

# NEW 'SUPER-HET' WORKS SPEAKER ON 3 TUBES!

By A. F. Lapierre, Consulting Engineer

# RADIO WORLD

Title Reg. U. S. Pat. Off.

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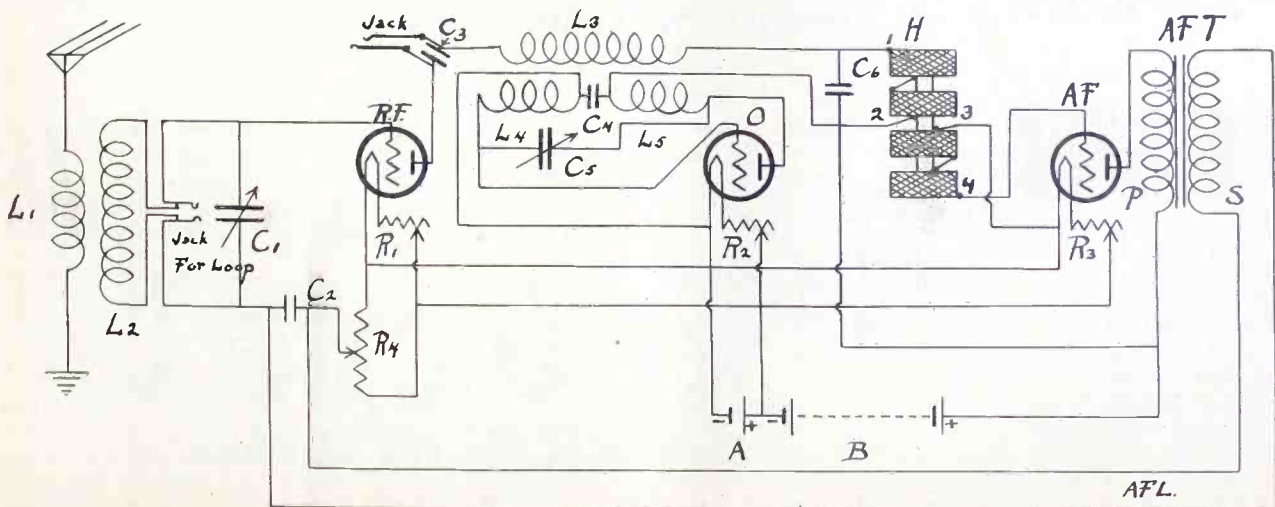
# HORN ON 1 TUBE!

Dynoflex, a Tube-and-Crystal Set, Brings in Locals With Plenty of Volume

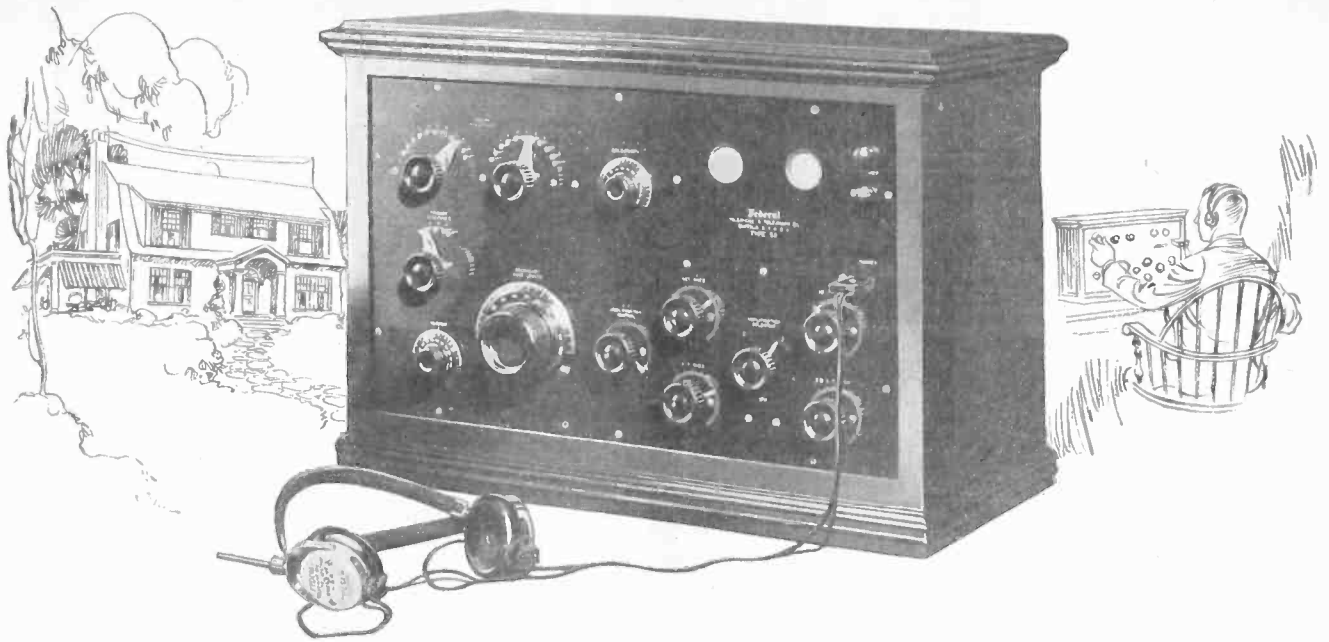
By N. N. BERNSTEIN, TECHNICAL EDITOR



(Fotograms) THE THREE-TUBE "SUPER-HET," inspires terpsichorean joy.



CIRCUIT NETWORK of Three-Tube Super-Heterodyne, which works a loud speaker. No detector is used in this circuit, as the incoming wave is made audible by heterodyning. For correct wiring of connections to H see Page 5.



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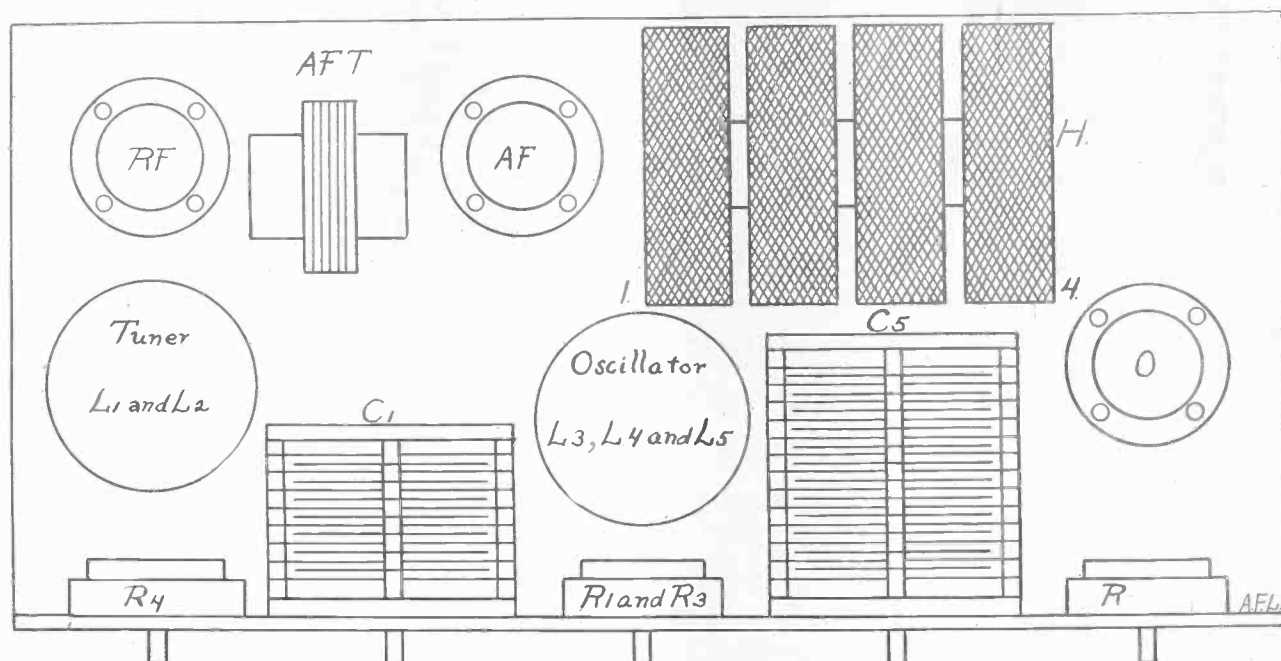
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## A 3-Tube Super-Heterodyne That Works Without Detector

Using Only a Bedspring Aerial, Louisville, 600 Miles Away, Was Heard by the Author on a Loud Speaker—Total Cost of His Set, Complete, \$55



CONSTRUCTIONAL PLAN FOR LAPIERRE'S 3-TUBE SUPER-HETERODYNE, printed at about one-third scale, shows the simplicity of the assembly. The three tubes (corresponding to those in the circuit network published on the front cover) are RF, radio-frequency; O, oscillator, and AF, audio-frequency. The AF transformer is placed between the RF and AF tube sockets. The tuning coil, L1L2, is right behind the potentiometer, R4. C1 is 17 plates, C5 is 43 plates, both variable condensers. One rheostat (R1R3) controls the RF and AF tubes. The oscillator tube has its own rheostat, R2, at extreme right (shown in assembly diagram merely as R). The honeycomb coils are mounted on a cardboard tube 2 inches diameter by 7 inches. H1 is the No. 1 connection and H4 the last one on H. See Page 5 for correct way to wire.

By *A. F. Lapierre*

Consulting Engineer

ANYBODY desiring a set for loud speaker operation on local and DX stations normally must make provisions for three tubes. So popular is the Super-Heterodyne that the prospective constructor prefers, if possible, that type of receiver. But the obstacles, such as cost and some difficulty in construction, often prevent the most desired Super-Heterodyne from being the one selected. But here I present a Super-Heterodyne that uses only three tubes, that is not difficult to construct, that costs about \$55, complete, including everything, except speaker and storage battery. Its selectivity is good, volume and tone quality superb. It is just the kind of receiver thousands of fans have been waiting for, affording optional loop or aerial operation. The 4-tube Super-Heterodyne, which functions without a detector, is adapted to 3-tube operation by reflexing the first audio tube for a stage of RF. The audio-frequency transformer is brought around to the first tube at C<sub>2</sub> and the plate circuit of the first tube is in series with a bypass condenser C<sub>3</sub> which is shunted by a jack and constitutes the output of this set.

L<sub>1</sub> and L<sub>2</sub> constitute a fixed coupler consisting of a bakelite or hard rubber tube 3½" in diameter wound with 15 turns of No. 22 DCC for L<sub>1</sub> and 65 turns of the

same wire for L<sub>2</sub>. There should be a separation of ¼" between these coils and both must be wound in the same direction. L<sub>2</sub> is shunted by a double-circuit jack for use with a loop. This jack, as shown in Fig. 1, allows the same condenser to tune either the loop or the secondary of the coupler, depending on whether the operator desires to use the loop or outside antenna for reception. Therefore, if a loop is to be used con-

(Continued on next page)

# How to Wind the Oscillator Coil

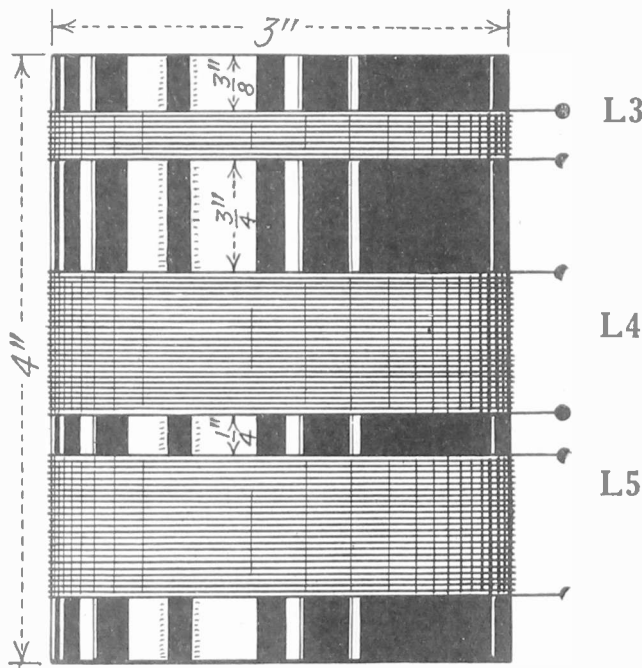


FIG. 2—The oscillator coil consists of L<sub>3</sub>, L<sub>4</sub> and L<sub>5</sub>, and is wound with No. 22 DSC or SCC wire on a 3-inch diameter tube 4 inches high. L<sub>3</sub> consists of 10 turns, begun  $\frac{3}{8}$ -inch from the top. Terminate and, leaving  $\frac{3}{4}$ -inch, wind 35 turns for L<sub>4</sub>. Also L<sub>5</sub> consists of 35 turns, begun  $\frac{1}{4}$ -inch from L<sub>4</sub>. The beginning of L<sub>3</sub>, at extreme top of the tube, connects to one side of the fixed condenser C<sub>3</sub>. The end of L<sub>3</sub> goes to H<sub>1</sub>, the beginning of the primary of the honeycomb transformer, and to one side of the fixed condenser C<sub>6</sub>. The beginning of L<sub>4</sub> goes to one side of the variable condenser C<sub>5</sub> and to the grid of O. The end of L<sub>4</sub> is connected to the A- and to one side of fixed condenser C<sub>4</sub>. Thus a direct grid return is accomplished through L<sub>4</sub>. The beginning of L<sub>5</sub> goes to the remaining side of C<sub>4</sub>, to the end (H<sub>2</sub>) of the primary of the honeycomb, and to the remaining side of the fixed condenser C<sub>6</sub>. The end of L<sub>5</sub> connects to the plate of O and to the remaining side of C<sub>5</sub>. See page 5 for trouble shooting advice on the oscillator coil.

stantly, the coil L<sub>1</sub>L<sub>2</sub>, designed for aerial-ground connection, need not be made.

The oscillator consists of L<sub>4</sub> and L<sub>5</sub> in conjunction with a pickup coil, L<sub>3</sub>. The inductance values are L<sub>3</sub>, 10 turns of No. 22 on a 3" tube. Then leave  $\frac{3}{4}$ " and wind L<sub>4</sub>, which consists of 35 turns of the same wire. After leaving another space of  $\frac{1}{4}$ ", wind 35 more turns for L<sub>5</sub>. This unit, with the condenser C<sub>5</sub>, is the heart of the set and must be carefully constructed.

The next unit of importance is H. This unit picks up the heterodyne wave and passes it on to the third tube at audio frequency. Care must be taken that all the coils are in the same direction. This is important. One sure way, and also one that is convenient for mounting these honeycomb coils is to buy them with mounting plugs attached. Then with four spare mounting plugs firmly attached to a bakelite strip of sufficient length the coils may be conveniently plugged in. This also facilitates wiring to a great extent, making it very rigid. These coils are 1,500 turns in either the duolateral or other well known style of compact inductances.

Two coils are connected in series for the primary of H and the other two in series for the secondary.

Next is the audio-frequency transformer. It should be of a medium ratio, preferably 5-1, and of a good make.

The condenser C<sub>3</sub> is rather critical and several different sizes should be tried out to ascertain the correct capacity, as it was found that different phones or speakers required different capacities. Using a Music Master horn a capacity of .0015 was found to be correct.

UV201A tubes or their equivalent were found almost

necessary, due to the tremendous energy put out by the first tube. As these tubes only draw .25 amperes this is no hardship and the cost is the same. Each of these tubes requires a 20-ohm rheostat.

Only first-class material should be used. Low loss condensers are almost a necessity to keep the tuning reasonably sharp, otherwise the set tunes broad. For the bypass condensers C<sub>2</sub> and C<sub>3</sub> noiseless mica condensers should be used so that the leakage may be kept at a minimum.

This set is easily tuned, the procedure being the same as in other Super-Heterodynes. The first or tuning condenser C<sub>1</sub> is varied one or two degrees at a time and the oscillator condenser C<sub>5</sub> is slowly rotated over its entire scale for each setting of C<sub>1</sub>. During this procedure the lever of R<sub>4</sub> should be kept towards the negative side of A battery. If a loud howl is heard, ease the potentiometer off till the signal is heard or the howling stops. Then proceed to retune either for better reception of the signal or to another signal. With a little care you can learn to tune this set properly and get wonderful results for three tubes.

I heard Chicago on a loud talker with a 35-foot outside antenna, on my set, besides a host of other stations nearer New York, some with head phones and some on the speaker. The set was tried with a bed spring antenna and the results were remarkable, especially head phone reception, and the set promises to show real results this writer as a DX getter. On the bed-spring I got Louisville, Ky. (600 miles) on a speaker. These results were obtained with the assembly strewn over a table, with no semblance of order.

## PARTS NEEDED

- |   |  |
|---|--|
| One panel, 7 x 18 inches.   | R1, R2, and R3, rheostats of proper rating for tubes (see text). |
| One bakelite tube 3 x 4 inches for oscillator coils L <sub>3</sub> , 4 and 5. | R4, a 300-ohm potentiometer.                                     |
| One bakelite tube 3½ x 4 inches, for fixed coupler L1 and L2.                 | Three sockets.   |
| Four 1,500-turn honeycomb coils (H).  | One double-circuit jack.   |
| C1, a low-loss variable condenser .0025 mfd.                                  | One open-circuit jack.   |
| C5, a low-loss variable condenser .001 mfd.                                   | One audio-frequency transformer, 5-1 ratio.                      |
| C2, C4, C6, mica fixed condensers .001 mfd capacity.                          | Three tubes, preferably 201A or equal.                           |
| C3, mica bypass condenser (for capacity see text).                            | Two 4-inch dials.  |
|   | Five binding posts.  |
|   | ¼ lb. No. 22DCC wire.  |
|   | Spaghetti, bus bar wire, lugs, solder, sundries, etc.            |

The makes of parts, etc., that I used successfully included 7 x 18-inch Radion panel, DeForest 1,500-turn honeycomb coils, Cardwell low-loss condensers (Bowman condensers also worked well), Dubilier mica fixed condenser, .001 for C<sub>3</sub>, with an Amplex grid-denser in parallel with C<sub>3</sub>, enabling variation at this critical point; 400-ohm Amsco potentiometer; Pacent jacks and Amertran AF transformer. The Amplex grid-denser was of the type ranging from .0002 to .001 and had leak clips, so that it might be used in other experimental work for a variable grid condenser. The same variation may be applied to C<sub>6</sub> as to C<sub>3</sub>, as C<sub>6</sub> is somewhat ticklish.

The panel layout is simple and follows the instrument layout, making a beautiful and symmetrical job. From the bottom measure 2 inches and along this line layout the center holes for the rheostats and potentiometer, measuring 2 inches from each end of the panel and marking one point exactly 9 inches from the end, or at the center. From these points the screw holes are then marked and center punched for drilling. The potentiometer goes on the left-hand end. Now for the



# Trouble-Shooting in Detectorless Set

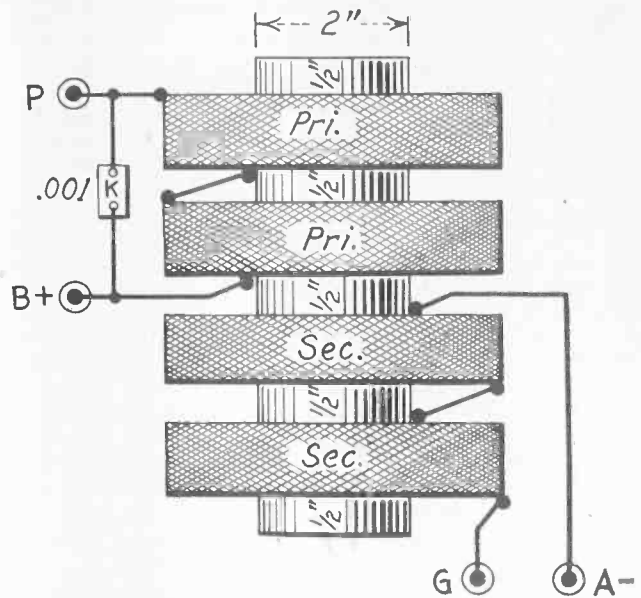
## Wiring Directions, Lapierre's 3-Tube Super-Heterodyne

1. Connect the aerial binding posts to the beginning of L1, and the other end of L1 to the ground binding post.
2. Connect the ends of L2 to the inside leaves of the two-circuit jack.
3. Connect one outside leaf of the two-circuit jack to the stator plates of the condenser C1 and to the grid binding post of the first tube. The other outside leaf is connected to the rotor of the condenser C1 and to one side of C2. The other side of C2 goes to the slide of the potentiometer R4. (In the case of an ordinary condenser the stator plates go to the grid, but here low-loss condensers are recommended.)
4. Connect the rheostats R1, R2, and R3, together and then to the plus A binding post, and to one side of R4. The other side of R4 is brought to the minus A. The minus A is brought to the sockets. The rheostats are brought to the other filament post on the sockets. Plus A and minus B are connected together.
5. Connect the plate of the first tube to one side of the open-circuit jack and to one side of C3. The other side of the jack is connected to the other side of C3 and to one end of L3. The other end of L3 is brought to one side of C6 and H1. See caption in next column for right method.
6. The inside terminals of L4 and L5 are connected to C4. The inside terminal L4 is connected to the minus A of the tube O. The outside of L4 is connected to one side of C5 and to the grid of this tube. The inside of L5 is connected to the condenser C6 and to H2. The outside of L5 is connected to the other side of C5 and then to the plate of tube O.
7. Connect H3 to the minus A of the third tube. Connect H4 to the grid of the same tube.
8. Connect the plate of the third tube to the plate binding post on the primary of AFT. Connect the B plus to the other end of the primary. The B plus also goes to H2.
9. The G post on the secondary is connected to C2 on the side nearest the grid of tube RF. Connect the other secondary post to the condenser C2 nearest R4.

condensers. Measure  $3\frac{1}{2}$  inches from the top and along this line the condensers are mounted,  $5\frac{1}{2}$  inches from either end of the panel. The loop jack is mounted in the upper left-hand corner in a convenient position for connecting to coil L2 and the condenser C1. The output jack is mounted in the upper right-hand corner, the same distance from top and side. The instrument layout is not very elastic and the panel layout must follow it closely.

The keynote of this set is the transformer H. The circuit must be adjusted to oscillate at an audible frequency. This is imperative. To do this we may either add more honeycomb coils or else increase the size of the condenser across H<sub>1</sub> and H<sub>2</sub>. In this position we may try a .002 or .003 mfd. fixed condenser and shunt H<sub>3</sub> and H<sub>4</sub> with a .001. We must come very nearly to resonance in these two circuits if we are to transfer the maximum amount of energy from one circuit to the other. This is an air core transformer and depends on resonance for operation.

Be sure that the oscillator circuit is percolating. This requires at least 90 volts of B battery. One method to determine if this tube is oscillating is to bring a regenerative set near the coils and listen for



IN CHECKING UP, if you find your 3-Tube Super-Heterodyne does not function properly, pay close attention to the oscillator coil, the fixed condenser C3 (designated K above) and the honeycomb arrangement. Your honeycomb coils may be hooked up as shown above. If so, you have made a mistake. The two honeycombs constituting the primary and the two comprising the secondary are bucking each other, if arranged as shown in diagram, and the set will not work. It is vital that the windings be in the same direction. In the diagram the primary coils start on the outside of one coil and the lower set (secondary) on the inside of a coil. Have both start on the inside and end on the outside of a coil. The beginning of a honeycomb coil emerges from beneath the winding. The end is on the outside. Hence the mounting should be: top coil, P, connected to inside; end of top coil (outside wire) connected to beginning of next coil (inside wire), the free end going to B plus 90 volts. That completes the primary. The next two series-connected coils would then be correctly wired if done as shown in above diagram.

a whistle. Make sure that the regenerative set is not the one whistling. Another method is to bring a thermo-coupled milliammeter in inductive relation to the grid coil. If there is a needle deflection, all's well. If not, then the trouble lies in the oscillator. Tighten coupling, decrease resistance, increase B battery voltage. Removing the intercoil fixed condenser as another experiment. The fixed intercoil condenser must not be removed unless connections are changed on the oscillator coil, otherwise the batteries would be shorted and the tubes possibly destroyed.

One thing MUST be done—be sure that the four honeycomb coil windings are in the same direction. This requirement is fulfilled by seeing that the ends of each of the coils point in the same direction. The beginning of a honeycomb coil emerges from under the winding. The end is on the outside.

