 inches. Accommodates windings for all popular circuits from crystal sets to superheterodynes. Results in vastly improved selectivity, sensitivity and tone quality, due to the extremely low-loss value and restricted magnetic field of this form of inductance. Price 50c each. The Kehler Radio Laboratories, Abilene, Kansas.

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

8-TUBE SUPER-HETERODYNE in cabinet built of ex-Inf. service parts with Como push pull amplification. This includes 8 201A bulbs, loop and phones. Parts cost \$135.00. Yours for \$150.00; guaranteed. Fada 5-tube assembled Neutrodyne in cabinet, parts cost \$75.00, yours for \$75.00; guaranteed. The above sets are as good as new. A letter will convince you. I also guarantee to answer your letters promptly, J. R. Whitehead, Box 456, Albany, Georgia.

RADIO FANS—Keep a record. Our new Log Book sent on receipt 25c postpaid. Dealers wanted. Stacy, 325 Royal Avenue, Rockford, Ill.

THE WORLD'S LARGEST DOG KENNELS offer for sale Orang Airedale watch dogs, automobile dogs, farm dogs, children's companions, hunters and retrievers. Also big game hounds, coonhounds, foxhounds, rabbit-hounds and thoroughbred puppy stock. Satisfaction and safe delivery guaranteed to any point in the United States. Large illustrated descriptive catalog mailed free. OORANG KENNELS, Box 139, La Rue, Ohio.

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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,
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1493 Broadway, New York City.
I desire to receive radio literature.

Name

City or town

State

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- William Falk, 4443 Penn. St., Kansas City, Mo.
- D. W. Johnson, Home National Bank, Cleburne, Tex.
- Chas. C. Morrison, 4075 Mentone Ave., San Diego, Cal.
- R. F. Miller, Thornton, Ia.
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- W. O. Goodwin, Hickory, O.
- Geo. H. Kramer, 12 S. 34th St., Camden, N. J.
- Mrs. F. A. Schimelpfenig, 3006 Smith St., Houston, Tex.
- Raymond Simmer, Tipton, Kan.
- N. E. Dupont, Minden, La.
- F. C. Lockell, Rocky Hill, N. J.
- M. E. Bryant, 502 Clark St., Ft. Scott, Kan.
- Ohio M. Brown, Rich Hill, Mo.
- Elec. Toy & Novelty Co., Granite City, Ill.
- J. W. Smith, P. O. Box 12, Rockport, Ind.
- R. C. Hall, 2014 Golden Gate Ave., San Francisco, Cal.
- 3475 Lycaste Ave., Detroit, Mich.
- B. C. Moody, Palo Alto, Cal.
- L. W. Young, Nescocopek, Pa.
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PATENT

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Factory Distributors. Tremendous profits in distributing newly invented, much needed Radio device. Patented. Sells for only 50 cents retail. Market several million yearly. Big repeats. Nationally advertised. Write at once for new sales plan.

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ACME 4-Tube REFLEX

We will build this set for you, using a genuine ACME KIT-SET assembled and wired in a beautiful mahogany cabinet, ready to operate, with loop, 5 Days' Trial—Refund if Not Satisfactory
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Complete
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100 Cards, Mahogany Finish or Oak Cabinet, and Index Dividers. A Useful Accessory to Any Set. Give Name of Set or Sketch of Dial Arrangement. Postpaid on Receipt of Cash or Money Order. Dealers Write for Terms.

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THE CHARMITONE LOUD SINGER

A NEW and somewhat different loudspeaker has been placed upon the market by the Dual Loudspeaker Company, of New York. The Charmitone Loud Singer is a departure from the usual type, in that it is not necessary to plug in phones to tune in, then switching to loudspeaker. The Charmitone has a system of stethoscopes that are super-sensitive, and which may be controlled by a simple arrangement at the base of the speaker. Horn and base are made with a crystal-line finish, with silver-plated metal parts. The company's exhibits at the Third National Radio Show, New York City, attracted much admiring attention.

Coming Events

- NOV. 11-14—Wisconsin Radio Exposition, Milwaukee.
- NOV. 17-22—Buffalo Radio Show.
- NOV. 18-23—Chicago Radio Fair. They advertise "all space sold."
- NOV. 24 TO 30, INCLUSIVE—International Radio Week.
- DEC. 1-7—Newark Radio Fair.
- DEC. 1 TO 8, INCLUSIVE—Boston Radio Exposition, Mechanics Building, Boston.

