AUGUST 30 1924

# LOW-LOSS ANTENNA

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# RADIO WORLD

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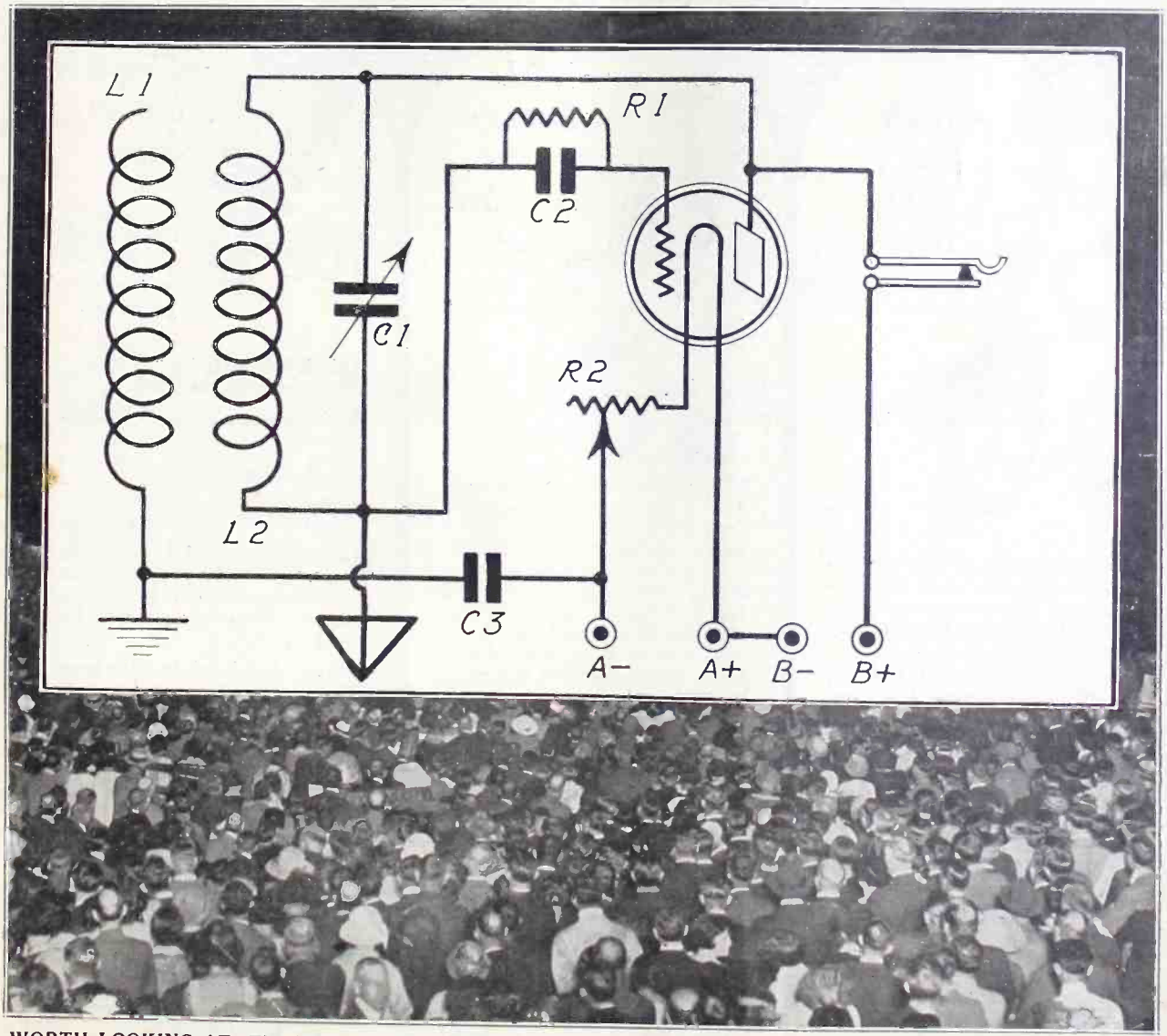
VOL. 5. NO. 23. 155-127 ILLUSTRATED EVERY WEEK


WORTH LOOKING AT—The Improved Solodial Circuit as constructed by Wainwright Astor, assisted by the originator of this 1-dial DX set of wonderful signal quality. See page 5 for article on how to build this circuit. It is one of the easiest sets to construct. A special low-loss coil, simple to make, is used with a low-loss condenser. (Photo by International Newsreel)

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Absolutely warranted to protect your set from lightning, with a guarantee to pay you $100 or to repair your set, should it be damaged through faulty operation of the arrester.

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VOLUME FIVE OF

# RADIO WORLD

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# Low-Loss Antenna and Ground

## *Greater DX and Better Tonal Quality Achieved by Making Your Collector Efficient—Effect Is Like Adding Another Tube to Your Set—Author Narrates Results He Obtained*

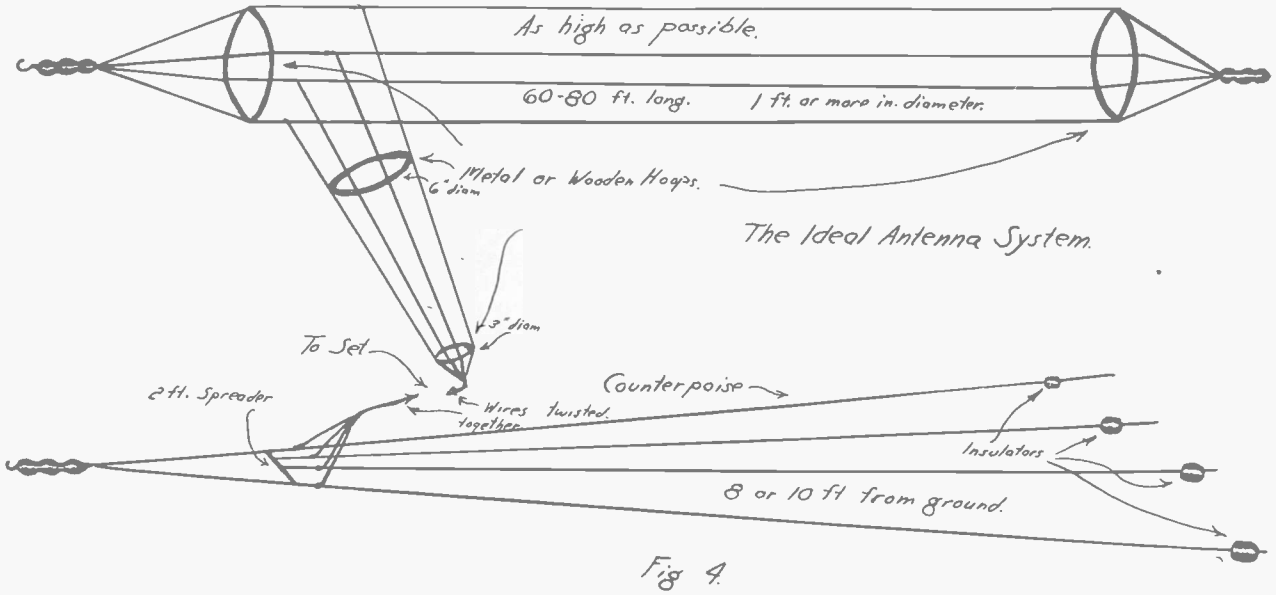



Fig 4.

**CAGE ANTENNA AND COUNTERPOISE SYSTEM—This arrangement is the most efficient for both receiving and transmitting. The counterpoise (at bottom) is used in place of a ground and almost always produces better results. The cage antenna wires (top) must be of the same length to preserve a ship-shape appearance when suspended in the air. It is advisable to place the spacing hoops all along the cage at intervals of 15 feet. The hoops may be of wood or metal. The counterpoise must be erected directly under the antenna about eight feet above the ground to obtain results. The same size wire is used for both.**

*By Neal Fitzalan*

MUCH has been done in the way of improving the efficiency of the many parts of a radio receiver, and when the up-to-date fan has installed low-loss condensers and low-loss inductances he is likely to think that his receiver is as near perfect as it is possible to make it. But it is extremely unlikely he is right, for the chances are that his antenna system is so poor that 90 per cent of the received energy is wasted. It may not be as bad as this, yet it may be worse. Then, too, it is possible to construct a new antenna, in a different position, or of a different type, which will give him far better results.

I have done considerable experimenting with different types of antennae. In looking over the antennae in my neighborhood I have as yet failed to see one that could not be considerably improved. The average person thinks that merely a wire, strung up on the roof with an insulator at each end, will do. Of course it will do, but what we are after is to get as near 100% efficiency as possible.

The first thing that can be improved is the wire. Figs. 1, 2 and 3 show three different types of antenna wire, solid, stranded and braided. The solid wire presents only a fair amount of surface, and so is only fairly good for reception. The stranded wire has a considerably larger surface and so is better for reception. The braided wire is made up of a number of thin ribbons of copper, and has a very large surface. This wire is very good for radio purposes. It must be remembered that at radio frequencies the signals travel only on the outside of the conductor, and so the larger the surface the lower the resistance and the better the results. It will thus be seen why the braided wire is by far the best. Some people might say that there is not a noticeable difference in results, but there is. Using a 50-foot indoor antenna of braided wire, I got results almost identical to those obtained on an 80-foot outdoor antenna of plain wire which was almost twice as far from the ground. In addition, the selectivity was at least twice as good.

Fig. 4 shows the ideal antenna system for a receiver or a transmitter. It is well known that a two- or three-wire flat antenna does not give better results than a single wire in the same position, when receiving. However, if several wires are used, and they are fastened around hoops, as shown, results will be much better. The drawing shows the complete construction of an antenna of this type.

A far better ground than the familiar water pipe is

# Better Ground than Water Pipe

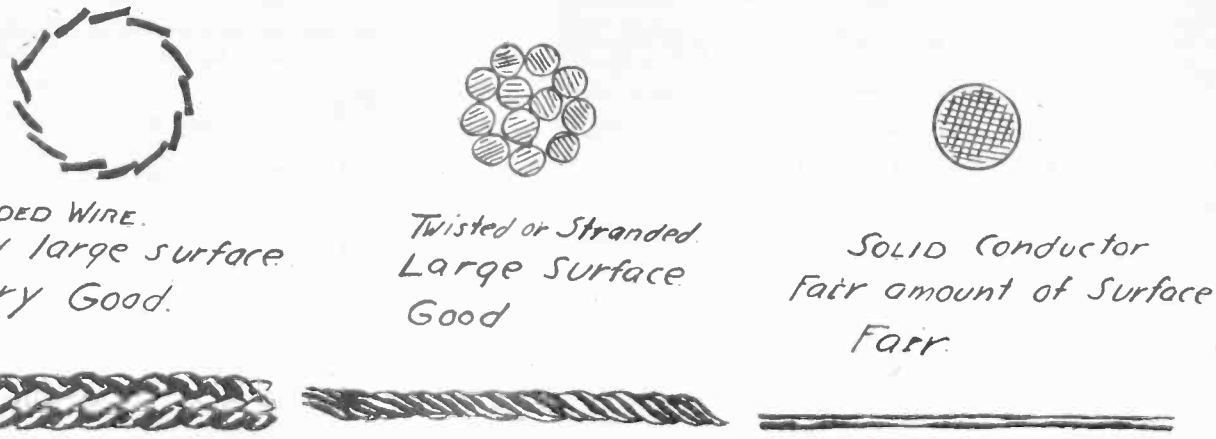



FIG. 1 (left) shows braided wire deemed best because it presents a very large current carrying surface. This kind of wire is used to a great extent on loops and indoor antennas. Some amateurs use it also for their grid leads in their receiving sets. Fig. 2 (center), the most often used antenna wire, consisting of a number of bare copper wires (about No. 22 B & S gauge) twisted or stranded together. It has great tensile strength and is a good conductor. Fig. 3 (right), the single solid copper wire not used extensively now. The hard drawn wire is very difficult to work with and the soft drawn kind stretches under a strain

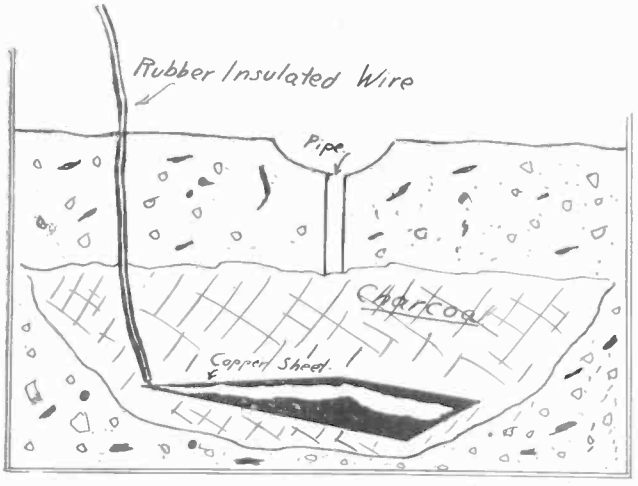



Fig 5

THIS kind of ground may be made in the suburbs and in the country. A pit is dug to a depth of about five feet, the hole half filled with small charcoal in which a copper sheet about 4 x 5 feet is buried, and the rest of the hole filled in again. To keep the charcoal ground damp a strong brine solution is poured over it. A pipe may be driven into the ground over the copper plate and water poured down to keep the soil moist

shown in Fig. 5. A heavy rubber insulated wire is soldered to a large piece of metal, such as a copper plate, and this plate is buried about 4 or 5 feet under the ground, in a pit of charcoal. Strong brine is poured over this and when the hole is filled in a pipe is used, so that water may be poured down to the charcoal. This pipe is not necessary but it will enable one more easily to keep the ground around the plate in a moist condition, which is essential for the best results.

Sometimes better results may be had with the use of a counterpoise than with a ground. Fig. 4 illustrates this. The counterpoise should consist of a number of wires, well insulated, supported about 8 feet from the ground, and connected to the set in place of the ground. Care should be taken that the antenna system is not grounded to the earth in this case.

When making the antenna place it as high as possible and keep it as far as possible from any tree, house or other object, for although the object be below the antenna it nevertheless raises the resistance of the antenna. Insulators should be of glazed porcelain or some other high-grade material and the fewer used the better, unless they are placed in series.

If the fan will carefully inspect his antenna system he will find that there are a dozen reasons why his antenna is not giving him near the results which it should. By using braided wire, a good ground or counterpoise, and by following the other details mentioned, it is possible to increase the efficiency and range of the average receiver at least an additional "tube power."

[*Those who construct this aerial 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.*]

# One RF Stage Enough for Crystal

ONE stage of radio-freuency amplification ahead of the crystal detector works more efficiently than two or three stages. In more than one stage is employed there will be a reduction in signal strength. A stage of radio-frequency amplification adds to the selectivity of a crystal detector. Radio-frequency amplification will increase the range and audio amplifiers will strengthen the volume. The range of a crystal set depends chiefly upon the sensitiveness of the detector.

# Bubbles Disclose Negative of Main

TO test your lighting main for positive and negative for connection to charger, place the current wires in a glass of salt water, and keep them several inches apart. Bubbles will rise from the negative terminal. A completely charged battery should not be left standing idle for several weeks. If you are going away leave the battery at a service station.

# An Improved 1-Dial Set

## *Sensitive Receiver of Excellent Tonal Quality and Capable of DX Easily Constructed—Special Home-Made Coil Used—It Is Low-Loss, as is the Variable Condenser.*

*By Wainwright Astor*

THOSE desiring to build a very sensitive 1-dial set may do so by following the diagram published on the front cover of this issue. By a slight change, as described later, the set may be operated without any ground. However, such operation is not as stable as when a ground connection is used, nor is the volume as great. The fact that no ground is necessary nevertheless attests to the sensitivity of the set.

**LIST OF PARTS**

**50 feet of No. 22 DCC wire.**
**One spider-web form, 13 spokes, 5″ diameter.**
**One low-loss 23-plate variable condenser (C1).**
**One grid condenser, .00025 mfd. (C2) and grid leak mounted thereon (R2).**
**One .001 mfd. fixed condenser (C3).**
**One carbon-pile rheostat.**
**One 4½-volt C battery for use as the A battery.**
**One 45-volt B battery.**
**One 7″ x 10″ panel.**
**One 7″ x 10″ cabinet.**
**One 6″ x 5″ baseboard.**
**One 4″ dial.**
**One pair of earphones.**
**One 199 or 299 type tube.**
**One socket to match tube.**
**One single-circuit jack.**
**100 feet of aerial wire, 50 feet of No. 14 insulated lead-in wire, lugs, solder, ¼ lb. flexible No. 18 wire, one brass angle.**

From these parts a circuit capable of DX and affording fine quality of signals may be constructed.

### Panel

First measure half way across the panel, that is 5″ from either side. Draw a perpendicular pencil line. Measure 2½″ from the top and centerpunch for the variable condenser shaft. Follow the template that comes with the condenser and thus mount the condenser to the panel with the screws, having countersunk the holes you drilled for the screws. Slip the dial on the condenser and with a pencil draw a circle measuring the space taken up by the dial. At the middle point on top of this circle scratch a small V with a scriber or pocket knife, so the angle of the V meets the circumference exactly and the whole V is above the circumference. Instead, you may use a fine drill and barely start a hole to mark the desired point on the circumference, omitting the V. The object, of course, is to have a marker as your guide in reading the condenser dial settings. Next, mount the rheostat (preferably a Filkostat or Bradleystat) in perpendicular alignment with the condenser shaft, and under the dial. The jack is mounted to the right of the rheostat. Be sure you do not mount the rheostat and jack so low that it will interfere with the baseboard.

Place the baseboard against the back of the panel, at bottom and at right angles to it. Lay the socket on the baseboard behind the variable condenser, mounting the grid condenser to the G post of the socket and turning the socket so that the G post is as near as possible to the condenser. Now lay the baseboard on a table and fasten the socket. Next fasten the baseboard to the panel. Now we come to the coil. It

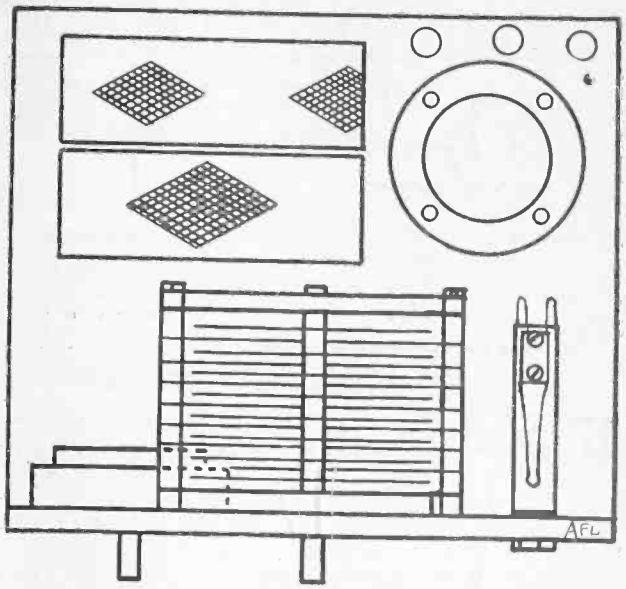


FIG. 2—If honeycomb coils are used, the 1-dial set may be arranged as shown in this assembly plan. The circuit network is published on the front cover

is easily wound by measuring off 11 feet of No. 22 DCC wire and 38 feet of the same wire. Take one end of each piece of wire, leave 4″ slack, and lacing in and out of the successive arms of the spider-web form, complete five turns. The two wires are wound side by side, together, as one operation. Now leave the shorter piece of wire free and continue on with the other alone for an additional 30 turns. Picking up the other piece of wire again, bring it over to the longer piece at an angle of 45° and once more wind both together. The shorter piece will terminate first. Leave 4″ slack and continue on with the longer until all except the 4″ of free wire are wound. The slack pieces are for connections. You will find that adjacent windings will keep the terminals in place, except the last one, which may be secured by a half hitch passed around the next preceding turn. Now with 13 separate pieces of thread bind the winding. This is done by passing a piece of thread through the aperature separating the arms of the form and around to the circumference, where a knot is tied. The direction of the thread is at right angles to the direction of the wire windings. The thirteen pieces of thread being thus fastened at thirteen different points, next cut away the spokes, one at a time, where they are secured to the center, and pull them out of the windings. When the last spoke is freed the center will fall out. The resulting coil is virtually self-supporting and is low-loss.

Mount the coil on the back of the variable condenser by screwing a brass angle or piece of wood or hard rubber to the condenser. The coil may be secured to the support with thread. If a brass angle is used, insulate it with paper. The coil is mounted to the left of the condenser as you look at the panel front.