In some trouble shooting the writer performed on a friend's set, these coils were so arranged that the first two were in one direction and the next two in the other. The set would not work at all. The change was made and the set worked. It is a difficult set to build and operate properly but is well worth the time and pains.

The directions I have given for winding the oscillator coil are those I followed myself, and I got good results. However, as we are blazing new trails, greater improvements will be devised than are suggested herewith. One friend of mine built the set and complained that signals were not strong enough. I advised him to add more turns to L3 and thereby also automatically decrease the distance ( $\frac{3}{4}$  inch) between L3 and L4 (see Fig. 2). He reported that he used 25 turns instead of 15 for the pick-up coil L3 and signals came in strong.

# Crystals as Oscillators and Amplifiers

**N**EW glories are in store for the catwhisker and crystal set in the realm of radio. A radio revolution has begun in Russia that promises to restore and greatly enhance the pristine vogue of the crystal, making it in future a rival of the vacuum tube as an amplifier and even generator of continuous electric waves. This opens up new vistas in the radio world with prospects of tubeless receiving and transmitting sets capable of emulating some of the wonderful achievements of the thermionic tubes, merely by the use of crystals. It requires little imagination to see that if the promises make good, the simplification of the radio fan's outfit will tend to bring radio wonders within the ken of greater numbers than ever all the world over.

Hitherto the one drawback that has proved fatal to the crystal in competition with the tube has lain in the fact that it will not amplify. But this heavy handicap upon the efficiency of the crystal detector appears at length to have been overcome by successful experiments carried out by M. Lossev, a Russian radio engineer. Crystal users may soon be able to compete upon more level terms with those who can indulge in expensive tube sets. This development is due to the discovery that it is possible to make a crystal detector generate self-sustained oscillations, and therefore function as a relay, in much the same way as a back-coupled thermionic tube.

It is the result of patient researches carried out for many years by Russian scientists and engineers, who, like American inventors, such as G. W. Pickard, have

long been exploring the mysterious phenomena associated with crystal surfaces.

A number of amateurs in a large city of Russia are using the crystal successfully, but only for transmission and reception of code over a distance of 800 meters, which distance will certainly be increased within a short time.

Up to the present zincite (oxide of natural zinc), used with a steel point has given the best results.

Zincite is a dark red mineral mixed, in form of small crystals, with another mineral, or vein-stone, from which these small crystals must be separated. The crystals are then set in Wood's alloy, as in the case of galena, and the whole crystal is then mounted in the same way as an ordinary detector.

It is also possible to get a more sensitive crystal by casting it in an electric arc.

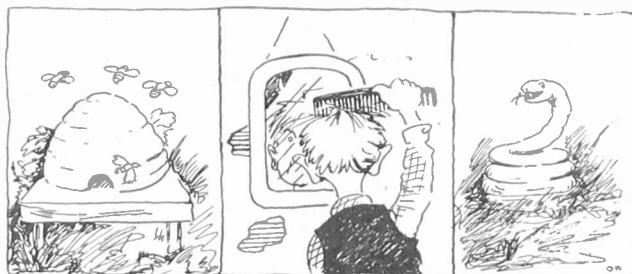
M. Lossev studied the characteristics of this contact, that is, the curve of the milliamperes functioning with the volts applied, and found the curve of Fig. 3, which shows a curve of negative resistance (to the right), analogous to that of an arc.

The contact of the catwhisker and crystal causes oscillations at high frequencies, the potential difference being sufficient. For longer waves (low frequencies) a circuit is used that employs a potentiometer to give a variable voltage, the resistance (R) being about 1,000 ohms. Earphones of from 100 to 150 ohms resistance are used in all the circuits.

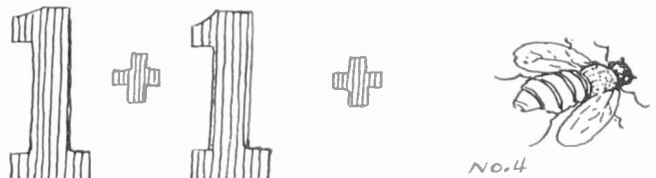
The Autodyne receiver is shown in Fig. 2 for long waves, in Fig. 4 for short waves. For short waves (Fig. 4) it is well to use a fixed condenser.

## Solve These Rebuses, Get on Honor Roll

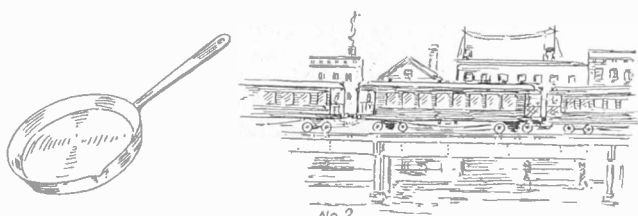
**H**EREWITH are reprinted Rebuses Nos. 1, 2, 3, 4 and 5. Ensuing ones will be republished next week, so that, all told, nine will be reprinted. Then three new ones will be published, one a week. The reprinting is done to enable those who missed previous issues to be eligible for the Rebus Honor Roll. Those who correctly answer all twelve will be put on the honor list and their names published. Address, Rebus Editor, RADIO WORLD, 1493 Broadway, New York City.



Rebus No. 1



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TRO



Rebus No. 5

# Long and Short Waves Heterodyned

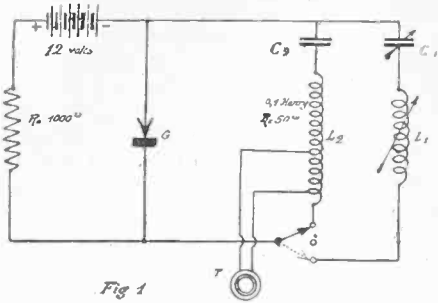


Fig 1

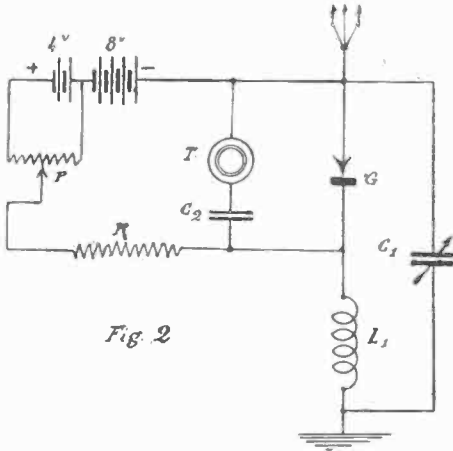
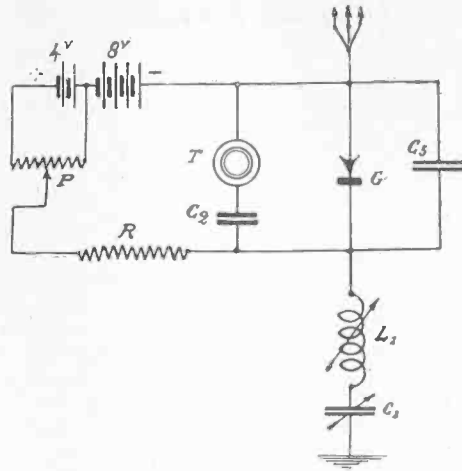


Fig. 2

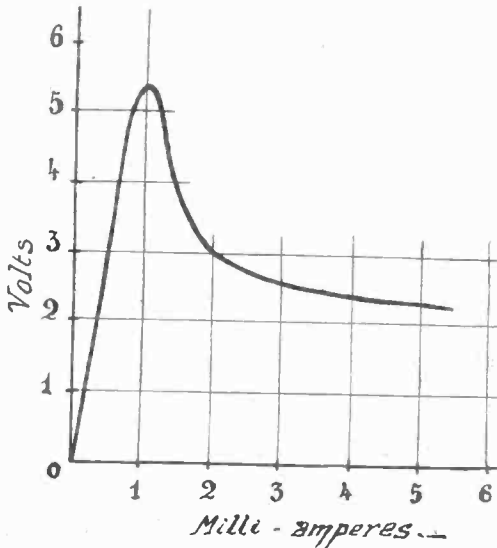


Fig 3

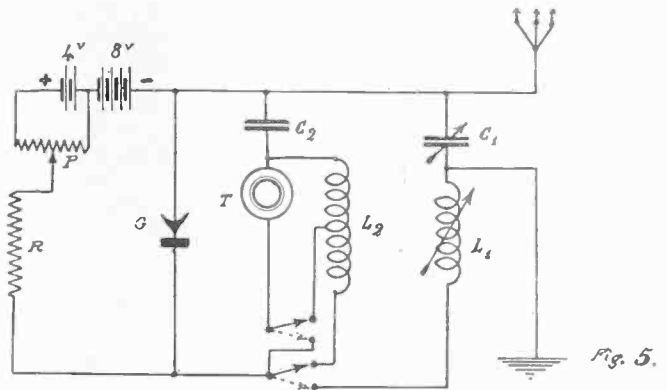


Fig. 5.

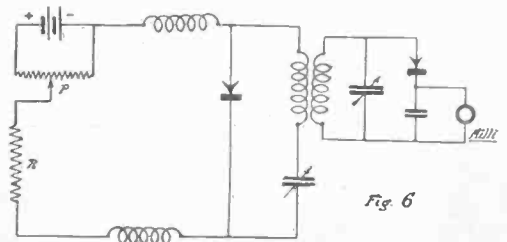


Fig 6

FIG. 1 is the Pickard crystal heterodyne system. A local battery of 12 volts is impressed on the crystal detector through a resistance of 1,000 ohms. The oscillator circuit consists of the fixed condenser C3 and the inductance L2. The tuning is done by means of the variable inductance L1 and variable condenser C1. Fig. 2 is the Autodyne receiver for long waves. Here the crystal detector is placed in series with the antenna, and a local battery of 12 volts applied through a fixed resistance and potentiometer. The tuning is done by condenser C1. Fig. 3 shows the characteristic of generating point of the oscillating crystal. At 5.1-3 volts there is a current of 1 milliampere. Fig. 4—The short-wave receiver is identical with the long-wave receiver (Fig. 2) with the exception that the tuning is done by means of the variable condenser placed in series with the ground. Fig. 5—Combination of long-wave receiver with low-frequency circuits. This system combines the Autodyne long-wave receiver (Fig. 2) and the short wave system (Fig. 4). Fig. 6—Short-wave generator system. The local battery and crystal generate an appreciable current which can be measured with a milliammeter when the two circuits are placed in inductance relation. Fig. 4 is at right on top of page.

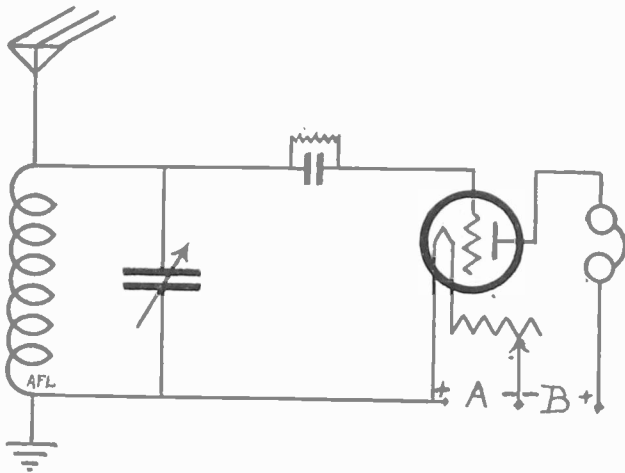
# Playing With the Kiddie Kar of Radio

By Herman Bernard

THE experimenter may spend many pleasant evenings tinkering with single-dial circuits that use only a tube. Where a tube-and-crystal combination is used other fields are open, but the tube alone affords sufficient opportunity for whiling away a dozen enjoyable evenings.

The big problem is to obtain selectivity. In some localities, especially where the set-owner is satisfied to listen to stations not more than 100 miles away and whose wavelengths are not less than 30 meters apart, selectivity may not be necessary, and a circuit used as shown in Fig. 1. This is the simple audion, consisting of a coil of wire bridged by a variable condenser. The quality of reception is as excellent but the selectivity is poor. It is from this point that the experimenter must proceed forward and it is well that he hook up this circuit just to see how it works. Also he will obtain sufficient data on the combination of coil and condenser to permit him to move quickly as he progresses to a more selective and, if possible, wholly satisfactory single-dial set.

As there will be considerable switching of connections the experimenter should rig up a variable condenser on a panel, say 7 x 7 inches, and mount the tube socket on a baseboard to be attached to the panel. The condenser should be mounted far enough at the right to permit insertion of coils. If he will keep the condenser as far to right as possible he will fare well. A rheostat should be mounted on the panel and the A battery connections wired. So much of the mounting and wiring as has been described already will be permanent for all tests. When the plate lead is brought to one of the phone terminals the experimenter should remember that this lead will have to be changed somewhat, so provision for facilitating this should be made at the beginning. In fact, to make the work lighter, spring clips should be fastened to the two sides of the variable condenser and one clip to the plate terminal for phone connections, as the plate lead is to be intercepted by a coil. Twisted wire connections should be avoided, not only because they are inefficient but because they are dangerous. The B battery current may be fed accidentally to the filament and the tube ruined. The use of insulated wire



THE SIMPLE AUDION CIRCUIT (Fig. 1), consisting of coil and condenser, brings in signals of startling quality, with crystal purity, but with a fine volume that the crystal lacks. But the circuit is not a bit selective and locals and they are not less than 30 meters apart in wavelength. If the station is powerful and near (say, 6 miles or so), it will be heard almost all over the dial, if a 23-plate condenser and 50-turn honeycomb coil are used. The hook-up should be tried out, however, as the first experiment with single-dial sets.

for connections, due to the shifting, is recommended. Annunciator wire will serve the purpose.

With the parts thus mounted and facilitating precautions observed, try out Fig. 1. If you use a .0005 mfd. variable condenser (normally 23 plates) you may use a 50-turn honeycomb coil. As fans know their condensers rather by the number of plates than by the actual capacity, and as different makes of condensers with the same number of plates vary as to minimum and maximum capacity, the experimenter will do his own matching. He may find that the 50-turn honeycomb coil does not reach the highest radiocast wavelength when paired with his 23-plate condenser. He will then substitute a 75-turn honeycomb coil. This may bring in high wavelength stations near the 50-degree mark on his condenser dial, which, of course isn't satisfactory, because the inductance probably will be too high for the low wavelength radiocast stations. Turns of wire should be removed from the coil, one or two at a time, until stations like WNYC (526 meters) come in around 70 or 75. Even 80 will do nicely. Now the condenser and coil are matched and the selectivity and quality of signal may be tested.

I live six miles from WEAJ (492 meters) and six and a half miles from WNYC. These stations radiocast on a 1,000-watt power, the highest the law allows for regular radiocasting. Using the circuit shown in Fig. 1 it was impossible to separate these two stations, although their wavelengths are 34 meters apart. The aerial pointed in the direction of both of them, which made matters worse. WNYC could be heard very loud, with WEAJ always giving faint competition. WEAJ could never be heard loud without almost as much volume coming from WNYC. In fact, WNYC could be heard faintly within a 30-degree dial variation of where it came in strongest. Certainly this is selectivity-minus!

The quality and volume of reception from such stations as could be heard without interference was remarkably good.

An improvement on the foregoing circuit is shown in Fig. 2, where another coil is introduced. The aerial circuit is tuned by the condenser and the coil's terminals are connected to aerial and ground, exactly as formerly, but a new coil, L2, is introduced in the plate circuit. L1 and L2 are closely coupled. L2 may be a 35 or 50-turn honeycomb coil. The experimenter may try both, and even put in a 75-turn coil in the plate lead, observing how the increase in the number of turns affects the tuning of the aerial coil. Does the condenser dial read lower for a given station than before? If so, more inductance has been placed in the aerial circuit, due to the introduction of the additional coil, L2, although that coil is only in inductive relationship to L1 and is not physically connected in the aerial circuit.

The fact that the two coils are closely coupled causes the tuning of L1 to affect L2. It is the same principle of forced tuning present in the 3-circuit tuner, with its aperiodic or untuned primary. There is tuning indeed, although the primary is called untuned, for varying the capacity by rotating the movable plates of the condenser affects the neighboring coil as well as the coil to which the condenser is physically connected.

The object in view in such a circuit as shown in Fig. 2 is to obtain feedback from plate to grid circuit. When such feedback is properly balanced you have regeneration. In fact, regeneration should be present in the circuit even when the balance is not perfect, but by testing the signals with L2 in the plate circuit, and then with the plate of the tube connected directly to the phone tip, which you can easily do by short-circuiting



# Fascination in Single Dial Sets

L2, you will find out what effect, if any, L2 has on volume.

If the tuning accomplished by means of the variable condenser is such that, while it directly tunes L1 it also tunes L2 in proper relationship, you have a good single-dial regenerative set. Theoretically this works out fairly well, and perhaps some reader will be able to accomplish something interesting with this simple hookup.

For those who care to experiment along this line an assembly plan for mounting the parts is shown in Fig. 3. The variable condenser might be mounted farther to the right than shown in the diagram, to give you more room for coils that may be added later. The two honeycomb coils shown in the diagram may be tied together with a piece of string. For convenience, and as coils are to be put on and taken off, tying may be done by winding a piece of cord, upright, twice around the outside of the two coils and making a firm knot. The security afforded is sufficient and the tying may be done easily.

Those desiring to tie the coils more firmly may pass four pieces of string, one at a time, first through the inside and then around the outside of both coils, making a firm knot at the end, each string being equidistance from its neighbor. This requires some one to hold the coils in place while you do the tying.

So far we have been tuning the primary directly. Now we will try a circuit (Fig. 4) in which the primary is aperiodic and the secondary or grid circuit is tuned by the condenser.

The same condenser-and-coil combination used previously may be employed now. The coil that was in series with the plate lead is removed. A 25-turn honeycomb coil may be connected to aerial and ground. This coil (L1) is mounted in close inductive relationship to the other coil. At first they may be just as close as you desire. But here, as in the previous instance, some attention may well be paid to varying the degree of coupling. A strip of hard rubber, such as used for panels, may be placed between the coils, to keep them 3-16 to 1-4 inch apart. Two pieces may be used to increase the distance, that is, decrease the coupling.

The circuit in Fig. 4 is regenerative, when properly balanced. The presence of regeneration is easily discovered, of course, especially when a high-inductance coil is used as suggested, and most especially when a fixed condenser, in addition, is shunted across the plate coil. So great may be the regeneration that signals can not be heard. Fierce oscillation is indeed a vice, and its prevention lies in getting the proper balance in among the coils. If it is possible to balance them so well that the variable condenser adequately tunes both plate and grid, then you will have a great set. There may be more in the idea of using the one condenser to tune all three coils at once than has been popularized to date, but it must be remembered that high-efficiency tuning of the ulterior circuits is not accomplished by the forcing method, and the problem resolves itself into obtaining the happiest compromise. Also, if regeneration is obtainable, and the balance can be struck to such a nice degree that there will never be an excess of regeneration, then you will have a regenerative set that positively does not radiate if the tube is not forced into oscillation. Some reader may produce the single-dial regenerative set that never quite reaches the saturation point which is the vice of regeneration. In the hands of an unskilled operator the regeneration is frequently brought beyond the saturation point and the set functions as a miniature sending station, emitting

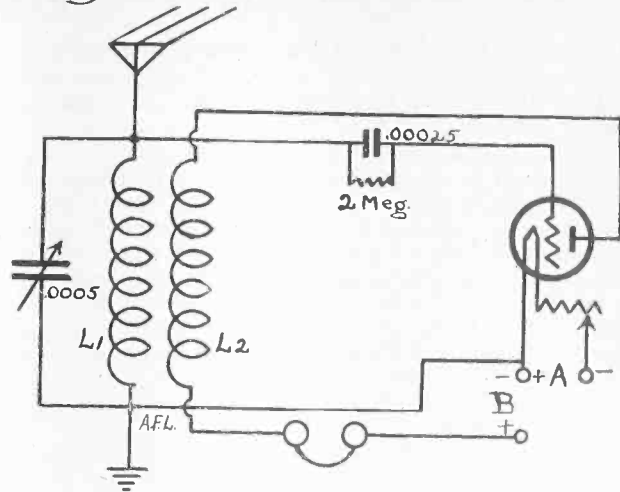
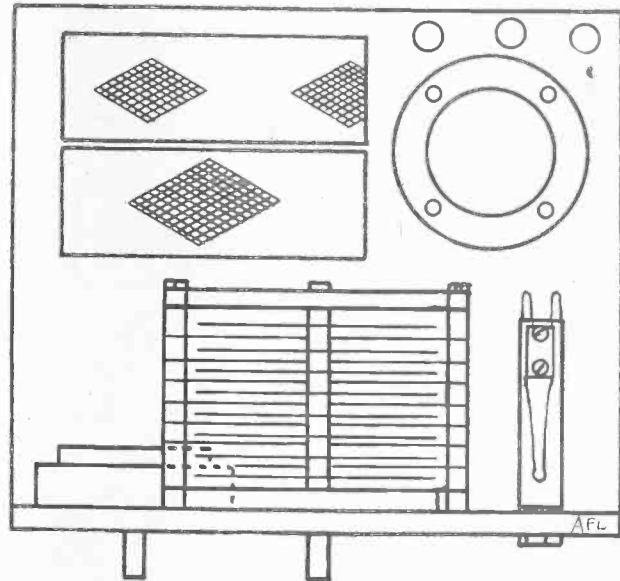
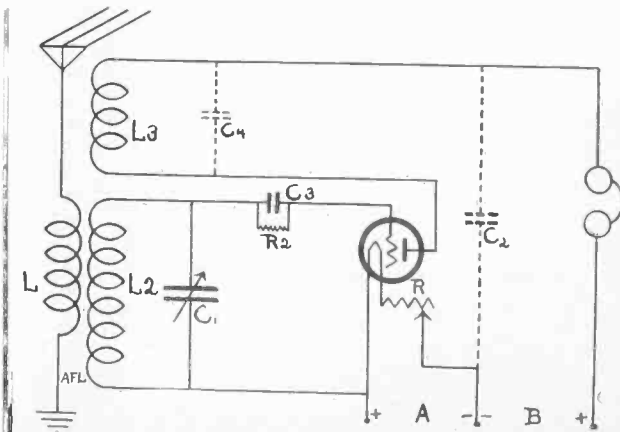


FIG. 2 is an improvement on Fig. 1. Here regeneration is introduced, the plate current being fed back to the grid circuit by L2, a 35-turn or 50-turn honeycomb, closely coupled.



HOW to mount parts for a single-dial set (Fig. 3), using honeycomb coils. This assembly plan is good for any of the circuits discussed in the accompanying article. Mount the variable condenser as far to right as possible.



AN APERIODIC PRIMARY is used in this circuit (Fig. 4). The ground and A+ may be wire-connected. Try .001 and .002 fixed condensers for C2 and C4. This hookup has possibilities.

# DX Obtainable on Only One Knob

squeals on its own heterodyned wavelength to the annoyance of neighbors trying to listen to some interesting program or tune in a station on the same wavelength.

For Fig. 4 you may wind the following coil: On a tube 4 inches in diameter by 3 inches high, wind 31 turns of No. 22 DCC wire. Terminate. Leave one-eighth inch space and wind 45 turns of the same wire in the same direction and terminate. Over the 31 turns wind 15 turns for the primary. Bind the terminals of the top layer of 15 turns with sealing wax. The 15 turns are L1, the 31 turns L2 and the 45 turns L3. Used in conjunction with a 23-plate condenser this arrangement will work. If you use honeycomb coils, try 25 turns for L1, 50 for L2 and 60 or 75 for L3. Interchange L2 and L3. Try adding more turns or the equivalent in the plate circuit. Then try cutting the turns down to 10 or less.

Variations are advised in the plate circuit if a homemade coil is used because the coil in the grid circuit is partly covered by the primary winding and may be harder to alter. A substitute for adding more turns

turns of the same wire in the same direction for L2. The condenser is 23 plates. C2 is the fixed grid condenser, R1 the grid leak and R2 the rheostat. L1 is connected to the ground and the aerial. A fixed condenser, .001 mfd., joins the end of L1 to the beginning of L2. If honeycomb coils are used try a 25-turn coil for L1 and a 75-turn honeycomb coil for L2. The connection of the aerial-plate circuit to grid circuit gives the feedback that makes regeneration.

A wavetrapp of almost any kind may be used in these experiments. Especially is the single-coil-and-condenser variety adaptable to this use. A wavetrapp having primary and secondary windings may be used for the double circuit work; also, if the primary terminals are brought to binding posts, it is useful in single-circuit work. However, it is best to use honeycomb coils, for they are easiest to handle and, besides being efficient, are inexpensive.