THIRD ANNUAL CHICAGO RADIO SHOW OPENS ON TUESDAY

CHICAGO.
THE stage is all set for the Third Annual Chicago Radio Show which is to open in the enlarged Coliseum, under the management of U. J. Herrmann and James F. Kerr, on Tuesday afternoon, Nov. 18, and continue until Midnight, Sunday Nov. 23. The entire radio fraternity of the middle-west is intensely interested in the coming exposition, which gives every promise of equaling the extraordinary artistic, financial and scientific success of the recent First Radio World's Fair in New York City.
One hundred and eighty of America's leading radio manufacturers and twenty of the most famous wireless concerns of England, France, Italy, Germany and Japan will be among this season's exhibitors. Over \$5,000,000 worth of apparatus, covering every phase of the enormous industry, will be on display.

THE BENWOOD-LINZE CO. NEW CONSOLIDATION

THE Benwood Co., Inc., 1110 Olive St., and the Linze Electrical Supply Co., 1129 Olive St., St. Louis, Mo., have consolidated as the Benwood-Linze Co., 1129 Olive St. Both houses are pioneers in the radio line in the Midwest. The officers are: Harold J. Wrape, president; N. E. Hill, secretary; L. D. Walsh, treasurer.

P. W. MILLER QUITS BUFFALO CO.; RUNS A SALES OFFICE

P. W. MILLER has resigned as vice-president and general manager of the Buffalo Telephone Co., and is operating a sales office under the name of Henderson & Henderson, 257 Washington St., Buffalo, N. Y. The New York State territory, exclusive of New York City, and the Pennsylvania territory, exclusive of Philadelphia, are covered by a staff of experts.

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

New Corporations

The Liberty Chain Stores, manufacturers of devices, \$15,000,000; David E. Hurwitz, Bessie Rollnick, Mollie Turner, New York City. (Corporation Trust Co., attorney.) Delaware corporation.

NAME CHANGES

Niagara Battery Corp., change of name to Searchlight Battery Corp., Wilmington, Del. Increase of capital stock from \$120,000 to \$150,000.

OPENS BRANCH STORE

LOWELL, MASS.
THE Radio Equipment Co. has opened a branch store at 155 Merrimac Street with Everett E. Taylor as manager.

MAHOGANITE and BLACK RADION PANELS

DIALS, KNOBS, TUBING, SOCKETS
RADION LOUD SPEAKER HORNS, ETC.

"THAT SPECIAL SIZE" FOR YOUR
PHONOGRAPH, PORTABLE OR SUPER

ALL STOCK SIZES
WHOLESALE RETAIL

Send for Complete Price List
New York Hard Rubber Turning Co.
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HARP TUBES \$1.50

6 Volt, 1/4 Amp. Detector
Regular price \$3.75
Every tube guaranteed
new and perfect.

6 V. AMPLIFIER \$1.75
Royal Mfg. Co.
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LOUD SPEAKING CRYSTAL SET

Stations brought in from over 1000 miles and heard all over the room right from crystal set with the STEINMETZ AMPLIFIER. Get our complete catalog.
STEINMETZ WIRELESS MFG. CO.
5957 Baum Blvd., Pittsburg, Pa.

SOLDERLESS LUG

(Holds Bus Bar Like Clips)
Don't turn screws and cut hundreds of times back and forth. Use the SOLDERLESS LUGS and connect or disconnect wires in a jiffy, directly from the lug. 10 for 5c. Ask your dealer.

Manufactured by P. GLAMZO
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- One Year, 52 Issues 6.00
- Add \$1.00 a Year for Foreign Postage; 50c for Canadian Postage.

How to Keep Battery Clean

(Concluded from page 11)
insure continuously clear reception as far as the condensers are concerned.
Poor reception is often caused by a shorted lightning arrester. Test the arrester every now and then. (Fig. 5). If

the bell rings the arrester is shorted and a new block must be purchased.
This circuit is very handy to have around the laboratory. Coils may be tested for continuity by substituting the coil for the arrester. If the bell rings, the coil is all right. If the bell fails to ring, it shows there is an open circuit in the winding. Variable condensers may also be tested in a like manner. Place the condenser in circuit as in Fig. 5. If the bell rings, condenser is shorted. If a lightning arrester causes the bell to ring, it is no good.
When soldering use rosin flux. If paste is used great care must be taken

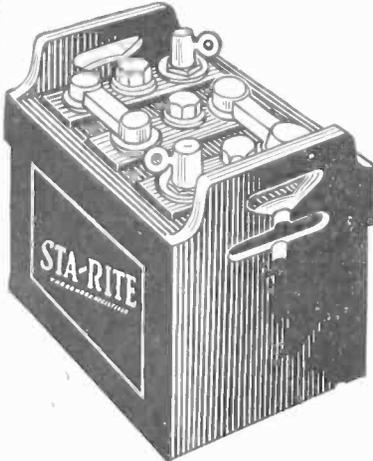


FIG. 6—The storage battery must be kept free from corrosion. A battery whose terminals are covered with corrosion, is a battery whose life will be comparatively short. Keep the battery clean and you will be rewarded with long, care-free service.