### Wiring

Connect the A— of the battery to one side of the rheostat and the other side of the rheostat to the F— post on the socket. Use No. 18 flexible wire, double silk covered. Do not use stiff wire, such as bus bar, as this causes gong-like noises in the type of tube used. Connect the battery A+ to the F+ post on the socket. Connect A+ and B—. Connect the ground to the

(*Continued on page* 31)

# Determining a Coil's Range

## *An Easy Way to Make Your Own Wavemeter*

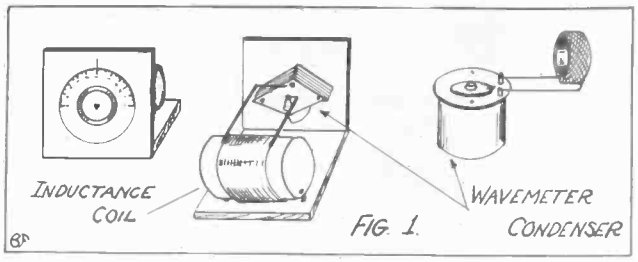



**FIG. 1—The wave meter is a variable condenser connected in shunt with a coil of wire. It is useful in calibrating receiving sets as well as for finding the tuning range in meters of coils and condensers for new sets.**

*By Brainard Foote*

FOLK used to think the only reliable way to determine the wavelength range which may be covered by any particular combination of inductance winding and variable condenser was to purchase a calibrated wavemeter for the purpose. As a matter of fact, this is entirely unnecessary nowadays because we have so many accurately tuned broadcasting stations by which we can test our own home-made wavemeters and tuning circuits.

And the only other necessary instrument needed for employing these broadcasting stations in this way is a receiving set. Most of us have that already. Suppose you are building a tuned radio-frequency receiver and you find that you can't get the 3¼" diameter tubing which the specifications call for and have to take the 3½" of 3¾" size. How many turns are you going to wind on them? Naturally, you won't need so many, because there is more length of wire per turn on the larger tubing than on the 3¼" size.

### The Wavemeter

The first thing necessary is some kind of a wavemeter. This isn't a formidable instrument, as radio goes these days, and its essentials are a variable condenser and a coil of wire (Fig. 1). The instrument may be mounted on a 6 x 7 inch panel and small baseboard, using a 23-plate (.0005 mfd.) variable condenser fairly rugged in construction. A good large dial should be firmly attached with a set screw, and a thin indicator mark read "zero" when the movable plates are all "out" of the fixed plates.

The coil is made of 50 turns of fairly heavy wire, between No. 20 and No. 24, wound on a piece of hard rubber or bakelite tubing about 3" long and 3½" in diameter. This is mounted to the baseboard by means of two wood screws and two short pieces of brass or fiber tubing to keep it about one-half inch off the board. The ends of the coil are left about 6" long, after being firmly fastened in small holes in the tubing, and connected to the terminals of the variable condenser.

You may also employ a 50-turn honeycomb coil for the inductance, and fasten by short lengths of bus bar to a mounted type of 23-plate variable condenser. This assembly is even simpler and may be preferred by some. The results are just as good.

Next comes the calibration of the meter, and the regular receiving set is called into service for this purpose. All that is necessary is to tune in one local station after the other, using plenty of regeneration if you use a regenerative receiver, adopting the following procedure in each case:

Place the wavemeter near the receiver, with the inductance coil of the meter in coupling position with the first coil (if it's a Neutrodyne) or with the secondary tuning coil if it is the usual type of regenerative set However, the wavemeter coil must not be too close, and the farther away from the set it is placed, the more accurately the dial settings can be noted. When the local station has been well tuned in, vary the wavemeter condenser slowly until the signal disappears. It is "trapped out" just as if you were using a wavetrap. Move the wavemeter far enough away to confine the absorption to only a single degree or fraction of a degree on the meter.

### The Graph

Write down this setting of the wavemeter condenser and alongside it the wavelength of the particular station, as found in RADIO WORLD's list of programs or list of stations. Repeat this for all local stations, and get a few DX stations, too, if you haven't enough locals to note the setting for a station at every 50 meters or so. For instance, in New York, the dial settings for nearby stations would be perhaps as follows: WEAF, 55; WJZ, 41; WOR, 28; WHN, 17; WAAM, 7; WBBR, 3. These dial settings are plotted against the known wavelengths of these stations on a sheet of cross-section paper to form the "curve" (Fig. 3). A dot is placed at the intersection of the corresponding wavelengths and dial reading lines, and a smooth curve drawn through the dots. If one or two of them seem to be out of line, repeat the tuning in and absorption process to get them more accurately.

The best instrument for drawing the graph is known as a French Curve and may be obtained at little cost at a stationer's carrying architects' and draftsmen's supplies. With this curve we can quickly find what wavelength is represented by any setting of the wavemeter dial. All we have to do is to glance up vertically from the dial number and look at the wavelength scale opposite the point where the dial number line intersects the curve. We can thus set the wavemeter to any desired wavelength within its range or tell at a glance what wavelength any particular setting indicates. It works both ways.

Now for the "double click." Disconnect the antenna and use enough regeneration to cause the tube to oscillate. Bring the wavemeter near the secondary coil and vary the condenser slowly until suddenly there is a loud click in the phones and the receiver stops oscillating. As the wavemeter condenser is carried beyond this absorption point, there's another click and the tube oscillates once more. When the wavemeter is in tune with the secondary it absorbs enough energy to stop the tube from oscillating, providing the coupling between the two is great enough. The wavemeter should be just near enough to get these two clicks.

### The Unknown Coil

Next we are in a position to determine the wavelength range of our unknown coil and condenser. Set the receiver oscillating at a high wavelength, with the aerial disconnected. Vary the condenser of the new tuned circuit until it, too, acts as an absorber and stops oscillation. Change the receiver setting until the absorption point occurs when the variable condenser of the new tuned circuit is just at maximum capacity. At this point the highest wavelength within range will be tuned in. Then take the coil and condenser away and bring the wavemeter up in its place. Vary this

(*Concluded on next page*)

# Only Beginners Break Radio Dates

***Artists who have "arrived" professionally always sure to have arrived in person, and on time, studio director finds***

*By the Studio Director*

WHEN a radio announcer is forced to go on the air with the dismal statement, "We regret to announce that the artist who was scheduled to broadcast at this time will be unable to do so," the deserved censure is not confined to the offending artists. An accumulation of these "artists breaking faith" announcements results in a station being stigmatized to a degree which nullifies weeks and months of hard, earnest work. The reputation of the offending artist suffers most, however, as any one will readily see who spends even a short time reading letters of complaint which invariably follow these occurrences.

Unquestionably there are some instances where it is not humanly possible for the advertised radio artist to keep a radiocasting engagement. But these rare instances have no relationship to the alibis—"cold," "missed train," "unexpected arrival of friends" and "completely forgot the date"—received at the eleventh hour.

In a majority of instances the radio artists are beginners who by disappointing listeners-in become a target for censure. Seldom or never do professionals already high in public esteem expose themselves to the disapproval which broken radio engagements is sure to call forth. Their years of training and experience prohibit such action. Their full appreciation of the difficulty to reclaim reputations thus tarnished quite overshadows all personal discomfort and records go to prove that the real artist arrives at the station by which he has been advertised well in advance of the appointed time.

This was demonstrated the other evening when a station attendant remarked to a world-renowned star: "I was just beginning to think you were going to disappoint us." The screen celebrity registered great surprise and just a trace of indignation as she replied: "I never permit anything to interfere when I have given my word to make a personal appearance. I would be here tonight even had I broken my leg and were it necessary to arrive on a stretcher." This is not an individual instance and could be multiplied in dozens of instances.

Few persons are familiar with the extreme conditions under which President Coolidge recently kept faith with the listening public when out of the maze of official duties his voice was heard by radio throughout America. Again, the fact that Dr. Adolf Lorenz, the famous Viennese surgeon, had performed over 75 critical operations on the same day did not prevent him from travelling to WOR at Newark, N. J., to address hundreds of thousands from whom he could at the outside, expect only moral support.

Quite apart from serious consequences to artists by reason of lost popularity which broken radio engagements induce, some thought should be given the injustice done program directors by the irregularities of such artists.

Time is the big element in scheduling radio entertainment and one absentee acts as the proverbial wrench in a most complicated machine. Either the next artist has not arrived at the studio or is not yet ready to go on the air.

# Novel Wavemeter

*(Concluded from preceding page)*

without touching the receiving set itself. Now please note that the wavemeter dial reading for this point and look on the curve to find the corresponding wavelength. This will then be the highest wave within reach of the new circuit, and some turns of wire may be added or some removed to find out just how many will be needed. It is assumed that the range of the receiving set is greater than that of the new circuit. To be thoroughly useful and complete in any receiving set, whether tuned radio-frequency, reflex or whatnot, the coil and condenser to be used in it should include all wavelengths between about 550 and 220 meters. Only the upper and lower extremes need be measured to be sure of this range. If the upper wavelength, 550 meters, is obtained with a dial-setting of perhaps 75 or 80, there are too many turns of wire on the inductance for easy adjustment. When the scale is crowded this way, the setting of the tuning condenser on low wavelengths will be very difficult.

With regard to vernier, the wavemeter condenser may be so equipped, but the extra plate type will not do, for it prevents accurate notation of dial settings. The vernier should be a friction cam on the shaft, or by a continuous gear in such a manner that it moves the entire set of plates over a short distance.

Not only is the "double click" method simple to use, but it is also remarkably accurate because the regeneration in the set can be stopped for only a small fraction of a degree. This method is much more accurate than the older scheme of buzzer excitation for the meter. Any ingenious man can fasten a semi-circular piece of cardboard to a flat metal dial, just in back of the dial readings, and print on this card the actual wavelength scale. This will render the graph only necessary while the settings were being taken.

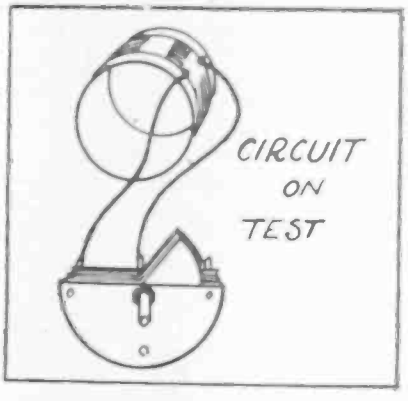
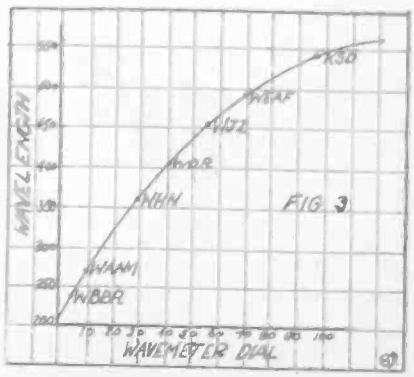



FIG. 2—How to test for wavelength range (at left). The coil and condenser are hooked up as shown in the diagram. A vernier may be provided on the condenser, but the extra plate kind will not do, because it prevents accurate notation of the dial setting. A fifty turn honeycomb coil may also be used here with equal results. Once you calibrate the wavemeter with your set, you may tune in any station, knowing their wavelength by simply setting the dials to correspond with the chart.

FIG. 3—Calibration chart (at right) which shows the curve of the testing circuit, the wavelength being marked off at left, from 200 to 550 meters, in stages of 50, and the wavemeter dial being recorded from 0 to 100 in stages of tens. Graph paper for this purpose can be bought in an artists' supply store. The graph is made by setting the condenser at the lowest point, moving upward from there. At whatever point on the dial a station is heard a mark is placed on the sheet at the corresponding point. A line is then drawn through all the points.



# Lacault's Ultradyne Wonderful for DX

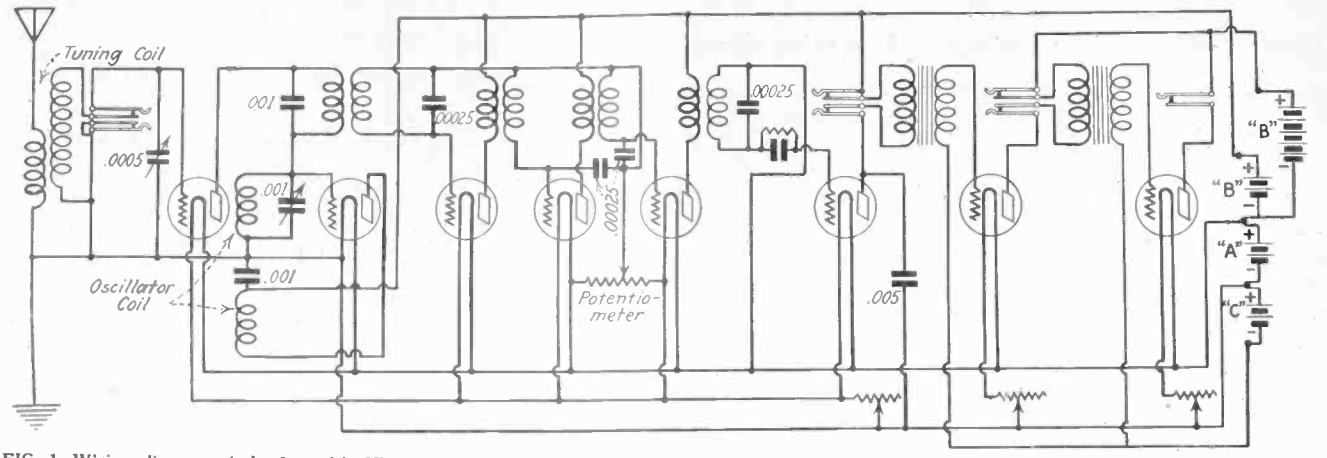



FIG. 1—Wiring diagram of the Lacault's Ultradyne, using 8 tubes. The Ultradyne is a modified form of the Super-Heterodyne circuit, and is claimed by the author to be better than the original. As seen in the diagram, provision is made for the use of an outdoor antenna or a loop, which may be plugged into the double-circuit jack at the extreme left. The tubes are, from left to right, straight radio-frequency amplifier, oscillator, first, second and third intermediate-frequency amplifiers, detector, and first and second audio-frequency amplifiers. Instead of using a pickup coil on his oscillator, Lacault hooks the oscillator coils directly in series with the plate of the first intermediate-frequency transformer. As usual on Super-Heterodynes, only two tuning controls are used, one for the antenna tuning, the other on the oscillator.

*By Byrt C. Caldwell*

## PART I

FOR the DX fan the most sensitive, most selective and the most satisfactory Super-Heterodyne yet devised is, in my opinion, Lacault's Ultradyne.

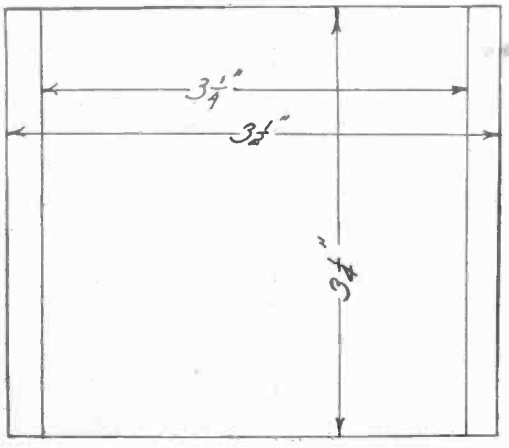
In building this receiver, it is important that the constants given by Lacault be closely adhered to.

In this article is described the construction of the tuning inductance, the oscillator coil and the long wave radio frequency transformers, and the lay-out of the panel.

For the tuning inductance and the oscillator coil we must have two radion or bakelite tubes, each three inches in diameter and four and six inches in length, respectively. These are wound with No. 20 double cotton covered wire. The tuning inductance is wound first. Put eight turns on the longer tube, one-half inch from the end. One and one half inches from this wind the secondary, which consists of 72 turns, wound in the same direction. The oscillator coil is in two sections, wound in the same direction. The first consists of 24 turns, and the second of 32 turns.

The long-wave radio-frequency transformers should be made next. The winding forms for these are made from one eighth inch radion. An eighth inch radion panel for these can be had at any radio parts store.

For ease in cutting, these are shown of a square shape. If a washer cutter or some other cutter is at hand with which you can cut circular pieces of the radion, it will be best to make the transformers in the



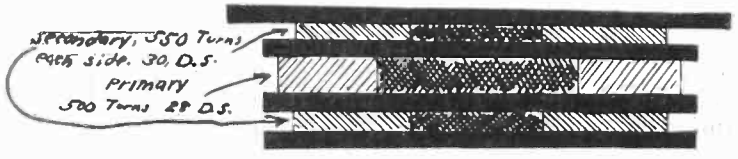
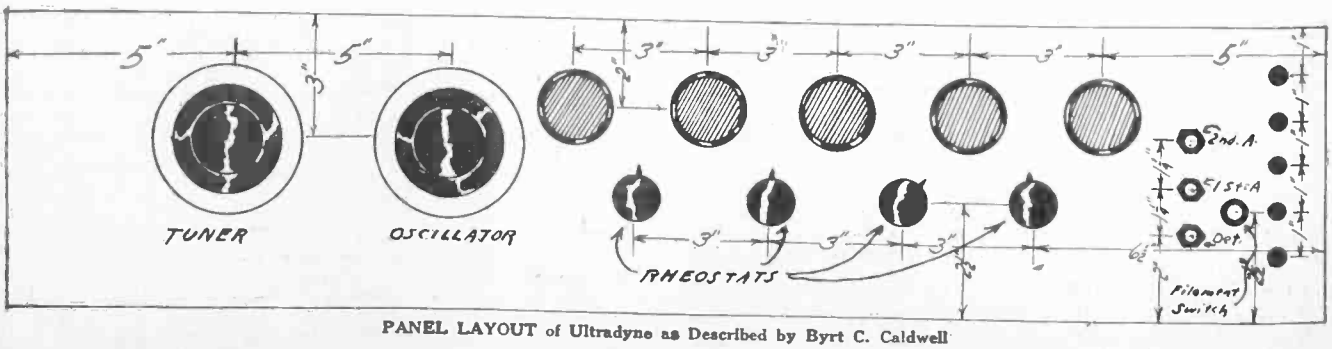




FIG. 2 (left) shows the end forms for the intermediate frequency transformer windings, made square for the radio fan's convenience in constructing. The cutting dimensions are given on the diagram. Fig. 3 (above) is a cross-section view of the completed intermediate-frequency transformer. The primary is wound on one form and the secondary wound in two sections—one placed on each side of the primary. It is of the utmost importance that both sections of the secondary winding go in the same direction, otherwise the set will not work. The primary has 500 turns No. 28 double silk covered wire, and each section of the secondary 550 turns of No. 30 double silk covered wire. Fig. 4 (below) is the panel layout correctly measured and marked off so that the builder can follow the dimensions and be sure that all the holes will be in their proper places. The best way is lay out on a piece of wrapping paper the exact size of the panel and all the holes to be drilled. Paste this on the actual panel and drill through the marked places. The paper is easily removed by soaking the panel in warm water.




PANEL LAYOUT of Ultradyne as Described by Byrt C. Caldwell

# How to Wind Transformers Yourself

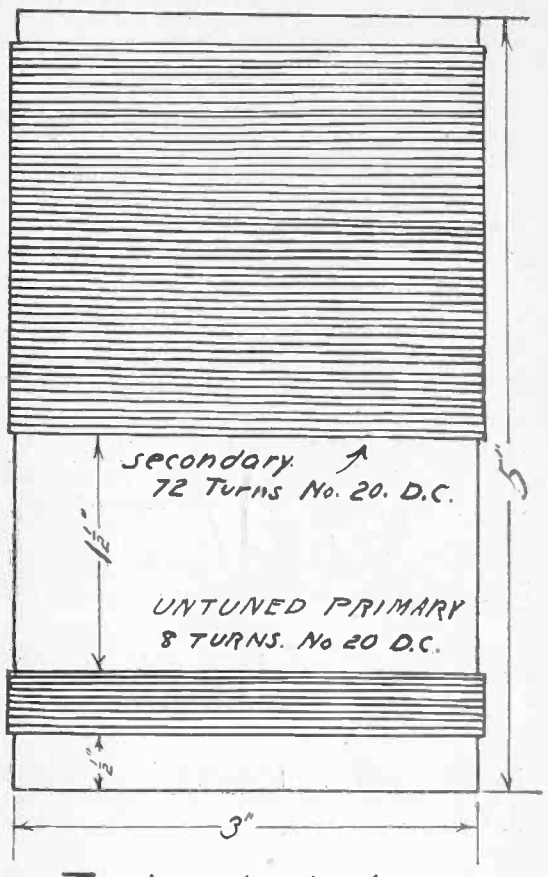
regular circular form. However, the square transformers will serve just as well. With a hack saw, cut the radion into the following sizes. Four, 3¼ x 3½ inches; twelve 3¼x3¼ inches; eight 1x1 inches, and eight, 1½x1½ inches. A hole should be drilled through the centers of all of these, so that they may be bolted together. A binding post should be fastened to each corner of the large pieces, and four forms should then be made from the pieces cut, according to the diagram, placing two of the 1½x1½ inch pieces together, for the middle of each transformer. A support of brass strip should be bolted to each transformer so that it may be fastened to the base. Wind the primaries of these transformers first. These consist of 500 turns of No. 28 double silk covered wire, wound in the center slot of three of the transformers. The other transformer has 300 turns instead of 500. The secondaries consist of 550 turns of No. 30 double silk covered wire in each of the outside slots. These are wound in the same direction as the primaries and are connected together. The secondaries may best be wound by first putting the 550 turns in one slot, and then, by bringing the wire across the primary, winding the second half.