Those who prefer spider web coils may use them to excellent advantage in these circuits, especially the low-loss kind, described by Byrt C. Caldwell in *RADIO WORLD*, issue of August 2, and adopted by N. N. Bernstein in the new 1-tube-and-Crystal Loud Speaker Reflex, published in this issue. Low-low coils and con-

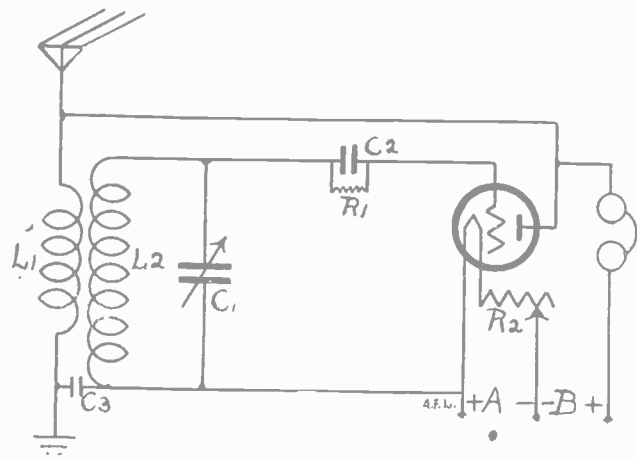
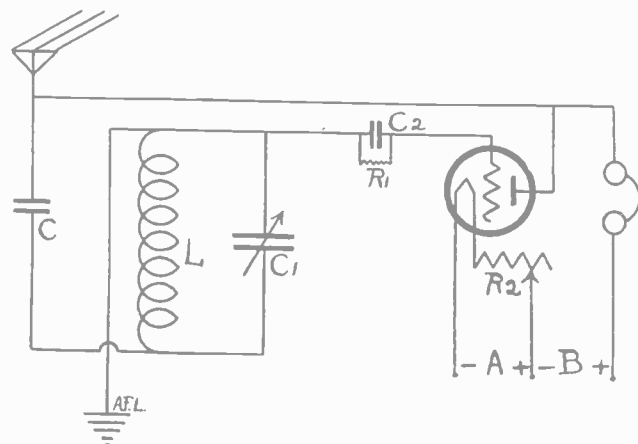


FIG. 5—The most popular one-knob set, with a large section of fans. The grid return is both to the plate and the A+. The circuit is a modified Colpitts receiver and is in the Ultra-Audion class. Try it for DX and selectivity. Many report good results. It is also a regenerative circuit, the plate current being fed to the grid circuit through induction and across the fixed condenser C3.



THE GRID RETURN is to plate and ground in this circuit (Fig. 6). Try introducing an aperiodic primary, also a plate coil, both closely coupled with the grid coil L. How about connecting the lower end of C1 (aerial lead) to A+? The fixed condenser C should be a good one, .001 or .002, for it alone, in that case, would avert short-circuiting the B battery.

of wire to the plate coil is to shunt the ends of this coil with a fixed condenser. Try .00025 or less, at first, and work up. You may find that the natural wavelength of the coil is ultimately boosted so high that, due to conjunctivity, the whole combination of coils is raised above and beyond the highest radiocast wavelength. Of course the wavelength may be boosted in any of the experiments on any of the coils by the introduction of the shunted fixed condenser. In the grid circuit one end of the condenser would go to the ground, the other to the aerial. In the grid circuit the fixed condenser would be shunted across the variable condenser. C4, shown in a dotted line, is the optional fixed condenser for the plate circuit. C2 is an optional fixed condenser bypassing radio-frequency currents, so they will not have to travel through the B battery and phones, and in some cases produces a marked improvement in the tone quality, though it has no effect on the wavelength in most circuits.

A combination of regeneration and the Ultra-Audion circuit exists in Fig. 5. A self-wound coil would consist of 20 turns of No. 22 DCC wire, wound on a 3-inch diameter tube 4 inches high. Terminate, then wind 55

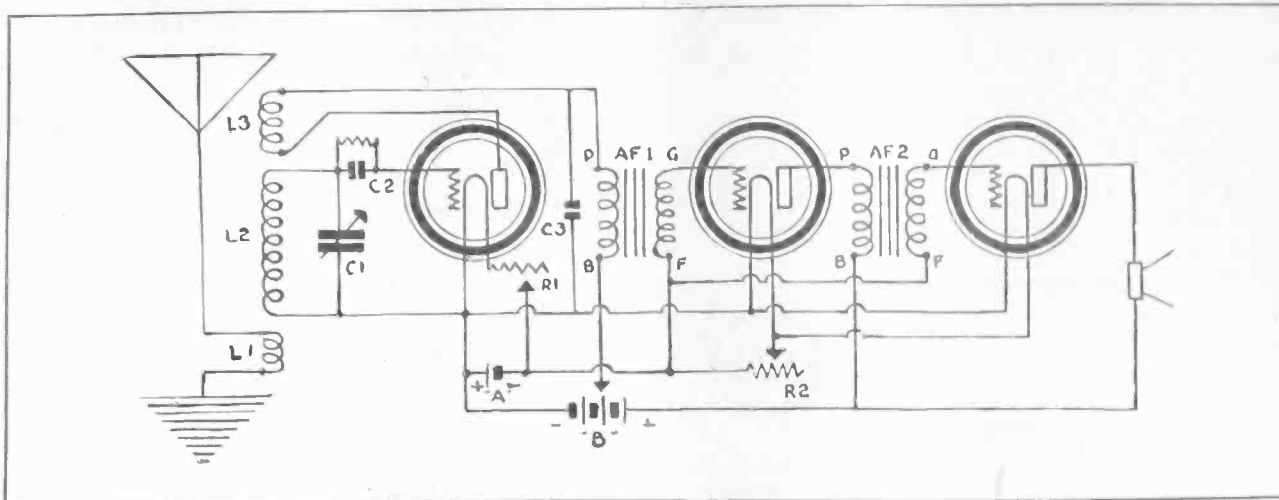
condensers often improve the efficiency of a set 20 per cent.

Now, comparing notes, you will discover whether you have gained selectivity and whether you have come across anything that suggests an improvement on any popular single-dial circuit. While gaining selectivity, what happens to tone quality and volume? Has regeneration been introduced to such an extent that squealing results? If so, what are you going to do to get rid of it? Keep regeneration below the saturation point, indeed, but how? From your tests may emerge a selective DX-getting set that may justly be called the Kiddie Kar of Radio for its inexpensiveness, ease of operation, selectivity, volume, quality, and constancy as a source of joy.

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

# Single Dial On a Loud Speaker Set

*Plate Coil is Tapped in Monodial Circuit to Control Regeneration*



**CIRCUIT NETWORK OF THE MONODIAL SET**, which has only one control and operates a loud speaker. L1 is the aperiodic primary, consisting of 6 turns of No. 22 DCC wire on a 3-inch diameter tube, 2 $\frac{3}{4}$  or 3 inches high. On the same tube and with the same kind of wire, wound in the same direction, are placed L2, 60 turns, and L3, 8 turns, tapped at the third turn. C1 is a 23-plate variable condenser, C2 the .0025 fixed grid condenser with leak mounted thereon, and C3 a .002 fixed by-pass condenser. R1 and R2 are rheostats. The audio-frequency circuit is wired in the usual way, as explained in the accompanying text. A plus and B minus are connected together. This is one of the easiest circuits to make.

**It Gets DX Under Good Conditions and Meets Normal Needs as to Selectivity and Volume—Dry-Cell Tubes May Be Used.**

*By Neal Fitzalan*

**A**N advance in the production of single-dial sets is marked by the circuit known as the Monodial, due partly to the control of regeneration through tapping the plate coil. The commercial Monodial coil may be used or the coil may be constructed as follows:

Procure a tube 3" in diameter and 2 $\frac{3}{4}$ " or 3" long. Using No. 22 DCC wire throughout, and winding all coils in the same direction, start at one end of the tube and wind 6 turns. This is L1, the aperiodic primary. At the other end of the tube next wind the tickler coil, L3. This consists of 8 turns, with a tap taken off the third turn, counting from the beginning. The tap is to be used in adjusting regeneration. If too much regeneration is encountered, the tap is connected to the plate, otherwise the beginning of the winding is connected. The two coils, L1 and L3, having been wound, place a layer of empire cloth over the windings. The secondary, L2, is wound directly over the other coils, that is, around the empire cloth, and consists of 60 turns. All told, there will be seven leads.

#### PARTS NEEDED

|   |  |
|---|--|
| One coil as described.  | One .00025 fixed grid condenser and grid leak. |
| One .0005 mfd. variable condenser (normally 23 plates).                     | One .002 fixed condenser.                      |
| Three UV201A or UV199 tubes or equal, UV201A being better for this circuit. | One panel 7 x 14 inches.                       |
| Three sockets.  | One cabinet 7 x 14 inches.                     |
| Two rheostats.  | One A battery.                                 |
| Two audio-frequency transformers.   | Two 45-volt B batteries.                       |
| Seven binding posts.  | One dial.                                      |
|   | One loud speaker.                              |
|   | Solder, lugs, aerial and connecting wire.      |

The parts are for the construction of a set that works a loud speaker. If only earphone operation is desired a 7" x 7" panel may be used and only one tube and one socket will be needed, earphones supplanting the

loud speaker, the AF transformers being omitted, and one 22 $\frac{1}{2}$ -volt B battery bought instead of two 45-volt batteries.

#### WIRING DIRECTIONS

1. Wire the A plus and A minus leads and connect B minus and A plus. Note that one rheostat is in the A minus for the detector and one in the A minus for the two AF tubes.
2. Connect the aerial to the beginning of L1 and the ground to the end of L1.
3. Connect the beginning of L2 to one side of the grid condenser, the other side of that condenser being connected to the G post of the first tube (grid). The beginning of L2 is connected also to one side of the variable condenser C1, preferably to the stator plates. The end of L2 is connected to the other side of C1 and to the filament plus. This is the grid return.
4. Connect the beginning of L3 to the plate of tube No. 1 (at extreme left in diagram) and the end of L3 to the phone up. If 3 tubes are being used, the end of L3 goes to the beginning of the primary of the AFT1, marked P1 or just P. If too much oscillation occurs, use the tap as the beginning of L3 and leave the actual beginning unconnected. If the beginning itself is used, the tap remains free.
5. Connect the fixed condenser C3 (.002) between the plate lead of the first tube and B minus or A plus.
6. Connect B plus 22 $\frac{1}{2}$  volts to the remaining phone tip or, if 3 tubes are used, connect B plus 22 $\frac{1}{2}$  volts to the end of primary of AFT1 (marked P2 or B on the transformer).
7. In the AF circuit, G or S1 of AFT1 goes to the grid of the second tube and S2 or F on the transformer goes to filament minus. The plate of the second tube goes to P on the second transformer and B plus 90 volts is connected to the B post on the transformer. Again transformer G goes to the grid (this time of the third tube) and F to filament minus. The plate of the third tube is connected to one of the speaker terminals, the other speaker terminal going to B plus 90 volts.
8. The two 45-volt batteries are connected in series, plus 45 to minus 45 of the other battery, leaving two leads, minus on one battery and plus 45 (not equalling 90) on the other. The 22 $\frac{1}{2}$ -volt tap for the B post of the first transformer is taken from the post marked 22 $\frac{1}{2}$  on the battery that has the free minus.

This circuit gets DX fine under good conditions, and with the detector rheostat turned so the tube is burning not too brightly, regeneration is successfully controlled. A vernier rheostat, especially of the carbon pile variety, gives excellent adjustment.

# 1-Tube-and-Crystal Set Works Speaker

*Radio World's Dynoflex Circuit Brings In Good Volume on Locals, DX on Earphones—Special Low-loss Coils Used in Reflex Hook-up—How to Make Them in Spider-web Fashion*

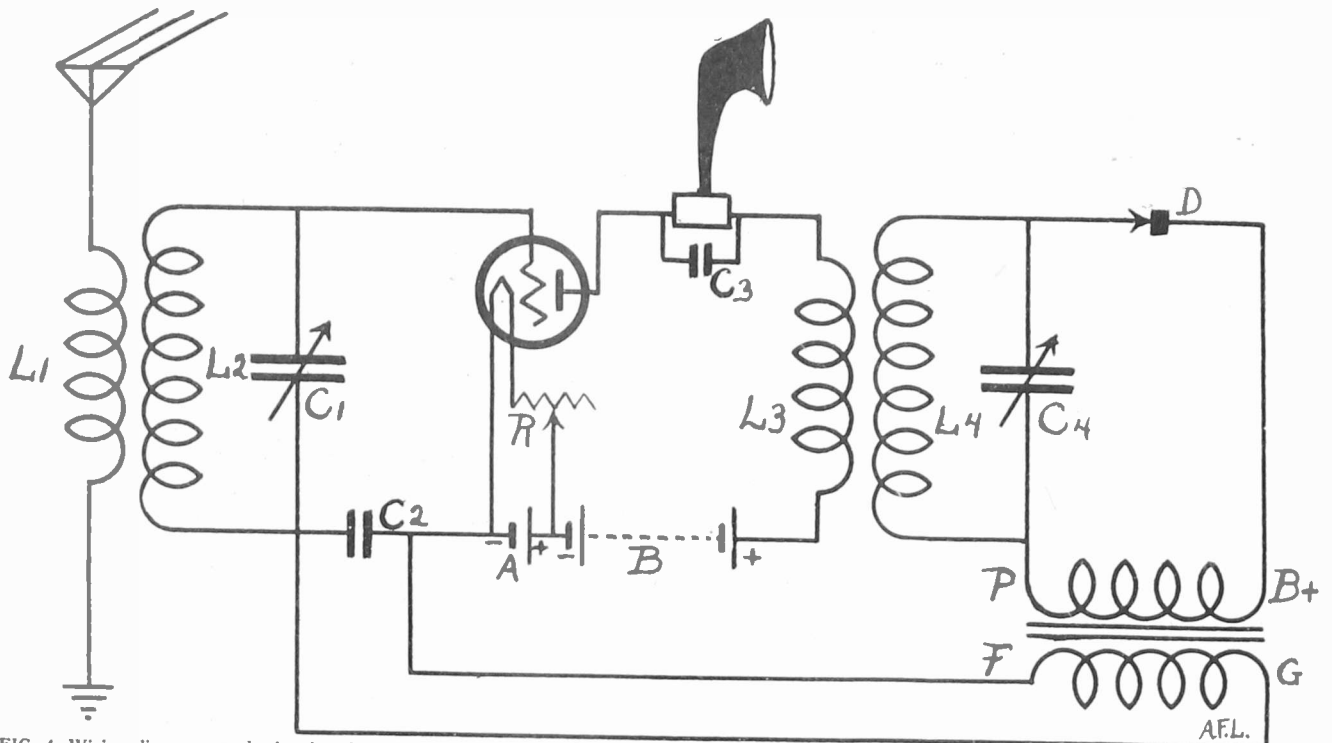


FIG. 4—Wiring diagram on the low-loss Dynoflex 1-tube-and-crystal receiver. The Dynocoils insure efficient conservation of energy due to insulating material being kept at a minimum. Using an improved method of wiring, ease of construction is insured. While the crystal detector is mentioned as fixed, in the article, the constructor may incorporate an adjustable detector provided he has no objection to an added control. Otherwise, the two variable condensers, C1 and C4, are the only controls. Good reception on the Dynoflex was obtained under Summer conditions, which raises very high hopes of great DX than ever with the coming of cool weather. Full wiring directions will be found on page 14.

By *N. N. Bernstein*

Technical Editor

**W**ITH the approach of cool weather and static about to disappear the minds of radio fans lightly turn to thoughts of DX.

The development of reflexed circuits has at last brought about one, which, when properly constructed of good parts, will actually operate a loud speaker on locals with good volume and occasionally medium distance stations with fair volume. With 90 volts on the plate New York stations were brought in at Brooklyn very comfortably on the loud speaker. In cooler weather one may expect the same volume from stations up to 250 miles and on earphones 1,500 miles may be expected under fair conditions. If more volume is desired up to 150 volts may be used on the plate of the tube which must be either UV201A, DV2, WE216A, Schickerling or similar. All the tubes mentioned gave excellent results.

## How to Wind the Coils

A valuable and important feature of the set is the use of the extremely low-loss spider-web Dynocoils. The popular style of home-made radio-frequency transformers are wound on cardboard or bakelite tubing, have losses which can be avoided. Although we call the coils Dynoflex spider-webs, in reality they are self-supporting, the spider-web forms being removed after the winding is finished.

Two forms are cut out of sheet celluloid (not colored) as shown in Fig. 1. The wire is to be wound on this

form, and then the whole coil dipped in a dissolvent made of ether or amyl acetate, inexpensively purchasable in any drug store.

The celluloid form is 1-16-inch thick, 5½ inches in diameter, with a 1½ inch hub, having 9 radiating arms. This number of arms is sufficient for this type of coil and facilitates the winding considerably. After the forms are cut we are ready to begin winding. Measure off from a spool of No. 24 double silk covered wire 10½ feet. Double the wire at that point, and twist the loop together so that it won't come apart. Starting at the hub, make 15 turns of the doubled wire, and terminate the free end by looping it through an intersection between the turns of wire, leaving a few inches of slack for connection. Continue winding the wire from the spool until 54 turns are made, and terminate as before. Now untwist and cut the loop where the windings were started, and fasten the ends. With one operation you have wound both primary and secondary of the coil on one form. To remove the form, dip one part of the coil at a time in a dish of ether or amyl acetate, and in a few seconds the celluloid will dissolve. Take the coil out of the solution before the entire form is dissolved. That which is left will be just enough to hold the coil together with desirable rigidity. If you have lost track of which end of wire is the beginning of the primary, just test with a battery and head phones.

Both coils are constructed in the same fashion with the same number of turns of wire. These coils are about the lowest-loss type which can be made by the radio fan, as the almost entire absence of supporting material proves. If the builder does not wish to go to

# How to Construct the Dynocoils

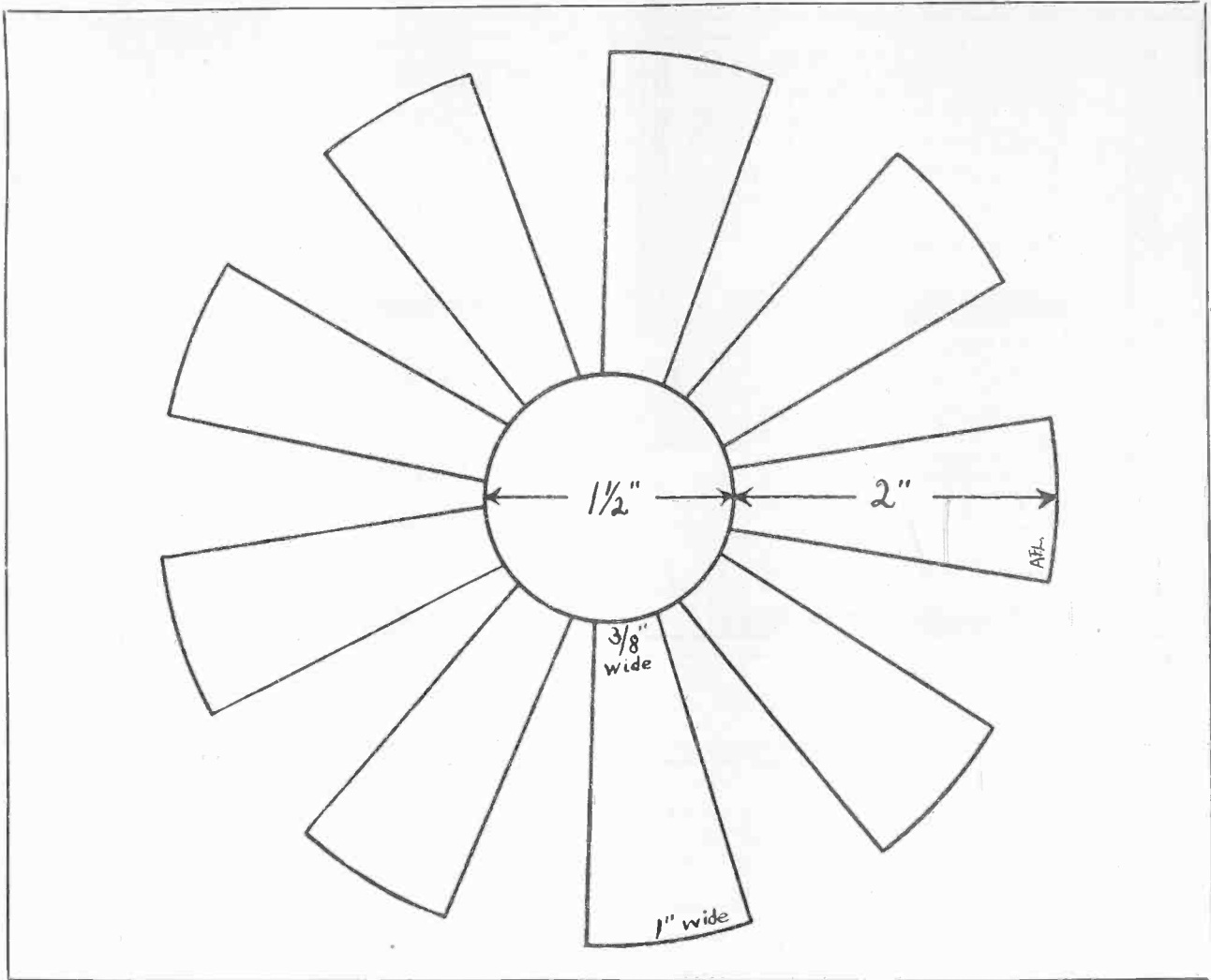


FIG. 1—Above is an actual size template for the Dynocoil. The builder may lay his square of celluloid directly on it and mark thereon the lines for cutting. If a fibre form is used lay a piece of tracing cloth or paper on the figure, and copy the lines. Then paste the tracing on the fibre square and cut on the lines. In an emergency, a good grade of cardboard may be used, but it is not advised.

the slight trouble of using celluloid and then dissolving it, he may use either the celluloid or a fibre form of the same size, and leave the windings on it. However, improved results were obtained from using the lowest-loss Dynocoils.

## Panel and Assembly

The next item for consideration is the panel and assembly layout. The panel may be bakelite or radion, 3-16 x 7 x 12 inches, and the baseboard to go with it is  $\frac{5}{8}$  x  $6\frac{1}{2}$  x 11 inches. After the set is assembled and wired, the whole may be placed in a 7 x 12 inch cabinet.

Fig. 2 is the panel layout, on which appear two large dials controlling the two variable condensers, and one small dial or knob for the rheostat. Another hole is drilled in the panel to accommodate a single-circuit jack, so that the speaker or phones may be plugged in with ease. It is advisable to mount the binding posts on a rubber strip 7 inches long by  $1\frac{1}{2}$  inches wide at the rear edge of the baseboard, and holes drilled in the back of the cabinet to pass the antenna ground and battery wires through. However, if the builder wishes to have the binding posts on the front panel, two small holes are drilled in the upper left hand corner one inch apart, and three holes drilled in the upper right hand corner one inch apart. The two at the left will be for antenna

and ground respectively and the three at the right for the A and B batteries. The middle post here is a common connector for the plus A and minus B battery leads.

The Dynocoils, which are very light, may be fastened or fixed self-supportingly in the following manner, and as shown in the assembly layout, Fig. 3.

A length of rigid or hard drawn bus bar is bent in the manner shown on the diagram and soldered to the points of contact on the end plates of the variable condensers and to the ends of the secondaries on the Dynocoils. Thus, with one effort, we not only make good connections but also provide the very necessary mountings, the Dynocoils touching nothing which might cause a high resistance leak. The crystal detector, which may be of the fixed type and incidentally the best that money can buy, is mounted directly onto the B plus post of the audio-frequency transformer. The AF transformer is screwed to the baseboard about 1 inch in back of the tube socket. The socket is screwed to the base directly between the two variable condensers and 2 inches from the panel. The .001 mfd. fixed condenser C3 is soldered directly to the two leaves of the single circuit jack with two short lengths of bus bar.