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"Popular Wherever Radio Is Used"
14 Sizes in Beautiful Display Case
Dealers write for big money-making proposition.
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Save you 60% and guarantee you in writing 2 years of better battery performance.

IN ALL RUBBER CONTAINERS

Try to Beat These Prices

100 Amp. Hour	\$ 9.45
140 " "	10.55
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Get Yours Today—NOW—Send No Money

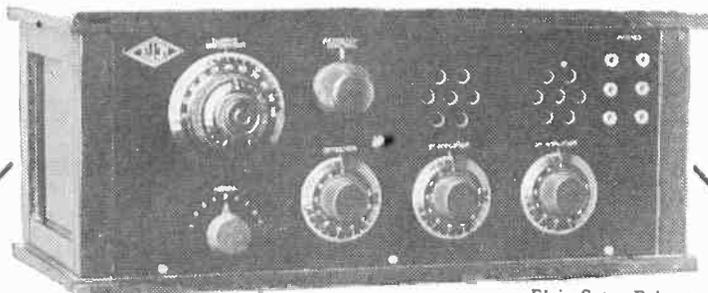
The batteries are fully guaranteed in writing and shipped subject to examination on the day your order is received. You pay on delivery or deduct 5 per cent. if full cash accompanies order. You may deduct 10 per cent. if two or more are ordered at one time.

STA-RITE BATTERY CO., Dept. Louisville, Ky

that the paste does not run between the soldered joint and another terminal, as serious loss of energy will result. After soldering with paste as a flux clean the terminal well with a cloth saturated in alcohol.

Fig. 6 shows how a storage battery should be cared for. It is important that the battery be kept absolutely clean, if you are to foil its worst enemy, corrosion. Do not allow corrosion to form, for as soon as the battery becomes corroded its life will be very short indeed, unless immediate steps are taken to save it by thorough cleansing. Vaseline placed at the terminals will act as a protective covering, guarding against corrosion.

All contacts, such as switch levers, hand-switches, binding posts, aerial leads, ground connections, etc., should be a clean condition always.



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2LO Model Tuner

The Set That Heard London

This astonishing reception was accomplished twice, in two separate cities of the United States during the trans-Atlantic tests last season.

The Elgin Super-Reinartz, 2LO Model Tuner spans the continent nightly at the hands of thousands of Radiophans. Through this highly efficient circuit amazing reception has been obtained. New York is entertained by EGO and Houston, Texas, listens in on WLAG with surprising regularity.

ELGIN Super-Reinartz "The Ford of Radio"

will give you the DX records it has brought to others.

YOU MUST LEARN MORE ABOUT THIS WONDER CIRCUIT AT ONCE!

Mail the coupon TODAY with your name and address and we will send—FREE of charge—the complete working diagram of the Elgin Super-Reinartz, 2LO Model. There are no obligations, of course.

DEALERS: WRITE FOR PROPOSITION

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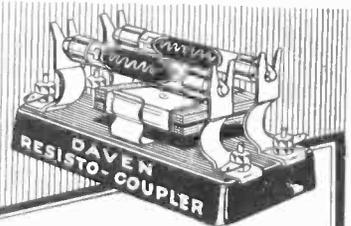
Elgin Radio Supply Co.,
Dept. B, 207 E. Chicago St., Elgin, Ill.

Send at once the working drawings of the ELGIN SUPER-REINARTZ, 2LO MODEL TUNER—The Set That Heard London. I am enclosing stamp to cover postage.

Name

Address

PLEASE PRINT IN PENCIL



Resistance Coupled Amplification

The Resisto-Coupler illustrated above is inserted in your set in the place of the ordinary transformer. It is less expensive to install and operate, gives audiotively perfect amplification and wonderful volume. We recommend three stages of Resistance Coupling for most satisfactory service. Price, \$1.25.

Read the Daven "RESISTOR MANUAL" by Zeh Bouck. A practical handbook on Resistance Coupled Amplification. Sold everywhere.

Price 25c

DAVEN RADIO CORP.

"Resistor Specialists"

Newark

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WIRELESS IN THE HOME. By DeForest. Sent postpaid on receipt of 15c. The Columbia Print, 1493 Broadway, N. Y. C.