The panel should next be laid out. This is size 7x32 inches. All the measurements are given in the diagram. The additional apparatus required besides that mentioned follows:

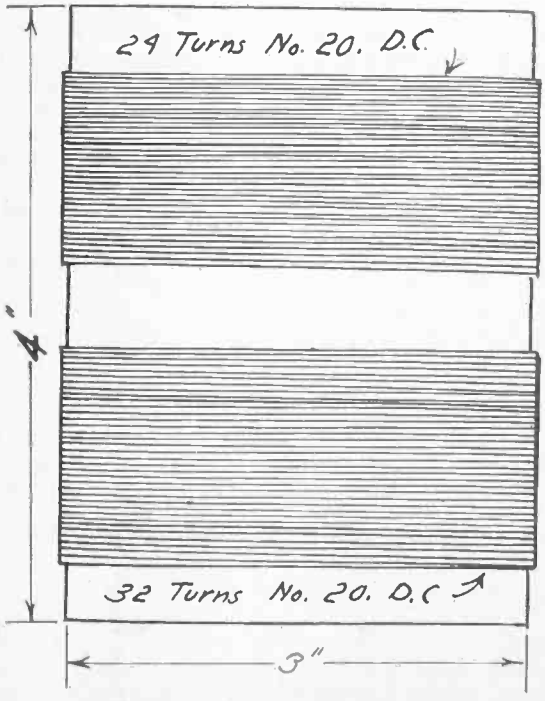
**1 .0005 mfd. low loss variable condenser.**
**1 .001 mfd. low loss variable condenser.**
**2 vernier dials.**
**8 good positive contact sockets. Moulded bakelite.**
**1 Potentiometer.**
**3 6 ohm rheostats.**
**2 double circuit jacks.**
**1 single circuit jack.**
**1 filament switch.**
**1 grid leak. Variable preferred. .00025 mfd, mica condenser attached.**
**4 .00025 micadons.**
**2 .001 micadons.**
**1 .005 micadons.**
**2 audio-frequency transformers. Medium ratio.**
**7 binding posts.**

The apparatus should all be of the very best, if real results are desired.

*[In the next and final article Mr. Caldwell will explain next week the assembling, wiring and operation of this receiver.]*




Tuning Inductance




Oscillator Coil

**TUNING and Oscillator Coils for Ultradyne.**

## Voltmeter Is Handy for Trouble-Shooting

A 50-VOLT voltmeter will come in handy to test the condition of the B batteries. Sometimes one block will go bad and it will kill them all unless removed from the string. Not only that but it will also add noise to your reception. There are few things noisier than a dying B battery.

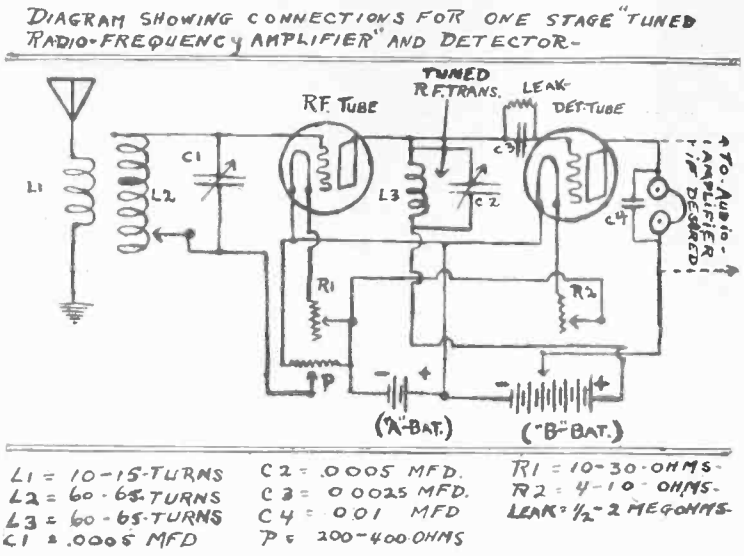
## Fit the Tool to the Task

EVERY tool has its own uses. Don't try to loosen 4-36 screw with a screw driver having a half-inch wide blade, or to cut quarter-inch brass rod with a pair of four-inch side cutting pliers. For a small screw, use a small screwdriver, and for cutting, use a hack saw.

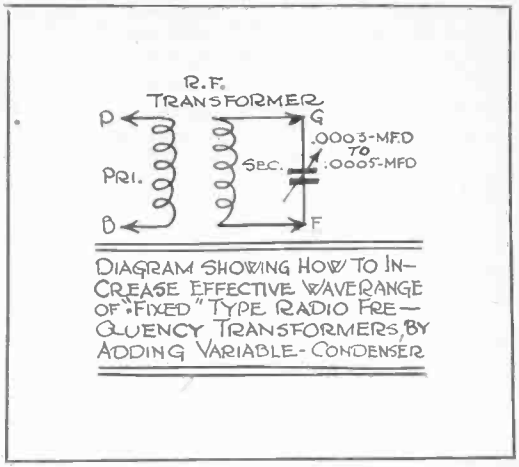
## You Can File Bakelite

DESPITE its toughness bakelite can be filed fairly easily. The file, however, must be a coarse one and must be shaken out thoroughly after half a dozen strokes.

# Why You Should Employ Tuned RF




THE COILS for a stage of RF and detector may be wound on a tube 3" in diameter, 4" high, thin wire being used. No. 26 is suggested. P represents the potentiometer, which acts as a stabilizer by controlling the grid bias. In the above circuit the tuner is at left and the RF impedance coil is between the two tubes. The simple audion hookup is used in the detector unit.




A RF TRANSFORMER (above) consists of two coils, while an impedance coil has only one winding. A fixed commercial RF transformer may be tuned by shunting the secondary with a variable condenser, 15 to 23 plates. Thus the shortcoming of some commercial fixed RF transformers—the pronounced peak that narrows the effective range—is avoided. This unit may be placed ahead of the detector or after it, in point of position. The scheme adhered to by Lieut. Breckel is to put the detector first, although of course the radio-frequencies reach the detector tube last, no matter where the RF transformer or impedance coil is placed.

*By Lieut. Harry F. Breckel*

Associate, Institute of Radio Engineers

MANY advantages are to be gained through the use of radio-frequency amplification. Receivers of this type are best for radiocast reception.

The more important advantages to be gained are, first, the fact that it permits of the reception of very distant stations which cannot ordinarily be heard at all with the conventional receiver employing audio-frequency amplification only, and secondly that it permits the use of very small antennae such as the loop type, which can be used indoors. Such a type of antenna is frequently essential for persons who reside in an apartment house where conditions make it impossible to erect an outside antenna.

The underlying principle of radio-frequency amplification is the amplification, by means of vacuum tubes, of the received radio-frequency currents. These are the currents absorbed by the antenna system and are very feeble. This amplified radio-frequency current is then impressed on the detector tube circuit on which it reacts much more strongly.

In the construction of a radio-frequency type receiver it is best to employ radio-frequency transformers of the tuned type to get best results. The fixed type cannot provide maximum results over the entire range of wavelengths or frequencies used by the stations. When radio-frequency transformers of the non-adjustable or fixed type are used certain stations will come in very loud while other stations of practically equal power but operating on different wavelengths will be heard with much less volume, though located nearer to the listener.

In some cases it will be impossible to hear certain stations at all because the radio-frequency transformer design is such that it will not respond to their wavelengths. In such cases where the transformer will not respond to the higher wavelengths, say, for example, between 475 and 600 meters, it is possible to overcome this condition through the use of a variable condenser of a capacity of .0003 to .0005 microfarads (15 to 23 plates) connected across the secondary terminals of the radio-frequency transformer. (See diagram.)

I have observed some radio-frequency receivers in which the transformers employed would not permit the reception of stations operating on the higher wavelengths such as WEAF, New York; WWJ, Detroit; KYW, Chicago; WOAW, Omaha, and KSD, St. Louis, all of which were heard with good volume when the radio-frequency transformer was made to respond to these higher wavelengths by means of a variable condenser.

A radio-frequency transformer of the iron core type will respond to a wider range of wavelengths and will prove fairly efficient, while the air core type provides greater amplification per stage with the disadvantage of covering only a narrow range of frequencies or wavelengths, due to the lower effective resistance of the windings.

Sufficient compensation for the extra controls will be gained through being able to hear distant stations with better volume and the fact that the receiver will cover the entire band.

A simple tuned radio-frequency transformer of the impedence type may be constructed by winding from 50 to 65 turns of number 26 B&S gauge double cotton or silk covered magnet wire on a 3" diameter tube, shunting the coil with a variable condenser of from .0003 to .0005 microfarads capacity (15 to 23 plates). This unit should then be connected in series with the plate circuit of the radio-frequency amplifier tube as shown in the diagram. Then by simply varying the value of the variable condenser, the wavelength to which the amplifier will respond is correspondingly varied, and the unit always works at the correct value to permit of the most efficient reception of the frequencies (wavelengths) within its range.

Clarity, distance and volume in a set employing radio-frequency amplification depend absolutely on inter-stage radio-frequency transformers of the proper type and which will respond to the entire range with a maximum of efficiency.

# Wiring the Low-Loss Superdyne

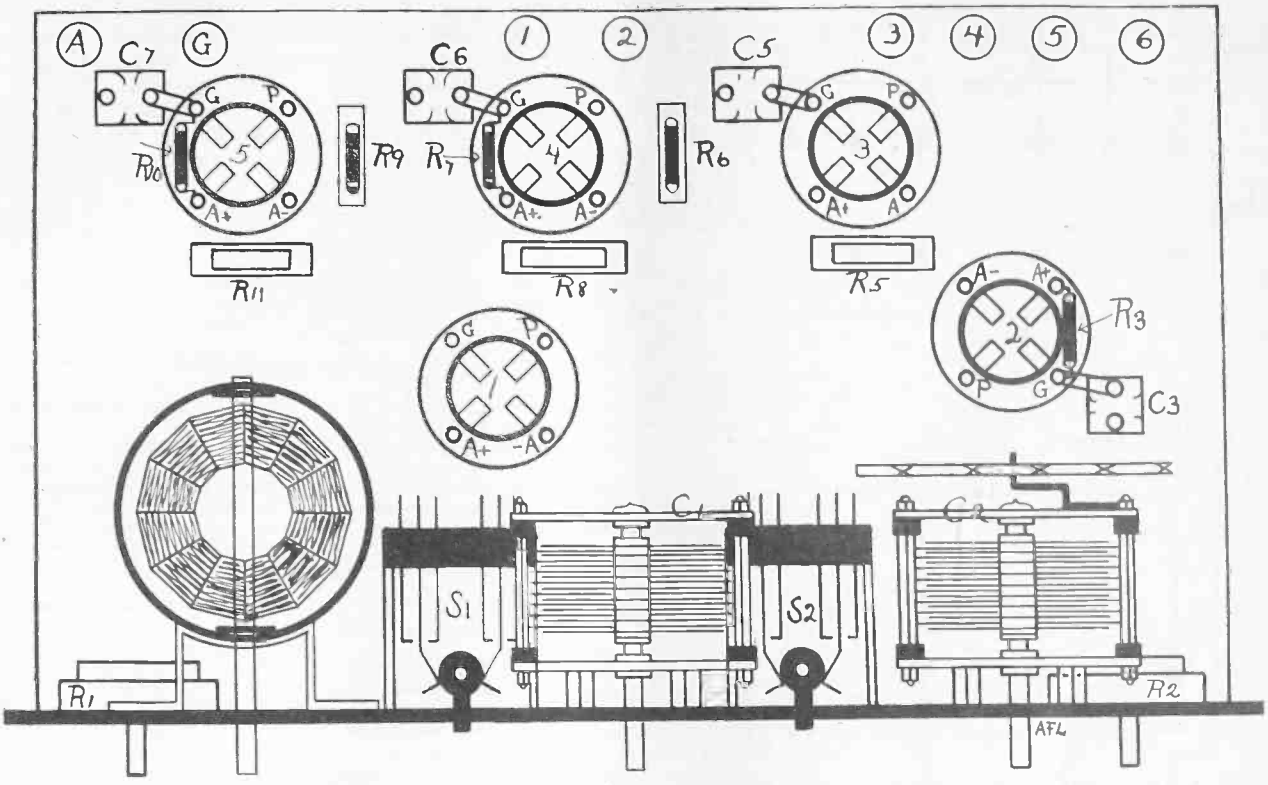



FIG. 5—The assembly of the Low-Loss Superdyne is particularly easy, owing to the absence of audio-frequency transformers. The only parts that are screwed to the baseboard are the sockets and resistance mountings. The placement of the coupler and condensers permits easy and short leads.

*By N. N. Bernstein*

Technical Editor

(Construction design by A. F. Lapierre)

## PART II

[*The first instalment of the 2-part article on "A Low-Loss Superdyne" was published last week, issue of August 23.*]

The two 4-pole double-throw anti-capacity switches do five things: 1, switch A (Fig. 3) controls the high and low wavelengths, eliminating the use of two separate sliding arm switches with their inefficient method of contact; 2, switch B automatically extinguishes tubes 4 and 5 when listening in on low volume; 3, also automatically extinguishes tubes 4 and 5 when listening on the detector jack; 4 also automatically extinquishes all the tubes when in neutral position, thus making unnecessary the use of an additional filament battery switch, and, 5, when plugged in on J2 automatically throws the output (high or low volume as the case may be) to that jack.

When listening in on the detector jack the first AF tube (No. 3) remains lit although not in use. This may seem extravagant but always remember that very little listening is done on the detector jack and you will very seldom plug in on it. The first AF stage is almost universally used for tuning in purposes and ear phone reception.

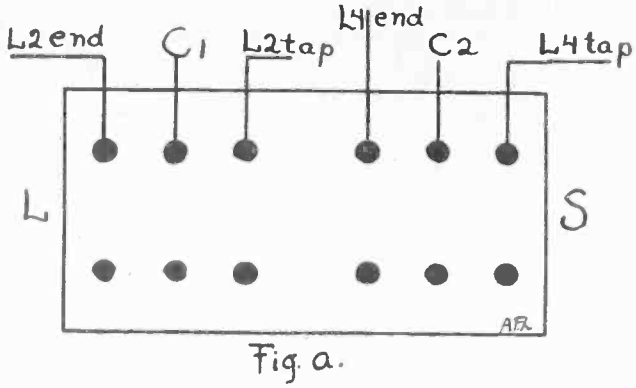
Fig. 4 shows the layout of the panel in detail with all dimensions plainly marked thereon. The only hard part is drilling the two square holes to accommodate the two cam switches. The manner of making these holes, and an exact size template for them, were published on page 13 of RADIO WORLD, issue of August 23, in Part I of this article. Care should be taken to get these oblong apertures to align so as not to throw the appearance of the panel out of balance. When the left-hand cam switch is thrown to the left, long waves will be tuned in and when to the right the short waves will come in.

The volume control switch at the right, when in the middle or neutral position, will extinguish all the filaments. When the switch is thrown to the right the last two tubes will be turned off, giving low amplification, and when thrown to the left will give maximum amplification with all tubes lit. This is with the phones plugged into J 2, the left-hand jack. When J 1, the right-hand jack, is plugged in, you will be listening on the detector tube, and the switch should be thrown to the right. The first AF tube will remain lit whenever the set is in operation, and as only tuning will be done on the detector tube hardly anything will be lost by letting the first AF tube burn. Besides, most radio fans do their listening and tuning on one stage of AF, and use the detector jack very little. The usual layout of the Superdyne has been changed a bit here to facilitate wiring and to establish shorter leads than was possible before. Here the variocoupler is placed at the left and the two tuning condensers set one in the center and one at the right. The jacks and switches are handily located for convenient operation, as are the two rheostats. The dimensions on Fig. 4 should be strictly adhered to for proper placing of the parts. The templates for the variable condensers usually come with each instrument and the extra holes for screws are to be added when marking the dimensions on the panel.

### Assembly

The assembly of the instruments is important because by placing them in the best position possible, the shortest leads are effected. Fig. 5 shows an ideal layout

# Marvelous Quality from DX Set



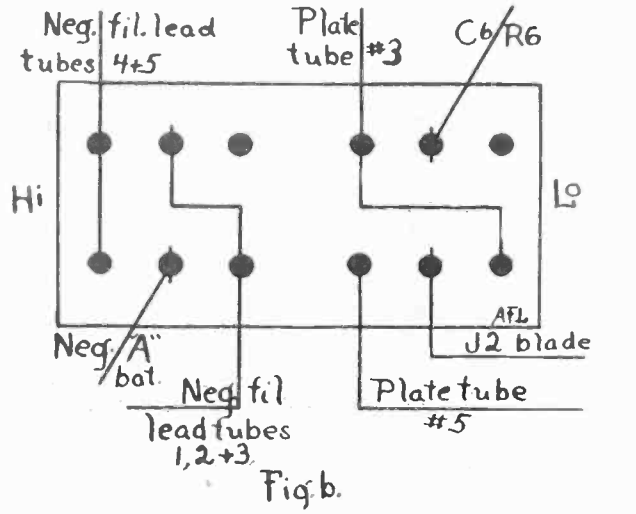




FIG. 3 (a), back view of left-hand switch on panel which controls the wavelength; (b), back view of volume control and filament switch (at right on panel). The connecting wires go to these two switches exactly as shown.

of the sockets, resistances and condensers. The space ordinarily taken up by audio-frequency transformers is used for the wiring. The two jacks are not shown in Fig. 5 because they are under the coupler and C2. Mountings are used for resistances 6 and 9, and the fixed filament controls R5, 8 and 11. Resistances R3, 7 and 10 are wired directly to the binding posts of sockets 2, 4 and 5 by means of short lengths of bus bar wire bent in the form of a small loop to hold the cone ends of the resistances.

C4 and R4, not shown in the assembly plan, are wired directly to J1 (Fig. 1, on front cover of RADIO WORLD, August 23), as it also R12, the latter being suspended from J2. C3, 5, 6, and 7 are wired directly to their respective sockets. The binding posts as laid out separate the aerial and ground leads and the A battery and the B battery leads, thus minimizing the possibility of mistakes in connecting the batteries. The plate coil, shown suspended from C2, is in a good position for short leads. Mount the parts on the panel first, screw the panel to the baseboard and then fasten on the sockets and resistances. This part of the construction work is very simple.

The coupler, as shown in Fig. 5, consists of the stator, which is a bakelite tube 3½" wide by 2½" long, wound with 42 turns No. 20 double cotton covered wire, with a tap at the twentieth turn. An aperiodic primary of 6 turns of No. 18 double silk covered wire is wound directly on top of this stator. The rotor is spider-web wound, 45 turns No. 22 double cotton covered wire. The inside diameter of the spider-web rotor is 1½". Spider-web forms for this purpose can be bought at any radio store. The spokes of this rotor are withdrawn and the winding bound with string. A good method for doing this is described on page 6, RADIO WORLD, issue of August 23, in an article by Herman Bernard. After the coil is bound with string or thread a 5/16" diameter bakelite or wooden shaft is fastened firmly to it with thread and passed through the bakelite supports extending up from the coupler, and through the panel. (See assembly layout, Fig. 5). Should the fan not care to build his own Superdyne coils they may be purchased ready made. See the advertising columns.