Although the fixed condenser C2 is shown on the diagram placed between the negative A lead and the



# Assembly Plan for Bernstein's Set

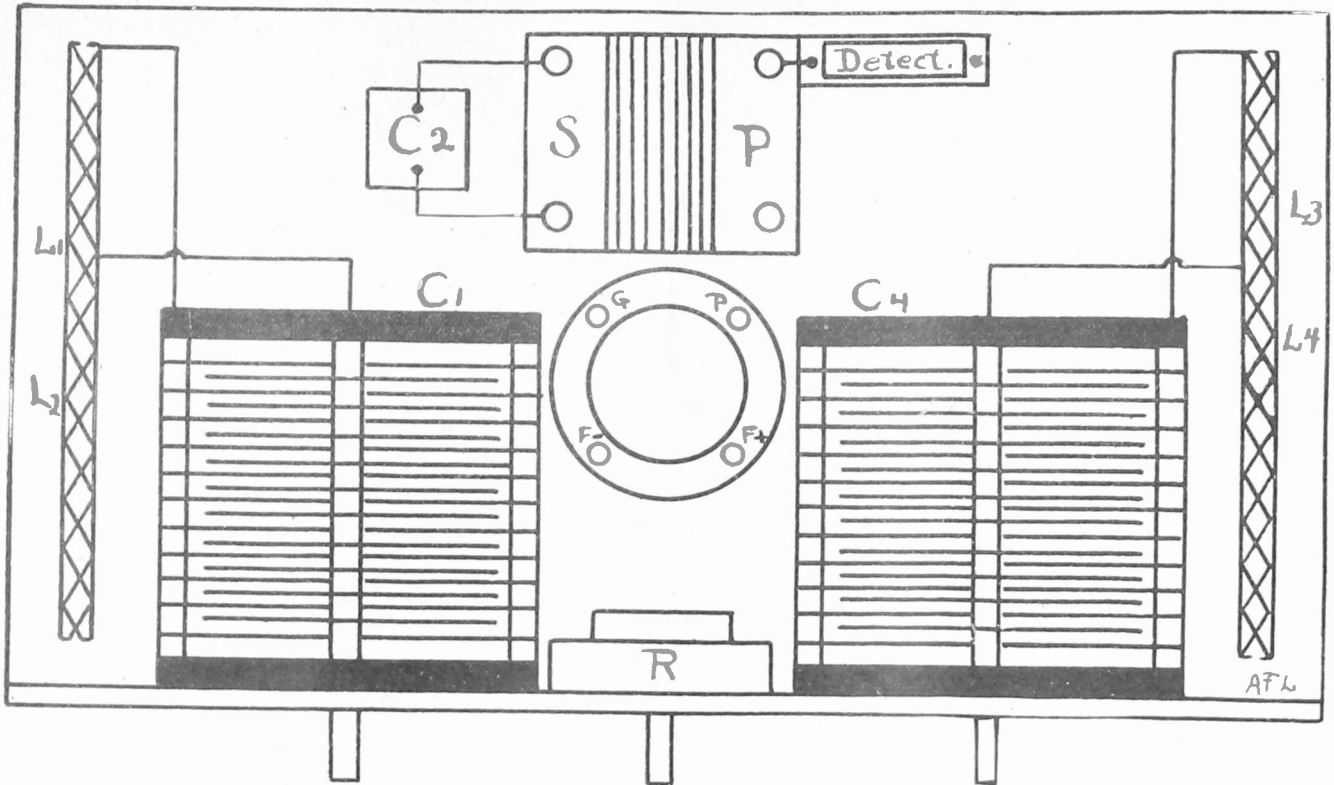


FIG. 3—Top view of the Dynoflex circuit. The unusual feature of the layout is the placing and supporting of the Dynocoils. They are shown at the extreme left and right of the diagram. The placing of the various parts as shown insures extremely short leads.

rotor plates for C1, it is mounted directly onto the secondary of the audio-frequency transformer. So far, I have advised the use of rigid bus bar wiring. Now, I will deviate from the usual custom and advise a different and more efficient method, easier than the awkward stiff bus bar wiring.

Radio-frequency currents travel with almost no loss of energy on straight or slightly rounded wires, while on bus bar that has many sharp angles there is a radio-frequency resistance at each bend. The idea is to eliminate as many angles in the wiring as possible. To accomplish this I use flexible stranded wire (No. 18 fixture wire). I measure off the necessary length of wire from point to point, and solder a small lug to each end. For example, the lead from the antenna binding post to the beginning of L1 (Fig. 4), is about  $3\frac{1}{2}$  or 4 inches. A lug is soldered to each end of a piece of wire that long, one lug going under the head of the antenna binding post screw, and fastened firmly, and the other soldered to the antenna lead of L1, the wire running in a straight line. The same applies to all the wiring. The insulation on the wire relieves the mind of all anxiety regarding short-circuits and blowouts. Where a lead must pass a transformer or socket the wire may be made a trifle longer to provide a long-sweeping loop, thus avoiding angles. The soldering of lugs to the various leads also obviates the necessity of soldering wires to the rheostat and sockets, as the lugs may be firmly fastened to them by turning down real tight on the nuts with a pair of pliers. Although the finished job will not look as bright and mechanical as bus bar wiring, you will have wiring that will carry the weak radio currents without throwing any of them off at the sharp turns in the road.

### Wiring Directions

Fig 4 is the complete wiring diagram of the Dynoflex. The connections are made as follows: From the bottom binding post at the front right-hand side of the panel run a lead directly to the negative post on the

tube socket. The other filament lead from the socket goes to one post on the rheostat. The lead from the other post on the rheostat goes to the middle binding post, the one over the A minus post on the panel. This completes the A battery wiring. In assembling the parts you have already connected the secondaries of the Dynocoils to the variable condensers with the supporting bus bar, which, by the way, should have a rounded bend instead of a sharp turn at the angles. The antenna post lead (top, left-hand side of panel) goes to the inside end of L1, and the ground wire to the outside end of L2. The stator plates of C1, which are connected by the bus wire to the inner end of L2, go to the grid post on the socket, while the rotor plates of C2, which go to the outer end of L2, are connected to one side of the fixed condenser C2 and the G post on the audio-frequency transformer. The post F or other side of the secondary of the AF transformer goes to the other side of C2 and to the negative filament-post on the tube socket. The plate post on the socket goes to one lead on the jack and to one side of C3. The outside end of L3 goes to the other side of the jack and C3. The inner end of L3 goes to the B plus binding post (top, right-hand side of panel). The stator plates of C4 are connected to the inner end of L4 and to one side of the fixed crystal detector, and the rotor plates to the outside end of L4 and to the post P on the AF transformer. The other side of the crystal detector goes to the B plus post on the AF transformer. (In assembling you have already screwed or soldered this at that point).

### Ready to Operate

The wiring is now complete and the set ready to operate. The vacuum tube used must be a hard one, as heretofore described, and at least 90 volts must be used on the plate. The A battery should be a small capacity storage type, sufficient to operate one tube.

(Concluded on next page)

# RADIOCAST PROGRAMS

Thursday, August 7

**WFBH, New York, 273m (1100k), E. S. D. S. T.**  
—New Hotel Majestic station, operating temporarily on the above call letters. Regular call letters will be assigned in the near future. 2 P. M., musical concert and artist performers until 8 P. M. daily. 11:30 P. M. to 2 A. M., three nights a week. All programs will consist chiefly of musical entertainment. Advance programs are being arranged and will soon be published in RADIO WORLD.

**WNYC, New York, 526m (570k), E. S. D. S. T.**  
7:30 P. M., police reports and alarms. 8:30 P. M., musical program composed of band selections and vocal and instrumental numbers by artists. 10:30 P. M., police alarms.

**WGY, Schenectady, 384m (790k), E. S. T.—1 P. M.**, music, excerpts from "Pinafore," by WGY results. 5:15 P. M., report on New York State highways. 5:30 P. M., organ recital by Stephen E. Boisclair. 7:40 P. M., baseball scores. 7:45 P. M., a few moments with new books, William Jacob, librarian. 8 P. M., radio drama, "Silas, the Chore Boy," by WGY Student Players.

**WFAA, Dallas, Tex., 476m (620k), C. S. T.—12:30 P. M.**, address, Capt. O. B. Freeman, on "The Former Soldier as a Citizen." 8:30 P. M., "Pep Peddlers," an orchestra from Paris, Tex. 11 P. M., Schubert Junior Choral Club and Glee Club in recital.

**WCAE, Pittsburgh, 462m (650k), E. S. D. S. T.—3:30 P. M.**, baseball scores. 4:30 P. M., stock market reports; "The Machine Girl"; Pittsburgh livestock quotations. 6:30 P. M., dinner concert from William Penn Hotel. 7:30 P. M., Uncle Kaybee. 7:45 P. M., baseball scores. 9:30 P. M., musical program. 11 P. M., Moores' Cafeteria Radio Review.

**WWJ, Detroit, 517m (580k), E. S. T.—10:25 A. M.**, weather forecast. 11:55 A. M., Arlington time. 12 Noon, Detroit News orchestra. 3 P. M., concert by Schmemman's concert band broadcast from Belle Isle Park. 3:50 P. M., weather forecast. 3:55 P. M., market reports and baseball scores. 5 P. M., baseball scores. 7 P. M., Detroit News orchestra. 7:30 P. M., concert by Schmemman's concert band. 10 P. M., dance music by Jean Goldkette's orchestra from the Graystone Ballroom.

**KGO, Oakland, Cal., 312m (950k), P. T.—4 P. M.**, concert orchestra of the Hotel St. Francis, San Francisco. 6:45 P. M., stock exchange and weather reports, and news items. 8 P. M., three-act comedy, "Not So Fast," presented by KGO Players, direction of Wilda Wilson Church; music between acts by KGO orchestra.

**WMAQ, Chicago, 448m (670k), C. S. D. S. T.—4 P. M.**, sports results. 6 P. M., Chicago theatre organ recital. 6:30 P. M., Hotel LaSalle orchestra. 8 P. M., weekly talk by Rockwell R. Stephens, auto editor of The Daily News. 8:15 P. M., weekly talk by Boy Scouts. 8:30 P. M., recreational talk. 8:45 P. M., weekly investment talk. 9 P. M., one of a series of garden talks by James H. Burdett. 9:15 P. M., Mr. and Mrs. W. A. Fricke, tenor and soprano.

**KPO, San Francisco, 423m (710k), P. T.—2:30 P. M.**, organ recital by Theodore J. Irwin. 4:30 P. M., Rudy Seiger's Fairmont Hotel orchestra. 5:30 P. M., children's hour stories by Big Brother of KPO. 7 P. M., Rudy Seiger's Fairmont Hotel orchestra. 8 P. M., organ selections by Theodore J. Irwin. 9 P. M., Japanese romance—Harrison Coles, tenor; Hana Shimazumi Iki, soprano (Japanese prima donna); Piano duets by Grace Hendricks and Mabel Jones; contralto solo by Dorothy B. Miner. 10-11 P. M., E. Max Bradford's versatile band.

**KGW, Portland, Ore., 492m (610k), P. T.—11:30 A. M.**, weather forecast. 3:30 P. M., children's program. 7:15 P. M., police reports. 7:30 P. M.,

# Who Is America's Most Popular Radio Entertainer?

Everybody is interested in this query: Who is America's most popular radio entertainer? You have your favorite. Who is she or he? Let us know your choice, whether a comedian, an opera singer, a jazz band, or a story-teller.

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Name .....  
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Yearly subscribers for RADIO WORLD may, when sending in their \$6.00 for a yearly subscription, vote the entire fifty-two issues in advance for their favorite entertainer, when they so designate their desire to do so. In the June 7 issue there was published a tally showing H. M. Snodgrass, of WOS, Jefferson City, Mo., leading. Another tally will be made and published in RADIO WORLD of August 16, 1924 (out next week).

baseball scores, weather forecasts and market reports. 10 P. M., dance music by George Olsen's Metropolitan orchestra of Hotel Portland.

**WHAS, Louisville, Ky., 400m (550k), C. S. T.—4 P. M.**, selections by Dick Quinlan's Golden Derby orchestra; police bulletins; weather forecast; "Just Among Home Folks," daily humorous column; selections by the Alamo Theatre orchestra; late news bulletins. 4:50 P. M., local livestock, produce and grain market reports. 4:55 P. M., baseball scores. 5 P. M., Central Standard time. 7:30 P. M., concert, auspices of Mrs. Pleasant M. Brooks; concert from the leading hotels and theatres of Louisville; four-minute digest of International Sunday school lesson; four-minute child welfare talk; late news bulletins; Central Standard time.

**WDAF, Kansas City, Mo., 411m (730k), C. S. T.—3:30 P. M.**, The Star's radio trio. 5:50 P. M., marketgram; weather forecast; time signal, and road report. 6 P. M., School of the Air; address—Edgar Allan Linto, fourth of a series of talks on world travels; reading—Miss Cecile Burton from popular poems and essays; the Tell-Me-a-Story Lady; music—Carl Nordberg's Plantation Players, Hotel Muehlebach. 11:45 P. M., Night-hawk Frolic, the Plantation Players, Hotel Muehlebach.

## Friday, August 8

**WNYC, New York, 526m (570k), E. S. D. S. T.—7:30 P. M.**, police reports and alarms. 8:30 P. M., musical program composed of band selections and vocal and instrumental numbers by artists. 10:30 P. M., police alarms.

**WDAR, Philadelphia, 395m (670k), E. S. D. S. T.—2 P. M.**, Arcadia Cafe concert orchestra; artist recital. 4:30 P. M., dance program given. 5:45 P. M., baseball scores. 7:30 P. M., Dream Daddy with the boys and girls; Stanley features. 8 P. M., book review by Arnold Abbot; artist recital. 8:15 P. M., dance music from Young's Million Dollar Pier, Atlantic City. 8:30 P. M., Emmett Welch Minstrels, direct from the Million Dollar Pier. 9:15 P. M., Famous Benson Chicago orchestra, Victor Record artists. 9:30 P. M., Charley Fry and his Million Dollar Pier orchestra. 10 P. M., Arcadia Cafe concert orchestra.

**KFI, Los Angeles, 469m (640k), P. T.—5 P. M.**, Evening Herald news bulletins. 5:30 P. M., Ex-

aminer news bulletins. 6:45 P. M., Aeolian organ recital. 8 P. M., Evening Herald-Fishers Melodrama orchestra. 9 P. M., Examiner program. 10 P. M., Los Feliz trio. 11 P. M., Ambassador Hotel Coconut Grove orchestra.

**WGI, Medford, Mass., 360m (830k), E. S. D. S. T.—7:45 P. M.**, closing stock market reports; code practice; Boston police reports. 8 P. M., evening program: Tabloid radio talk on "The Elements of Human Personality," by Mr. N. B. Cowley; musicale.

**WJY, New York, 405m (740k), E. S. D. S. T.—7:30 P. M.**, Leonard Nelson's Knickerbocker Grill orchestra. 8:15 P. M., "School High Spot Contest."

**WJZ, New York, 455m (660k), E. S. D. S. T.—4:30 P. M.**, Hotel Astor organ recital, direct. 5:30 P. M., state and federal agricultural reports; Farm and Home reports; closing quotations, New York Stock Exchange; foreign exchange quotations; Evening Post news. 7 P. M., Ernie Golden's McAlpin Roof orchestra, direct. 7:20 P. M., financial developments of the day. 8:15 P. M., "Problems of Retailing," Prof. Brisco of N. Y. University. 8:30 P. M., New York Philharmonic orchestra, direct from Lewisohn Stadium. 10:15 P. M., time pop question game. 10:30 P. M., Harold Stern's Belleclair Towers orchestra, direct.

**WIP, Philadelphia, 509m (590k), E. S. D. S. T.—3:05 P. M.**, visiting artists and Chats with celebrities, broadcast direct from the WIP control station on the Steel Pier, Atlantic City. 3:30 P. M., concert by Comfort's Philharmonic orchestra; soloist, Miss Dorothy Fox, soprano. 6 P. M., weather forecast. 6:05 P. M., dinner music by Eddie Elkins' orchestra from the El Kadia Gardens. 6:45 P. M., agriculture, livestock and produce market reports. 7 P. M., Uncle Wip's bedtime stories and roll call for the children.

**WOO, Philadelphia, 509m (590k), E. S. D. S. T.—4:45 P. M.**, grand organ and trumpets. 7:30 P. M., sports results and police reports; dinner music by A. Candelori and his orchestra. 8:30 P. M., WOO orchestra; Mabel Rumig, soprano; Alma Wilson, accompanist. 9:30 P. M., grand organ recital, Harriette G. Ridley. 10 P. M., dance program by A. Candelori and his orchestra.

**KHJ, Los Angeles, 395m (760k), P. T.—6 P. M.**, Art Hickman's concert orchestra from Biltmore

(Continued on page 18)

# Dynoflex Should Work Well Right Away

(Concluded from preceding page)

The antenna preferably should be outdoors, at least 100 feet long, for good DX. If all instructions are followed to the letter, the set will work at the first trial, and in nine cases out of ten will work perfectly at once.

### LIST OF PARTS FOR DYNOFLEX

- ½ lb. No. 24 DSC wire.
- Two spider-web forms as specified in text.
- Two 17-plate variable low-loss condensers (.00035mfd.).
- Two .001 mfd. fixed condensers.
- One fixed crystal detector.
- One hard tube (UV201A, C201A, DV2, Schickerling, WE216A or similar).
- One socket.
- One 30-ohm rheostat.
- One single-circuit jack.
- Two 45-volt B batteries.
- One 10-to-1 audio-frequency transformer.
- One panel, 7 x 12 x 3-16 ins.
- One baseboard, 9½ x 6½ x 11 inches.
- One 7 x 12 inch cabinet.
- Five binding posts.
- Two dials.
- Aerial wire, screws, lugs, connecting wire and hardware.

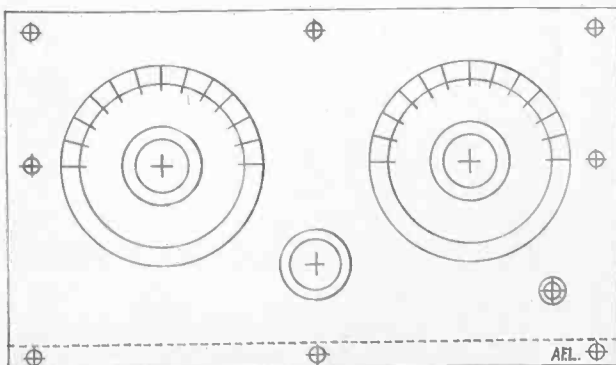


FIG. 2—Panel layout, showing approximate position of the condenser control dials, rheostat knob and phone jack. The holes for the binding posts are omitted, as many builders prefer to arrange the binding posts on a separate strip and place it in the rear of the cabinet.

# Keeping in Trim—Students' Orchestra



(Foto Topics)

**WHEE!** These two girls go over the top at Atlantic City in response to the instructions coming over the radio from WOR, Newark, where setting up exercises are being radiated early every morning. The setting up exercises have just been finished, and the young misses are making a bee line for the surf. Thus they keep their youthful figures trim and neat.



THIS Troy, N. Y., Tech students' orchestra is known from coast to coast, it alternates with the Campus Sorenaders, the students' dance orchestra, in presenting programs. A. Olin Niles. The announcer and program director.



(Keystone)

**A. S. MOFFAT**, well-known Boston movie news reel man, is shown above in his car with his new Super-Heterodyne receiving set. It is only 16 x 8 x 4 in. in size, containing 6 tubes. From one position of the automobile he has heard 25 different stations. The set is so compact and sensitive that it is used successfully without an antenna or ground wire. See article on page 28, "Using a Set on an Automobile Trip."



(Photonews)

**NEARLY EVERY ANIMAL** in captivity has been pictured before the radio receiver and a great representation of them before the microphone, but here we have a crow acting like a real radio "bug." The bedtime story has just been finished by Uncle Wiggle Woggle, and Master Crow maybe is cawing his good night in return to Uncle's similar salutation. This picture was obtained only after three hours of patient effort.



(Kadel & Herbert)

**RUDOLPH ARNOLD** of Brooklyn, N. Y., (at left) built a 1-tube receiver using an old phonograph record as the front panel. The tuning dial is very neatly located in the center of the record. As you can see, it is a 1-dial set. A discussion of such sets is published in this issue. See pages 8, 9, 10 and 11.

neatly located in the center of the record. As you can see, it is a 1-dial set. A discussion of such sets is published in this issue. See pages 8, 9, 10 and 11.

# Delights Audiences — Portable Brings Joy



aska to Panama, wherever WHAZ is known. The Symphony Orchestra gives radio concerts monthly. The Symphony Orchestra is directed by Rutherford Hayner.



(Kadel & Herbert)  
THE 1924 GIRL is rapidly forming the habit of taking her portable radio along on all occasions. The above picture was snapped at Coney Island.



ROBERT TAYLOR of New York took his radio receiver along on a motor trip, placing it on the left-hand running board in a large cabinet. (Keystone)



(Kadel & Herbert)  
HERE'S AN IDEA! Coffee cups used as loud speakers.



NO radio keeps youngsters off the streets after dark is shown in this picture of the radio workroom of the Knights of Columbus, West 50th Street, New York City. (Foto Topics)

(Kadel & Herbert)  
AT RIGHT, the first complete radio transmitting and receiving station on wheels constructed by the Chester County Radio Association of Parkersburg, Pa. It travels through the rural districts and gives the people of the suburban districts a chance to hear radio, in many cases for the first time, and see the mysterious apparatus that performs the miraculous feat. Naturally, it helps to stimulate interest in radio. The Chester County Radio Club is fast becoming popular through this advertising medium. The station on wheels is owned by Horace A. Beale of Parkersburg, Pennsylvania.





# Programs

Friday, August 8 (continued from page 15)

Hotel. 6:45 P. M., children's program, Prof. Walter Sylvester Hertzog; bedtime story by Uncle John. 8 P. M., program, courtesy, Mr. and Mrs. J. L. Hunter, San Juan Capistrano; arranged by Julia Keller, harpist. 9:30 P. M., program presenting Charlie Wellman, jazz tenor, and Bill Hatch, pianist. 10 P. M., Art Hickman's dance orchestra.

WLW, Cincinnati, 309m (970k), C. S. D. S. T.—11 A. M., weather forecast and business reports. 1:30 P. M., market reports. 3 P. M., stock quotations. 4 P. M., special program, T. C. O'Donnell, editor of Writers' Digest, lecture on "Practical Lessons in Writing."

WRC, Washington, 469m (640k), E. S. T.—3 P. M., fashions, developments of the moment prepared by "Women's Wear." 3:30 P. M., song recital by Arthur McCormick, baritone. 3:20 P. M., "Beauty and Personality," by Elsie Pierce. 3:25 P. M., current topics, editor of "The Review of Reviews." 3:35 P. M., piano recital by Ethel Grant. 3:50 P. M., Magazine of Wall Street. 4 P. M., song recital announced. 5:15 P. M., time signals and weather forecasts. 6 P. M., stories and songs for children by Peggy Albion.

WOC, Davenport, Ia., 484m (620k), C. S. T.—9 A. M., opening market quotations. 10 A. M., household hints. 10:55 A. M., time signals. 11 A. M., weather and river forecast. 11:05 A. M., market quotations. 12 noon, chimes concert. 1 P. M., closing stocks and markets. 7 P. M., sport news and weather forecast. 8 P. M., musical program, program by group of artists from Galva, Illinois. 9 P. M., weekly tourists' road bulletin.

WOR, Newark, N. J., 405m (740k), E. S. D. S. T.—6:15 P. M., Agnes Leonard in songs for children. 6:30 P. M., "Man in the Moon" stories for the children by Josephine Lawrence and William F. B. McNeary. 7 P. M., "Music While You Dine," P. George Ori and his Peerless Trio. 7:20 P. M., resume of the day's sports with "Jolly Bill" Steinke.

WEAF, New York, 492m (610k), E. S. D. S. T.—11 to 12 A. M., Jeanne Austin, pianist; talks by Lecture Bureau of Board of Education and Garden Magazine; market and weather reports. 4 to 5 P. M., Harry Jenks, jazz pianist; Mary Rowe Davis, contralto. 6 to 10 P. M., dinner music from the Rose Room of the Waldorf-Astoria Hotel; children's stories; Kathleen Stewart, pianist; George Leach, baritone; Alberta Kawashima, violinist; B. Fischer and company's "Astor Coffee" dance orchestra.

WOS, Jefferson City, Mo., 441m (680k), C. S. T.—8 P. M., address, "Lighting the Headlights for the Farmer," by E. A. Logan, Missouri Agricultural Statistician. 8:20 P. M., band concert by the Missouri Pacific Boosters band of Sedalia, Missouri; program sponsored by the State Fair Association; address by L. E. Slate, publicity director.