Superdyne Plate Coil

(Continued from page 5)

coil may be used if you can not obtain a duolateral coil. A honeycomb has one winding directly on top of another, corresponding turns presenting a straight-line view as one looks at the coil from the top of the winding. A duolateral coil is like a honeycomb coil, except that successive windings are moved to one side. Looking down at the coil winding you see two turns of a given winding with one turn of a preceding winding in between. The duolateral coil has less distributed capacity than the honeycomb coil and is therefore recommended.

The 75-turn duolateral coil, used in conjunction with a .0005 mfd. variable condenser, is too much inductance. Therefore some turns will have to be removed, otherwise the maximum capacity would be above 700 meters and the minimum well over 200, and the new wave band would not be covered. Remove turns from the duolateral coil after the set is made, taking off one turn at a time, until the greatest signal volume is obtained with the reading of the C₂ dial in step with those of the C₁ dial. The plate coil may be mounted on the back of C₂ with two pieces of bus bar, one piece going from one of the plate terminals of the condenser to one of the terminals of the coil, and the other piece of bus bar completing the remaining open connections here. But do not have the coil less than 1 1/2" from the condenser or the panel.

The radio-frequency transformer used in the laboratory model was the Tri-Coil, which has special windings whereby the reflex principle is employed.

Condensers

The only controls in the set are the two variable condensers, C₁C₂. Both should be low-loss and of .0005 mfd. maximum capacity, with a minimum capacity of .00003 mfd. or preferably .000025. No vernier is necessary. If you have one vernier condenser use it as

C₁, not as C₂. The DXL condensers were used in the original circuit.

Detector

The crystal detector in the original set was a Harco, of the double mineral type. The adjustable arm consists of "synthetic zincite" and the fixed mineral is tellurium. Strong signals were obtained with this

(Continued on next page)

20% OFF

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The advertised list price less one-fifth is our price. Goods shipped immediately, generally in original package.

No Catalogs

We carry too large a line to catalog. Order from ads. in any radio publication, or we will be pleased to quote you on anything you may be interested in.

Send check or money order, or pay upon delivery. We pay transportation on all orders of \$4.00 or over.

Satisfaction Absolutely Guaranteed

ALEXANDER RADIO CO.
640 Broadway New York City



CHARMITONE
LOUD SINGER

—a superior
Musical Instrument
for Your Radio!

THIS Radio Horn is rapidly becoming the favored instrument of discriminating enthusiasts, due to its remarkable musical performance, its beautiful appearance, and its patented mechanical features which assure easier and more satisfactory operation.

TWO-in-ONE ACTION

Tuning and Amplifying off the same master phone in the base of the horn.

SUPERSENSITIVE STETHOSCOPE

Eliminates Head Phones and increases the pleasure and satisfaction from your Radio Set.

NO PLUGGING IN AND OUT OF RADIO SET

Tuning is done with Stethoscope in ears, then one turn on lever in base of horn cuts out Stethoscope and operates the horn. No chance of losing volume when changing from head set to horn; or disturbing dial adjustments and losing station. Same lever also controls volume in Stethoscope and horn. Any number of Stethoscopes may be used for listening without additional drain on the batteries or loss of volume.

BEAUTIFUL, SPARKLING ONE-PIECE HORN

with silver plated metal parts. Best workmanship in every detail; dark gray crystal-line finish. Made in two models; see illustration above. Extra Stethoscopes, complete with all fittings, each, \$1.50.

Ask your dealer to demonstrate the **CHARMITONE LOUD SPEAKER** for you. If he cannot supply you, we will send either model direct, prepaid, upon receipt of price.

Dual Loud Speaker Co.
210 West 54th St. New York City

PERFECTION HYDROMETER
If it's a good hydrometer, it's a PERFECTION

A glance instantly gives condition of your battery.

Look for the name "PERFECTION" — it represents supreme quality in a hydrometer.

Abutments in nozzle preserve clear air passage and prevent clogging and leaking. Noat studded to prevent sticking.

Every detail is perfected to give the Radio set owner the finest hydrometer obtainable.

\$1.00 At All Radio Dealers

Benco Manufacturing Company
243 W. 55 St. N.Y. City

RADIO BY MAIL

- \$30.00 Phenix Ultradyne Kit, Model L2. . . . \$26.75
- \$60.00 Freshman "Masterpiece" Receiver. . . . 49.76
- \$17.50 Freshman "Masterpiece" Kit. . . . 14.69

- \$5.50 Genuine Precelsinn Cockaday Cells. . . . 4.49
- Amsco Dubl-Wundt potentiometer and rheostat. . . 1.89
- Amperites (all types) mounted, 50.97; unmted. . . . 50
- Accuratone 4/7 Micrometer control dial. . . . 2.96
- Benjamin Clear-tone sockets Std. or 199. . . . 84
- Amplex Grid-converters, .0005 or .001. . . . 97
- No. 285A "Preclse" audio transformers. . . . 4.24
- Bradley-Ohms (No. 10, No. 25, or No. 50). . . . 1.88
- New "Cockaday" 7/8" x 2 1/4" drilled panel. . . . 3.89
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CARDWELL CONDENSERS