### LIST OF PARTS

One low-loss coupler.
One low-loss plate coil.
Two Federal 1424-W cam switches.
Two 30-ohm rheostats.
Two 23-plate low-loss variable condensers.
Two single-circuit jacks.
Three fixed filament resistances.
Five tube sockets.
One .00025 mfd. fixed condenser.
One .002 mfd. fixed condenser.
Three .0025 mfd. fixed condensers.
Two .5 meg. fixed resistances.
Three .1 meg. fixed resistances.
One .05 meg. fixed resistance.
One .25 meg. fixed resistance.
Mountings for resistances.
Five 201A type tubes.
One 7x18x3/16 inch panel.
One 7x18x12 inch deep cabinet.
One 11x17½x½ inch baseboard.
Eight Fahnestock binding posts.
Hardware, connection wire, phones, loud speaker.
Two 45-volt B batteries, one storage A battery.
Aerial equipment.

### WIRING

The wiring of the Superdyne should be done with No. 18 flexible stranded double silk covered fixture wire. The ideal way to work with flexible connections is to measure off the necessary length of wire and solder a small copper lug to each end. Where a wire must be tapped scrape the insulation off and when the top has been made and soldered drop a bit of melted sealing wax on it for insulation. Bunch all the A battery leads and minus B battery leads and run them in cable fashion to their designations. This cable may be run close to the panel under the condensers and switches so as to be out of the way. It does not matter if the A battery leads are a bit longer if it will make the wiring more convenient. It is vital that short grid and plate leads be made, as the success of the set depends in a measure on the wiring. The parts are laid out in such a fashion as to provide the smallest leads from the coupler and plate coil the RF and detector tube.

Referring to the diagram of the Superdyne, which appeared on the front cover of RADIO WORLD of August 23, the wiring is as follows:

*Legend*: L1, aperiodic primary; L2, tapped secondary of coupler; L3, tickler coil; L4, reverse wound plate coil, tapped; C1 and C2, 23-plate low-loss variable condensers; C3, .00025 mfd. fixed condenser; C4, .002 mfd. fixed condenser; C5, C6, C7, .0025 mfd. fixed condensers; R1, R2, 30-ohm rheostats; R3, R7, 5 meg. fixed resistances R4, R6, R9, .1 meg. fixed resistances; R5, R8, R11, fixed filament resistances (Amperite No. 1-A); R10, .25 meg. fixed resistance; R12, .05 meg. fixed resistance. Binding posts, 1, A minus; 2, A plus; 3, B minus; 4, plus 22½ volts; 5, plus 45 volts; 6, plus 90 volts. The top cam switch is for wavelengths control, and the bottom one the volume and filament control.

The antenna and ground are connected to L1. The top of L2 goes to the grid of tube 1, while the tap and bottom lead of L2 go to the wavelength switch. One

# Resistance-Coupled AF Is Used

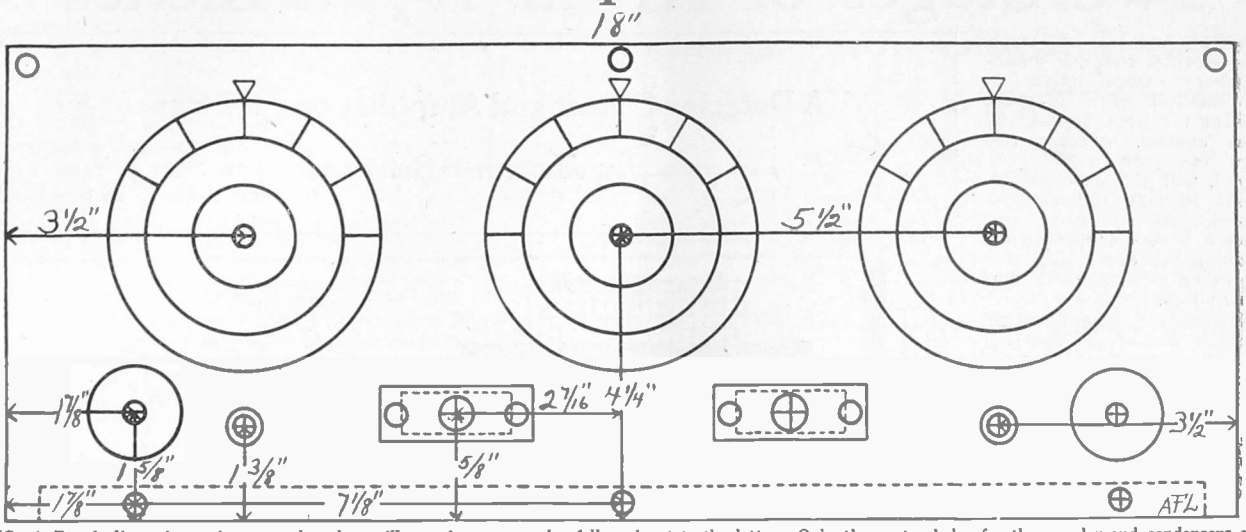



**FIG. 4—Panel dimensions given on the above illustration are to be followed out to the letter. Only the center holes for the coupler and condensers are shown, as the mounting holes depend on the make of condenser to be used. The oblong dotted lines are for the cam switches, the template for which was published in Part 1 of this article, issue of August 23.**

side of L3 (either end) goes to post 5 and the other end to the stator plate of C2. The rotor plates of C1 go to the grid of tube 1 and the stator plates go to the wavelength switch to one side of R1 and to the volume control switch. The other side of R1 goes to the negative F post of tube 1. The top of L4 goes to the plate of tube 1, to the rotor plates of C2 and to one side of C3. The tap and the bottom leads of L4 go to the wavelength switch. The other side of C3 goes to one side of R3 and to the grid of tube 2. The other side of R3 goes to the positive F post of tube 2. R2 goes in the lead between the negative F post on tube 2 and the volume control switch. The plate of tube 2 goes to the blade of J1. C4 and R4 are bridged across J1. The frame of J1 goes to C5 and binding post 4. The other side of C5 goes to the grid of tube 3. R5, R8 and R11 are connected together and the lead goes to binding post 2. The other side of those resistances go to the positive F leads of tube 3, 4 and 5. The negative leads from tubes 3, 4 and 5 go to the volume control switch. The plate of tube 3 goes to the volume switch. R6 goes to the positive A lead on one side and to C6 and the volume switch on the other. R7 goes to the plus A lead on one side and to the other side of C6 and the grid of tube 4. R9 goes to binding post 6 and to one side of R12. The other side of R9 goes to the plate of tube 4 and to one side of C7. R10 goes to the plus A lead on one side and to the other side of C7 and the grid of tube 5 on the other. The plate of tube 5 goes to the volume switch. The frame of J2 goes to R12 and the blade goes to the volume switch.

Fig. 3 is the sketch of the two cam switches, showing clearly and exactly how the different leads are connected to the various springs on the switches. It is a back view, showing their actual position when mounted on the panel and each lead is definitely marked so that no mistakes should be made in the wiring. Simply follow the diagram, comparing it with the switch.

## OPERATION

The Superdyne is a bit more difficult to tune than the ordinary multi-tube set, as the grid and plate circuit must be brought to resonance before maximum signal strength is obtained. Place the tickler at an angle of about 45 degrees and tune both condensers together until a signal is heard. Adjust the tickler to a point just below the oscillation point and retune the two condensers. Another slight readjustment to the tickler may be necessary to bring up the volume. The knack of tuning the Superdyne can be mastered in a short time.

It may be found that R1, controlling the RF tube may be a bit critical. In tuning a station to maximum volume slight readjustments of the tickler and variable condensers may be necessary. Up to 120 volts can be used on the amplifiers with excellent results, and the least that should be used is 90 volts. The heavy duty Eveready batteries are recommended, as they will stand up under the 5-tube strain in good shape. A 120-ampere hour storage battery should be used to light the filaments. Loud speaker operation will be extremely clear and voluminous, so much so in fact that the low volume side of the cam switch will be the vogue for local and middle distance stations.

[In the laboratory Superdyne set the following make parts were used: Amperite fixed filament resistances, Daven Resistors, Freshman fixed condensers.]

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

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# Panel Must Be Inscribed to Use Chinese White

SOME recommend Chinese white for lettering a panel, but anyone who has ever tried to make this stuff stick knows what a job it is. The panel simply will not hold it. Incisions must be made in the surface, so that when the white dries it will remain in them as deposits.

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# A Wonderful Circuit

**A 1-TUBE SET WORKS SPEAKER, POSITIVELY!**

Send 15 cents for copy of RADIO WORLD, issue of August 9, or start your subscription with that number. RADIO WORLD, 1493 Broadway, New York City.

# Two Stages of AF in 4½x5 Inches

## A Detector Circuit and Amplifier on 7x12 Panel

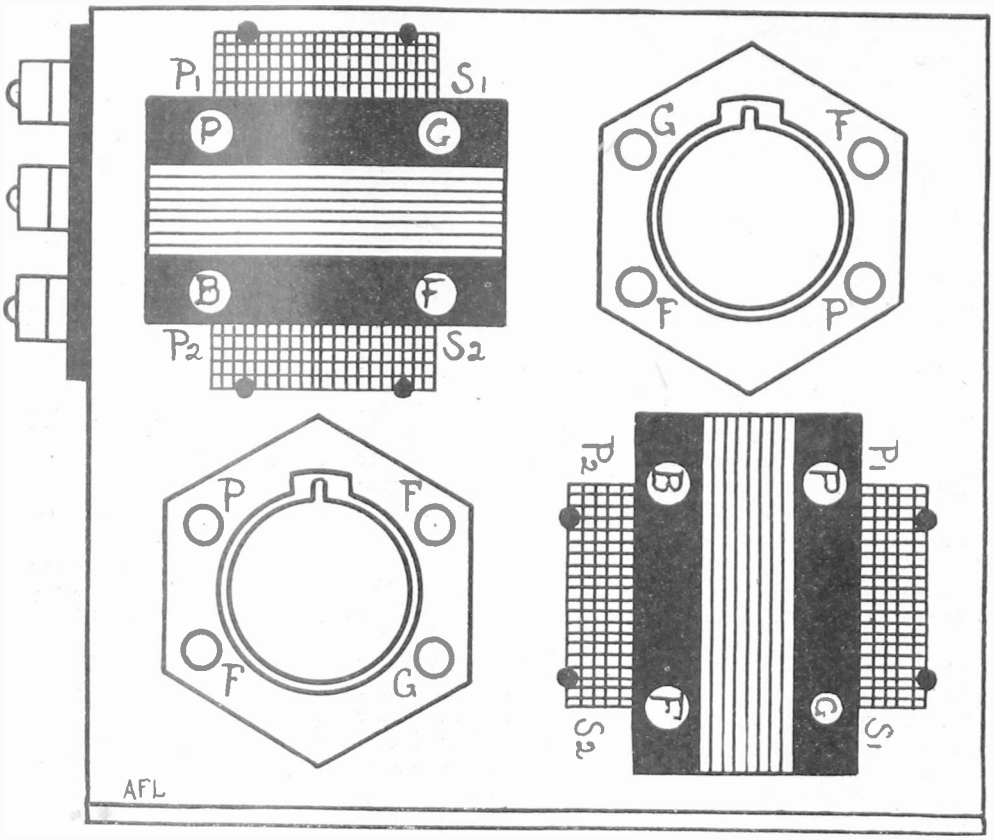
*By Herman Bernard*

TWO stages of transformer-coupled audio-frequency amplification in the smallest possible space without the necessity of any extra control, whereas two extra ones are usually employed, will give excellent results. In fact, this method, although the entire AF unit is on a 5" x 4½" baseboard, accomplishes everything that any other two-stage AF amplifier does.

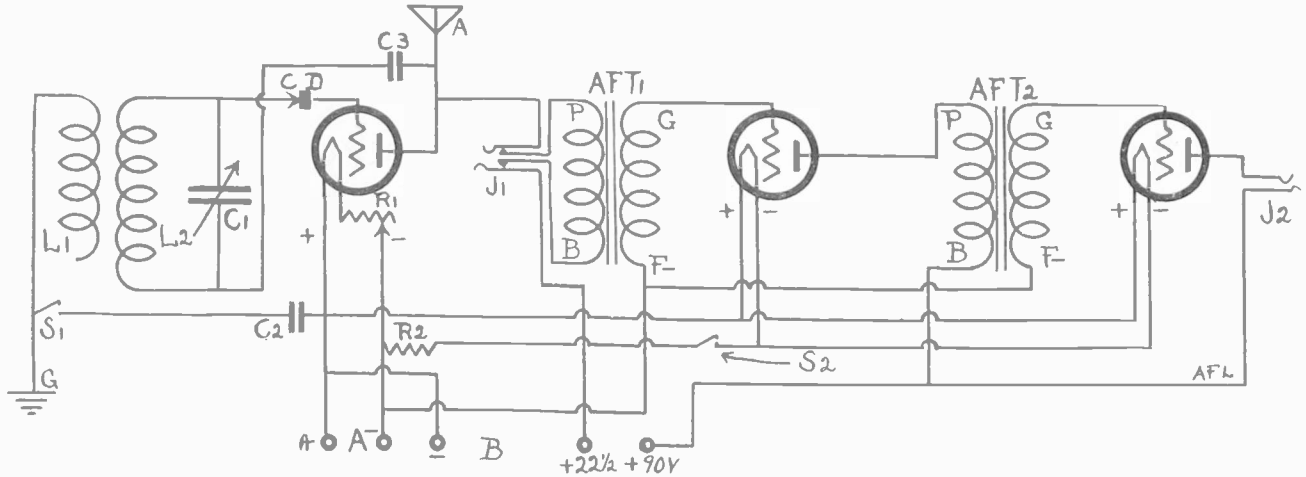
The detector circuit shown in Fig. 2 is that of the One-Dial Set, using a solo coil for the tuning in conjunction with a variable condenser. However, the two AF stages may be added to any circuit whatever, the leads that now go to the phones of the detector unit simply being connected to the primary of the first audio-frequency transformer (AFT 1). The lead from the plate of the detector tube goes to P or P1 and the B 22½-volt lead to the B or P2 post of the transformer. The two sets of designations are given because different makes of transformers vary in the use of the designations.

For those desiring to make a single-control set that gets DX and gives excellent quality of reception, that is sufficiently selective for all normal needs and gives the option of using straight audion or regeneration, the constants are given herewith for the detector unit:

L1, eleven feet of No. 22 single cotton covered or double silk covered magnet wire; L2, 38 feet of the same wire; S1, a push-pull switch or a two-tap switch such as is used for tapping a tuning coil; C1, a 23-plate variable condenser; C2, fixed condenser, .001 mfd., optional and may be omitted; C3, .002 fixed condenser; CD, fixed crystal, such as used for detector, though it is not a detector in this circuit; R1, rheostat to match the tube. In this circuit the 199 and 299 type of tube was used with excellent




ACTUAL SIZE of two stages of transformer-coupled audio-frequency amplification, (Fig. 1). The baseboard is 5" wide by 4½" deep. This is the smallest possible space that enables best results. The AF transformer at top, left, is AFT1 in the circuit network (Fig. 2, below). The socket at right, top, is for the first AF tube, or the second tube from left in Fig. 2. AFT2 and the second AF socket are at bottom of the above diagram. Sockets for 199 or 299 type tubes are shown, but sockets for any other tubes may be substituted, the free space at edges permitting additional room. On the transformers the criss-crossed areas represent the windings, the parallel lines in center are the core. The black circles are screws for fastening the transformers to the baseboard. At extreme left, top, the position of the resistance mounting strip is shown. Although only three binding posts are visible, four are there actually, one being hidden. See Fig. 3. The two posts shown at extreme ends of the strip connect to P and B of AFT1, and are placed near those points for that purpose. Notice that AFT1 and AFT2 are placed at right angles to each other. This is important. The AFT posts are marked P, B, G and F, also with the corresponding designations, P1, P2, S1, and S2, respectively, as different makes of transformers vary as to which set they use.




CIRCUIT NETWORK (Fig 2) for One-Dial Set and two stages of transformer-coupled audio-frequency amplification. The AF part may be added to any circuit, the phone leads of the detector going to P and B of AFT1. The plate of the detector tube goes to P and B plus 22½ goes to B. In the AF circuit a fixed resistance, R2, is used instead of a rheostat. Directions for making such a resistance for a few cents appear in the text. S2 is a battery switch, the AF tubes being lighted simply by pulling out the switch knob. R2 should be 10 to 15 ohms if 199 type tubes are used and 6 to 10 ohms for 201A type. The resistance is not critical. A 20-ohm rheostat may be used for R2 and adjusted until best results are obtained, then left at that position permanently.

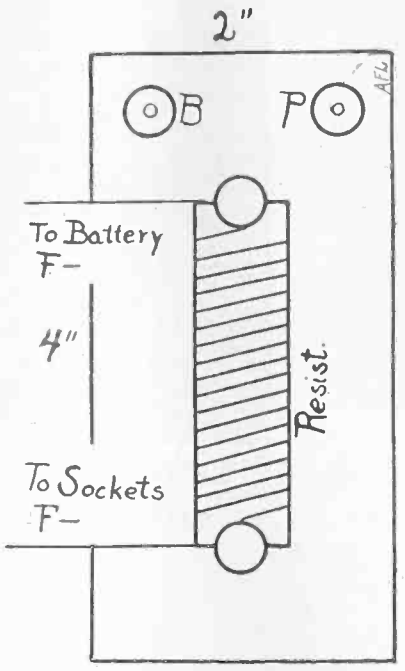
# Mounting Parts for AF Amplifier

results, requiring a 20-ohm rheostat, socket to match tube and a 4½-volt C battery used as the A battery.

The coil L2 is wound on a 5" diameter spider-web form. The ends of both wires are held together, a foot is left for slack, and the winding begun, the wires being wound side by side and care being taken to keep the same particular wire on the inside track all the time. If green covered wire is used for the primary and white covered for the secondary, or vice versa, the distinguishing of the wire and terminals will be easier. Wind the two wires together in this fashion until five turns are completed. Then let the primary wire, L1 (the short piece), remain free and continue on only with the other one. When a total of thirty turns has been completed on the secondary, including the original five, pick up the primary wire, L1, again, carry it at an angle of about 45 degrees over to where the secondary now temporarily ends, and again continue winding both together as before. Leave a foot of slack at the terminal of L1, which coil will be terminated first, and continue on with the secondary, L2, temporarily looping the terminal of L2 around one of the spokes. Now with thirteen pieces of slender string or thread tie the windings fairly tight. Pass each piece of string around the 1¼" width of the winding, introducing each piece at the point where the spokes are separated. Each of the thirteen pieces of string is knotted at the outer circumference of the coil, thus binding the wire. Now the spokes are cut away with heavy shears or sharp knife where they meet the central circle. After the last spoke is cut the circle will fall out. Each spoke is plucked out and the coil now has no spider-web form on it and is distinctively low-loss. A template for the spider-web was published in RADIO WORD last week, issue of August 23, together with full structural details and diagrams of the Solocoil hook-up, as it has been termed. Full wiring directions, with explicit data on all connections, as well as panel layout, assembly plan, and full list of parts were published then. The tuning unit requires only a 7" x 7" panel, but the addition of two stages of AF will require 5" more in width. How to get real good detector and two stages of AF in a 7" x 7" x 12" cabinet is something not set forth every day.

The detector may be made to produce greater volume, with a correspondingly increased loudness from the speaker, if a grid leak and grid condenser are mounted on the G socket of the detector tube and the crystal omitted. Also the fixed condenser in the plate lead (C3) may then be omitted. Some slight sacrifice in quality is made, but the increased volume is preferred by many. The quality still remains good.