WHN, New York, 360m (830k), E. S. D. S. T.—5 P. M., Billy Page's Broadway Synchronizers. 6:30 P. M., Alamac dance music by Olcott Vail's trio and Paul Specht's dance orchestra. 9:30 P. M., Chas. Strickland's Palisades Park orchestra. 10 P. M., baseball statistics by Al. Munroe Elias. 10:05 P. M., Wright and Bessinger, harmony singers. 10:15 P. M., Jos. C. Wolfe, baritone. 10:30 P. M., Roseland dancing academy. 11 P. M., musical program. 11:30 P. M., Club Alamac revue.

KDKA, Pittsburgh, 326m (920k), E. S. D. S. T.—5 P. M., baseball scores. 5:30 P. M., organ recital by Paul Fleeger, from Cameo Motion Picture Theatre. 6 P. M., baseball scores. 6:30 P. M., children's period. 6:45 P. M., news bulletins. 7 P. M., baseball scores. 7:40 P. M., Stockman report. 8 P. M., concert by KDKA Serenaders, saxophone quartet, and the Davis male quartet. 9:55 P. M., time signals; weather forecast; baseball scores.

KYW, Chicago, 536m (560k), C. S. D. S. T.—6:30 to 7 P. M., program broadcast from KYW's studio in the offices of the Duncan Sisters' Music Publishing Company. 7:20 to 7:45 P. M., speeches. 8 to 11:30 P. M., Midnight revue.

WBZ, Springfield, Mass., 337m (890k), E. S. T.—7:30 P. M., bedtime story for the kiddies. 10 P. M., concert by Elaine Merlin, soprano; Albert Hiatt, baritone; Mme. Isidore Martinez, pianist, from the Hotel Brunswick studio, Boston. 10:55 P. M., time signals; weather reports. 11 P. M., concert by "The Harmony Trio."

## Saturday, August 9

WNYP, New York, 526m (570k), E. S. D. S. T.—7:30 P. M., police reports and alarms. 8:30 P. M., musical program composed of band selections and vocal and instrumental numbers by artists. 10:30 P. M., police alarms.

KFI, Los Angeles, 469m (640k), P. T.—5 P. M., Evening Herald news bulletins. 5:30 P. M., Examiner news bulletins. 6:45 P. M., Hennessy's Paramount Players. 8 P. M., Althea Oliver, mezzo-soprano, arranging concert. 9 P. M., Examiner program. 10 P. M., popular song program. 11 P. M., Ambassador Hotel. Coconut Grove orchestra.

WGI, Medford, Mass., 360m (830k), E. S. D. S. T.—7:15 P. M., code practice; New England weather forecast; New England crop notes. 7:30 P. M., talk on current events by David M. Cheney; music; weather report and time.

WJZ, New York, 455m (660k), E. S. D. S. T.—1 P. M., Hotel Vanderbilt orchestra, direct, Joseph Strissoff, director. 4 P. M., Herman Riedrich, Jr., basso. 4:30 P. M., Roger Wolfe's Baltimore Tea Room orchestra, direct. 5:30 P. M., state and federal agricultural reports; Farm and Home reports; closing quotations New York Stock Exchange; foreign exchange quotations; Evening Post news. 7 P. M., Waldorf-Astoria Roof orchestra.

# Radiocasts from Under Sea

PHILADELPHIA.

THE first man ever to radiocast from the bottom of the sea has done it well. To the listeners-in on the program of the Gimbel Brothers' station WIP, he told all about the sunken ships he saw in Davy Jones's locker.

The radiocaster was C. O. Johnson, a diver for the Philadelphia Derrick and Salvage Corporation. He talked from the floor of the Atlantic off the Steel Pier, Atlantic City. Through an arrangement much like a telephone hi voice was carried to a boat anchored near by, and thence to an amplifier on the pier by a cable, waterproof and flexible. From that point it was carried by telephone to the station here and radiocast.

tra. 8 P. M., Ned Jakobs presents Alexis Kudisch Ensemble; Ruth Arden, soprano. 10 P. M., talk by the Museum of Natural History. 10:30 P. M., Hotel Astor dance orchestra.

WIP, Philadelphia, 509m (590k), E. S. D. S. T.—6 P. M., weather forecast. 6:05 P. M., dinner music by the Kentucky Serenaders orchestra. 6:4 5. M., agriculture, livestock and produce market reports. 7 P. M., Uncle Wip's bedtime stories and roll call for the children. 8 P. M., concert by Comfort's Philharmonic orchestra. 8:45 P. M., "What the Wild Waves are Saying," picked up by a microphone placed amidst the breaking waves under the Steel Pier, Atlantic City. 8:50 P. M., concert by Vessella's concert band. 10 P. M., dance music by Bob Leman's dance orchestra. 11:05 P. M., organ recital by Karl Bonawitz, broadcast from Germantown Theatre.

KHJ, Los Angeles, 395m (760k), P. T.—6 P. M., Art Hickman's concert orchestra from the Biltmore Hotel. 6:45 P. M., children's program presenting Prof. Walter Sylvester Hertzog; bedtime story by Uncle John. P. M., program presenting the Naval Reserve Band; M. L. Brock, director. 10 P. M., Art Hickman's dance orchestra.

WLW, Cincinnati, 309m (970k), C. S. D. S. T.—1:30 P. M., weather forecast and business reports. 1:30 P. M., market reports.

WRC, Washington, 469m (640k), E. S. T.—7:45 P. M., Bible talk by W. H. Kerr of the Department of Labor. 8 P. M., dance program. 9 P. M., piano recital by LaSalle Spier. 9:30 P. M., violin recital by Henri Sokoloff. 9:45 P. M., song recital announced.

WOC, Davenport, Ia., 484m (620k), C. S. T.—9 A. M., opening market quotations. 10 A. M., household hints. 10:55 A. M., time signals. 11 A. M., weather and river forecast. 11:05 A. M., government bulletins. 11:15 A. M., closing market quotations. 12 noon, chimes concert. 12:15 P. M., weather forecast. 7 P. M., sport news and weather forecast. 9 P. M., orchestra program, the Palmer School Radio orchestra.

WOR, Newark, N. J., 405m (740k), E. S. D. S. T.—6:15 P. M., "Music While You Dine," Ernie Krickette's Cinderella orchestra. 7:15 P. M., resume of the day's sports with "Jolly Bill" Steinke. 8 P. M., concert by the Park City Four. 8:15 P. M., baritone solos by James Macdonald. 8:30 P. M., program by the S. S. America orchestra of the U. S. Lines, introductory talk by Captain Rind. 9:30 P. M., concert by the Park City Four.

WEAF, New York, 492m (610k), E. S. D. S. T.—4 to 5 P. M., Elmer Grosso and his versatile orchestra. 6 to 11 P. M., dinner music from Rose Room, Hotel Waldorf-Astoria; Jeanne Austin, popular singer and pianist; Anne B. Tyndall, soprano; Bernard Frank, harmonica player; Effie de Niffen, pianist; Eight Colga Singers; Vincent Lopez and his orchestra from the Roof Garden of the Hotel Pennsylvania.

WNYP, New York, 526m (570k), E. S. D. S. T.—7:30 P. M., police reports and alarms. 8:30 P. M., musical program composed of band selections and vocal and instrumental numbers by artists. 10:30 P. M., police alarms.

PWX, Havana, 400m (750k), E. S. T.—8 P. M., concert at the studio of station PWX by the violinist, Mr. Lino Cosculluela.

WHN, New York, 360m (830k), E. S. D. S. T.—6:30 P. M., Alamac orchestra music by Olcott Vail's trio and Paul Specht's dance orchestra. 7:30 P. M., Bert Reith's Southern Harmonists. 8 P. M., Jimmy Flynn, tenor. 8:15 P. M., Louis Segerer, zither selections. 8:30 P. M., Kathryn R. Behnke, contralto, Marion Carr, accompanist. 8:45 P. M., the Perfect Harmony Four, male quartet. 9:15 P. M., Doris Schroeder, contralto, classical selections. 9:30 P. M., "The United States Constitution," by Geo. Hiram Mann. 9:45 P. M., Ellen Montague Cross concert company. 10:15 P. M., Fitzpatrick Brothers, singing old time medlies. 10:30 P. M., baseball statistics by Al. Munroe Elias. 11 P. M., Jimmy Clarke and his entertainers. 11:30 P. M., Roseland dancing academy.

KDKA, Pittsburgh, 326m (920k), E. S. D. S. T.—6 P. M., baseball scores; dinner concert. 6:30 P. M., "The Fairy Redbreast," children's period. 6:45 P. M., feature. 7 P. M., baseball scores; sport review, by James J. Long. 8 P. M., concert by the Westinghouse band.

KYW, Chicago, 536m (560k), C. S. D. S. T.—5 P. M., news, financial and final markets. 6 P. M., dinner concert. 8 P. M., talk by Vivette

Gorman, Home Economics Department. 8:05 P. M., Youth's Companion, short stories, articles and humorous sketches.

WBZ, Springfield, Mass., 337m (890k), E. S. T.—7:05 P. M., market reports. 7:30 P. M., bedtime story for the kiddies. 7:40 P. M., concert by the Hotel Kimball, Jan Geerts, violinist and director; Angela Goddard Lonergan, cellist; Paul Lawrence, pianist. 9 P. M., to be announced. 10:55 P. M., time signals; weather reports.

## Sunday, August 10

WGI, Medford, Mass., 360m (830k), E. S. D. S. T.—5 P. M., twilight program: "Adventure Hour" conducted by the Youth's Companion; music; talk, auspices Greater Boston Federation of Churches, by David S. Klugh, D.D., Peoples' Baptist Church, Boston.

WIP, Philadelphia, 509m (590k), E. S. D. S. T.—10:45 A. M., morning service radiocast from Holy Trinity Church, Rittenhouse Square, Philadelphia. Rev. Floyd W. Tomkins, D.D., rector. 3:35 P. M., special Sunday afternoon concert by Comfort's Philharmonic orchestra, radiocast direct from WIP control station, Atlantic City.

WOAW, Omaha, Neb., 526m (570k), C. S. T.—9 A. M., radio chapel service by Rev. R. R. Brown, pastor of Omaha Gospel Tabernacle of the Christian and Missionary Alliance and minister of World Radio Congregation; Marie Danielson, soloist; Mrs. Albert McIntosh, pianist. 9 P. M., musical chapel service by courtesy of Hope Mission.

KGW, Portland, Ore., 492m (610k), P. T.—6 P. M., church services

WGY, Schenectady, 380m (790k), E. S. T.—9:30 A. M., united service, First Reformed and Fourth Presbyterian churches of Albany, N. Y., sermon by Rev. Robert Wyclif Starie. 2 P. M., concert by Schenectady's Little Symphony orchestra, Leo Kliwen, conductor, from Central Park, Schenectady. 7:30 P. M., concert by New York Philharmonic orchestra, from Lewisohn Stadium, New York.

WDAF, Kansas City, 411m (730k), C. S. T.—baseball scores at 3:30, 4, 4:30 and 5 P. M. 4 P. M., program radiocast from the Newman Theatre.

WHAS, Louisville, Ky., 400m (750k), C. S. T.—9:57 A. M., organ music. 10 A. M., church service by the Broadway Baptist Church; H. U. Goodwin, organist and choir director; Mrs. Roy N. Downs, soprano; Miss Angeline McCrooklin, contralto; Charles H. Barnes, Jr., tenor, and A. W. Thompson, baritone. 4 P. M., concert, auspices Miss Ruth Hedden, assisted by George Bromagem.

WOS, Jefferson City, Mo., 441m (680k), C. S. T.—7:30 P. M., union open air religious services radiocast from the Capitol lawn; music by the Missouri State Prison concert band.

KGO, Oakland, Cal., 312m (960k), P. T.—3:30 P. M., concert by KGO Little Symphony orchestra, and soloists, Carl Rhodehamel conducting.

KPO, San Francisco, 423m (710k), P. T.—10 A. M., Hebrew services by Rabbi Fried. 11 to 12 A. M., undenominational and nonsectarian church services; the speaker will be Dr. R. S. Donaldson; soloist, Martha Jane Tackabury, contralto; organ concert by Theodore J. Irwin. 8:30 to 10 P. M., concert by Rudy Seiger's Fairmont Hotel orch.

KYW, Chicago, 536m (560k), C. S. D. S. T.—10 A. M., Sunday morning service radiocast from Chrysostom's Episcopal Church; Dean F. F. Crawford, rector. 1:30 P. M., studio chapel service.

## Monday, August 11

WNYP, New York, 526m (570k), E. S. D. S. T.—7:30 P. M., police reports and alarms. 8:30 P. M., musical program composed of band selections and vocal and instrumental numbers by artists. 10:30 P. M., police alarms.

WOAW, Omaha, Neb., 526m (570k), C. S. T.—6 P. M., popular half hour. 6:30 P. M., dinner program by Randall's Royal orchestra. 9 P. M., artist program arranged by Adaline Wykoff, soprano.

WFAM, Dallas, Tex., 476m (630k), C. S. T.—12:30 P. M., address, Dr. J. D. Boon, astronomer, Southern Methodist University. 8:30 P. M., Earle D. Behrends and Mrs. Behrends in song; Mrs. M. C. Hull in piano solo and accompaniment.

KGW, Portland, Ore., 492m (610k), P. T.—11:30 A. M., weather forecast. 3:30 P. M., literary program by Portland Library Association. 7:15 P. M., police reports. 7:30 P. M., baseball scores; weather forecast; market reports. 8 P. M., concert by Percy A. Campbell and his American band.

WGY, Schenectady, 380m (790k), E. S. T.—7:45 P. M., musical program by Fort Orange Society dance orchestra with incidental solos by Leo Pearlman and tenor solos by Edward Dillon; address on "Fused Quartz" by Edward R. Berry, General Electric Research Laboratory, Lynn, Mass.

WDAF, Kansas City, 411m (730k), C. S. T.—3:30 P. M., the Star's radio trio. 5 P. M., weekly Boy Scout program. 5:50 P. M., marketgram; weather forecast; time signal; road report. 6 P. M., address, speaker from University of Kansas, summer session faculty; the Tell-Me-a-Story Lady; music, Carl Nordberg's Plantation Players. 8 P. M., program by the Star's radio orchestra and the WDAF minstrels. 11:45 P. M., (Night-hawk Frolic), the Riley-Ehrhart Winnwood Beach orchestra.

KSD, St. Louis, 546m (550k), C. S. T.—7 P. M., concert by Aberg's concert ensemble; Arne Arnesen, violinist; radiocast from Hotel Statler Roof Garden. 8:30 P. M., program, direction of M. I. Epstein, Gladys Entenman, Antonio Kott-hoff, Bernadette Bostick and Dora Rubin, pianists, Emma Marie Wenzel and Inez Baker, vocalists; Clementine Baker, accompanist. 9:40 P. M., concert by Crow's Band.

WWJ, Detroit, 517m (580k), E. S. T.—8 A. M., setting-up exercises by R. J. Horton. 9:30 A. M., "Tonight's Dinner," and a special talk by the



# U. S. to Bring Anti-Radio Trust Suit

Woman's Editor. 9:45 A. M., public health service bulletins and talks of general interest. 10:25 A. M., weather forecast. 11:55 A. M., Arlington time. 12 noon, Detroit News orchestra. 3:50 P. M., weather forecast. 3:55 P. M., market reports and baseball scores. 8:30 P. M., concert by Schmeman's concert band, radiocast from Belle Isle Park. 9:30 P. M., Detroit News orchestra.

**WMAQ, Chicago, 448m (670k), C. S. D. S. T.—** 4 P. M., sport results. 6 P. M., Chicago Theatre organ recital. 6:30 P. M., Hotel LaSalle orchestra. 8 P. M., Harry Hanson, literary editor The Daily News. 8:20 P. M., Miss Clara E. Laughlin, travel talk. 8:40 P. M., talk by Fred Lund on watches. 9 P. M., series of talks by the United States civil service commission. 9:15 P. M., Miss Hazel O'Neill, soprano.

**WHAS, Louisville, Ky., 400m (750k), C. S. T.—** 4 to 5 P. M., selections by the Alamo Theatre orchestra; police bulletins; weather forecast for Kentucky, Indiana and Tennessee; readings; late news bulletins. 4:50 P. M., local livestock, produce and grain market reports. 4:55 P. M., baseball scores. 5 P. M., Central Standard time announced.

**WHAZ, Troy, N. Y., 380m (760k), E. S. T.—** 9 P. M., vocal and instrumental concert with readings by pupils of Gretta M. McOmber of Watervliet, N. Y.; dance music by Tony Flush and his orchestra.

**WOS, Jefferson City, Mo., 441m (680k), C. S. T.—** 8 P. M., address, "State Marketing Bureau Exhibit at the State Fair," by D. C. Rogers. 8:15 P. M., talks, "The People Versus the Scrub Bull," and "Farmers' Cooperatives" by Arthur T. Nelson, State Marketing Commissioner. 8:30 P. M., program of popular dance numbers by the Varsity Players orchestra of Missouri University.

**KGQ, Oakland, Cal., 312m (960k), P. T.—** 3 P. M., studio musical program. 4 to 5:30 P. M., Henry Halstead and his dance orchestra, Hotel St. Francis, San Francisco. 6:45 P. M., stock exchange and weather reports; news items. 8 P. M., educational program.

**KPO, San Francisco, 423m (710k), P. T.—** 4:30 to 5:30 P. M., Rudy Seiger's Fairmont Hotel orchestra. 5:30 to 6:30 P. M., children's hour stories by Big Brother of KPO. 7 to 7:30 P. M., Rudy Seiger's Fairmont Hotel orchestra. 8 to 9 P. M., musical program. 9 to 10 P. M., program under the direction of Louise Polos. 10 to 11 P. M., E. Max Bradfield's versatile band.

## Tuesday, August 12

**WNYC, New York, 526m (570k), E. S. D. S. T.—** 7:30 P. M., police reports and alarms. 8:30 P. M., musical program composed of band selections and vocal and instrumental numbers by artists. 10:30 P. M., police alarms.

**WOAW, Omaha, Neb., 526m (570k), C. S. T.—** 6 P. M., popular half hour. 6:30 P. M., dinner program by Russ Townsend's orchestra. 9 P. M., program by courtesy of Spelbring's concert orchestra.

**WFAA, Dallas, Tex., 476m (630k), C. S. T.—** 12:30 P. M., address, DeWitt McMurray, editor Semi-Weekly Farm News, in a medley of humor, pathos and wisdom. 8:30 P. M., Mrs. V. O. Rosser and Mrs. Eugene Duggan in song, piano and violin recital. 11 P. M., violin recital presenting Miss Helen Hall of Dallas.

**KGW, Portland, Ore., 492m (610k), P. T.—** 11:30 A. M., weather forecast. 3:30 P. M., children's program. 7:15 P. M., police reports. 7:30 P. M., baseball scores, weather forecast; market reports. 8 P. M., concert by George Weber and his orchestra.

**WGY, Schenectady, 380m (790k), E. S. T.—** 1 P. M., music and household talk, "Summer Foods." 5 P. M., produce and stock market quotations; news bulletins; baseball results. 5:15 P. M., report on condition of New York State highways. 5:30 P. M., organ recital by Stephen E. Boisclair. 7:15 P. M., baseball scores. 7:45 P. M., a few moments with new books, William F. Jacob, librarian. 7:30 P. M., program of N. Y. Philharmonic orchestra, radiocast from Lewisohn Stadium, College of City of New York.

**WDAF, Kansas City, 411m (730k), C. S. T.—** 5:30 P. M., marketgram; weather forecast; time signal; road report. 6 P. M., address, tenth of a series of piano lessons by Miss Maudellen Littlefield; address, Clerin Zumwalt, author and lecturer, twelfth of a series of educational lectures; the Tell-Me-a-Story Lady; music, Carl Nordberg's Plantation Players, Hotel Muehlebach.

**WWJ, Detroit, 517m (580k), E. S. T.—** 10:25 A. M., weather forecast. 11:55 A. M., time relayed by Western Union. 12 noon, Detroit News orchestra. 3 P. M., concert by Schmeman's concert band radiocast from Belle Isle Park. 3:50 P. M., weather forecast. 3:55 P. M., market reports and baseball scores. 5 P. M., baseball scores. 8:30 P. M., concert by Schmeman's concert band. 9:30 P. M., Detroit News orchestra.

**WMAQ, Chicago, 448m (670k), C. S. D. S. T.—** 4 P. M., sports results. 6 P. M., Chicago Theatre organ recital. 6:30 P. M., stories for children. 8 P. M., weekly Northwestern University lecture. 9 P. M., talk from one of the Chicago charities. 9:15 P. M., program by Walther league.

**WHAS, Louisville, Ky., 400m (750k), C. S. T.—** 4 to 5 P. M., selections by the Alamo Theatre orchestra; police bulletins; weather forecast for Kentucky, Indiana and Tennessee; readings; late news bulletins. 4:50 P. M., local livestock, produce and grain market reports. 4:55 P. M., baseball scores. 5 P. M., Central Standard time. 7:30 to 9 P. M., concert by the Happy Hoosier Harmonists of New Albany, Ind.; late news bulletins; baseball scores; Central Standard time announced.

**KGQ, Oakland, Cal., 312m (960k), P. T.—** 4 to

## Two Favorites



**GEORGE D. HAY** who is familiar to the radio audience as "The Solemn Old Judge," is the assistant director of WLS, the Sears-Roebuck Agricultural Foundation station in Chicago. He is very popular.



**CRYSTAL WALTERS**, who gives American song recitals frequently, and is the finest singer to present a chronological discourse on the evolution of American songs. She is a favorite at WHN, New York City.

5:30 P. M., concert orchestra of the Hotel St. Francis, San Francisco. 6:45 P. M., stock exchange and weather reports, and news items. 8 P. M., Arion trio; Oris Osborne, contralto; reading by Vera Frances Morse with musical accompaniment; Homer Henley, baritone; Ethel Barnes Karmel, soprano; Esther Hale Sittig, pianist; travel talk by J. E. Barnes; Mrs. Homer Henley, soprano. 10 P. M. to 11 A. M., Henry Halstead and his dance orchestra playing in the Garden Room of the Hotel St. Francis.

**KPO, San Francisco, 423m (710k), P. T.—** 4:30 to 5:30 P. M., Rudy Seiger's Fairmont Hotel orchestra. 5:30 to 6:30 P. M., children's hour stories by Big Brother of KPO. 7 to 7:30 P. M., Rudy Seiger's Fairmont Hotel orchestra. 8 to 10 P. M., varied program. 10 to 11 P. M., E. Max Bradfield's versatile band.

## Wednesday, August 13

**WNYC, New York, 526m (570k), E. S. D. S. T.—** 7:30 P. M., police reports and alarms. 8:30 P. M., musical program composed of band selections and vocal and instrumental numbers by artists. 10:30 P. M., police alarms.

**WFAA, Dallas, Tex., 476m (630k), C. S. T.—** 12:30 P. M., musical recital by the Red-Head Girl of the Dallas Journal's editorial staff.

**KGW, Portland, Ore., 492m (610k), P. T.—** 11:30 A. M., weather forecast. 3:30 P. M., talk by Jeanette F. Cramer, home economics editor of the Oregonian. 7:15 P. M., police reports. 7:30 P. M., baseball scores; weather forecast; market reports. 8 P. M., concert by John Claire Monteith, baritone. 10 P. M., dance music by George Olsen's Metropolitan orchestra of the Hotel Portland.

**WGY, Schenectady, 380m (790k), E. S. T.—** 5 P. M., produce and stock market quotations; news bulletins; baseball results. 5:30 P. M., "Adventure Story." 6:30 to 8 P. M., musical program by Filipino orchestra of United States liner Leviathan, and the radio address by Captain Herbert Hartley, commander of the Leviathan, from State Theatre, Schenectady, N. Y. 8 P. M., concert by New York Philharmonic orchestra, radiocast from Lewisohn Stadium, College of the City of New York.

**WDAF, Kansas City, 411m (730k), C. S. T.—** 6 P. M., address, speaker from the Meat Council of Greater Kansas City; address, weekly health talk, auspices Health Conservation Association; the Tell-Me-a-Story Lady; music, Carl Nordberg's Plantation Players, Hotel Muehlebach. 8 P. M., program presented by some of WDAF's favorite soloists of the year. 11:45 P. M., (Nighthawk Frolic) the Plantation Players, Hotel Muehlebach.