- 11-PI, \$3.57; 21-PI, \$4.19; 17-PI, \$3.97; 41-PI, \$5.04
- \$1.50 Freshman crystal detector. . . . \$1.26
- \$1.00 Naid 4" Super de Luxe dial. . . . 83
- Naid No. 400 De Luxe Std. V-T socket. . . . 62
- \$35.00 Timmons "B'Limiter". . . . 29.39
- "Brendonne" Type 201A vacuum tube. . . . 2.97

"B" HAMMARLUND CONDENSERS

- 11-PI, \$3.78; 17-PI, \$3.97; 23-PI, \$4.19; 43-PI, \$5.04

Plain Vernier

- 11-PI, \$4.02; 17-PI, \$4.83; 23-PI, \$5.04; 43-PI, \$5.88

MODEL "B" HAMMARLUND CONDENSERS

- 11-PI, \$3.78; 23-PI, \$4.19; 17-PI, \$3.97; 43-PI, \$5.04

Plain Vernier

- 11-PI, \$4.62; 23-PI, \$5.04; 17-PI, \$4.83; 43-PI, \$5.88

- \$35.00 Shamrock Harkness Reflex Kit. . . . \$29.39
- Bremor-Tully Low Loss Tuner (2 sizes). . . . 4.24
- Eastern Special superdyne coupler. . . . 4.76
- Formica (any size) 3-16" 2e; 1/4", 2 1/2e sq. in. . . . 4.67
- \$5.50 Uncle Sam Tuning Coil. . . . 4.67
- Burgess or E. R. large 22 1/2 V. B Batteries. . . . 1.68
- Burgess or E. R. large 45 V. B Batteries. . . . 3.14

- BREMOR-TULLY "LIFETIME" CONDENSERS**

- 11-PI. \$3.78 23-PI. \$4.24 43-PI. \$5.46

- G. E. Tuner Charuter, 2 Amp., \$14.39; 5

- Amp. . . . 22.39
- \$1.25 Universal Disks, Black, \$1.09; Mahoo. . . 1.28
- \$28.76 "Rico" Transformer parts kit. . . . 23.96

- ERLA REFLEX "SEALED" PARTS KITS**

- 1-Tube. \$22.94 2-Tube. \$32.56 3-Tube. \$41.47

Send 10c For Our New Fall Catalogue, 2433 Bargains, 10c Will Be Refunded on First Purchase.

Prices F. O. B. St. Louis, Mo. Cash or C.O.D.

SIMPLEX RADIO SALES CO.

1806 Lafayette Ave., Dept. H., St. Louis, Mo.

Parts for Superdyne

(Continued from preceding page)

combination. As the voltage used was only 22½, this combination stood up flawlessly; but if a voltage of 90 or more were used the crystal would not last long.

Socket

It is highly advisable to use a low-loss socket.

Tubes and Batteries

As the economy element was consid-

GET THIS!
50¢ EVERYWHERE



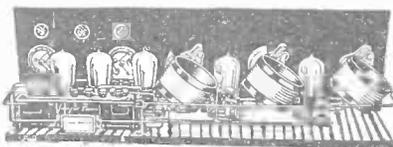
IT'S A
KORKER

BENDS BUS BAR AND WIRE. SHAPES EYE-LETS, BORES, REAMS and COUNTERSINKS HOLES, STRIPS and SCRAPES WIRE. HAS REVERSIBLE STEEL BLADE.

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Fada 5-Tube
Neutrodyne Set **\$69.50**

The most selective and powerful set yet produced. All the best material procurable used, including genuine Fada Neutroformers and Fada Neutrodons. Black or Mahogany Panel. Built for you FREE, \$69.50.

SPECIAL PRICE

Send No Money! Pay on delivery. If not satisfied within one week return set and get your money back.

PERFECTION RADIO STORES

24 Murray Street New York City

Welcome



The
"SELF ADJUSTING"
Rheostat

\$1.10
Everywhere

Write for
FREE
Hook-Ups

No rheostat knobs on panels to turn—no meters needed—no tube worry. One amperite, used in series with each tube, inside the set, automatically supplies just the right current for each individual tube's greatest efficiency. Works on thermo-electric principle. Simplifies wiring. Reduces set cost. Proved in use. Adopted by more than 50 set manufacturers. No set is up-to-the-minute in design without it.