## Connecting Strip from Detector Circuit *Simplifies Wiring*




**THE COMPLETED FIXED RESISTANCE is mounted on a 2" x 4" hard rubber strip. Two binding posts for connection to plate and Bx22½ volts are placed at top as shown. The bottom of the strip is affixed to the baseboard. Be sure that the lead to the F— socket posts is connected to the resistance at the end opposite the one that goes to the F— post of the A battery. The F— posts on the transformers are connected to the battery side of the resistance, not to the socket side. The line at left is a continuous one, representing one side of the strip, though broken up in the diagram for the sake of explicitness.**

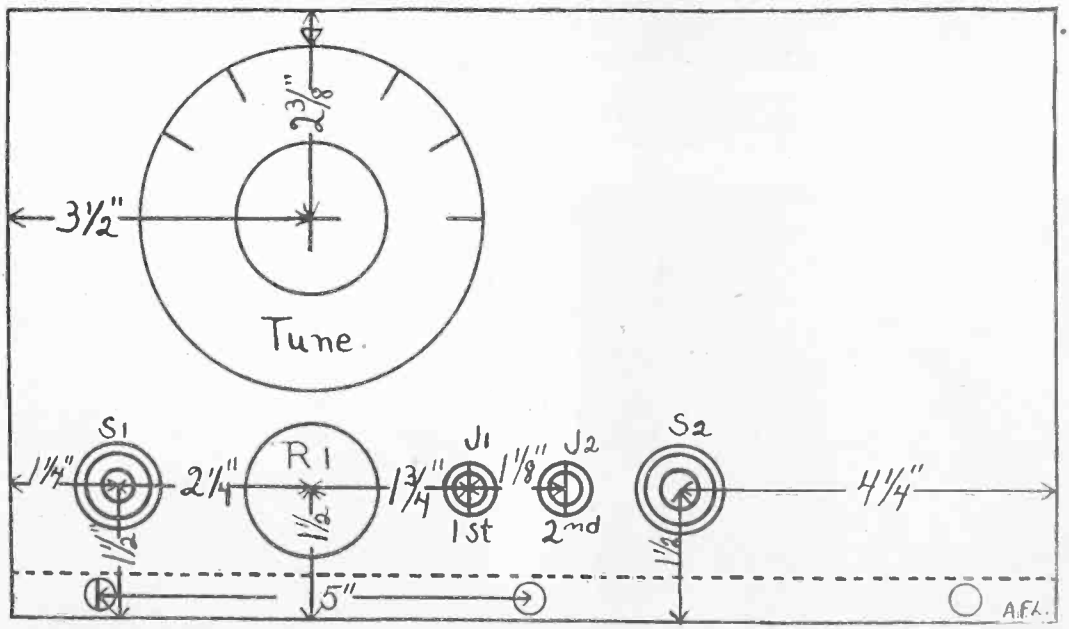
### Constructing the Two Stages of A. F.

To construct the amplifier circuit the following parts will be necessary:

**One panel (7-in. x 5-in. for amplifier alone; 7-in. x 12-in. for 1-dial set and AF).**
**One cabinet.**
**Two audio-frequency transformers (AFT1 and AFT2).**
**One double-circuit jack (J1).**
**One single-circuit jack (J2).**
**One jack plug.**
**Two extra tubes.**
**Two extra sockets.**
**An A battery.**
**Two 45-volt B batteries.**
**One push-pull battery switch (S2).**
**One fixed resistance (R2).**
**One baseboard, 4½-in x 5-in.**
**One hard rubber strip, 2-in x 4-in.**
**Four binding posts.**
**Connecting wire, solder, lugs.**

First cut the baseboard to size. Granting that the 199 or 299 type tube is being used—and they give sufficient volume to work a loud speaker enjoyably—arrange the transformers and sockets as shown in Fig. 1. Follow the dimensions exactly. These you may obtain by using a ruler on the diagram, Fig. 1, which is printed actual size. Notice that the primary of the first transformer, at left, faces to the left (P and B) and the primary of the second transformer faces away from you. Thus capacity feedback between the transformer and secondaries is avoided, also interplay of induction between the two transformers and between the transformers and the tuning coil. That is why the tuning coil should be placed as

(*Continued on page 24*)




**PANEL LAYOUT (Fig. 4) of two stages of audio-frequency amplification, transformer coupled, added to a 1-dial circuit. The panel is 7" x 12" and is drawn half scale. The dotted line represents the top plane of the baseboard. The variable condenser dial is mounted at left, as shown. S1 is the switch to cut in full regeneration, R1 the rheostat, J1, double-circuit jack, J2 single-circuit jack, and S2 the A battery switch for turning on both amplifier tubes. All the dimensions are marked on the diagram. If the AF is to be added to some other set, simply add 5" of panel width to the panel of that set, which would require remounting the detector parts on the new panel and including J2 ahead of the AF panel space.**

# Makes Own Grid Leak—Green's Hobby—Trai

(Kadel & Herbert)
THE SIMPLEST THING in your radio set is a grid leak and yet it plays an important part in good reception. Miss Gertrude McDonald shows how she made hers from a piece of cardboard and two binding posts. The leak itself consists of a lead pencil line draw between the two posts.

(Wide World)
COLONEL E. H. GREEN, son of the late Hetty Green, always takes his radio along when riding in his little electric auto. Col. Green spent over $250,000 putting into operation station WMAF, Dartmouth, Mass.

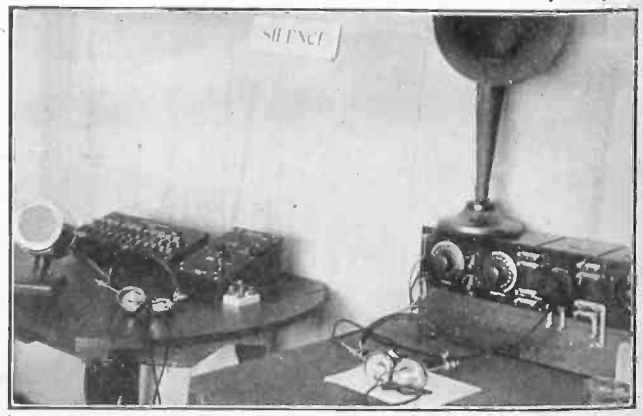
(Kadel & Herbert)
SUCCESSFUL transmi
Coach, 6ZZ, which mad
land to Aberdeen, Scotl
to an express train, wa
is now an easily accom

(International Newsreel)
MARY LINDSTROM of San Francisco gets the latest data on tasty dishes direct from the leading chefs, culinary artists the country over who tell the world how to properly boil tea and scramble eggs. She has added a heaping tablespoon of sugar and a pinch of salt and is now about to take the final plunge

(Wide World)
ONE of the first steps in the Republican Presidential campaign was the equipment of automobiles carrying powerful radio receivers. These cars are to be sent to remote parts of the country so speeches may be publicly received. This enables many persons, who otherwise would not hear the campaign speeches, to listen. The President recently heard the acceptance speech of his running-mate, Charles G. Dawes, by radio. He was at his father's home in Plymouth, Vt., and Dawes in Evanston, Ill.

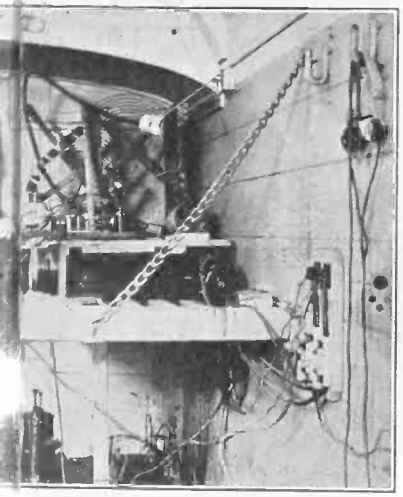
(Wide World)
IN GERMANY the facto
for the set. All the uni
made in the shops. The
turned out daily. Each
that he will keep up with
which he works,
but which he does
not enjoy. A fore-
man also sees to it
that all employes
are kept busy.

(Kadel & Herbert)
TYPICAL CLASSROOM scene at the Improved Instruction of Deaf Mutes, where the children listen to programs. It was found that radio lectures and music increase the children's interest and stimulate their hearing to a great extent




ANNOUNCER'S microphone and control station in the Hotel Mt. Royal, Montreal, where programs are picked up and carried to station CKAC, La Presse, Montreal. The control panel which switches the different halls to La Presse station is at the left, and on the right is the receiving set which guides the operator as to volume and quality

# Transmission—Ingenious Diagnoses by Radio



has been made with the Radio Experimental ebut recently in a run from King's Cross, Eng- The tests were made while the coach, attached g at full speed. Reception on a speeding train d fact and transmission is receiving attention. progress is being made.

(Kadel & Herbert)

THERE was no loop aboard and no mast on the rowboat, so these two fans simply suspended a wire between two upright oars and used the lake for a ground.

(Kadel & Herbert)

DR. CLARK FRANCIS FLETCHER experimenting with the late Dr. Albert Abrams' radio invention, which Dr. Abrams claimed would correctly diagnose disease. On left is the dynamizer, next is the amplifier, then a reflectofone. The device is supposed to tune on the vibratory rate of different diseases. Experiments are still being conducted.

hat make radio receivers don't go outside their own doors for any part luding the head-phones, vacuum tubes, batteries and even cabinets are graph shows a large assembling plant where hundreds of receivers are equipped with a complete work bench and his output is measured so average accomplishment required by the German efficiency system under

(Fotograms)

FEMININE STUDENTS of Hunter College, New York City, are enthusiastic over the summer course in radio. The laboratory attracts the fans even after school hours

del & Herbert)

ALTER VAN BRAAM ROBERTS, of the Palmer Physical Laboratories, ncetom University, built this 2-tube set which combines tuned radio- quency, neutralization, regeneration, reflex and audio-frequency ampli- tion. With this outfit Mr. Roberts has picked up stations in California on the loud speaker

(Foto Topics)

HERBERT SWASON, owner of amateur station 2CVN, Brooklyn, N. Y., is also a Boy Scout leader of Troop 2, Brooklyn. Herbert has been interested in radio for 6 years, and is now only 18

# RADIOCAST PROGRAMS

### Abbreviations Explained

**G. M. T.—Greenwich Meridian Time**
**E. S. T.—Eastern Standard Time**
**C. S. T.—Central Standard Time**
**M. T.—Mountain Time**
**P. T.—Pacific Time**
**m.—meters**
**k.—kilocycles**

*[If the station you want comes under daylight saving time, add one hour to the time on the program.]*

## Thursday, August 28

**WNYC, New York, 526m (570k), E. S. D. S. T.**—7:45 P. M., Elmer Grosso and hsi versatile orchestra. 8:15 P. M., concert from the Mall, Central Park, by the 71st Regiment Band, direction Lieut. Lambert Eben. Soloist, Gloria Dawn, soprano. 10:15 P. M., Mallie and Little in popular numbers. 10:30 P. M., police alarms—missing persons and stolen automobiles. 10:35 P. M., Sam Perry and Herbert Clair—two piano concert. 11:00 P. M., official weather forecasts.

**WNAC, Boston, 278m (1080k), E. S. D. S. T.**—10:30 A. M., WNAC Women's Club talks. 1:00 P. M., Shepard Colonial Orchestra. 4:00 P. M., Shepard Colonial Orchestra. 6:30 P. M., WNAC dinner dance. 7:30 P. M., talk—Mrs. Fred A. Simmons—All New England Week. 8:00 P. M., operatic program arranged by Stetson Humphrey.

**KDKA, Pittsburgh, 326m (920k), E. S. D. S. T.**—5:00 P. M., baseball scores. 5:30 P. M., dinner concert by KDKA Little Symphony Orchestra. 6:00 P. M., baseball scores. 6:30 P. M., the children's period. 6:45 P. M., news bulletins. 7.00 P. M., baseball scores. 7:15 P. M., program by The National Stockman and Farmer. 7:40 P. M., report of the primary livestock markets. 8:00 P. M., concert by the KDKA Little Symphony Orchestra. Mrs. Gertrúde Sykes King, soprano. 9:55 P. M., time signals; weather forecast; baseball scores. 10:00 P. M., concert.

**WBZ, Springfield, Mass., 337m (890k), E. S. T.**—7:05 P. M., market reports. 7:10 P. M., letter from New England Homestead. "At the Theatres," with A. L. S. Wood. 7:30 P. M., bedtime story for the kiddies. 9:00 P. M., to be announced. 10:55 P. M., time signals; weather reports.

**WHN, New York, 360m (830k), E. S. D. S. T.**—5:00 P. M., Leonard Patridge's orchestra. 6:30 P. M., dinner music—violin solos by Olcott Vail, accompanied by Steve Balogh. Paul Specht's Alamac Orchestra. 9:30 P. M., Palisades Park dance orchestra. 10:00 P. M., Sarah V. Turitts, soprano. 10:15 P. M., Vincent Lane, tenor. 10.30 P. M., Roseland dance orchestra. 11:00 P. M., Harry Hock and his entertainers. 11:15 P. M., Jack Anthony, tenor.

**WDAR, Philadelphia, 395m (760k), E. S. D. S. T.**—11:45 A. M., daily almanac. 12 Noon, Orfan recital from the Stanley Theatre; features from the studio. Arcadia Cafe concert orchestra. 2:00 P. M., Arcadia Cafe concert orchestra. 4:30 P. M., artist recital from studio. 5:45 P. M., baseball scores and other sports results.

**WEAF, New York, 492m (610k), E. S. D. S. T.**—11:00-12:00 P. M., Gertrude Herold Bronenkant, soprano; talks to housewives and market and weather reports. 4:00-5:00 P. M., Sadie Eskin, pianist; children's story hour. 6:00-11:00 P. M., dinner music, rose room Hotel Waldorf-Astoria, mid-week services of the Greater New York Federation of Churches; Bud Fisher's happy players; Florence Balmanno, mezzo soprano; Britt and Finch, harmony singers and song writers; Vincent Lopez and his orchestra.

**WLW, Cincinnati, O., 423m (710k), C. S. D. S. T.**—11:00 A. M., weather forecast and business reports. 1:30 P. M., business reports. 3:00 P. M., market reports. 4:00 P. M., piano solos by Miss Adelaide Apfel. Concert program by the Milnor Instrumental Trio. 10:35 P. M., popular program and entertainment by The Doherty Melody Boys.

**WIP, Philadelphia, 509m (590k), E. S. D. S. T.**—7:00 P. M., Uncle Wip's bedtime stories and roll call for the children. 8:00 P M., "Timely Talks to Motorists," talk by Gene Hogle. 8:15 P. M., Concert by Comfort's Philharmonic Orchestra. Soloist, Miss Katherine Melson, contralto. 8:45 P. M., "What the Wild Waves Are Saying." 8:50 P. M., performance of Murphy's Minstrels. 9:30 P. M., concert by Vessella's Concert Band, Oreste Vessella, conductor. Soloist, Olive Marshall, soprano.

**WOO, Philadelphia, 509m (590k), E. S. D. S. T.**—11 A. M., grand organ. 11:30 A. M., weather forecast. 12 Noon, luncheon music by the Tea Room orchestra. 12:55 P. M., time signals. 4:45 P. M., grand organ and trumpets. 7:30 P. M., sports results and police reports.

**WJY, New York, 405m (740k), E. S. D. S. T.**—9:00 P. M., Al Resier's Club Ferreri Orchestra.

**WJZ, New York, 455m (660k), E. S. D. S. T.**—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. 7:00 P. M., Gotham Hotel concert orchestra. 7:20 P. M., financial developments of the day. 7:30 P. M., Gotham Hotel concert orchestra. 7:55 P. M., Collier's Weekly talk. 8:00 P. M., Weekly French lesson. 8:30 P. M., Irene Jacques, soprano. 9:30 P. M., Hilda Ramon, mezzo-soprano; Charles Bryden, tenor. 10:30 P. M., Waldorf-Astoria roof orchestra.

**MARJORIE GARRIGUS SMITH, the wife of Fred Smith, studio director of the Crosley Radio Station, WLW, Cincinnati, is an accomplished pianist, and often gives recitals over the air from WLW.**

## Friday, August 29

**WNYC, New York, 526m (570k), E. S. D. S. T.**—7:35 P. M., dance program by Vic's Orchestra. 8:15 P. M., concert from the Mall, Central Park, by the 22nd Regiment Band, George F. Bregel, bandmaster. Soloist, Margaret White, coloratura soprano. 10:15 P. M., Albert Greene, tenor, and Milton Armbruster, violinist, in 40 minutes of favorite numbers. 10:30, P. M., police alarms—missing persons and stolen automobiles. 11:00 P. M., official weather forecasts. 11:40 P. M., midnight dance program by Nat Martin and his orchestra from "I'll Say She Is."

**WNAC, Boston, 278m (1080k), E. S. D. S. T.**—1:00 P. M., Shepard Colonial Orchestra. 4:00 P. M., Shepard Colonial Orchestra. Frances Cook, soprano. 6:00 P. M., children's half-hour—Mrs. William H. Stewart. 6:30 P. M., WNAC dinner dance—Shepard Colonial Orchestra. 8:00 P. M., program announced.

**KDKA, Pittsburgh, 326m (920k), E. S. D. S. T.**—5:00 P. M., baseball scores. 5:30 p. m., organ recital by Paul Fleeger. 6:00 P. M., baseball scores. 6:30 P. M., the children's period. 6:45 p. m., news bulletins. 7:00 p. m., baseball scores. 7:30 p. m., address by United States Bureau of Mines. 8:00 P. M., concert by trio from KDKA Little Symphony Orchestra. 9:55 P. M., time signals; weather forecast; baseball scores.

**KYW, Chicago, 536m (560k), C. S. D. S. T.**—5:45 P. M., children's bedtime story. 6:00 P. M., dinner concert. 6:30 P. M., program broadcast from KYW's studio. 8:00 to 11:30 P. M., midnight revue.

**WOR, Newark, N. J., 405m (740k), E. S. D. S. T.**—6:15 P. M., piano selections by Matilda Rosenstrauch. 6:30 P. M., "Man in the Moon" stories for the children, Josephine Lawrence and William F. B. McNeary. 6:55 P. M., Jackie Coogan, juvenile motion picture star. 7:00 P. M., J. Knox Vallance, Scotch baritone.

**KSD, St. Louis, 546m (550k), C. S. T.**—7 P. M., concert by Abergh's concert ensemble, Arne Arnesen, violinist.

**WHN, New York, 360 (830k), E. S. D. S. T.**—6:30 P. M., dinner music, violin solos by Olcott Vail, accompanied by Stephen Balogh at piano. Paul Specht's Alamac Orchestra. 9:30 P. M., Palisades Park dance orchestra. 10 P. M., Wright & Bessinger, "The Radio Franks." 10:15 P. M., Arthur Ball, musical comedy tenor. 10:30 P. M., Roseland dance orchestra. 11 P. M., Jesse Calkins, lyric tenor, Jos. C. Wolfe, baritone. 11:30 P. M., Club Alabam Revue.

**WDAR, Philadelphia, 395m (760k), E. S. D. S. T.**—2 P. M., Arcadia Cafe concert orchestra, artist recital from the studio. 4:30 P. M., artist recital. 5:45 P. M., baseball scores and other sports results. 7:30 P. M., Dream Daddy with the boys and girls. 8 P. M., book review by Arnold Abbott. Talk. Dance music by the Benson Chicago Orchestra. Fry and his Million Dollar Pier Orchestra. 8:30 P. M., the world-famous Emmett Welch Minstrels.

**WEAF, New York, 492m (610k), E. S. D. S. T.**—11-12 A. M., musical program; "Why I Go to Church," by Cameron Rogers; "Weights and Measures," by Frederick L. Roberts; market and weather reports. 4-5 P. M., Forrest Huff and his orchestra; Della Riordan, lady baritone. 6-10 P. M., dinner music, rose room Hotel Waldorf-Astoria stories for children by Blanche Elizabeth Wade. Ben Gordon, tenor; Bella Hecht, pianist; George Peccoraro, and Charles Catanese, Hawaiian guitar players Marion Schott, jazz pianist; B. Fisher and Company's "Astor Coffee" dance orchestra.

**WLW, Cincinnati, O., 423m (710k), 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., piano recital by pupils of Mr. Leo Stoffregen.

**WOC, Davenport, Ia., 484m (620k), C. S. T.**—11:05 A. M., market quotations. 12 Noon, chimes concert. 12:15 P. M., weather forecast. 1 P. M., closing stocks and markets. 7 P. M., sport news and weather forecast. 8 P. M., musical program. Fred Sutterlin, ukelele; Jesse Clinton, guitar; Peter Kale, baritone; Mrs. Leon H. Nelson, whistler. 9 P. M., weekly tourists' road bulletin.

**WOO, Philadelphia, 509m (590k), E. S. D. S. T.**—7:30 P. M., sports results and police reports. Dinner music by A. Candelori and his Hotel Adelphia Roof Garden Orchestra. 8:30 P. M., Stephen J. Benn, Instrumental Trio; Rafael Miany, pianist. 9:15 P. M., grand organ recital, Harriette G. Ridley. 10 P. M., dance program.

**WJY, New York, 405m (740k), E. S. D. S. T.**—7:30 P. M., Leonard Nelson's Knickerbocker Grill Orchestra. 8:15 P. M., looseleaf current topics, Wm. H. Allen. 8:30 P. M., "Janice Meredith," music direct from Cosmopolitan Theatre.

**WJZ, New York, 455m (660k), E. S. D. S. T.**—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. 7:20 P. M., financial developments of the day. 8 P. M., Arthur Maebe, Belgian violinist; Caesar Borre, accompanist. 8:15 P. M., Time Pop Question game. 8:30 P. M., Arthur Maebe, violinist, Caesar Borre, accompanist. 8:45 P. M., Piedmont Trio. 10:30 P. M., Harold Stern's Belleclair Towers Orchestra.