**KSD, St. Louis, 546m (550k), C. S. T.—** 8 P. M., Silverman's orchestra concert broadcast direct from Lyric Skydome.

**WWJ, Detroit, 517m (580k), E. S. T.—** 9:45 A. M., public health service bulletins and talks of general interest. 10:25 A. M., weather forecast. 11:55 A. M., Arlington time. 12 noon, Detroit News orchestra. 8 P. M., concert by Schmeman's concert band. 3:50 P. M., weather forecast. 3:55 P. M., market reports and baseball scores. 5 P. M., baseball scores. 8:30 P. M., concert by Schmeman's concert band. 9:30 P. M., Detroit News orchestra.

**WMAQ, Chicago, 448m (670k), C. S. D. S. T.—** 4 P. M., sport results. 6 P. M., Chicago Theatre organ recital. 6:30 P. M., Hotel LaSalle orchestra.

**WHAS, Louisville, Ky., 400m (750k), C. S. T.—** 4 to 5 P. M., selections by the Alamo Theatre orchestra; police bulletins; weather forecast for Kentucky, Indiana and Tennessee; readings; late news bulletins. 4:50 P. M., local livestock, produce and grain market. 4:55 P. M., baseball scores. 5 P. M., Central Standard time announced. 7:30 to 9 P. M., concert, auspices of Mrs. J. E. Harmon, Jr., of New Albany, Ind.; late news bulletins; baseball scores; official Central Standard time announced at 9 o'clock.

**PWX, Havana, 400m (750k), E. S. T.—** 8 P. M.,

## Papers Being Prepared by Attorney-General Stone Under Sherman Law—Trade Commission's Recent Report Is Declared to Be Basis of Suit

WASHINGTON.

INDICATIONS were given at the Department of Justice that Attorney-General Stone is preparing an action against some of the radio equipment companies for alleged violation of anti-trust laws. The steps contemplated are understood to be based on the recent charge by the Federal Trade Commission that a monopoly existed among some of the companies.

The Attorney-General declined to discuss the situation, but admitted that the "Sherman law section" of his department was considering the findings of the Trade Commission, which were said to be of such a character as to warrant close study and "a further investigation for additional facts."

Some department officials indicated a belief that an agreement existed among certain radio equipment makers with respect to selling prices, but they were not prepared to discuss procedure, nor would they say whether the companies were the ones cited by the Trade Commission. These were the Radio Corporation of America, the General Electric Company, the American Telephone and Telegraph Company, the Westinghouse Company, Western Electric Company, the International Radio Company and the United Fruit and Wireless Specialty Company.

These, the commission in a complaint issued last January charged, were creating and maintaining a monopoly in radio apparatus and communication.

concert at the Malecon band stand, by the General Staff Band of the Cuban Army, Captain Jose Molina Torres, band leader.

**WOS, Jefferson City, Mo., 441m (680k), C. S. T.—** 8 P. M., address, "Productive Sheep Raising" by R. L. Waddell. 8:20 P. M., barn dance tunes by the Old Time String Trio, Louie Barton, Georgie Schrimpt and Bryan Williams.

**KGQ, Oakland, Cal., 312m (960k), P. T.—** 3 P. M., musical program; speaker, courtesy, Cora L. Williams Institute, Berkeley. 4 to 5:30 P. M., concert orchestra of the Hotel St. Francis, San Francisco. 6:45 P. M., stock exchange and weather reports; news items.

**KPO, San Francisco, 423m (710k), P. T.—** 5:30 to 6:30 P. M., children's hour stories by Big Brother of KPO. 7 to 7:30 P. M., Rudy Seiger's Fairmont Hotel orchestra. 8 to 11 P. M., E. Max Bradfield's versatile band.

## Thursday, August 14

**WNYC, New York, 526m (570k), E. S. D. S. T.—** 7:30 P. M., police reports and alarms. 8:30 P. M., musical program composed of band selections and vocal and instrumental numbers by artists. 10:30 P. M., police alarms.

**WOAW, Omaha, Neb., 526m (570k), C. S. T.—** 6 P. M., story hour, conducted by Doris Claire Secord, daughter of "Uncle Ross" of World-Herald. 6:30 P. M., dinner program by Yost's orchestra of the De Luxe Dancing Academy. 9 P. M., Woodbine, Iowa.

**WFAA, Dallas, Tex., 476m (630k), C. S. T.—** 12:30 P. M., address, Charles E. Osborne, physical director of the Y. M. C. A. on "Health for Service." 8:30 P. M., George A. Nicoud and old-time music box demonstration. 11 P. M., Melrose orchestra in popular music recital.

**KGW, Portland, Ore., 492m (610k), P. T.—** 11:30 A. M., weather forecast. 3:30 P. M., children's program. 7:15 P. M., police reports. 7:30 P. M., baseball scores; weather forecast; market reports. 10 P. M., dance music by George Olsen's Metropolitan orchestra of the Hotel Portland. Note: Station KGW will be inactive from August 17 to August 31.

**WGY, Schenectady, 380m (790k), E. S. T.—** 11:30 A. M., stock market report. 11:40 A. M., produce market report. 11:50 A. M., report on farm movement of lettuce. 11:55 A. M., time signals. 1 P. M., music and address, "The Key, note to Conservation—Preservation of Forests," August 31.

(Continued on page 30)

## A THOUGHT FOR THE WEEK—

*How can modern man obtain as un-failing a variety of entertainment, day in and day out, and at such a small investment, as he now obtains through radio?*

Powel Crosley, Jr., President, Crosley Manufacturing Co.

# RADIO WORLD

Title Reg. U. S. Pat. Off.

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AUGUST 9, 1924

## Radio In the Foreground of the Presidential Campaign

MUCH of the political news today concerns the plans of the Presidential candidates for waging a campaign by radio. This emphasizes once again how the person who has no set is "out of it." He realizes this more and more, day by day. Finally he reaches the point where he buys a set—and never regrets it. Just as the radio-casting of the Republican and Democratic conventions caused a big increase in the sale of radio sets and parts, so will the campaign itself have a stimulating effect, to an even greater extent. You hear not only what the candidate says, but just how he says it, which gives an important insight that the printed word lacks. With President Coolidge and Mr. Davis determined to wage radio campaigns, who would

## Marching Onward

THE coils are the heart of the Neutrodyne. Granting that the highest efficiency is obtained from the coils you could probably get results at least as good without using neutralizing condensers. Therefore it is extremely interesting to build a set for which low-loss, high-efficiency coils are minutely described, and see what quality, volume and distance are obtained. Then you may try the neutralization of the inter-coupling capacity. And suppose you discovered that, even when properly neutralized, the set does not compare in results with what was obtained formerly? What then? No matter what method you finally adopt—and the two options are fully presented and explained—you are bound to get splendid results if you follow the directions of N. N. Bernstein, Technical Editor, contained in his article "A Low-Loss Neutrodyne Set." Full data is given on neutralization—what it is, how and why it is done, etc. But the coils! They are the thing! You may find them so good that your set will be a Neutrolessdyne! The set consists of the usual five tubes—two stages of RF, detector and two stages of AF. Neutrodyne fans will read this article with great interest. It will be published in next week's RADIO WORLD, issue of August 16, out Wednesday, August 13.

"The Super-Audible Wave," by B. J. Bongart, in the same issue, will treat of the theory of the 3-Tube Super-Heterodyne, the detectorless circuit that works a loud speaker.

Lester Hutter will tell how to build a 3-tube set that uses the Superdyne principle for two stages of tuned RF, detector and two stages of AF. The set works on a loop. Mr. Hutter is a high authority on radio engineering and his followers will be more devoted to him than ever, after reading this splendid article.

Brainard Foote, one of America's foremost radio experts, will describe "How to Build a Unit for Lighting Your Amplifier Tubes with AC Current." The cost of operation is next to nothing a year! And you get no objectionable hum.

Brewster Lee, Neal Fitzalan, Dennis J. O'Flaherty and Herman Bernard will also contribute interesting and authoritative articles in that number.

In the same issue will be published a tally of the votes in RADIO WORLD's canvass to determine the most popular radio entertainer. Turn to page 15 of the present issue and see the coupon.

## RADIO WORLD

15 CENTS Illustrated ISSUE OF AUGUST 9, 1924

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deny himself a set that will bring their voices into his home? It is self-punishment to miss these great advantages. And yet, in broad comparison and important as they are, they constitute only a tiny fraction

of the appeal of radio—the year-round, un-failing source of entertainment and instruction. We radio fans will be doing others a favor by strongly coaxing them to join our happy ranks.

# The Radio University

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

I recently purchased a set of Eastern Coil Corp. Superdyne coils and I notice some differences in the specifications as compared to the Superdyne article in RADIO WORLD. These apparently do not make use of the 4 to 10 turn aperiodic primary. The secondary and radio-frequency coils are 30 turns each and not tapped for high and low wave lengths. Will these coils give me good results?—C. F. Allen, c/o W. S. Nott Co., Minneapolis, Minn.

The coils you mention will work efficiently with the Eastern Coil hook-up, which you should use with those coils. However, the coils will also work well in the RADIO WORLD Superdyne provided you wish to spend a little time on it trying slight constructional changes to suit your coils, but sticking to the general directions in the RADIO WORLD articles.

I have a 3-circuit honeycomb coil set with which I have a little trouble in tuning out some high-

lights up brighter than when on full, but never lights up as bright as the other tubes. Can you tell me where the trouble is?—Roy C. Hyde, Rowan, Ia.

The trouble lies in the first amplifier rheostat. Evidently it has become defective with use and a poor contact or loose connection exists. Have that rheostat taken out and repaired, or replace it with a good one. Also examine the A battery leads inside the set going to the rheostat for poor connections.

Can one or two stages of straight audio-frequency amplification be added to the one-tube reflex set described by A. P. Peck in the July 12 issue of RADIO WORLD? Where should the first straight AF transformer be hooked in?—F. S. Scheetz, care Amwell National Bank, Lambertville, N. J.

Yes, you may add straight AF to this or any other one-tube circuit. The primary of the first stage of straight AF is connected to where the

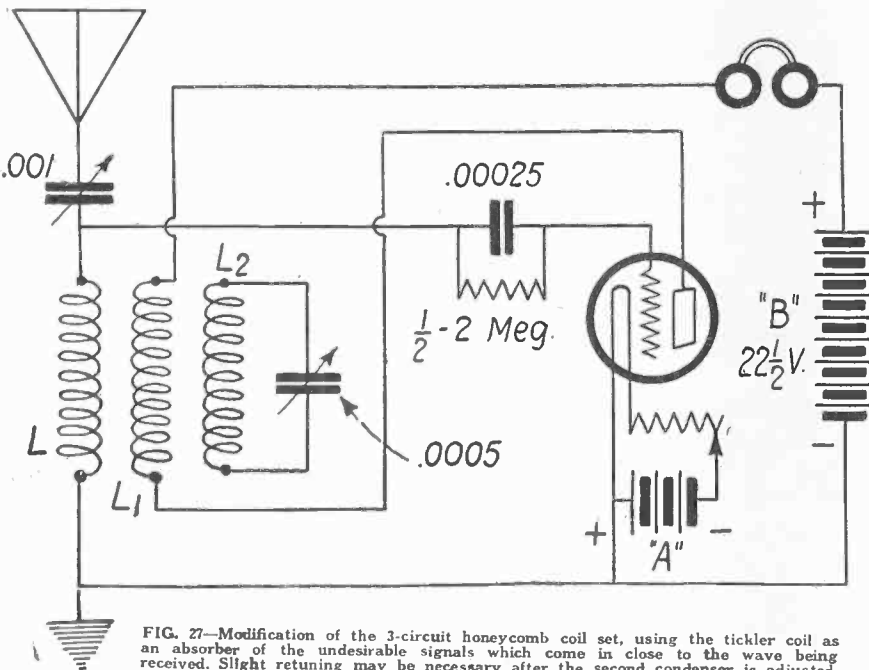


FIG. 27—Modification of the 3-circuit honeycomb coil set, using the tickler coil as an absorber of the undesirable signals which come in close to the wave being received. Slight retuning may be necessary after the second condenser is adjusted.

powered stations right close by. Can you give me some arrangement whereby I may use my present apparatus wired so that I can eliminate to a still greater extent my present interference?—J. A. Ascher, 252 Broadway, New York City.

The above diagram, Fig. 27, is an arrangement of the three honeycomb coil circuit employing the third or tickler coil as an absorption circuit. The secondary is hooked into the plate circuit, and the grid and positive filament leads connected to the first or primary coil together with the antenna and ground. After tuning in the regular way with the antenna condenser, the variable across the third coil is adjusted to a wave length slightly higher or lower than the wave being received. This has the effect of absorbing undesirable impulses which would otherwise be heard.

I have a single-circuit regenerative set, three tubes, employing 1 1/2-volt WD12s. The first amplifier tube does not light up as brightly as the two other tubes unless I turn the rheostat on right to the limit. Then sometimes when I turn it back

phones are in the circuit now. It would be advisable for you to insert a double-circuit jack where the phones appear in the diagram, so that you may use one tube for listening in on the head phones.

I have built the 3-circuit tuner described by Brainard Foote in RADIO WORLD for June 21 and would like to know if I can use the Thompson Metaform frequency changer with it? If not, what circuit can I use it with?—Frank E. Jensen, 179 Summit Ave., West Hoboken, N. J.

Yes, the Metaform Unit may be used with Brainard Foote's circuit, or with any other circuit. See RADIO WORLD for July 26, University Department, showing how to use the Metaform with the Cockaday receiver.

After building the Superdyne according to instructions published in RADIO WORLD, I find the volume of 4 tubes, two C299s and two C301As, about equal to a Reinarts 3-tube regenerative re- (Concluded on page 26)

## MAGNAVOX Radio Products



A1—\$27.50

## MAGNAVOX Audio-frequency Power Amplifiers

THESE instruments offer the most ideal method for amplification of audio-frequency waves before they are reproduced into sound.

Wherever ordinary audio-frequency is replaced with Magnavox Power audio-frequency, stations previously out of range can be reproduced in excellent volume.

The new one-stage Magnavox Power Amplifier A1, illustrated above, is just what is needed in many cases to bring in the distant stations.

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- A1-R consisting of electro-dynamic Reproducer with 14-inch curvex horn and 1 stage of amplification \$59.00
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## National Radio Trade Convention Sept. 22, Won by New York City

RADIO editors from every section of the United States will be in attendance at a special meeting to be held in conjunction with the National Radio Trade Association convention to be held in New York City during the week of September 22. The convention was won by New York City from a big field.

Moulders of radio parts, which is a recent addition to the ranks of the association, will hold their first meeting during the national radio convention. The new division of the parent organization prizes one of the most important industrial units of the radio field.

The action taken by radio set manufacturers in bringing out new models during the months of July and August rather than announcing new models at other seasons, which was approved by a vote of members of the National Radio Trade Association, will be discussed at length at the convention.

The claim has been made that the trade does not fully understand the significance of a special model time and its relation to merchandising. To hear from those who entertain opposite opinions, a special session of the convention will be assigned to the subject at which every angle will be discussed. The referendum vote is not obligatory but is being taken with a view of finding the opinions of the membership in the matter.

The address of the National Radio Trade Association is 1133 Broadway, New York City.

# The Radio Trade

## R F Sets Most Popular

RADIO receivers embodying the principle of tuned radio frequency amplification are popular types with radiocast listeners. This is shown by three separate investigations conducted from different parts of the country, one by a national magazine, another by a battery manufacturer and the third by an advertising agency.

All three investigations were conducted on the basis of a questionnaire directed to radio dealers, inquiring which was the most popular set in their territory. All three corroborate each other to a surprising degree, although one of them was restricted to the music trade.

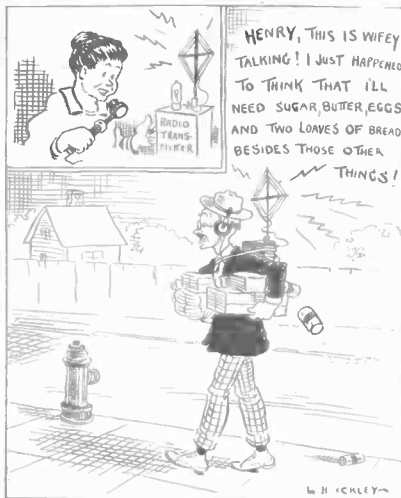
The results from two of the questionnaires show that regenerative sets sold incorporate tuned radio-frequency and of the RF sets two-thirds were of the Neutrodyne type.

The remaining results from the questionnaires show that regenerative sets constitute 33 per cent of the total. All other types, including multi-tube receivers, such as the Super-Heterodyne, are placed at 14 per cent.

A slightly different result came from the music trade. Here the Neutrodyne type showed a preference of 52 per cent of all receivers. Regenerative sets were 37 per cent and all other types 11 per cent.

**JORDAN BATTERY USES LAVIER FORMULA**  
The Lavier Formula—the only "different" method for making batteries—has just been applied to radio batteries by the Jordan Battery Company, Ypsilanti, Michigan, manufacturers of the Ray batteries. This battery is called the Raydio B Storage Battery and is said to be a revolution in radio battery construction. Among the

## This Freedom



HER HOME equipped with a small transmitting station, Friend Wife can follow her shopping husband around without leaving the house, thus extending her sphere of preeminent influence.

## Swiss to Repeat Exposition

CONSUL Lewis W. Haskell, Geneva, reports that the first Swiss National Wireless Telephone and Telegraph Exposition, the outcome of the efforts of the Radio Club of Geneva, was a success. The chief purposes of the exposition were to give the people a better understanding of radio, to make known the capability of the Swiss industry in this line, and to make known the use of radio and its various applications. The event will be repeated next year.

unusual feature of this battery is the fact that no separators are used, giving free, unobstructed passage of the current, thus eliminating the hissing and sizzling that are often laid to static. Raydio B Storage Batteries, it is stated, respond instantly to atmospheric variations, thus eliminating the annoyance of constant tuning. They are easily and quickly rechargeable and a small amount of current from the electric light circuit keeps them fully charged all the time, doing away with the annoyance of using batteries after they have been partly discharged.

## FIL-KO-STAT NOW PROVIDED WITH A SWITCH

A COMPRESSION type rheostat that can be switched off without being turned off is obtainable. It overcomes the slight inconvenience that the compression rheostat has, that of the number of turns required to turn it on or off. The Fil-Ko-Stat, allowing as it does, infinite control of current flow, formerly had to be turned off like all other compression rheostats, but can now be left at approximately the correct adjustment, and the A battery disconnected by means of the little nickel-plated switch attached to the regular Fil-Ko-Stat mounting screws on the front of the panel. No extra holes need be drilled.

## CROPS THIS YEAR \$11,000,000,000; RADIO TRADE AFFECTED

BECAUSE of an increase in value of principal crops harvested by American farmers of \$430,000,000 during the last month, it was estimated the total value of all crops this year will approximate \$11,000,000,000. That is important to the radio trade, because it means the farmer will have greater purchasing power.

## RADIO BUYER

Visiting New York, August 4th, will pay cash for any overstocks, including parts, accessories, small radio sets, head sets—anything of merit. What have you to offer to W. D. C.? care Hotel Chelsea, 23rd St., N. Y. Replies strictly confidential.

## Literature Wanted

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

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

Name .....

City or town .....

State .....

Andrew Huraght, Jr., 25 East 27th St., Bayonne, N. J.  
Alfonse A. Cioban, 945 North Grove St., Vir- den, Ill.  
Michael C. Buckosky, Box 330, Leechburg, Pa.  
Ronald F. Thompson, Greene, Ia.  
E. G. Barnes, dealer, Maple Avenue Farm, RR 3, Mt. Vernon, O.  
George Taylor, 1547 Laura St., Jacksonville, Fla.  
Oliver E. Rippel, 3002 Idlewood Ave., Youngstown, O.  
L. C. Murrell, Greenville, Miss.  
Rev. L. C. Gray, Ocilla, Ga.  
Charles A. Nutter, Waverly, Mass.  
Paul Lyon, 1106 Springfield Ave., Irvington, N. J.  
Robert Sealock, Leroy, Ill.  
C. G. Massie, 3424 Freemout, South, Minneapolis, Minn.  
John Shubert, Meth, San., Albuquerque, N. M.  
T. L. Finch, Lookeba, Okla.  
Lehman's Radio Service, 749 Cleveland Ave., Amherst, O.

## Tradiograms

HAROLD J. POWER, founder of the American Radio and Research Corporation, has acquired complete ownership of the business. The Amrad company started in 1915.

THE ELECTRIC SUPPLY & EQUIPMENT COMPANY, INC., whose main office is at Albany, N. Y., with branches in Elmira and Buffalo, N. Y. and Reading, Scranton, and Wilkes-Barre, Pa., have recently been appointed distributors for the Eagle Neutrodyne Radio Receivers. Schwabacher-Frey Stationery Company, 609 Market Street, San Francisco, have secured the agency for the Eagle.

CLYDE P. STEEN, secretary of the Window Display Advertisers Association, a national organization of window display men, has accepted the post of chairman of the window display committee for International Radio Week which will be held November 24 to 30, 1924. Headquarters are at 1133 Broadway, New York City.

## Coming Events

AUG. 16 TO 21, INCLUSIVE—Pacific Radio Exposition, Civic Auditorium, San Francisco, under auspices of Pacific Radio Trade Association, Herbert E. Metcalf, Magnavox Co., Oakland, Cal., president. A. S. Lindstrom is chairman of the exposition executive committee, assisted by C. C. Langevin, H. W. Dickow, F. J. Cramm and P. L. Jensen.

SEPT. 22-28—First Annual International Radio Show, Madison Square Garden, New York City.

OCT. 2-11—Exposition, Grand Central Palace, New York City, under auspices of American Radio Exposition Co.

NOV. 3-8—Third Annual National Radio Show, Grand Central Palace. S. L. Rothafel (Roxy) and "his gang" will broadcast from the convention.

NOVEMBER 24 TO 30, INCLUSIVE—International Radio Week.

DECEMBER 1 TO 6 INCLUSIVE—Boston Radio Exposition, Mechanics Building, Boston.

## Business Opportunities Radio and Electrical

Rates: 40c a line; Minimum 3 lines.

RADIO ACCESSORIES manufacture agency wanted for Canada; best lines; good connections, salesrooms and force; references. Box 11, Radio World.

WANTED—Successful concern or party to finance valuable radio-controlled clock and automatic weather signal, radio controlled; basically new and patent allowed; large market. Box 22, Radio World.

ESTABLISHED radio distributing house; sell part or entire interest. Box 33, Radio World.

MANUFACTURER well-known radio equipment wishes to raise working capital, temporary needs; offering marketable finished goods, high quality, as collateral. Box 44, Radio World.

# Sale of Super-Heterodyne Kit Enjoined

**Westinghouse Co. and R. C. A. Get Temporary Writ Against Experimenters Information Service, Inc., and Golden-Leutz, Inc.—Patent Violation Alleged**

THE sale of "a complete set of parts" for the announced purpose of having the purchaser construct the Super-Heterodyne constitutes an infringement of Fessenden heterodyne patents Nos. 1,050,441 and 1,050,728, and Armstrong regenerative patent No. 1,113,149, the United States District Court, New York, stated in an injunction suit.

The opinion was handed down by a judge in the case of the Westinghouse Electric and Manufacturing Company and the Radio Corporation of America against Inc., Golden-Leutz, Inc., Claude Golden the Experimenters Information Service, and Charles A. Leutz. The patents are owned by the Westinghouse Company, which co-operates with the Radio Corporation of America and other big radio concerns.

The judge granted a temporary injunction against all the defendants except Charles A. Leutz. The court said: "I find no evidence that he personally participated in the Experimenters Information Service before its incorporation."

Affidavits were submitted alleging that the Experimenters Information Service, Inc., and Golden-Leutz, Inc., were the same.

The petitioners alleged the sale by the respondents of a set of parts, or kit, to a man named Israel by a salesman of the respondents named Baldwin. The court, discussing this phrase, says:

"The argument is that this does not constitute an act of infringement though it may be an act of contributory infringement; that for the jurisdiction of this court there must be at least one complete sale. But it is an infringement to divide the patented machine into parts ready for assemblage, even though the party who is to use them must put them together, *Strobridge v. Lindsay, Sterritt & Co.*, 6 Fed. Rep. 510, *Spirella Co. v. Nubone Corset Company*, 180 Fed. Rep. 470, 473. Such a sale is not contributory but complete infringement. Here it is true that the set, strictly speaking, is a unity, but all the parts making it up were supplied and it would be unreasonable to hold that the infringement was not complete because they were sold in 'knocked-down' condition."