RADIALL COMPANY
Dept. R.W.-3, 50 Franklin St. New York

AMPERITE
"means right amperes"

ered important in a 1-tube set, dry battery operation was decided on. The WD12 tube was used. This requires only a 1½-volt A battery. The Columbia dry cell was used, the B battery being a 45-volt Eveready. No increase in volume was noted when greater B battery current than 22½ was used, but it is preferable to get a 45-volt B battery so that the B voltage may be varied until the correct potential is obtained. The 199 and 299 type tubes worked very well in this set, but no better than the 12 type, although the 199 and 299 are generally rated as better radio-frequency amplifiers. The 11 type tube has the same characteristics as the 12 type.

Panel

The panel used was a 7x10x3/16" Radion. This is hard rubber and very easy to drill, whereas bakelite and some other varieties are very difficult to drill. More over, hard rubber has better insulating qualities.

Rheostat

A fixed resistance is used instead of a rheostat, which is variable, because the filament voltage is not critical, the tube not functioning as a detector. Some trifling detection does occur in a radio-frequency tube, however, as may be determined by inserting the phones at the plate post of the socket and the B+. But unless the crystal is adjusted in this circuit no sound will be heard, hence the trifling audio current from the tube is rejected. The fixed resistance may be made by the home constructor, using resistance wire, or may be a factory product. The slider of the fixed resistance should be moved until the best setting is obtained. One end of the resistance is mounted on the A+ post of the socket. If a 35 ohm resistance strip is used the slider would have to be very near the socket post, for the 11 and 12 type tubes require only 6 ohms maximum. The tube may not even light if the slider is near the other end, but just move it up. There is no objection to using a rheostat, however, but the inclusion of the fixed resistance makes it possible to light the tube simply by pushing in or pulling out the filament switch, depending on the switch construction. A Federal anti-capacity switch was used.

Phones

The Tower's Scientific Phones were employed in the laboratory model of this set.

Jack

The Harco single-circuit jack was used in the laboratory model.

Constructing the Set

Get a piece of paper 7x10" and mark it according to the dimensions in Fig. 3. Instead of the condenser shafts being on a middle horizontal line they are ½"

NEUTRODYNE KIT \$19.75

Complete kit of licensed Neutrodons parts including panel, tube sockets, rheostats, Jack, fixed condensers and grid leak. Neutroformers complete with variable condensers and neutrodons. Every part included even to screws and wire. Easy read plans.

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RADIO SURPLUS STORES

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MONTANA

Brand-New Edition CRAM'S RADIO MAP

Brought Up to Date

Plate 30x20 inches, on paper 28x34 inches. Just 100 miles to 1 inch makes it easy to get distances. Complete list of sending stations by Cities, by States, by Call Signals. With Wave Lengths, Kilocycles, Location and owners for the United States, Canada, Hawaii, Alaska, Porto Rico, Cuba, Mexico, and leading United States Government Stations. Pocket Map prices 35¢, with Log, 40¢. Cloth Back for Wall. Log in Folder, \$2.00, on Heavy Board folded in center for Colored Tacks, \$0.75.

THE COLUMBIA PRINT, 1493 Broadway, N. Y. City

higher, that is, 4" from the bottom. The positions of these shafts are shown 2½" from left and right of the panel sides. This leaves room for actuating the condensers with 4" dials. On a central ver-

You "R. F. Monkeyers"

Same panel, same layout, fewer parts than a "Neut"—but, oh! how she steps out. Selectivity with deep, resonant volume. If you've been thru the embarrassing vicissitudes of "Neut" making, there's "Welcome" on your door mat for this very circuit. No one else has it. Necessary stabilizer, 22 feet gold sheathed wire, lithographed white print of circuit and complete simple instructions—prepared anywhere, cash or stamps—\$5.00. Nothing else to buy. Satisfaction guaranteed. Data about this circuit sent for 10¢. New radio catalog, thousands unusual items for stamp.

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For Maximum Amplification Without
Distortion and Tube Noises
use the well known

Como Duplex Transformers

Push-Pull

Send for literature.

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Bakelite, Engraved, Nickel-plated with lugs
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SUPERDYNE

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HENLEY'S WORKABLE RADIO RECEIVERS



An Authoritative 240-Page Book on Practical Receiving Sets of Modern Design with Complete and Explicit Directions for Building Them. Written and Edited by a Staff of Radio Engineers of Practical Experience and Best Theoretical Training.

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150 Diagrams and Illustrations Specially made for this book.