## Saturday, August 30

**WNYC, New York, 526m (570k), E. S. D. S. T.**—7:30 P. M., police alarms—missing persons and stolen automobiles. 7:35 P. M., to be announced. 8:15 P. M., concert from the Mall, Central Park, by the Monarch Band (colored), directed by Lieut. Frederick Simpson. 10:15 P. M., to be announced. 10:30 P. M., police alarms—missing persons and stolen automobiles. 11 P. M., official weather forecasts.

**WNAC, Boston, 278m (1080k), E. S. D. S. T.**—8:30 P. M., dance music—broadcast from Hotel Westminster Roof Garden. 9:30 P. M., dance music Copley Plaza Orchestra. Popular songs by Ted and Dick Waterson—Don Ramsay, Accompanist. Popular songs by Irving Crocker.

**KDKA, Pittsburgh, 326m (920k), E. S. D. S. T.**—6 P. M., baseball scores dinner concert. 6:30 P. M., the children's period, The Kiddies' Buddy. 6:45 P. M., last minute helps to teahcers. 7 P. M., baseball scores; sports review by James J. Long. 7:15 P. M., feature. 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. 5:45 P. M., children's bedtime story by Uncle Bob. 6 P. M., dinner concert.

**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 Trio. Jan Geerts, violinist and director Angela Goddard Lonergan, cellist; Paul Lawrence, pianist. 9 P. M., voice recital by students of Isidore Braggiotti. 10:55 P. M. time signals; weather reports.

**WOR, Newark, N. J., 405m (740k), E. S. D. S. T.**—6:15 P. M., "Music While You Dine"—Charley Storm and his collegians. 7:15 P. M., resume of the day's sports with 'Jolly Bill' Steinke. 8 P. M., Grace Devine, mezzo sopranoo. 8:20 P. M., Christian Holtum, baritone—Byrd Mock at the piano. 8:45 P. M., Grace Devine, mezzo soprano. 9 P. M., Dr. C. T. Erickson, representative of Albanian government and representative of peace conference. 9:30 P. M., Christian Holtum, baritone—Byrd Mock at the piano. 9:50 P. M., Ben Friedman entertainers in a popular program.

**WOAW, Omaha, Neb., 526m (570k), C. S. T.**—6 P. M., popular half hour. 6:30 P. M., dinner program by Harmo-Jazz Orchestra, Ralph Foral, director. 9 P. M., program by First Christian Church Orchestra.

**KSD, St. Louis, 546m (550k), C. S. T.**—8 P. M., Missouri Theater Orchestra and specialties broadcast direct from Missouri Theater.

**WHN, New York, 360m (830k), E. S. D. S. T.**—8 P. M., Jimmy Flynn, tenor. 8:15 P. M., Mary Meares, contralto. 8:30 P. M., Boys' Period conducted by Wm. J. Stuart. 8:45 P. M., The Perfect Harmony Four, Male Quartet. 9 P. M., Jack Kelly and his Collegian Orchestra. 9:30 P. M., "Representative Government or Chaos" talk, by Joseph T. Cashman. 9:45 P. M., Al Novia, tenor. 9:55 P. M., Frank D. Penny, violinist. 10:15 P. M., Charles Mansfield, lyric tenor. 10:15 P. M., Fitzpatrick Brothers, songs. 10:30 P. M., Loew's State vaudeville stars in person. 11 P. M., Jimmy Clark and his entertainers. 11:30 P. M., Roseland Dance Orchestra, from Roseland.

**WEAF, New York, 492m (610k), E. S. D. S. T.**—4:15 P. M., courtside description of the final matches of the Men's National Lawn Tennis Championship, direct from West Side Tennis Stadium, Forest Hills, New York. 6-11 P. M., dinner music, rose room Hotel Waldorf-Astoria. Eight Russian Volga singers Constance Hulsman, pianist; Vincent Lopez and his orchestra.

**WIP, Philadelphia, 509m (590k), E. S. D. S. T.**—6:45 P. M., agriculture livestock and produce market reports. 7 P. M., Uncle Wip's bedtime stories and roll call for the children. 8 P. M., concert by Comfort's Philharmonic Orchestra, Roy B. Comfort, conductor. Soloist, Bessie Crown, soprano. 8:45 P. M., "What the Wild Waves Are Saying." 8:50 P. M., concert by Vessella's Concert Band; soloist, Olive Marshall, soprano. 10 P. M., dance music by Bob Leman's dance orchestra. 11:05 P. M., organ recital by Karl Bonawitz, from the Germantown Theatre.

**WOC, Davenport, Ia., 484m (620k), C. S. T.**—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.

**WJZ, New York, 455m (660k), E. S. D. S. T.**—

1 P. M., Hotel Vanderbilt orchestra, Joseph Strissoi, director. 4 P. M., Henry A. Bissonette, tenor. 4:30 P. M., Roger Wolfe's Biltmore tea room orchestra. 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. 10:30 P. M., Hotel Astor roof orchestra.

## Sunday, August 31

**KPO, San Francisco, 423m (710k), P. T.**—11 A. M., Undenominational and non-sectarian church services; speaker, Dr. William Rader (Congregational); soloist, Mable Nickerson Bailey, contralto; organ selections by Theodore J. Irwin. 8:30-10 P. M., concert by Rudy Seiger's Fairmont Hotel orchestra.

**WGY, Schenectady, 380m (790k), E. S. T.**—9:30 A. M., service of Emmanuel Baptist Church, Schenectady, N. Y., sermon by the Rev. Dr. A. W. Rogers. 2 P. M., concert by Schenectady Little Symphony orchestra, at Central Park, Schenectady, N. Y., Leo Kilwen conducting.

**KYW, Chicago, 536m (560k), C. S. D. S. T.**—10 A. M., Sunday morning service broadcast from St. Chrysostom's Episcopal Church, Chicago, the Rev. Norman Hutton, rector. 1:30 P. M., studio chapel service broadcast from studio in Commonwealth Edison Building, Chicago.

**KFI, Los Angeles, 469m (640k), P. T.**—10 A. M., L. A. Church Federation service. 6:45 P. M., Metropolitan Theatre program. 9 P. M., program from Examiner studio. 10 P. M., Packard Six orchestra.

**WOAW, Omaha, Neb., 526m (570k), C. S. T.**—9 A. M., radio chapel service conducted by the Rev. R. R. Brown; service by Bishop E. V. Shaylor. 9 P. M., musical chapel service by Trinity Methodist Episcopal Church, the Rev. F. Charling Mills, pastor John S. Mercer, chorister; Arthur N. Howe, organist.

**WHAS, Louisville, Ky., 400m (750k), C. S. T.**—4:50 P. M., local livestock, produce and grain market reports. 4:55 P. M., baseball scores. 5 P. M., Standard time announced. 7:30 -9 P. M., concert by the Violin Quartette: Morris Perlmutter, Myer Green, Joseph Salzman, Howard Koch; late news bulletins; baseball scores; Standard time announced at 9 o'clock.

**WIP, Philadelphia, 509m (590k), E. S. D. S. T.**—3:35 P. M., special Sunday afternoon concert by Comfort's Philharmonic orchestra. 7:45 P. M., evening service broadcast from Holy Trinity Church, Philadelphia, the Rev. Floyd W. Tomkins, D.D., rector. 9:30 P. M., Sunday evening concert, with prominent soloists.

## Monday, September 1

**KPO, San Francisco, 423m (710k), P. T.**—1 P. M., Rudy Seiger's Fairmont Hotel orchestra. 2:30 P. M., program, management of Thomas J. Dermott, violinist. 4:30 P. M., Rudy Seiger's Fairmont Hotel orchestra. 5:30 P. M., children's hour stories. 7 P. M., Rudy Seiger's Fairmont Hotel orchestra. 8 P. M., organ recital by Theodore J. Irwin. 9 P. M., program, management of Mrs. Marie Moore-Sheffield.

**WHAZ, Troy, N. Y., 380m (790k), E. S. T.**—9 P. M., one-act radio play; Scotch songs by David Murray, soloists and instrumental numbers.

**WGY, Schenectady, 380m (790k), E. S. T.**—3:15 P. M., race between Epinard and the fastest American horses at Belmont Park. 7:45 P. M., movie talk, by Quinn Martin, movie critic of the "New York World." 7:55 P. M., Chinese night wtih music by the WGY orchestra and a travelogue. "New York's Chinatown a Quarter Century Ago," by Edward H. Smith.

**CKAC, Montreal, 425m (700k), E. S. D. S. T.**—1:45 P. M., Mount Royal Hotel luncheon concert. 4 P. M., weather and stock reports.

**KFI, Los Angeles, 469m (640k), P. T.**—5 P. M., Evening Herald news bulletins. 5 P. M., Examiner news bulletins. 8 P. M., Evening Herald Radiolians dance orchestra. 9 P. M., program from Examiner studio. 10 P. M., Ambassador Hotel Cocoanut Grove orchestra.

**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 and market reports. 8 P. M., concert by Gordon Soule, pianist.

**WFAA, Dallas, Tex., 476 (630k), C. S. T.**—12:30 P. M., Dr. J. D. Boon, chair af astronomy, school of physics, in Southern Methodist University. 8:30 P. M., B. M. Taylor and the Gospel-in-Song Quartet.

## Tuesday, September 2

**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 Sieger's Fairmont Hotel orchestra. 8 P. M., program by the U. S. Army band.

**WGY, Schenectady, 380m (790k) E. S. T.**—6 P. M., dinner music by Joseph Chichene and his Clover Club orchestra. 7:45 P. M., program of old time favorites by Marion Brewer, soprano; Ethel Osterhout, contralto; A. O. Coggeshall, tenor; Kolin Hager, baritone. 10:15 P. M., organ recital by Stephen Boisclair.

**CKAC, Montreal, 425m (700k), E. S. D. S. T.**—4 P. M., weather and stock reports, music. 7 P. M. kiddies' stories in French and English. 7:30 P. M., Rex Battle and his Mount Royal Hotel concert orchestra; features by Ben Scherzer, violinist. 8:30 P. M., concert by White Star Dominion Steamship orchestra. 10:30 P. M., Joseph C. Smith and his Mount Royal Hotel dance orchestra, featuring Teddy Brown, saxophonist.

**KFI, Los Angelesc, 469m (640k), P. T.**—5 P. M., Evening Herald news bulletins. 5:30 P. M., Examiner news bulletins. 6:45 P. M., Aeolian organ recital. 8 P. M., Ambassador Hotel Cocoanut Grove orchestra. 9 P. M., program from Examiner studio. 10 P. M., popular ballad program.

**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 and market reports. 8 P. M., concert provided by Seiberling-Lucas Music Co.

**WMAQ, Chicago, 448m (670), C. S. D. S. T.**—4 P. M., sport results. 4:20 P. M., items of interest to women. 4:30 P. M., musical program. 6 P. M., Chicago theatre organ recital. 6:30 P. M., Hotel LaSalle orchestra. 8 P. M., Harry Hanson, literary editor the Daily News. 8:30 P. M., Miss Clara E. Laughlin, travel talk. 8:40 P. M., talk by the United States Civil Service Commission. 9:15 P. M., Lyon & Healy program.

**WFAA, Dallas, Tex., 476m (630k), C. S. T.**—12:30 P. M., address, DeWitt McMurray, in a medley of humor, pathos and wisdom. 8:30 P. M., musical recital presenting Mrs. J. Roscoe Golden, contralto, and assisting artists of Dallas. 11 P. M., Walter J. Fried, violinist, and co-operating artists.

## Wednesday, September 3

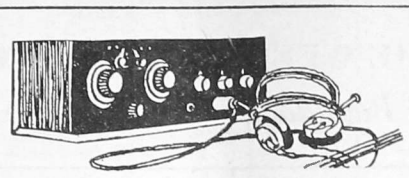
**WGY, Schenectady, 380m (790k), E. S. T.**—11:55 A. M., time signals. 1 P. M., music and talk "Reducing the High Cost of Dinner Parties," courtesy Modern Priscilla. 5 P. M., produce and stock market quotations; news bulletins; baseball results. 5:15 P. M., report on condition of New York State highways. 5:30 P. M., organ recital by Stephen E. Boisclair. 7:40 P. M., baseball scores. 7:45 P. M., "A Few Moments with New Books," L. L. Hopkins, assistant librarian, General Electric Company. 8 P. M., musical program.

**CKAC, Montreal, 425m (700k), E. S. D. S. T.**—1:45 P. M., Mount Royal Hotel luncheon concert. 4 P. M., weather, stock reports.

**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., detective stories and vocal concert. 7:30 P. M., Wendell Hall. 8 P. M., Evening Herald, Santa Ana night. 9 P. M., program from Examiner studio. 10 P. M., Hollywoodland Community orchestra. 11 P. M., Ambassador Hotel Cocoanut Grove orchestra.

**KGW, Portland, Ore., 492m (610k), P. T.**—11:30 A. M., weather forecast. 3:30 P. M., talk by Jeanette P. Creamer, 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 May Dearborn Schwab, soprano. 10 P. M., dance music by George Olsen's Metropolitan orchestra.

**WHAS, Louisville, Ky., 400m (750k), C. S. T.**—9:57 A. M., organ misuc. 10 A. M., church service, auspices Temple Adath Israel, the Rev. Dr. Joseph Rauch, pastor. 4 P. M., concert by the Beechmont Trio, Mrs. Harry Trent, soprano; Mrs. Blanche Thorp, first contralto; Miss Venus Thompson, second contralto; Miss Leah Parker, accompanist.



# *The* RADIO PRIMER

*Information and Instruction for the Beginner*

WE hear so much about low loss nowadays that it becomes necessary for someone to come out and explain what it is all about. Of course, many know that in variable condensers the plates are separated and supported by insulation which has in the past been in the form of solid end blocks. While this insulation does really insulate there is nevertheless a path for the weak radio-frequency currents to pass across the surface of the end blocks. Electricity travels on the surface of conductors. In the case of copper wire it travels along the outside circumference, very little of it attempting to travel through the solid part of the wire. The same holds true for the so-called insulators. An insulator is merely extremely high resistance material, such as glass, wax, oil, hard rubber, bakelite, etc. If the carrying surface of any material is reduced, less current in proportion will escape across its surface. That is the reason why on variable condensers the hard rubber component is reduced to a minimum. On some of the old-time condensers losses have run as high as 40 per cent, but on the modern low-loss type, losses have come down to 5 per cent.

This is also the reason why taps on panels have become unpopular. The panel presents such a large surface that a great deal of energy was lost through their use. The losses in coils also occur in the supporting and insulating material. Honeycomb coils are highly efficient, largely because the coil is self supporting. The Dynocoils as described in RADIO WORLD in this and past issues solves the loss difficulty by the winding of the coils spider-web fashion and then withdrawing all the insulating material. Variocouplers are now being made with self-supporting primaries and secondaries.

## Roxy Takes Set Along

S. L. ROTHAFEL ("Roxy") packed bag and baggage and left New York City bound for St. Jovite, Quebec, in the Lorentian Mountains. Mr. Rothafel stayed at the Gray Rocks Inn in St. Jovite. He took with him a special Super-Heterodyne, manufactured by the Western Electric Company.

# 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.**

**RADIO WORLD wants to be able to tell the world the name of the entertainer who stands highest in the regard of listeners-in.**

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**Cut off. Fill out. Mail today.**

**RADIOCASTING MANAGER, RADIO WORLD,**
**1493 Broadway, New York City.**

**Dear Sir:**

**My favorite entertainer is.....Station.....**

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

**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 August 16 issue was published a tally showing H. M. Snodgrass, of WOS, Jefferson City, Mo., leading.**

**Another tally will be made and published in RADIO WORLD soon and an important announcement made.**

**A THOUGHT FOR THE WEEK**—*The Seven-League Boots and the Carpet of Bagdad are combined in my radio.*

RADIO WORLD
Title Reg. U. S. Pat. Off.

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AUGUST 30, 1924

## Development of Operatic Features a Laudable Move

SEVERAL stations are making elaborate plans for radiocasting operatic features this Fall and Winter on an extensive scale. This is welcome indeed. The public may not fully appreciate the difficulty of presenting such features, for they require adroit choice of talent and infinite pains at rehearsals. They do not compare with impromptu programs in any way. But the public appreciates good music, as several canvasses show. WEAF ascertained, probably to its surprise, that jazz was not the overwhelming favorite many supposed.

Tabloid operas, with an interlocutor explaining the action between renditions, was tried by WOR a couple of years ago and afforded keen enjoyment. The Stadium concerts at New York City won renewed favor this year. They were philharmonic, rather than operatic, but they represent good music, which is a source of deep joy and makes life more worth while. Radio is fast cultivating public taste for good music.

# Marching Onward

WHAT does the inside of the newest Super-Heterodyne look like? How is the set constructed? The model considered the best so far achieved was analyzed by an expert for RADIO WORLD. Six tubes are used, all dry-cell operated; one tube is neutralized to prevent radiation and the reflex principle is employed. There you have the most advanced thought in radio construction all bundled together. The second harmonic principle plays its important part in this outfit, the commercial Regenoflex model of the Radio Corporation of America. Never before have the intimate details of this circuit been published in this manner, so all interested in the subject will find their curiosity satisfied in text and illustrations in next week's RADIO WORLD, in which Walter Scott, Jr., discusses "The New Super-Heterodyne."

Though dry cells are used for A battery current in this set, of course storage batteries are very popular with fans who like plenty of volume from sets of three, four or five tubes. "The Care and Operation of Storage Batteries" is a valuable article by N. N. Bernstein, Technical Editor, that will be published also in next week's RADIO WORLD, issue of September 6, on sale Wednesday, September 3. Hydrometer readings, voltmeter tests, equipment and efficiency will be fully discussed by Mr. Bernstein. This article is of particular importance to those who have completed sets from which they desire greater service.

For those faced with constructional problems dealing primarily with the carpentry side of radio—panel drilling, baseboard mounting, assembly of parts and variety and uses of tools—A. F. Lapierre will have a treat. It is a consulting engineer's contribution from the depths of his wide experience that smooths the path of the experimenter. "Tools and How to Use Them," is the title of the article.

J. E. Anderson, noted radio engineer and distinguished authority, after a restful vacation will be back with us again, this time contributing a constructional article, "A Simplified Neutrodyne, with Grid Bias Detection." The usual five tubes are used—two RF stages, detector and two AF stages, transformer coupled. The constructional design was specially made by the author. Excellent stability is achieved in the circuit Mr. Anderson presents.

Whatever set you make you must use coils. You want the best. They often are the least expensive to make. The coil question will be discussed by Neal Fitzalan, who will devote himself to "A Low-Loss RF Transformer."

Carrying on its campaign for low-loss construction, RADIO WORLD will publish an article on the construction of such a wave trap. This device cuts out interference. The author is Brewster Lee.

Byrt C. Caldwell's 2-part article on how to construct Lacault's Ultradyne, begun in the present issue, will be concluded in the next.

RADIO WORLD

## TABLE OF CONTENTS

A Weekly Paper Published Every Wednesday and Dated Saturday, by Hennessy Radio Publications Corporation from Publication Office, 1493 Broadway, New York, N. Y.

August 30, 1924.
Vol. 5 No. 23.
15 Cents.



# Radio Interference Mystery Solved

RADIOCAST listeners in Arizona have had much trouble with interference so strong that it was impossible at times to receive concerts radiated from the powerful stations along the Pacific Coast. Colonel J. F. Dillon, radio supervisor of the Sixth District, made a trip to Arizona to locate the source of trouble.

It was traced to an electric precipitator near Miami, which utilized rectified current from the 60,000-volt alternating current used in treatment of ore. The discharger used in connection with the converter radiated energy just like a broadcasting station, but over a wide band of wave lengths. Several days elapsed and after the cause of the interference was found the problem was to find a means of absorbing the oscillations from the converter spark in order to stop the radiation. Colonel Dillon and associate electricians discovered that by bridging the converter spark with a radio frequency circuit consisting of a glass plate condenser with an air-core inductance the trouble disappeared.