As the injunction is only temporary, and granted pending trial, all the issues will have to be aired in court, either before a judge or before judge and jury, before a final determination is reached.

## 15-Minute Limit for Campaign Radiocasting

A LIMIT of fifteen minutes is to be imposed on political speeches by radio in the coming Presidential campaign, some of the radiocasting stations announce. Important utterances, like the formal acceptances of Coolidge and Davis of their nominations for President, will not be restricted, but the usual run of addresses will.

Foremost among the stations said to have reached the decision are those operated by the Radio Corporation of America, the American Telephone and Telegraph Company, the General Electric Company and the Westinghouse Company.

National radiocasting will be attempted only infrequently, and candidates will have to rely mostly on the local stations.

## News of The Stations

STATION WHA, Madison, Wis., will install a new sound-proof studio, as well as additional new equipment, including a microphone and amplifier. The walls and ceiling of the new studio will be covered with Balsam wool, a new deadening material, and the floor with a thick rug, while at the window heavy velour curtains will be hung so that there will be no reverberations of sound.

THE Third Avenue Railway System radiocasting station, 130th Street and Third Ave., New York City, has opened for testing. The call letters are WEBJ, and the wavelength 273 meters. The station will radiocast twice a week from 7 to 9 P. M. Programs up to September 9, will be preliminary tests prior to the official opening on that date. Harry A. Bruno, program director, said that the programs will be made up of talent among the employees, and the chief motive of the station will be to create good will among the employees, many of whom have radio sets in their homes. He said: "No advertising or paid advertising talks will be radiocast from WEBJ."

### A LETTER OF APPRECIATION

EDITOR RADIO WORLD:

IT certainly made us rub our eyes after reading your editorial in the July 26 edition, and wish to express our appreciation. Your stand is broad-minded—a virtue which unfortunately is not very far developed by many publishers—and we hope will help to win readers over to your splendid magazine. We quote below an announcement we have instructed our announcer to make during to-night's program, and we hope will make you feel just as good as we did after seeing your editorial:

"We read an interesting article relative to radiocasting in one of the popular radio publications, which to our mind hits the nail right on the head. Just get yourself a RADIO WORLD at your newsdealer, dated July 26, and look on page 20. See if you get the same kick out of it we got."

Thanks, friend,  
Sincerely yours,

WHN Radio Broadcasting Station,  
ERWIN MARES, JR.

[The letter refers to an editorial, "Radio Censorship Would Be a Disaster."—Editor.]

### MEASURING DISTANCES BY RADIO AND SOUND

WASHINGTON. THE Lighthouse Service of the Department of Commerce is experimenting with a method of measuring distances at sea by means of simultaneous radio and sound waves, which may develop into a valuable aid to navigation and safety of life at sea. A sound oscillator has recently been installed on the Nantucket Lightship, about 200 miles east of New York and 120 miles southeast of Boston, which, operated in conjunction with the radio fog signal sent regularly in foggy weather, will enable the skipper of an Atlantic steamer to determine his distance from the Lightship.

## U. S. Backs Drive to Get \$1,000,000 Radio Fund for Vets

THE drive started by S. L. Rothafel (Roxy) and his gang from WEA, New York City, for funds with which to equip Federal hospitals with receiving sets, has been taken up by the Federal Government. The work became so heavy that Roxy had to ask for help. He got it quickly. Now the goal is \$1,000,000. The wounded veterans will get the benefit of this.

Already funds sufficient for the military and naval hospitals of the District of Columbia have been raised and the hospitals equipped. New York has collected approximately \$125,000; Chicago several thousands of dollars; Providence has given about \$15,000; and Boston is conducting a campaign for \$50,000. This money is used solely for the purchase of equipment; there is no overhead, and manufacturers are quoting especially low prices.

The radio programs are received at Walter Reed Hospital on one master receiving set, which feeds, by means of an impedance matching transformer, into an audio-frequency power amplifier, which, in turn, feeds into the 1,000 phones in parallel through another impedance matching transformer. The lines which run from the output transformer to the various wards and across which the phones are connected, may branch at any point and a double-pole switch is provided at every branch point in order that any trouble which may develop in the system may be isolated and more easily located.

### RADIOCASTING FOR CEYLON

ASSISTANT Trade Commissioner Donald Renshaw, Calcutta, reports that the Secretary of State in India has approved the introduction of radiocasting in Ceylon, to be under state control though not necessarily operated by the state.

## S-U-P-E-R-D-Y-N-E SPECIALISTS

Our Own Coils—guaranteed..... \$6.50  
Kit (Fluevelling Condensers, Coils and Dia-gram)..... 19.50  
Complete Parts, Assembled with Diagram..... 65.00  
Superdyne Advice Free. Mail Orders Solicited.  
**WALLACE RADIO COMPANY, Inc.**  
135 LIBERTY STREET NEW YORK CITY

Notice—To Those Who Have Ordered the Superdyne Series That Appeared in Radio World Dated May 17, 24 and 31.

These copies are very scarce. We are doing everything in our power to get back numbers in order to accommodate our readers. Do not worry if the copies you order do not reach you immediately. They will be sent to you as soon as these issues are in stock again. Circulation Department, Radio World, 1493 Broadway, New York City.

## Why Not Reach Out

with your crystal set? There's music on your aerial every night from stations far away! I have shown thousands of people how to hear long distance programs without tubes. Write me today.

LEON LAMBERT  
562 South Volusia, Wichtla, Kan.



TOWER'S

**TOWER'S**  
**Scientific**

WEIGHS ONLY 8oz

Perfect Tone Mates



**\$2.95**

Plus  
a few cents postage

Buy a Headset  
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**RADIO**  
**TOWER'S**  
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Money Back Guarantee

**OUR \$200,000.00 COMPANY STANDS SQUARELY BACK OF EVERY HEADSET**

**WORLD'S GREATEST HEADSET VALUE**

now \$2.95, with Notable Improvements

Longer Cord (full 5 feet), Stronger Magnets, Higher Resistance, Increase of Sensitivity, Perfect Tone Mates

EVERY SET TESTED BY LICENSED RADIO OPERATORS

*Send no money - Order on a Post-Card*

THE TOWER MFG. CO., Dept. D. 98 BROOKLINE AVENUE, BOSTON, MASS.

Scientific

## Views of the News

THE fact that the Senate Committee, on Patents, just before Congress adjourned, actually sent for the decision of Federal Judge Hickenlooper, of Cincinnati, dismissing the suit of Jerome H. Remick & Co., music publishers, against WLW, the Crosley broadcasting station there, and postponed indefinitely action on the Dill bill, was received with regret among radio fans.

The supposed reason for postponement is that, the question now being before

the courts, legislation is unnecessary. Re-assuring as is the fine victory achieved by the Crosley concern, the question still remains undecided finally. It will undoubtedly reach the United States Supreme Court, because it is an important fight and no conclusion will be accepted by both sides until the highest court has acted, if the judiciary alone is to make the decision.

There is, however, no reason for the Senate committee side-stepping the issue on any such pretext. The Dill bill would make it possible for stations to broadcast music without paying a royalty to the music publisher or composer. That is as it should be, since the publishers and the American Society of Authors and Composers, knowing that stations desire a wide choice of songs so that the listeners-in will get varied programs, are simply seeking to capitalize this honest effort to render effective service.

The publishers and the society know that broadcasting helps to popularize songs. Some publishers, like Irving Berlin, admit it. Whether such popularizing adds to the sale of sheet music is a subject on which the general public will feel at liberty to differ with the complaining publishers and composers.

It may be true, as the publishers say, that in the last two years their business has been decreasing, but, as revealed in the May 3 issue of RADIO WORLD, their business was on the wane prior to the advent of general broadcasting. There was a time the publishers blamed it on the war. Then the excuse was that the post-war depression hit them hard. Now they feel they have an opportunity to blame radio, although they make their newest assertion without any convincing effect. The same elements that insist

on collecting a fee for the "privilege" of "allowing" songs to be broadcast no doubt are made the hungrier for gold by the fact that theatres pay them a royalty and that similar but much more substantial royalties are collected from phonograph companies and producers of mechanical piano rolls. It is obviously therefore

(Concluded on next page)

**10c** Brings You  
Our New  
48-Page Radio Catalog  
Includes Thousands of  
Unequalled Radio Bargains

Send a dime for your copy, today!



CHICAGO SALVAGE STOCK STORE  
Dept. W6, 500 South State Street  
CHICAGO

### RADIO CRYSTALS

MOUNTED, UNMOUNTED, BULK  
Packed under your own label if desired.  
Dealers and Jobbers—Write us for lowest prices on Quality Crystals.

MELODIAN CO. OF AMERICA  
INDEPENDENCE, MISSOURI

### "ROLLS ROYCE"

#### RADIO TUBES



Like their name, significant of quality. Durable and powerful. Bring in distance with a maximum of volume and clearness.

Type 206—5 volts, 1 ampere  
Detector Tube

Type 201A—5 volts, .25 ampere  
Amplifier and Detector

Type 189—2-4 volts, .06 ampere  
Amplifier and Detector

Type 189—2-4 volts, .06 ampere  
With Standard Base—Amplifier and Detector

Type 12—1 1/2 volts, .25 ampere  
Platinum Filament—Amplifier and Detector

ALL TYPES  
of Radio Tubes **\$2.50**

Type 202 Five (5) Watt Transmitter . . . \$8.00  
EVERY TUBE GUARANTEED  
to work in Radio Frequency. Especially adapted  
for Neutrodyne, Reflex and Super Heterodyne Sets.  
Shipped Parcel Post C. O. D.  
When ordering mention type.

**Rolls Royce Tube Co.**  
21 Norwood Street Dept. W Newark, N. J.

# Move to Unite Amateurs

## Briton's Visit Stimulates Activities Toward a World Association

HARTFORD, CONN.

FURTHER impetus to the movement for uniting transmitting radio amateurs into a world association was given in the recent visit to the American Radio Relay League headquarters of Gerald Marcuse, secretary of the Transmitters Section of the Radio Society of Great Britain. Mr. Marcuse is making a tour of the United States and Canada to study amateur methods.

While in this city as an unofficial representative of the radio amateurs of England, he told Hiram Percy Maxim, presi-

dent, and other officers of the League, that he would give his personal support to the International Amateur Radio Union. The plans for this world association of amateurs were drawn up during Mr. Maxim's recent European trip. The final organization will take place at a special Congress in Paris during the Easter holidays of 1925.

Major William C. Borrott of Dartmouth, Nova Scotia, manager of the League's Maritime Division, visited this city at the same time. He declared that Canadian amateurs were ready to become connected with such a union.

## Views of the News

(Concluded from preceding page)

a wise thing indeed to enact the Dill bill and rather a misfortune that the decision favorable to the broadcasters and the public should have the opposite effect to the one intended—that of public benefit.

Suppose the United States Supreme Court should upset the Cincinnati decision? Suppose the Dill bill should die of sheer delay? Where would the public be then?

If the decision of Judge Hickenlooper stands then the authors, composers and publishers will be unable to levy tribute, because broadcasting will have been finally construed as no infringement of any copyright.

## MAHOGANITE and BLACK RADION PANELS

DIALS, KNOBS, TUBING, SOCKETS MAHOGANITE BINDING POSTS

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

ALL STOCK SIZES WHOLESALE RETAIL

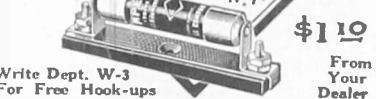
Send for Complete Price List

New York Hard Rubber Turning Co. 212 Centre Street New York City

## AMPERITE The "SELF-ADJUSTING" Rheostat

PERFECT for every CIRCUIT

Simplifies wiring Eliminates hand rheostats RADIALL COMPANY 320 W. 42nd St., N. Y.



\$1.10

Write Dept. W-3 For Free Hook-ups

From Your Dealer

HOOK-UPS FOR EVERYBODY—Hewley's 200 Radio Circuit Designs, \$1.00, postpaid. The Columbia Print. 1493 Broadway, N. Y. C.

## CYCLONE Radio "B" and "C" BATTERIES



WORLD'S BEST

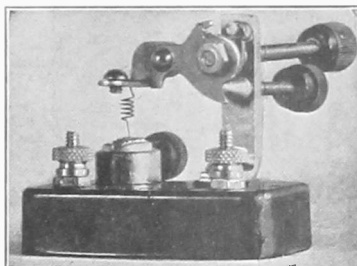
Cyclone Batteries are the power behind your plate. Their voltage is constant. Recuperative power high. Construction rigid. Appearance pleasing. CYCLONE withstands the test. Insist on CYCLONES. All good dealers have them.

Standard Electric Novelty Company New York, N. Y. Chicago, Illinois

**Free Mailing Lists**  
 Will help you increase sales  
 Send for FREE catalog giving counts and prices on thousands of classified names of your best prospective customers—National, State and Local—Individuals, Professions, Business Concerns.  
**99% Guaranteed 5¢ each**  
 by refund of  
**ROSS-Gould Co. 315 N. 10th St. St. Louis**

## Ambrose Marvelous Crystal Detector

Gives Best Results On Crystal or Reflex Sets



Beats 'Em All At Your Dealers or Mailed Prepaid

**\$2.00**

DISTRIBUTORS WANTED

For Particulars Write

Every Detector Guaranteed 100% Perfect

Ambrose Radio Company, 220 Vernon Ave., Brooklyn, N. Y.

Tested and Approved by Radio World—Mechanically and Electrically Perfect.

A mid-summer subscription offer

# Subscribe NOW and Receive Another Radio Publication Without Extra Cost

Radio World has made arrangements

- to offer a year's subscription for any one of the following publications
- with one year's subscription for
- RADIO WORLD;
- RADIO NEWS or
- POPULAR RADIO or
- RADIO BROADCAST or
- WIRELESS AGE or
- RADIO DEALER or
- RADIO (San Francisco).

This is the way to get two publications

- for the price of one;
- Send \$6.00 today for RADIO WORLD
- for one year (regular price
- for 52 numbers)
- and select any one of the other
- six publications for twelve months—
- Add \$1.00 a year extra for
- Canadian or Foreign postage.
- Present RADIO WORLD subscribers
- can take advantage of this offer by
- extending subscriptions one year NOW.
- Or order thru your newsdealer.

### RADIO WORLD'S SPECIAL TWO-FOR-PRICE-OF-ONE SUBSCRIPTION BLANK

RADIO WORLD, 1493 Broadway, New York City.

Enclosed find \$6.00, for which send me RADIO WORLD for twelve months (52 numbers, beginning ..... and also without additional cost, Radio News, or Popular Radio, or Radio Broadcast, or Wireless Age, or Radio Dealer, or Radio for twelve months, beginning ..... Put a circle around the other publication you want.

Indicate if renewal

This Offer Good Until

August 25, 1924

Name .....  
 Street Address .....  
 City and State .....

# The Radio University

(Concluded from page 21)  
 ceiver. Changing the feed-back wires makes no difference in volume or tone, and touching either ground or antenna post causes no squeals but only deadens the volume, the same as touching any battery post. I find the set very critical and extremely selective, but the volume not as great as claimed. Please let me know where my error is. My primary consists of five turns. Antenna is 190 feet long and 60 feet high and the ground is perfect. I use a variable grid leak and .00025 mfd. grid condenser. The plate coil is about three inches from the coupler and placed at right angles. The tone is good but I would like to get more volume.—H. E. Mueller, pastor, St. Paul's Church, Pilot Grove, Mo.

First, take out the grid leak, and use none at

all. This will probably overcome most of your trouble. Carefully examine the grid and plate leads. They should be kept as far apart as possible and when crossing must do so at right angles. Give the set a general overhauling, shortening all leads as much as possible, and no doubt a great improvement will be achieved.

## RADIO WORLD'S

### Radiocast University

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

One day I was listening in when suddenly the station disappeared. After tuning around a while I located it, seemingly fifty or seventy-five meters lower down. Since then all my stations come in seemingly from fifty to seventy-five meters lower. It is impossible for me to receive WOAW at Omaha, as I can reach only the outer edge of the wave of that station. I am using a Radiola Senior with a two-stage amplifier. 1—If possible please explain the cause of the trouble described above and the remedy. 2—Which makes a better detector, WD11 or C11? 3—Which makes a better amplifier, WD11 or C11? 4—Will better results be obtained by using all tubes of the same type? I shall listen for your answer to these questions.—George H. Weinmann, 457 West North Avenue, Chicago, Ill.

1—When you say that you located your station again lower down, it is understood to mean that you heard it on a lower dial setting. It is more reasonable to suppose, however, from your description that the effective wavelength receiving range of your set has been lowered, therefore you have to move up on the dials to hear the lost station. In that case, your trouble lies in the external wiring of the set. That is, either the ground wire connection has been broken, or more likely something has happened to your antenna, and an examination of that will probably disclose the trouble. 2, 3 and 4—The WD11 and C11 are the same type of tube, made under the same conditions and with exactly the same elements but sold by two different distributing concerns. Both are equal detectors and amplifiers, so a combination of WD11s and C11s would be all right.

I have heard your interesting talks on radio from WLS and would like to ask you a few questions. 1—When listening in, why do the signals come in loud and clear one moment, and then fade away to nothing the next. 2—Is there any use in disconnecting the wire from the A battery after the rheostats have been turned off so that the bulbs do not light? 3—About what is the life of the B battery? 4—When my 45-volt B battery gets weak, could I attach a 22-volt unit to the 45 without injury to the tubes?—Mrs. Pearl M. Cauble, R3, Salem, Ind.

1—The fading of signals is due to prevailing weather conditions and is most apparent in summer. There is nothing that can be done to eliminate it, unless it is to install a very powerful set that would bring in the present weak signal with comfort. Conditions will be immensely improved with the coming of cooler weather. 2—Once the rheostats are turned off there is no necessity for disconnecting the A battery as the power is automatically shut off. 3—The life of the average B battery is from 3 to 6 months, varying with the amount of use it is put to. 4—Yes, you may attach a 22 or even a 45-volt extra B battery to the present one and louder signals will result with no injury to the tubes.

## PIONEER VARIOMETERS

Bakelite, Moulded (List \$6.50), special . . . \$4.85  
 Erie Audio Frequency Transformers, special 3.95  
 Patent Phones (2200 ohms) . . . . . 2.95  
 Western Electric Phones, special . . . . . 9.45

AMBROSE and FRESHMAN CRYSTAL DETECTORS FOR REFLEX SETS  
 Marvel Radio Spec. Co. 132 Nassau St. New York City

## THAT 1-TUBE SET

The one-tube reflex brought out in Radio World dated July 12 is unusual because of the fact that no crystal detector is used, the radio frequency, detector and audio frequency action being done entirely with one tube. Full description and diagrams in Radio World dated July 12. Mailed on receipt of 15c. postpaid or start your subscription with that number.  
 RADIO WORLD, 1493 Broadway, N. Y. C.

## AMPLEX GRID-DENSER .0005

IN the advertisement of the Amplex Instrument Co., 88 West Broadway, N. Y. C., which appeared in RADIO WORLD, August 2 issue, describing the two GRID-DENSERS of different maximum and minimum capacity, which are manufactured and recommended by this company, an error was made in that the capacity of the smaller was quoted as being .005 and is actually .0005. This device permits a variable adjustment of the grid condenser so that better results may be obtained.

## IS YOUR NEUT RIGHT?

To revitalize unneutralizable Neutrodyne, we devised this Kladaq Coast-to-Coast Circuit. Uses same panel, etc., as Neut, except three less parts. Merely rewire. Success certain. Necessary stabilizer, 22 feet gold sheathed wire, circuit and complete, simple instructions—\$5.00 prepaid. Many have already rebuilt their Neuts—and written wonderful testimonials. Thousands will do it. Be FIRST—have the finest five tube set in your neighborhood revitalize others' Neuts. Description, etc.—10c. Radio Lists—2c. Stamps accepted.

KLADAG LABORATORIES, Kent, Ohio

## THE ROBERTS "B" BATTERY

Everlasting, rechargeable "B" BATTERY made of Edison elements. Best for Neutrodyne, Superdyne, Superheterodyne and all high powered circuits. Superior in quality, durability, workmanship and finish. Satisfaction absolutely guaranteed. Insist on your dealer showing you ROBERTS "B" BATTERY before buying any other.

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the Improved Super-Heterodyne. Send 50c for book giving complete details of drilling, assembling, wiring and tuning 6 and 8 tube ULTRADYNE Receivers.

50c

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RADECO SAFETY FUSES 50 CENTS EACH At Your Dealers or by Mail, Postpaid RADIO EQUIPMENT CO., 20 Stuart St., Boston

## Record Your Radio Stations On RADEX Log Cards to Match Your Set



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100 Cards, Mahogany Finish or Oak Cabinet, and Index Dividers, Complete, \$3.00. A Useful Accessory to Any Set. Give Name of Your Set or Sketch of Dial Arrangement. Sent Postpaid on Receipt of Cash or Money Order.

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### THE FLEX-O-DYNE CO.

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## AMPLEX

### GRID-DENSER DISTANCE!

You can pack all your DX troubles away the minute you put GRID-DENSER in your set. GRID-DENSER will put more pep in ANY receiver.

Whether it's the Cockaday, the Super-Heterodyne, the Superdyne, the Neutrodyne or any other GRID-DENSER is your best bet. You will convince yourself the minute you try it.

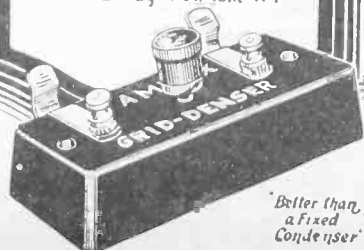
Replace your fixed condensers with GRID-DENSERS. A turn of the knob of a GRID-DENSER constantly gives you the correct capacity for best results.

(In either the .0005 or the .001 size with or without gridleak clips)

\$1.25

Write for the Hook-up Sheet FREE Dent. 89

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Complete kit of licensed Neutrodynes 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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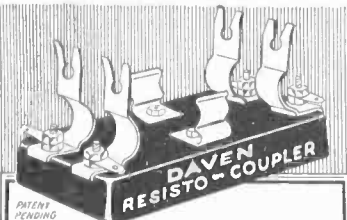
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From Your Lamp Socket  
Send for particulars.

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Send Fifty Cents for Manual  
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The tone quality from a **DAVEN RESISTANCE COUPLED AMPLIFIER** is the most perfect known to the radio art.

The Daven Resisto-Coupler, illustrated, greatly simplifies the construction in building up one of these distortionless ampli- \$1.50 fiers. Sold everywhere.....

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"RESISTOR SPECIALISTS"  
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**Join the A. B. C.**

**T**HE American Broadcast Club, formed under the auspices of RADIO WORLD, has for its object the promotion of the welfare of the broadcast listeners of the United States, Canada and Mexico.

Membership is open to all interested in radio in any way, either as broadcast listener, dealer, manufacturer, wholesaler or jobber.

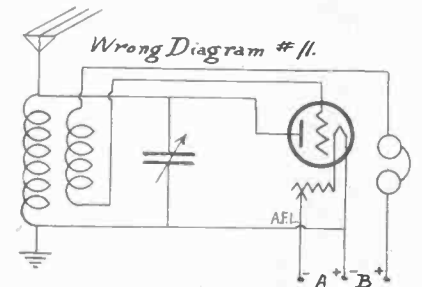
A novel feature of the A. B. C. is that membership entails no duties or obligations whatever. There are no dues. All you have to do is enroll. That will signify your interest in radio and make you one of the thousands unselfishly united in a common interest.

**NEW MEMBERS**

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- James P. Whiskeman, Jr., 1847 Crompond Road, Peekskill, N. Y.
- Mark Stewart, Presson, Tex.

**WHAT'S WRONG HERE?**

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



Editor, RADIO WORLD, 1493 Broadway, New York City. Mention Wrong Diagram No. 11. The names and addresses of those sending in the right answer will be published.

**NEW INCORPORATIONS**

- Phonion Co., radio apparatus manufacturers, \$500,000, Wilmington, Del. By Corporation Service Co.
- Beacon Radio Mfg. Co., Brooklyn, N. Y., \$10,000.
- M. Schussheim, L. Fradkin, Attorney, H. Schapiro, 264 Broadway, New York City.

**NAME CHANGES**

Philadelphia Radio Co., Inc., to American Radio Stores, Inc., and increase from \$100,000 to \$1,450,000. Philadelphia, Pa.