THIS new book contains complete and detailed descriptions of many types of receivers which, by long experience, have proved to be the most

satisfactory from the viewpoints of selectivity, sensitivity, convenience and economy of operation, dependability, and signal quality. It gives in great detail circuit and wiring diagrams, panel and baseboard layouts, and drilling templates, so that any amateur may build a successful receiver from the directions given.

It also includes a discussion on the principles underlying each circuit, and shows clearly how to test and calibrate the receivers.

In order to help the Workable Radio Set builder, who may not be familiar with the conventional symbols used, in hooking up a set, each of the receiving sets is illustrated by a complete full page diagrammatic drawing, showing just where to attach the wires, location of condensers, rheostats, transformers, vacuum tubes, plugs, jacks, etc.

Send FREE if, as a new Radio World subscriber, you send this clipping and \$0.

THE COLUMBIA PRINT
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Drilling Superdyme

(Continued from preceding page)

tical line are placed the crystal detector, the jack and the filament switch in that order, top to bottom. The advantage of having the jack as shown is that it is near the crystal detector, one side of which goes direct to the jack, thus insuring a short lead here. The three marks along the bottom are for drill holes through which wood screws are inserted for fastening the baseboard to the panel. When the template is made the paper is then pasted on the panel and the drilling is done. The holes for condenser set screws are omitted, as these are furnished with the condensers and vary for different makes. The drill holes for fastening the panel to the cabinet are not shown for the same reason.

Wiring Directions

1. Connect the battery A+ to the slider of the fixed resistance, the other resistance terminal being connected to the F+ post on the socket. The B- and A+ are united. The ground goes (a) to the beginning of L₂, and that is, the top terminal of the lower coil on the cylinder; (b) to the rotor plates connection of C₁, (c) to the F- post of the socket and (d) to the A- on the battery. This completes the filament wiring.
2. The aerial goes (a) to the stator or fixed plates of C₂ and (b) to the grid post of the socket.
3. The plate post on the socket is connected (a) to the beginning of L₂ (the beginning of a honeycomb or duolateral coil emerges from the winding) and (b) to the rotor plates connections of C₂. The end of L₂, which

emerges from the outside of the winding, goes (a) to the remaining unconnected plates of C₂ and (b) to the end of the coil L₂. The end of L₂ is the lower terminal of the top coil on the clinder. In Fig. 1 the plate lead that goes to L₂ is marked with an X. The beginning of L₂ is now joined to the P post of the RFT₂, whose B post goes to B+. (See Fig. 2). The G post of the RFT goes to one side of the crystal and the other side of the crystal goes to the frame of right angle of the jack. Join the F post of the RFT to the remaining unconnected side of the jack. That completes all wiring.

Tuning

Plug in the phones and tune for some local station that is on the air. See advance programs in RADIO WORLD for such information. A station of 492 meters, such as WEAJ, New York City, should come in 76 on C₁. The setting for C₂ should be the same. The number of turns on L₂ may be adjusted so that the two dials read in step, 76-76, etc. The highest wave station on the prospective new band, 545 meters, will come in at 95 on C₁ and when L₂ is properly adjusted the reading will be the same here. If at your first attempt you can not get a station, look to your crystal detector, for sometimes it takes a minute or so to find a spot on it where you can hear signals, and perhaps five or ten minutes to get the most sensitive spot. When the best adjustment is found it may last

for days without requiring readjustment. If directions have been followed faithfully the only cause for failure of the set to work is in the crystal, granting that the tube oscillates.

The main tuning control is C₁. It tunes the aerial circuit. The tuning is sharp here. If a signal is coming through with C₁ properly set, then it will be hard even though C₂ be varied over a wide arc of its dial. However, there is only one point on C₂ that will bring in the maximum signal volume.

The circuit was so designed that although C₂ tunes the plate circuit it also has a tuning effect upon the aerial circuit. This accounts for the possibility (Concluded on next page)