# 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.**

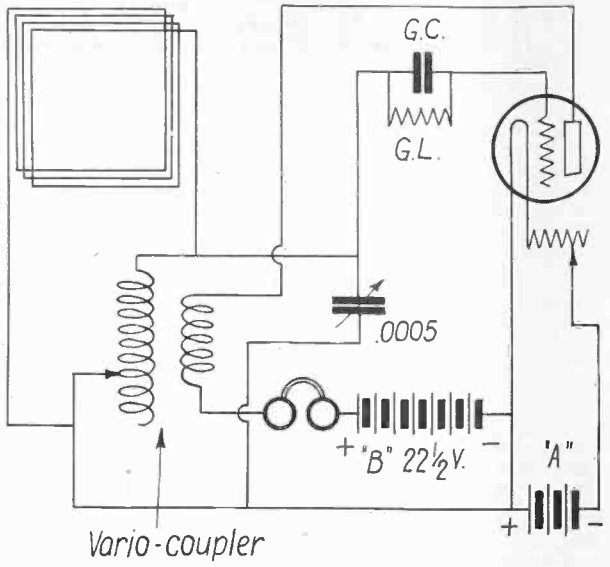



**DIAGRAM of 1-tube loop set. This circuit uses an ordinary variocoupler and 23-plate condenser for tuning. The plate or tickler coil supplies the regeneration while the grid and loop are tuned with the condenser. The grid condenser is .00025 mfd. and the leak ½ to 3 meghohms. If a hard tube such as 199 or 201A is used the plate voltage may be boosted up to 45 volts to obtain stronger signals. The loop, described in the answer, is pointed toward the station to be received. The 200 detector tube may also be used in this circuit**

*I live in an apartment house and am unable to erect an outside antenna, therefore I would like to have a simple set that works on a loop. I would like to experiment with some 1-tube circuits. Can you give me a diagram using a loop, one tube and a variocoupler that I can start with?—A. F. Smithson, 1240 A Avenue C, New York City.*

Fig. 30 is the diagram of a 1-tube set using a variocoupler and loop. The loop is connected across the primary of the coupler and is tuned by the 23-plate (.0005 mfd.) variable condenser. The rotor is used as a tickler coil and is placed in series with the B battery and plate of the tube. The tube may be either 11, 199 or 201 A type, with an A battery to correspond. The variocoupler may be of any make now sold. The loop may be 110 feet of No. 18 cotton or silk covered wire wound on a 3 ft. frame. Local stations should come in well and the tuning is fairly sharp.

* * *

*I bought a 3-tube set and am just a beginner in radio. 1—I would like to know what good a wave trap is, and how to work it. 2—The farthest I hear is a station five miles away. How can I get greater distance? 3—The second tube on my set will not light except in one place. What is wrong? —C. R. Cameron, Skaneateles, N. Y.*

1—A wave trap is a combination of condenser and inductance coil which is placed across the antenna and ground binding posts of a radio receiver and adjusted to eliminate interference from the wave you wish to receive. The wave trap is simply tuned in conjunction with your receiver until you get the clearest signals. 2—If you receive only from a distance of five miles there is something radically wrong with the set. 3—The rheostat is defective, the contact lever only touching in spots. Have the set overhauled by a radio mechanic.

* * *

*I have been interested in radio for the past two years and now am planning a trip to Cape Verde Island, on the West Coast of Africa. Radio is still unknown there and I would like to take with me a good radio set to introduce to the people there. I have built a 4-tube Superdyne but I am somehow afraid that it may not work well there as it is not easy to tune. I built this set from directions given in* RADIO WORLD. *I would like to ask a few questions about this set. 1—What size grid leak and condenser shall I use for 201A tube as detector? 2—How long should my antenna be? 3—Is it possible to connect wires from the output jacks of the set so that I can place one set of phones at the top of a building, and another pair in the basement, so that when I talk into one pair of phones I will be heard in the other, the while using the same circuit to receive radio on? 4—What is the range of the Superdyne? 5—Have you any new diagram of the Superdyne circuit? The place I am going is about 2,000 miles from a radiocasting station and I would like to be sure of getting a set that will cover this distance—M. S. Travers, 65 West Lenox St., Roxbury, Mass.*

1—The grid condenser is .00025 mfd, fixed. The grid leak may vary from ½ to 2 megohms. 2—If the antenna is to be erected at Cape Verde Island, place it as high as possible and make it about 130 feet long. Be sure to keep it as far away from trees or other surrounding objects as possible. Also make sure of a good ground. 3—Yes, you can connect more than one pair of phones in series, running the leads to them from the roof to the basement. When you speak into one set of ear phones it acts as a microphone and passes the sound in the form of electrical fluctation through the lines to the other pair of phones where it will be again heard as sound. This may be done better while the set is in operation and no signals are being received, as they would break up the conversation. 4—It is hard to determine the range of any receiver. You may be fortunate and receive thousands of miles across the ocean. A great deal depends on the operator, and how he tunes the set. 5—A new Superdyne circuit which is successful and very effective appears in RADIO WORLD for August 23 and 30. It employs five 201A tubes and brings in distant stations with great volume. Suggest you follow these articles and arrange yor set accordingly.

* * *

*My Garod Neutrodyne started whistling recently, the whistle increasing steadily and the reception decreasing until finally all sound stopped. My A and B batteries are fully charged and the tubes are in perfect order and light up bright, but still the set will not respond. What can the trouble be? —Frank J. Eslinger, R 1, Box 78, Oshkosh, Wis.*

One of the wires in the set has come loose and the connection has broken. This accounts for the squeal and sudden stoppage of signals. Go over all wiring carefully to locate the break, and of course solder it back securely.

*(Concluded on page 30)*

# Join RADIO WORLD'S University Club

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

**RADIO WORLD, 1493 Broadway, New York City:**

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

**Name** .....

**Street** .....

**City and State** .....

# The Radio Trade

## Radio Business to Increase 50% Over 1923, Says Expert

*By S. H. Mapes*

District Manager of the Federal Telephone & Telegraph Co., New York City

IN reviewing the radio market for the past year the outstanding feature from a technical standpoint was a trend toward better equipment. Radio manufacturers are spending a major part of their time and employing the best engineering talent in designing their apparatus. They are insisting on better material and they are equipping themselves with manufacturing plants and assembling facilities which are impeccable.

For the coming season there is a definite trend toward larger sets capable of long distance reception and extreme selectivity. In the case of New York, where we will have possibly eight to ten radiocasting stations on the air at the same time, it will be necessary to have a receiver that will tune out each station individually.

The industry being in a very much more stable condition than it was a year ago, I look forward to fifty per cent. greater business than was done during the year 1923.

Now it is a thing of the past that radio enthusiasts are going around shopping for prices. What they are doing at present is obtaining the very best equipment that money will buy from a reputable dealer, who handles radio made by recognized and reliable manufacturers.

I think that we are now reaching the time when the business men will find that it is just as essential to have a radio set in his home and at his office to receive the stock and market reports and current topics of the day as to have a telephone at his home or on his desk.

To dealers I say that is costs no more to carry standard apparatus and to give real service and to maintain honest prices. Those who follow this policy will be more than well repaid for their efforts. Their sales will mount and the first thing they know they will find themselves gradually drawing to them a steady and reliable lot of customers who have absolute faith in the dealers opinion. The business this fall will be just as good as they make it. The gold of the world is now flowing into the United States Reserve; farm prices are high, and this fall will find the radio public buying more than ever. The public has the money to spend and will spend it, and the dealers are going to get this business if they have standard equipment. The dealers will learn that they will have no come-back from the customers (due to poor receivers) if they handle dependable merchandise.

## Data for Advertisers Published in Book

THE Radio Department of Arthur Rosenberg Co., Inc., Advertising Agents, 110 West 34th Street, New York City, is now distributing to radio manufacturers the first issue of the Radio Advertisers' Data Book which it has compiled and published. This 54-page book contains the advertising rates, circulation, mechanical requirements and other data regarding all the radio consumer and trade publications, as well as those general magazines which feature Radio, including the Allied Trade Papers, covering such fields as the Electrical, Hardware, Talking Machine, Music Trades and Sporting Goods in the United States and Canada.

Data is also given regarding more than 300 newspapers which print radio news, programs or features. This matter is arranged by states, towns and cities. It includes data on circulation, radio advertising rates, and the paper's method of featuring radio. The newspapers listed are located in those cities generally recognized as the leading jobbing centres. The book contains much valuable information besides rates, including a radio trade map of the United States on which are indicated the areas of greatest radio sales activity. The numerical strength of the trade—both jobbers and dealers—is indicated in a table arranged by states and sections. The growth of the industry is reviewed, both in words and graphs. The export market is surveyed. An analysis of the radio in the rural sections is included. The various and important problems that confront the Radio Manufacturer regarding radio advertising and merchandising are discussed in detail.

## Coming Events

**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 radiocast from the convention.

**NOV. 24 TO 30, INCLUSIVE**—International Radio Week.

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

## Vancouver Exhibit Set for Oct. 4 to 11

THE Radio Institute, 309 West Cordova Street, Vancouver, B. C., will hold a radio and electrical exhibit at Radio House, above address, October 4 to 11, 1924. The best apparatus from the laboratories and factories of Great Britain, Canada and the United States will be exhibited. Thousands of visitors who have not yet taken up radio will be attracted to this exposition and a great deal of new business is expected. Space is being allotted by the Exhibition Manager, Vancouver Radio Exhibition, Radio House, 309 West Cordova St., Vancouver, B. C.

# WHAT

**do you think of the advance programs published in RADIO WORLD? Are they serviceable to you? If not, why not? If so, how much? YOUR views will be appreciated. Mail replies before September 15, 1924.**

**Address PROGRAM EDITOR, Radio World, 1493 Broadway, New York City.**

*An autographed photo of "Roxy" (S. A. Rothafel, WEAF) will be sent to everyone replying.*

### All You Want to Know About Aerials

How An Apartment House Dweller Can Solve His Aerial Problem, if Unable to Erect an Outdoor Antenna. Issue of May 3.

Nineteen Different Types of Aerials, Mostly Outdoor, With a Diagram of Each. Issue of June 28.

Popping Up Your Aerial for Greater Distance and Volume. Issue of July 5.

Loops. Which Type Is Best and Why. How to Make Different Kinds of Loops and How to Connect Them in Your Set. Issue of July 19.

Send 15c. for a copy of each issue. Address RADIO WORLD, 1493 Broadway, New York City.

All the radio phases of the Republican National Convention and the Democratic National Convention, the first sessions in history in which the choosing of candidates for President and Vice-President were radiocast, published in RADIO WORLD, issues of June 21 and 28 and July 5. You should preserve these numbers as records and mementos of notable events. Send 15c. for a copy of each issue. Or start your subscription with any of these numbers. Address RADIO WORLD, 1493 Broadway, New York



## 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 .....

Crabtree Radio Lab., Beaver, Okla.
J. W. Kimmel, Box 105, Jewett, Ohio.
H. S. Radio Service, 28 Gouverneur St., N. Y. C.
Wm. Raddatz, Jr., 10401 Ave. N, Chicago.
John C. West, Jr., 4513 N. Campbell Ave., Chicago.
Jacob Burdeck, 414 Burt St., Syracuse, N. Y.
Fred Gommo, Jr., 85 Clinton St., Brooklyn, N. Y.
Ernest Johnson, 405 N. Maple St., Creston, Ia.
Sylvan Elencweig, 1342 Forbes St., Pittsburgh.
Norman Thomas, 52 Short St., Edwardsville, Luzerne Co., Pa.
W. M. Cline, 54 Elizabeth St., Johnson City, N. Y.
E. J. Fangman, 2616 E. 75th St., Cleveland.
Edw. E. Preston, R. F. D. 4, Norwich, Conn.
Edw. H. Harvey, 4008 Westminster Ave., St. Louis.
Jos. W. Springer, Elizabethtown, Ind.
Kenneth W. Lynd, 216 South East 6th Ave., Galva, Ill.
E. H. Carpenter, 61 Johnson St., Springfield, Ill.
Lone Star Radio Co., 806 S. Ferguson St., Stamford, Tex.
Frank Barnes, 1835 Quindaro Blvd., Kansas City, Mo.
F. M. Tierman, 93 Maple St., Massena, N. Y.
Dick Reding, 505 N. Pine St., Lexington, Ill.
George F. Stier, 10 Ardale St., Roslindale, Mass.
Irwin Smith, 1316 W. Thompson Ave., Springfield, Mo.

## New Corporations

Van Stagan Radio Research and Mfg. Corp., New Rochelle, N. Y., 500 shares preferred stock, $100 each; 500 common, no par value. H. M. Van Stagen, L. C. Werking. Attorney, S. F. Swinburne, New Rochelle.

Schiffle Products, radio sets, $100,000. Charles Schiffle, Montclair, N. J., David Dewsau, F. C. Kaufman, New York City. By Corporation Title and Guarantee Co.

Rhamstine Radio Specialty Corp., New York City, $15,000. P. Schechter, B. Roland, C. Dash. Attorney, M. C. Weisman, 233 Broadway.

Namsal Radio Corp., New York City, $15,000. P. Schechter, B. Roland. Attorney, M. C. Weisman, 233 Broadway.

Severn Sales Co., New York City, wireless and telephone business, $15,000. C. C. Dawson, E. Miller. Attorney, C. Kimball, 115 Broadway.

Netson Radio Co., New York City, $10,000. I. Weisman, P. Morison, C. Avnet. Attorney, A. A. Klein, 38 Park Row.

## Business Opportunities Radio and Electrical

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

**MANUFACTURERS' REPRESENTATIVES,** old-established producers, invite correspondence from progressive manufacturers requiring productive sales representation for domestic and export trade. 504 Tribune Building, New York.

**ELECTRICAL ENGINEER** wishes connection with reliable electrical contracting and supply house; full service and small investment for interest in business. Box 646, 1393 Broadway.

**ESTABLISHED RADIO MANUFACTURER** wants live wire take financial interest in business; must be bookkeeper, stenographer; curiosity seekers don't apply. Box 999, RADIO WORLD.

**ESTABLISHED ELECTRIC FIRM,** with 15,000 signed, bonded city contracts, wants active party with $5,000 to $10,000; money absolutely secured; principals only. Box 1010, RADIO WORLD.

**WE ARE** radio and electrical parts manufacturers, with excellent Dun and Bradstreet ratings and banking references; established five years; our business last year was over $180,000.00; we have exceeded this amount so far this year and will do over $400,000.00 for the entire year; unfilled orders on hand now total $120,000.00. We require additional capital to increase quantity production and will accept a few partners with funds in limited amounts. Complete details will be given those interested by addressing P. O. Box 35, Trinity Station, New York City.

# Unofficial Radio Stamp Tax

## *Half Per Cent. Levy to Be Collected and $1,500,000 Estimated Annual Income Used for Paying Artists at 12 Selected Stations*

**TAKING the position that radio entertainment is not sufficiently high-class, a committee of the National Association of Broadcasters has decided to try to enforce an unofficial ½ per cent. tax on radio. Whether the jobber, retailer or ultimate purchaser is to pay the tax was not made clear. It was announced "these stamps will be issued to manufacturers." It is estimated $1,500,000 a year might thus be raised. The money would be used to pay performers, to be assigned to "twenty-five of the most representative stations."**

The American Telephone & Telegraph Co., operating WEAF, New York City, welcomed the move.

**President E. F. McDonald, Jr., of Chicago, appointed a committee several months ago to solve the problem of who shall pay for radiocasting. The stamp tax is the result. The plan will be voted on next month at the annual convention of the association.**

**"Must Be Improved"**

Paul B. Klugh, of New York, executive chairman of the association, said: "It was considered advisable to have the most feasible plan adopted before Secretary Hoover calls the National Radio Conference to order in September. Obviously the time has arrived when programs must be improved in quality. Performers who have devoted a life-time to creating a reputation are entitled to and require pay for their services, and the Association is determined to put into operation a plan whereby this may be brought about.

"Under this plan radio apparatus and parts will bear radio fund stamps of various denominations. These stamps will be issued to manufacturers for placing upon their products by the Radio Fund Committee. This committee will be composed of five citizens of national reputation, not connected with radio. The stamps will be paid for when taken, so that there will be no collection trouble or costs. The funds accumulated will be used by the committee for engaging talent. Twenty-five of the most representative stations, located in all parts of the country, will be supplied with Radio Fund performers. The committee will select the stations without fear or favor and solely in the interest of the public, so that the entire country may be covered with the best broadcasting available."

**General Dupont Approves**

General Coleman T. Dupont said: "I am heartily in accord with a plan which will stabilize programs and sustain interest."

It is expected that radio sales will reach $400,000,000 for the current year. Radio Fund stamps are based upon one-half of one per cent. of retail price, with a minimum stamp of one-quarter of a cent. Thus a fifty-cent plug carries a quarter-cent stamp; a $4 tube a 2-cent stamp, and a $100 receiving set a 50-cent stamp.

# Solving Resistance in AF

(*Continued from page* 15)

shown in Fig. 4, which gives dimensions for mounting. In Fig. 4 the distance from the right-hand end of the panel to the switch S2 is 4¼", though the baseboard behind will be 4½", with ½" free space. This is correct.

At left on Fig. 1 is shown a black strip with three binding posts visible on it. There are really four binding posts, one being hidden. Fig. 3 shows the actual dimensions of the strip, 2" x 4", which is mounted so that a 2" side is affixed to the baseboard where shown, and the 4" sides run perpendicular. Two binding posts are mounted on the strip of hard rubber for later connection to P and B of the detector, that is, for the input to the amplifier from the detector. The two remaining binding posts on the strip, instead of being mounted side by side are mounted one above the other, at a distance to be determined when the fixed resistance (R2) is purchased or made, or 3½" may be provided arbitrarily. This resistance consists of a balanced wire that has a resistance of 12 to 15 ohms (but not variable); or a succession of non-touching, non-insulated wire resistance wire. The wound wire kind may be purchased in retail radio stores and in some chain stores. The unit may be made by purchasing the resistance wire and winding it on a strip of hard rubber 2" x ½". The resistance wire will require all the room on this little strip, save that taken up by the binding posts. As the amplifier tubes are not critical, a little more or less resistance will do no harm. The wire wound unit itself is purchasable at such a low cost it is hardly worth the trouble to make it. However, those desiring to make it may write to RADIO WORLD for particulars as to the kind of wire to be used and how to get it.

Instead of the fixed resistance outlined above, you may use a rheostat, connecting it in series with the A minus, just as the fixed resistance will be connected, as detailed later. When the correct adjustment is obtained, which is determined by trying out the rheostat after the amplifier is in operation, the rheostat is left permanently at the value determined. The rheostat would be mounted on the strip instead of the fixed resistance.

The advantage of using either a fixed resistance or a 15-ohm rheostat converted into a fixed unit is that to turn the amplifier on all you need do is pull out the switch, S2, and not turn a rheostat knob or two knobs to get the correct value each time you want to tune in on the amplifier. The switch operates the two AF tubes.

The sockets, transformers and strip with four binding posts on it are fastened to the baseboard. Notice how the sockets are mounted (Fig. 1). I advise a separate baseboard for the amplifier unit because if you ever desire to use the amplifier in some other set you will not have to take the whole amplifier apart. All you need do is unscrew the baseboard from the panel and remove the leads from detector to amplifier and from batteries to amplifier and in five minutes the whole transfer is made.

Following the diagram (Fig. 2) from the output of J1, the plate of the detector tube is connected to the P post of AFT1, the B+

# Wiring Directions for Two AF Stages

22½ volts going to the B post of AFT1. This may be done on the strip (Fig. 3). Completing the connections to this transformer, G goes to the grid of the first AF tube and F direct to the F— post of the A battery. Do not connect F to the F— on the rocket. The fixed resistance R2 must not intercept this grid return (Fig. 3). If the F post is connected to the battery side the resistance (the side opposite the one that goes to the rockets) it will be correct. The plate of the second AF tube goes to P of AFT2, the B post connects to B+90 volts and G and F of this transformer go to the grid and F— of the second AF tube, on the same principle as stated for AFT1. The plate of the last tube goes to one of the speaker terminals, the other terminal going to B+90 volts.

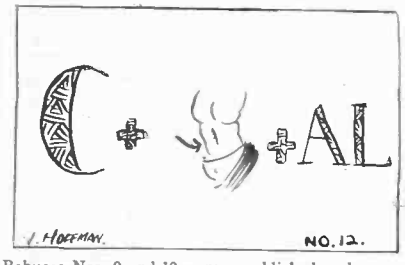
Connect the free end of the fixed resistance to one side of the switch S2, the other side of the switch going to the F— posts on both AF sockets. The A+ is connected direct from battery to the F+ socket posts. The A+ is joined also with the B—. The A— is connected to the fixed resistance R2, the other end of R2 going to both AF sockets where marked F—.

Remember that the tube at extreme left (Fig. 2) is the detector and hence the first AF tube is second from left and the second AF tube is third from left.