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NEW NON-METALLIC HOUSING ELIMINATES SCRATCHES AND SQUEALING

Wonderful new crystal—has millions of sensitive spots—long life—cannot short-circuit. **FITS ANY STANDARD DETECTOR**

At your dealers—otherwise send purchase price and you will be supplied postpaid. Write for Reflex circuit 107.

**50**

**Chas. Freshman Co. Inc.**  
Radio Condenser Products  
106 Seventh Avenue, New York City

**MANILA PLANS PROGRAM STATION**

**A**T a recent meeting of the American Chamber of Commerce at Manila, the establishment of a large radio station by the Radio Communication Company of Hongkong was discussed. This company has already obtained grants from the Portuguese Government for the establishment of a station in Macao.

**QUALITY PARTS**

**Lapierre's 3-Tube Superhet**

- 1—7 x 21 Radion Panel ..... \$2.65
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  - 3—20 Ohm Amso Rheostats, \$1.25 ea. 3.75
  - 1—400 Ohm Amso Potentiometer ..... 1.50
  - 3—Type 400 Naald Sockets for UV Tubes, 75c ea. 2.25
  - 1—Patent Double Circuit Jack ..... .80
  - 1—Patent Open Circuit Jack ..... .60
  - 1—5 to 1 AMERTRAN Transformer ..... 7.00
  - 2—3/8" Bakelite Dials, 80c ea. 1.60
  - 5—Eby Engraved Binding Posts, 20c ea. 1.00
  - 1/4—lb. No. 22 D. C. G. Magnet Wire. .30
- \$50.10
- Kit Consisting of Above Parts.....\$42.50

**Special** Set of 6 radio wrenches with screw-driver handles for various sized nuts. **\$1.25**

Haven't you noticed that famous radio engineers always recommend the use of the best parts for satisfactory reception? The experimenter knows from discouraging experiences that disappointment and wasted effort attend the installation of inferior equipment. Here you will find only what is right,—in quality and in price. That is why

Noted Experimenters Use This Headquarters **FOR HARD-TO-GET PARTS**

Try us on any radio parts you have been unable to secure. C. O. D. Mail orders will be shipped promptly.



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**LEGO WONDER FIXED DETECTOR**  
For REFLEX & CRYSTAL SETS

Something Entirely New!  
100% SENSITIVE

**10 IMPORTANT FEATURES READ THEM CAREFULLY**

- 1—No parts to replace or wear out.
- 2—The use of a **NEW MATERIAL** that effectively eliminates distorted and interrupted reception, and substitutes clarity and increased volume.
- 3—Absolutely 100% sensitive. No searching for sensitive spot.
- 4—Glass encased, it is immune from sun and dust.
- 5—Especially designed to withstand high voltage in reflex circuits.
- 6—Solidly constructed throughout, it is practically everlasting.
- 7—It is **ALWAYS READY**—no adjustments of ANY kind needed.
- 8—As good looking as it is efficient. High nickel-plated throughout, and attractively designed. It enhances the appearance of any set.
- 9—Constructed so that it is thoroughly **VIBRATION-PROOF**.
- 10—Carefully tested, approved and unconditionally guaranteed by its makers.

For Sale by All Dealers 90c. or Sent Postpaid Insured \$1.00

LEGO CORP., 225 W. 77th St., N. Y. C.

# Using a Set on An Automobile Trip

ALMOST any radio set will work well on an automobile. The set must, of course, be built with sufficient strength to withstand the trip. It need not have any great degree of selectivity unless the automobile is going to be near a powerful station. The ordinary single-circuit regenerative receiver is selective enough for use in the country. The radio set may be installed permanently in the car and the vacuum tubes may be lighted from the starting battery.

The set may be wired up directly to this battery, the switch or the rheostats on the set being ample to disconnect the receiver from the battery. Almost any car will have some pocket or space under the seats where the B batteries may be installed. If the vacuum tube filaments are lighted from the starting battery it will probably not be possible to use the radio set while the engine is going, due to the noise which will come back through the battery. It is particularly undesirable to use the set while on the road,

however, because there is enough noise in the car to make it difficult to get good reception. Also there are very few radio sets, except the Super-Heterodyne, which are sufficiently sensitive to work without an antenna.

The set should be mounted on springs or cushions to avoid noise caused by the vibration of the car. The set should preferably have its own independent filament batteries and head phones can be used to shut out extraneous noises.

For the sets that must have an antenna a very good method is as follows: Use a single strand of ordinary lamp cord. This wire is selected because it is easy to get, will stand considerable abuse without seriously kinking and breaking, and has insulation which will protect it if it touches parts of the automobile or other conductors. This piece of wire should be about 60 feet long. Get 50 or 75 feet of good stout braided cotton fish line. This should be of the variety used for salt water fishing. Tie a cord on the end of the wire, and at the other end of the cord tie a small stone. Have this ready in the car, coiled so that it can easily be unwound.

When the motorist is ready to put up the antenna select the best tree that is available. Lay the coiled antenna carefully on the ground so that it will unwind freely and throw the stone into a branch of the tree. The cord will carry the wire up into the tree. Now pull the wire back so that the joint between the cord and wire is just clear of the branch of the tree. The cord will act as an insulator and will be all that is necessary except in rainy weather. Now coil up what is left of the wire, tie it to the top of the car and connect the other end to the radio set. It will be found that an antenna of this kind is very satisfactory for short camping periods. It is inexpensive and easy to put up and take down.

The body of the car can be used for the ground. Connect the ground terminal to some point on the car which you are quite sure connects to the body, the frame and the engine. Ordinarily this will be an ample ground due to the capacity between the car and the earth, the car being insulated from the earth by the rubber tires. If the operator desires a better ground a coil of bare or insulated wire can be thrown into a well, brook or lake, allowing it to unwind as much as possible and connect the end of this wire to the ground terminal. If there is no water near, insulated wire should be laid along the ground, directly under the antenna.

The hills and the forests have their effects on radio reception. They tend to absorb the signal. Therefore, a point on open, level ground far away from hills and

thickly wooded patches should be selected. This does not mean that no signals can be received in the forest or in the deep valleys, but that they will be better in the open level stretches.

## LETTUCE REPORT FOR FARMERS

AS a special service to New York State farmers in the marketing of lettuce, one of their most perishable crops, WGY is radio-casting daily, except Sunday, a special report on the farm movement of lettuce. This report will be prepared by the New York State Department of Farms and Markets and will inform the farmer daily where the bulk of lettuce shipments is being made.

## RADIO RECORD

Keep a permanently bound record of all stations you have received and how you received them. Radio Record 5 1/2" x 14"—\$00.00. All broadcasting stations listed, and indexed with space for new stations—\$1.00 Postpaid.

THE BEADLE PRINTING CO.  
MITCHELL SOUTH DAKOTA  
Applause Cards 60 for \$1.00 Postpaid.

# ACME

~ for amplification

## NEW TUBES MANUFACTURERS' SALE

Price, \$2.25 each

All Types—All Guaranteed

Send No Money—Pay Postman

WALTER SCOTT & CO.  
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## SUMMER NUMBERS OF RADIO WORLD

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

- May 31—A Sensitive 2-Tube Reflex.  
By Byrt C. Caldwell.
- June 7—How to Solve Your Tube Problems.  
By P. E. Biedeman.  
An Ultra-Sensitive 3-Tube Reflex.  
By Byrt C. Caldwell.
- June 14—A Sensitive Double Superdome.  
By Fannimore Keams.  
How to Build a Set Like King George's.  
By Chas. H. M. White.  
A Super-Power 4-Tube Reflex.  
By Byrt C. Caldwell.
- June 28—Nineteen Ways to Erect an Antenna.  
By P. E. Biedeman.  
Distance-Getting 2-Tube Set.  
By Chas. H. M. White.
- July 5—Making the Superdome Work Right.  
By Brewster Lee.  
DX on 1-Tube and a Crystal.  
By J. H. Anderson.
- July 12—1-Tube Set Works on a Loud Speaker.  
By A. P. Peck.  
A 1-Tube Set That You Can Log.  
By Herman Bernard.  
Discussion of Inductance and Capacity.  
By N. N. Bernstein.
- July 19—Tips on the Superdome.  
By N. N. Bernstein.  
Loops.  
By B. J. Bongart.
- July 26—A New 4-Tube Reflex Super-Heterodyne.  
By Chas. H. M. White.  
1,500 Miles on 2-Tubes.  
By Herman Bernard

15c. per copy, or any seven copies for \$1.00, or start your subscription with any of these issues.

RADIO WORLD  
1493 BROADWAY NEW YORK CITY

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—they last longer



## DUTCH RADIO VALVE

D-201-A

.25 Amp. 5-6 Volts

Detector-Amplifier  
Guaranteed

Rigidly tested by expert  
engineers.

List Price \$4.00

Special discount to dealers  
—a few more distributors  
wanted.

Sole Distributors for U. S.  
D. R. V. Importing Co.  
515 Orange St., Newark, N. J.

Dealers write to distributors  
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MISSOURI—ST. LOUIS RADIO TUBE  
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3572 Olive Street, St. Louis, Mo.  
CANADA—CONSOLIDATED ELECTRIC  
LAMP CO.  
43 Queen St. E., Toronto, Ontario

## "GET HASTINGS, NEB." We Will Mail Free the Hook-up of "Killoch Kilo Koupler"

Most Wonderful Coil

A CIRCUIT WELL WORTH WHILE!

Build a two-tube set, one stage of R. F., using  
autodyne principle and detector. Full details in  
Radio World, issue April 12. Send 15 cents.

David Killoch Company

Dodge Building, 45 West Broadway  
Corner Park Place, New York City

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Every Turn **STAR** No  
A Tap **COIL** Soldering

SEND FOR LITERATURE  
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M. B. SLEEPER RADIO DESIGN & CON-  
STRUCTION FOR EXPERIMENTERS, REF.  
FLEX & RADIO FREQUENCY, \$1.00. The  
Columbia Print. 1493 Broadway, N. Y. C.

## ROXY — HIS PORTRAIT AND AUTOGRAPH — FREE

RADIO WORLD has arranged for a limited number of sepia prints of the autographed portrait of Mr. S. L. Rothafel ("Roxy") that appeared on page 11 of Radio World dated July 19, 1924.

These sepia portraits are not for sale, but will be presented with the compliments of Radio World to every new subscriber whose name is entered on our books from August 1 to September 1, 1924.

This offer is intended for new subscribers only. However, we don't want to

SUBSCRIPTION DEPARTMENT, RADIO WORLD, 1493 BROADWAY, NEW YORK CITY

overlook the elder members of the Radio World subscription family, and, therefore, if your name is already on our subscription list, send in a renewal at once, and this sepia portrait will be sent to you gratis.

You are entitled to the benefit of this offer even if you recently subscribed IN CASE YOU SEND US A RENEWAL AT ONCE.

If you want this portrait, let us know at once, as there probably will be no second edition of this picture of the man who has made millions of friends and whose portrait is well worth adding to your treasured collection.



# Intimate Details of Coolidge's Set

**I**N response to an inquiry from RADIO WORLD, Lieut-Commander E. D. Langworthy, U. S. N., Bureau of Engineering, wrote a letter telling about President Coolidge's White House set as follows:

The set installed in the White House by the Navy Department is in no way similar to the one installed on the U. S. S. Mayflower. The one in the White House was assembled by this Bureau with the idea of giving the White House a unique piece of equipment that would be different from any other in the country, with the finest quality of workmanship and the best quality of tone obtainable. With this end in view, we requested various manufacturers to send us sample receivers

and loud speakers, that we might choose from these various pieces of equipment one which would give the results desired.

After a comparative test of these various receivers over a period of about three weeks, we selected one that gave us the best results. This we mounted in a small serving table so as to resemble a large-sized tea cart which would be capable of being wheeled anywhere in the White House without any difficulty. The loop was mounted on the back of the table and concealed from view when the equipment was viewed from the front. It could, by means of a universal joint, be swung up so as to give better directional effect, also better distance work.

There is nothing unique whatsoever in the wiring of the receiver or in its design. It was manufactured by a company for its own officials and for sale to the government. It is not on the market, nor can it be purchased by anyone outside of the Government service. Its special feature we consider to be its quality of workmanship.

The feature of the White House set which makes it unique is the way in which it is mounted and the construction of the loud speaker. This latter piece of equipment is responsible for the excellent quality of tone given out by the set. It is not yet on the market, the one in the White House being an experimental one sent to the Navy Department for test purposes. Until it is in the market we are not at liberty to divulge the name of the manufacturer nor any details of its construction. The principal feature used in its construction permits of its response to all the voice frequencies from about 20 up to 10,000. It would operate just as well on any other receiver as the one we used in this set. It requires a power amplifier and for that purpose we are using a commercial type 3-tube power amplifier which is on the market.

The Navy Department's reason for not divulging the name of the manufacturer of the receiver is that we do not desire to give prestige to one company at the expense of others. When this comparative test was started, it was with the understanding that the name of the manufacturer of the equipment as we are not in

the advertising game, nor do we think that the White House should be used in any way for the advertisement of one piece of equipment over that of any other. We desire to keep faith with these various companies, and the manufacturer of the receiver in question gladly volunteered to maintain secrecy in the matter.

I am sure you will appreciate our attitude in this matter. There is absolutely nothing unique in the wiring of this receiver. It is a 6-tube Super-Heterodyne set using a commercial type push-pull 3-tube power amplifier. All of this equipment is mounted in the cabinet behind doors which open down.

**\$25** THE FAMOUS **BEL-CANTO**  
Loud Speaker—Price \$10  
Direct from Factory to you.  
Delivered free C.O.D. to your door.  
Coming, "The Bel-Canto Headset,"  
something entirely new.

**\$10** BEL-CANTO MFG. CO.  
General Office and Factory, Dept. R.W.  
417-419-421 E. 34th St., N. Y. City  
Vanderbilt 8959

**HOW TO MAKE THE**  
**?????**  
**What shall we call it?**



After a great deal of experimenting and testing, we have evolved what is undoubtedly the most sensitive, most selective, and most satisfactory two tube receiver which has ever been designed. In fact, it is more sensitive than any three tube receiver more so than all but a few, a very few, four and five tube receivers.

The receiver uses but two tubes, and yet it is extremely sensitive, equal in this respect to the five tube tuned radio frequency receivers such as the neodynes. By that we mean that under ordinary good conditions, the receiver will bring in stations from all over the country on the loud speaker! And with but two tubes!

**SELECTIVITY.** No more selective receiver has ever been made. Local stations may be tuned out and stations a thousand miles or more can be tuned in without the least interference, even if their wavelengths are but a few meters apart.

**TONE.** A crystal detector is used, and as a consequence, the tone is perfect. There is no howling, and no radiation.

**PRICE.** At the cost of an ordinary two tube receiver, you can make this super-sensitive, super-selective super receiver. In the directions, instructions are given, so that with a little work, and at no cost, you can use low priced apparatus, and so change this, that it is equal in efficiency to the highest priced equipment. This alone is worth the price of the direction many times over.

If you are going to build a receiver, if you build receivers for others, or if you are going to build any kind of a receiver, you should order today.

We sell the complete outfit of parts for this receiver, assembled, ready for wiring, or we sell the receiver, ready for operation, with a guarantee of perfect results.

When you order your directions, suggest a name for this wonderful receiver. As soon as a satisfactory name is received, we shall present to the person who suggested it, one of these receivers, made from the best parts which money will buy. Will you be the winner? Order now!

**PRICE**—Complete instructions, hook-up, diagrams, etc., etc.

**\$1.50**

Dealers! Write us for prices on this lightning seller.

**The Biltmore Radio Co.**

Dept. W-4 Boston 30, Mass.

## New Radiocasters

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| Call  | Keys. | Meters | Watts   |
|---|-------|--------|---------|
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| WABN—Ott Radio, Inc., La-<br>Crosse, Wis.       | ..... | 1230   | 244 500 |
| WFPB—Eureka College, Eureka,<br>Ill.            | ..... | 1250   | 240 50  |
| WFBG—The Wm. F. Gable Co.,<br>Altoona, Pa.      | ..... | 1150   | 261 100 |
| WNAL—Omaha Central High<br>School, Omaha, Nebr. | ..... | 1160   | 258 20  |
| WNAR—First Christian Church,<br>Butler, Mo.     | ..... | 1300   | 231 20  |

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DIFFICULT TUNING MADE EASY

**Mail Orders Prepaid**

Why the ACH is different  
3 in. DIAL \$2.50 (8-10-1)  
4 in. DIAL \$5.00 (8-10-1)  
\$10 REG. 1/4-3/10 DUSHINGS 35 EACH

Send for Circular D

**A. C. Hayden Radio & Research Co.**  
Brocton, Mass., U. S. A.

**WE REPAIR RADIO TUBES**

|                              |                   |
|------------------------------|-------------------|
| WD-11 .. \$2.50              | DV-2 .. \$2.50    |
| WD-12 .. 2.50                | DV-6A .. 2.50     |
| UV-200 .. 2.50               | UV-100 .. 2.50    |
| UV-201 .. 2.50               | C-200 .. 2.50     |
| C-300 .. 2.50                | UV-201A .. 2.50   |
| C-301 .. 2.50                | C-301A .. 2.50    |
| DV-6 .. 2.50                 | Moorehead .. 2.50 |
| DV-1 .. 2.50                 | Moorehead .. 2.50 |
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# A Study in Potentials, By Brewster Lee

THE reason why some attempts at radio set construction by fans result in failure, is because the fan does not know what is happening in the set. He goes and buys all the necessary equipment for the new receiver and assembles and wires the set according to the instructions and the set may work fairly well. If it does not function he is up a tree. The most frequent trouble in almost any type of set, including the more popular types such as Neutrodyne, and Reflex, is that constant oscillation is uncontrollable. The reason is that the current flow in the va-

rious coils, audio and radio-frequency, is not in the right direction.

To understand the high and low potential problem, let us go back for a moment to magnetism and induction.

As we all know, a magnet has a north and south pole, and a magnetic field. Theoretically and in practice the north pole is the high potential end, and the south pole the low potential end. A coil of wire connected to a battery has exactly the same characteristic. Fig. 1A shows a solenoid, or single coil of wire, connected to a battery. The lines of

force generated by each turn of wire will unite with those set up by the adjacent turns when a current flows through the coil. The lines of force inside each turn will have the same general direction, forming several long lines of force that may be said to pass through the entire solenoid. These lines pass out of the coil at one end, and enter at the other end, just as in the case of a straight bar magnet. If the general direction of the lines of force inside this coil is from right to left, the left-hand end will be a north

(Concluded on next page)

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## Programs

### Thursday, August 14 (concluded from page 19)

Mrs. Edward C. Whitmyer, Schenectady Federation of Women's Organizations, 5 P. M., produce and stock market quotations; news bulletins; baseball results. 6 P. M., dinner music by Joseph A. Chickene and his Clover Club orchestra, Albany, N. Y. 7:40 P. M., baseball scores 7:45 P. M., musical program by Jahan Goldberg, pianist, and Ernest Bliss, baritone.

WDAF, Kansas City, 411m (730k), C. S. T.—3:30 P. M., the Star's radio trio. 5:50 P. M., market gram; weather forecast; time signal; road report. 6 P. M., school of the air, address, Edgar Allan Linton, fifth of a series of talks on world travels; reading, Miss Cecile Burton from popular poems and essays; the Tell-Me-a-Story Lady; music Carl Nordberg's Plantation Players, Hotel Muehlebach.

WEAO, Columbus, O., 360m (830k), C. S. D. S. T.—8 P. M., talk, Prof. W. C. Roman, Department of Architecture; Lillian Wood, violin; Marion Bracy, piano; Linda Furniss, contralto; Julia Reed, soprano; Mr. John Bohannon, banjo; Edith Cissne, accompanist, for Mr. Bohannon.

WWJ, Detroit, 517m (580k), E. S. T.—12 noon. Detroit News orchestra. 3 P. M., concert by Schmemman's concert band. 3:50 P. M., weather forecast. 3:55 P. M., market reports and baseball scores. 5 P. M., baseball scores. 8:30 P. M., concert by Schmemman's concert band. 9:30 P. M., Detroit News orchestra. 10 P. M., dance music by Jean Goldkette's orchestra radiocast from Graystone ballroom. 11 P. M., Detroit News orchestra.

WMAQ, Chicago, 448m (670k), C. S. D. S. T.—4 P. M., sports results. 6 P. M., Chicago Theatre organ recital. 6:30 P. M., Hotel LaSalle orchestra. 8 P. M., weekly talk by Rockwell R. Stephens, auto editor of the Daily News. 8:15 P. M., weekly talk for Boy Scouts. 8:30 P. M., recreational talk. 8:45 P. M., weekly investment talk. 9 P. M., one of a series of garden talks by James H. Burdett. 9:30 P. M., to be announced.

WHAS, Louisville, Ky., 400m (750k), C. S. T.—4 to 5 P. M., selections by the Alamo Theatre orchestra; readings; police bulletins; weather forecast for Kentucky, Indiana and Tennessee; late news bulletins. 4:50 P. M., local livestock produce and grain market reports. 4:55 P. M., baseball scores. 5 P. M., Central Standard time announced. 7:30 to 9 P. M., concert by the Ella Sharrard violin quartet; digest of International Sunday school lesson; child welfare talk; late important news bulletins; baseball scores; Standard time announced at 9 o'clock.

KPO, San Francisco, 423m (710k), P. T.—4:30 to 5:30 P. M., Rudy Seiger's Fairmont Hotel orchestra. 5:30 to 6:30 P. M., children's hour stories by Big Brother of KPO. 7 to 7:30 P. M., Rudy Seiger's Fairmont Hotel orchestra. 8 to 9 P. M., organ recital by Theodore J. Irwin. 9 to 10 P. M., program by the Sciots Minstrels. 10 to 11 P. M., E. Max Bradfield's versatile band.

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# A Study In Potentials

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pole and the opposite end a south pole. The polarity of the coil may always be determined if the direction of the current is known. The rule is that looking at the

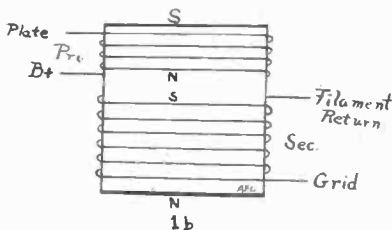
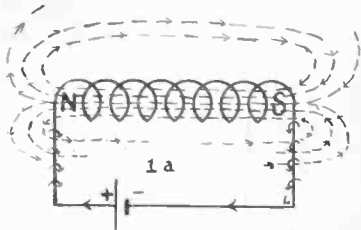


FIG. 1a—Current in coil of wire produces magnetic North and South poles. Fig. 1b—It is important to keep like poles pointing in the same direction. In this case the windings are placed end to end so the bottom of the primary faces the top of the secondary.

end of a coil in which the current flows around, clockwise turns, the end nearest to the observer will be a south pole, but if the current flows in the opposite direction, it will be a north pole. In Fig. 1A the positive current flows into the coil at the left, flowing in a clockwise direction through the turns of wire, thus making the left-hand end the north pole, or high potential end.

Fig. 1B is an ordinary radio-frequency transformer such as is used in Neutrodyne and Reflex sets. The current should enter at the point marked plus, flowing in a clockwise direction up through the coil and out at P, which lead goes to the plate of the preceding tube. It follows then that the high potential end of the primary P is the north pole, and faces downwards, while the south pole or low potential end goes to the plate. Now, to keep the magnetic flow in the right direction it is extremely important to keep like poles apart in Fig. 1B (end to end coil). It then follows that the end of the winding on the secondary nearest the primary should be at low potential in order to give it a negative polarity. Therefore that end of the winding goes to the nega-

tive A battery lead. (This connection is known as the grid return). The connection to the grid of the tube is the high potential lead. Now we have the current in both coils flowing in the same direction, and the lines of force going in the same direction. When this scheme is not followed the lines of force between the windings will buck each other, and result in uncontrollable oscillation.

Fig. 2 is an audio-frequency transformer showing how the beginning and ends of the two windings are connected in order to keep like potentials apart.

The whole solution lies in keeping like poles pointing in the same direction, whether the coils are wound overlapping or end to end.

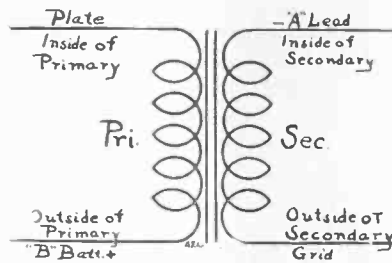


FIG. 2—Showing how audio frequency transformer is connected in amplifier. The high potential ends are the ones going to B plus and grid.



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