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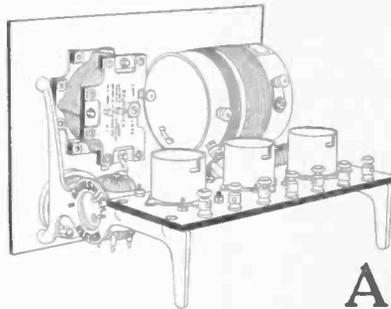
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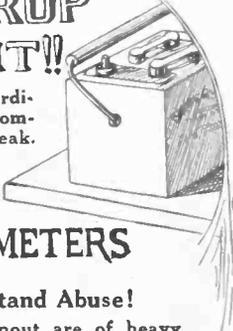
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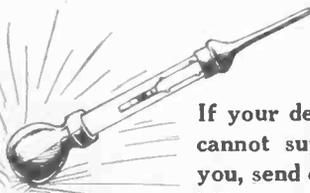
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(Concluded from preceding page)
of getting a station at two different dial settings, a few degrees apart, e. g., instead of WEAJ at 76-76 it may be heard at 73-79. Only one combination of settings gives best results and you will quickly find out that combination. However, unlike most circuits in which there is compensated tuning, you can not take a low reading for C_1 and a correspondingly high one for C_2 and still hear the station, e. g., 56-96. The latitude is a very small one, perhaps, never exceeding three or four degrees on the dial. This is due to the preponderating tuning effect of C_1 upon the aerial circuit. The fact that L_1 and L_2 are in inductive relationship causes the mutual contribution of inductance, the inductance of each being a little higher than it would be were the two coils not magnetically coupled. Also the contributory tuning of C_1 makes for greater selectivity in the aerial circuit, since a single-coil and condenser in that circuit, by themselves, would never afford sufficient selectivity. By plate tuning and some aerial tuning C_2 plays an important part in the circuit indeed.

If whistles are heard when stations are tuned in then the coupling between C_1 and C_2 is too tight and the distance between the end of one and the beginning of the other should be increased to $1\frac{1}{2}$ " or more. But this should not be necessary, as seven sets were made in RADIO WORLD'S laboratory and not one of them produced a whistle with the spacing made as suggested, but did whistle and suffer body capacity effects when the coupling was tightened to $\frac{1}{2}$ " or less. Thus regeneration without radiation was

actually accomplished. This is not generally true of the Superdyne, for it does radiate.

Another advantage of the 1-tube Superdyne is that it completely covers the wave band that will go into effect in a few weeks, 200 to 545 meters, which lowers the present minimum by about 22 meters.

List of Parts

- One cardboard cylindrical tubing, $3\frac{1}{2}$ in. diam. by 4 in.
- $\frac{1}{4}$ lb. No. 22 single cotton covered wire.
- One 75-turn duolateral coil.
- One fixed radio-frequency transformer.
- One tube.
- One socket to match.
- One A battery to match.
- One 45-volt B battery.
- One adjustable crystal detector.
- Two 4" dials.
- One single-circuit jack.
- One anti-capacity battery switch.
- One fixed resistance strip.
- Two variable condensers, vernier not necessary, .0005 mfd. capacity, normally 23 plates. These condensers must be low-loss.
- One pair of earphones.
- One 7x10x3/16 in. panel.
- One cabinet to match.
- One 6 $\frac{1}{2}$ x9 in. baseboard.
- 100 feet of braided enamelled aerial wire, 50 ft. insulated No. 14 lead-in wire, connecting wire for inside of set, flexible preferred; Fahnestock clips, solder, hardware.

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Tim Turkey's Talk

(Continued from page 22)

and see him working over a set, his almost red-hot soldering iron flourished, a piece of bus bar in the other hand, a varicoupler on the baseboard about to be mounted,

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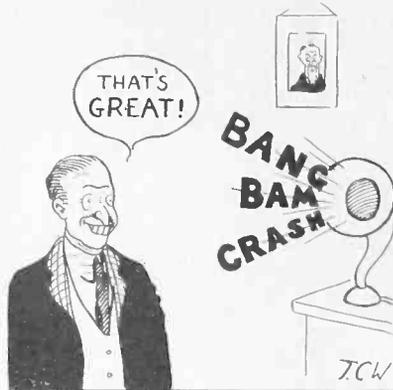
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He Likes Volume



VOLUME is Mike Denisby's hobby. Asked whether he prefers DX or volume, he cautiously answers: "Both."

and a high-loss condenser, with solid rubber end plate, hugging the panel. On his face is the grin of the satisfied man. I can tell you that Hen gets a lot of joy out of life, and most of that joy seems to come from ripping sets apart and putting them together again in some other form. Some day he will hear the Pacific coast from New York City. And then—then do you think he will quit? He will NOT. He'll try for Eiffel Tower, even if that station is sending out nothing but code in French, and he understands neither French nor English. But Hen's a boy after my own heart.

THEN there's the volume hound. Everybody has the DX fever, more or less, the temperature always being high and the severity of it only a question of degree. There's a real thrill in DX, because no matter how much you know about radio or how long you've been at it, you'll just look at your aerial and wonder how it all happens—that clear-as-a-bell reception from Hastings, Neb., coming right into your little flat in the First Assembly District! Yet some folks, like Mike Denisby, while strong for DX, are still stronger for volume and, if asked which they prefer, would answer: "Great DX with enormous volume." Bang, bam, crash, goes the speaker as some local comes pounding in, and Mike says to himself, hands in the pockets of his cozy smoking jacket: "That's great."

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