A fixed condenser, .001 or .002 mfd., may be used across P and B of AFT1 or across G and F or AFT2, but should not be necessary. They would be used only if harsh noises are heard. They reduce volume.

## The Weekly Rebus

REBUS No. 12 is published herewith. Rebuses Nos. 1 to 5, inclusive, were reprinted in the August 9 issue, Nos. 6, 7 and 8 in the issue of August 16. Last week, issue of August 23,




Rebuses Nos. 9 and 10 were republished and a new Rebus, No. 11, was printed. The names of all those correctly solving the twelve Rebuses will be placed on the Rebus Honor Roll and published. Address, Rebus Editor, Radio World, 1493 Broadway, New York City.



GET ON THE REBUS HONOR ROLL!—The names of all those correctly solving Rebuses Nos. 1 to 12 will be placed on the Rebus Honor Roll and published in Radio World. Rebuses Nos. 1 to 11 inclusive are published in Radio World, issues of August 9, 16 and 23. Rebus No. 12 is printed on the page you are reading. Send 15 cents for each back number desired or start your subscription with that number. Radio World, 1493 Broadway, New York City.

# The Ideal Loop in Simplified Form

THE ideal loop described in the August 2 issue of RADIO WORLD may be wound in several different ways and all of them work. It has been found, after extensive tests, that probably the best all-around method of making this loop is the one described herewith. The parts needed are: one base, one upright strip of hard rubber, 30 x ½" for the upright; two cross arms, of hard rubber, 12 x ½"; four blocks of hard rubber, 2 x 1", 50 feet of wire, lamp cord or No. 14 bare; two cord tips. Fig. 1 shows the direction of winding the wire and the position of the wire. Fig. 2 shows the end blocks.

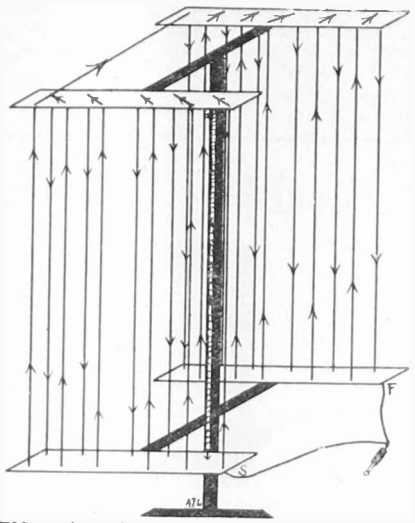


FIG. 1 shows how the completed loop looks. Arrows indicate the direction of winding

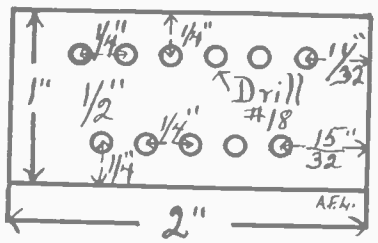



FIG. 2 is a template, (actual size) for the end blocks

To make the end blocks cut the hard rubber to size, 2 x 1", using the template, Fig. 2. The dimensions are given on the diagram. The holes are ¼" apart where side by side. Six holes are drilled in front and five in back, the five being so placed that each one of these holes is not directly behind a front hole, but between two front holes, though in the rear of them. This prevents the turns from obstructing one another when you wire the loop.

First erect the upright on the base, then affix the two cross arms so that these arms will be two feet from each other, measured perpendicularly. The end blocks are affixed to the cross arms, at the ends of the arms, so that their lengths are at right angles to those of the cross arms. Fig. 1 shows the upright and cross arms in solid black. The end blocks are the oblongs in Fig. 1.

Leave 2 feet slack wire for connection and start winding at the point marked S in Fig. 1. The start is made at an outside front hole at extreme right, on the lower block. Thread the 2 feet of slack downward through this hole. Then, taking the other end of the wire, thread this through the front outside hole at extreme right of the upper block on the same side of the loop, passing the wire upward through this hole. Then carry the wire to the first rear hole of the upper block, at extreme right, and down to the first rear hole of the bottom block. This second turn is shown for clarity in a shaded line, so it stands out in relief against the black upright. The direction of winding is indicated by the arrows in Fig. 1. Continue the winding on the two aforesaid blocks

(*Concluded on next page*)

# How to Wind Loop for Best Results

until top block's front hole at extreme left is laced, when the wire is carried over across to the top block on the opposite side of the loop. It is most convenient to turn the loop toward you to wire the second side and it will be found that the first hole to be laced is the outside front one of the top block, now the hole at extreme right. The wire goes to the corresponding front hole of the bottom block and is then laced through the first inside or back aperture of the lower block. Continuing the winding you will find that the wire terminates at the bottom block (where marked F) and to this end and to the beginning terminal the two tips are soldered.

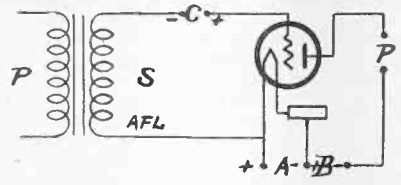






## WHAT'S WRONG HERE?

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




*Wrong Diagram No. 13.*

Editor, RADIO WORLD, 1493 Broadway, New York City. Mention Wrong Diagram No. 13. The names and addresses of those sending in the right answer will be published.

## Coolidge Hears Dawes

PLYMOUTH, VT.

PRESIDENT COOLIDGE, in his father's home, via radio, heard Charles G. Dawes, his running mate, deliver his speech of acceptance.

Although the speech was not completed until after his usual retiring hour, the President and the other members of his family listened attentively to the Evanston ceremony.

Fourteen radiocasting stations, connected with land wires, radiocast throughout the East the entire Dawes notification ceremony at Evanston, Ill. The stations were WCAP, Washington, D. C.; WEAF, New York; WJAR, Providence; WMAF, South Dartmouth, Mass.; WNAC, Boston; WBDH, Worcester; WGY, Schenectady; WGR, Boston; KDKA, Pittsburgh; WSAI, Cincinnati; WMAQ, Chicago; WEBH, Chicago; KSD, St. Louis, and WDAF, Kansas City.



### LEAGUE INDORSES ESPERANTO

AFTER a two year's survey of the international language situation, the American Radio Relay League, with qualifications, has decided in favor of Esperanto as its official international auxiliary language, this action having been taken by the board of directors at their annual meeting in Hartford, Conn.

# Cross-Ocean Phone Near

WASHINGTON.

THE American Telephone and Telegraph Company is working in conjunction with a British concern for the establishment of transatlantic telephone communication between the United States and England by radio on a commercial basis. Extensive experiments are being carried out in voice transmission from the station at Rocky Point, N. Y., to a receiving station near London, and the tests have convinced the engineers in charge that the scheme is practicable.

**Announcement Awaited**

So far as transmission from the United States to London is concerned formal announcement of the prospective service is understood to be awaiting the completion of a British station of high power, now being built. Until this station is completed and tested it cannot be said finally that the service is feasible, since only then will it be possible to test transmission in both directions.

Experts say it is only a matter of time before it will be possible to talk from New York to Tokio, Rio de Janeiro, Buenos Aires, Mexico City or virtually any point which can be reached by radio.

Details of the giant radio station now being constructed at Hillmorton, England, near London, are contained in an official report to the Department of Commerce. This station, which is expected to be the most powerful in the world, will be able to communicate, according to experts, with any stations now in existence in various parts of the world. The aerial of the new station will be a mile and a half long and half a mile wide, and will be supported by twelve masts of 300 tons each and 820 feet high. Each mast will be fitted with an elevator capable of carrying four men.







## RESULTS

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

RESULTS EDITOR:

I HAVE constructed your Dynoflex set, for which data was published in the August 9 issue, and it worked fine. It worked well at the start, but much better with a little checking over. I wound the coils on celluloid and dissolved all coating on the coils with collodion. I used an Erla fixed crystal at first but a Freshman variable one worked much better. I used a Rathburn variable condenser, Dubilier micadons, Amestran audio transformer, 5 to 1 ratio. The 5 to 1 worked much better than a 10 to 1 All-American. I also used a Thordarsan 2 to 1. This was much clearer, but it wouldn't work a loud speaker except on KSD and WLS. I used a Kellogg socket and a Pacent rheostat. My aerial is 125 feet long and 50 feet high. I have got WGY, Schenectady, 850 miles, on a loud speaker. With my two-step amplifier attached the volume is deafening. Thank you very much for the hook-up.

O. L. SCRIBNER,
708 S. Webster,
Decatur, Ill.

The Dynoflex works a loud speaker on one tube and crystal.





## FILL OUT AND MAIL NOW

*SUBSCRIPTION BLANK*

# RADIO WORLD

*RADIO WORLD* 1493 *Broadway, New York City*

*Please send me RADIO WORLD for.....months, for which please find enclosed $.....*

SUBSCRIPTION RATES:

Single Copy .....$ .15
Three Months ..... 1.50
Six Months ..... 3.00
One Year, 52 Issues..... 6.00
Add $1.00 a Year to Foreign Postage; 50c for Canadian Postage.

**HOW** to build a simple current supply unit, by Brainard Foote. You can light your amplifier tubes at a cost of only a few cents a year! Complete construction article and diagrams, with photo of completed unit, in Radio World, issue of Aug. 16. Send 15 cents for a copy or start your subscription with that number. RADIO WORLD, 1493 Broadway, N. Y. C.

# Decorations On Panel Make His Set Span Pacific

Ayeno Tammayato, Strickt care Hon. Ed. RADIO WORLD:

Deere Ayeno cousine:

Your hon. father, my more hon. father's broather, so we cousines and I saw firstly youre letter lst w'ks R. WORLD. Whye Ayeno you ask American Edditor bout our won'ful countrye when I, Ietteo, your own bloode realtionships, can answer more so?

You not get long dist. DX air noise beccause you not got fine American set inclusive most two won'ful Japanese deccorations, so got mine. I got set, big noiser, too. Got four tubers and miles wire, and fearful great loud horn like washtub for laundrye ladies low birth. Well all these and so forth. Work pretty much not so well. Then i fathom great ideas like Eddison othr fine genusses and rich citzens. This great American free place. I get Japanese artiste of kind draw pictures cows and emperors like most everything. He paint vilesome dragons, so soft fayre Geisha girls, and Lotus blossoms front of set. Then when deccoration all on front like gallery of Met. Musseum, Central Pk. W., I tune him in .0 by grate god of Yakeshima, our hon. countrye, how she noise in like hurrikane big Pacific. I near lose all hearing sound in ear, it come won'ful fine. Those so fine deccor'ns help so big and DX come along easy like rollin' logs.

And you think what Ayeno? I get sounds like beautofool Geisha girls singin in Tokio, address Japan. O joyous! You too get Hon Japan DX perhaps you have decc-r'tns like mine, dragons, fayre Geisha and etc., so forth. All show how great hon. countrye America like but more Hon. Japan like to. Let me give piece of advice to you to get deccr'ations like mine also, Ayeno, and let know great success with music and othr noises. You get DX Japan O.K. and maybe C. O. D. Your obedient and so truly cousine. Eletto Oatanno, Per H.,

Care good laundrye kitchen, Low prices,
Hotel Continental, Salt Lke. Cty.

# *Antenna 50 Miles Long*

THE development of the central receiving station at Riverhead, L. I., has already reached the point where the signals from Europe are received on an antenna system thirty miles long and the signals from South America on another antenna system twenty miles long. The antennae consists of two telegraph wires mounted on telegraph poles.

The basic element of this receiving system is the so-called "wave antenna" or "Beverage antenna." In its simplest form it consists of a single wire, one wavelength long, mounted on telegraph poles or even laid on the ground. This antenna is sensitive to waves from only one direction. A wave is started by the ether wave in one end of the wire and travels along the wire with the velocity of light. In the meantime energy is continuously added to the wave in the wire from the ether wave which travels alongside it, so that the wave in the wire continuously increases and reaches a maximum at the opposite end of the wire, where the receiving set is located.

# The Radio University

## *Questions Answered by a Staff of Experts*

(Concluded from page 21)

*I have built a 5-tube Neutrodyne, using spider-web coils for RF transformers, and have trouble in controlling oscillation at times. When tuning in at 20 on all three dials I get a howl or beat and can only get stations when I tune in between the beat notes. I have used good parts. My antenna is 85 feet long, 35 feet high, with a 40 foot lead in to the set and a 5-foot ground lead. What can I do to eliminate this trouble?—John A. Hoffman, 1795 East 47th Street, Cleveland, O.*

To solve your problem, read the Neutrodyne article by N. N. Bernstein, published in RADIO WORLD in two parts—August 16 and in this issue. He describes how to neutralize this type of circuit, eliminating all oscillation. Your antenna and ground are suitable for the Neutrodyne.

* * *

*I have a Radiola III-A and am using an antenna of 175 feet. This results in rather broad tuning. Rather than cut down my antenna I should like to use a wave trap and am interested in one described in RADIO WORLD, issue of May 17. Can a wave trap be purchased, and if so will you mention a good make and about what the cost is? Do you believe that I can make one that will work as well as if I purchased one? I have a condenser called the Accuratone which is enclosed in insulatnig material and ready for use. Can I make use of it?—P. M. Bouton, Ridgefield, Conn.*

There are a number of good wave traps on the market. See our advertising columns. There is no reason why a home made trap can't be made to work good. The Accuratone condenser is suitable for use wtih such a home made device. Follow the instructions in the article you mention.

* * *

*Have built the Superdyne as per the instructions in RADIO WORLD and I fail to get volume. After reading what others have done with it, I went over the set and rebuilt it again, but still the great volume is lacking. The set, however, does everything else claimed for it. 1—What can I do to improve volume? 2—How can I test the audio-frequency transformers (Erla 6 to 1 and 3½ to 1 ratio.) 3—Have 23-plate condensers which have large ends made of bakelite. Can I improve on these condensers?*

Your questions will have to be answered backwards. The condensers you are now using are the old type and should be replaced with low-loss condensers or you can convert yours into the low-loss type. See RADIO WORLD, July 5. This will greatly aid in bringing up the volume. The transformers evidently are in good order because the set now works. However, carefully check the connections of the transformer posts to make sure that the plate and grid leads are on correctly. The 3½ to 1 transformer should be in the second stage and the 6 to 1 in the first stage. The change in condensers and a possible change in transformer connections should increase your volume. Use at least 90 volts plate battery.



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# Wiring the Improved 1-Dial Set

(Concluded from page 5)

end of the coil L1, the beginning of this coil being connected to nothing. The ground goes also to one side of the fixed condenser , .001 mfd., the remaining side of C3 being connected to the filament. The circuit network, published on the front cover shows this lead going to A—, and this works better on some tubes, particularly the 200 type, but if the 199 or 299 type of tube is used, make the connection to the B+ instead of the A— and disregard the diagram to this extent. As an experiment try one connection, then the other, if you desire, and use the one you better. The set will work if the fixed enser and all connections to it are ted, but it is introduced to supply regeneration, which may be hardly noticeable if the circuit is used without it, although signals are still splendid.

Connect the beginning of L2 (the secondary coil) to the plate as follows: (a) to the plate, marked P on the socket; (b), to the stator plates of the variable condenser, C1; and (c) to one of the springs of the jack. Connect the end of L2 (a) to the remaining side of C1, (b) to the end of L2, (c) to the aerial and (d) to one side of the grid condenser C2. If a low-loss condenser is not used as C1, then connect the aerial lead to the stator plates, instead of to the rotor. In any event, introduce the aerial as near to the grid condenser as possible. Turn on the rheostat. See if the tube lights. If it does, then connect B+ 45 volts to the remaining unconnected spring of the jack.

Insert the earphone cord tips in a jack plug and insert the plug in the jack to hear signals.

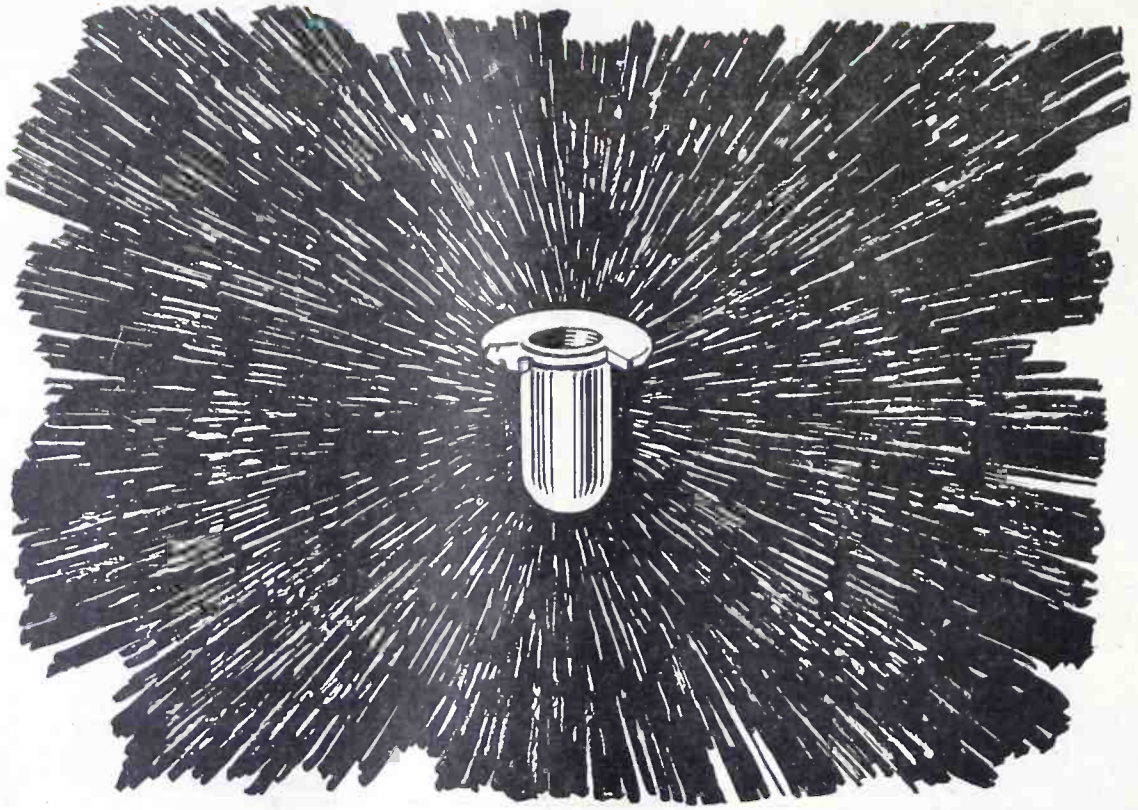
In outlining the assembly no provision was made for aerial and ground binding posts, nor for filament or B battery binding posts. These are not necessary and while they may enhance appearance they do not enhance electrical efficiency. Instead of aerial and ground binding posts being attached to the front of the panel, there to build up high resistance to the feeble radio-frequency impulses that are the very breath of life of reception, it is better to make the connection direct to the coils in a set like this. The aerial and ground may be introduced through the back of the cabinet, in which holes are drilled and are insulated with hard rubber bushings. A spring clip will secure the aerial or ground to its proper place. By soldering a 2" piece of hard copper wire, such as bus bar, to the side of the grid condenser where the aerial is to go, a good connection is afforded, the aerial wire and grid wire being secured at the same point.



## THAT GREAT SUPERDYNE CIRCUIT

That appeared in RADIO WORLD dated May 17, 24, 31, 1924, aroused so great an interest that the entire supply of those issues has been exhausted. The Editors, therefore, decided to bring the articles strictly up-to-date, and the Superdyne Circuit was, therefore, fully covered in descriptive story and diagrams in RADIO WORLD dated Aug. 23 and 30, 1924. These two copies sent on receipt of 30 cents. Also the July 5 issue contained an article about "Trouble Shooting for the Superdyne"; mailed on receipt of 15 cents. RADIO WORLD, 1493 Broadway, New York City.

# The Gem of the Radio Field



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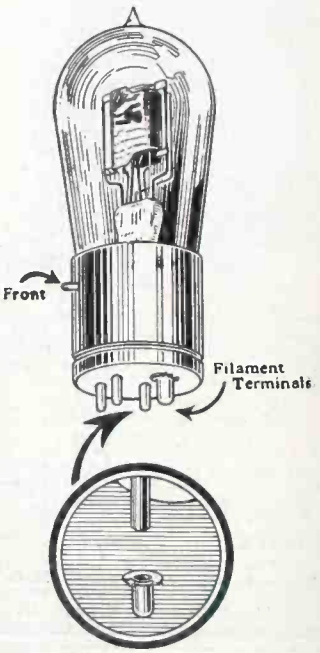


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