

"100% LOW-LOSS" SET NOW ONE-TUBER

Everybody's 5¢

RADIO

WEEKLY

Vol. 1—No. 7

CHICAGO, SATURDAY, NOVEMBER 1, 1924

\$2 BY THE YEAR
POSTPAID



IN THIS ISSUE: How to Build a One-Tube "Everybody's 100% Low Loss" Receiver Using a Home-Made Three Circuit Tuning Unit : : : How to Build a One-Tube Portable Loop Set : : : Extra Amplification for the Ultraloggo Reflex : : : Timely Tips : : : News for Amateurs.

CURRENT COMMENT AND CANDID OPINION

IT PAYS TO LOOK BEFORE YOU BUILD, WHEN IT COMES TO RADIO

This magazine receives many letters in a day's mail from its readers asking questions. Many of these questions complain of hookups which have been published in these columns fail to do as specified. Either they lack volume or they are without selectivity or they refuse to bring in the distant stations.

And yet, in the same mail we may receive letters from four times as many readers who have built the set and report wonderful results. Which all goes to prove that it is not the circuit or the hookup that is at fault, but the fellow who built the set.

Hookups and circuits, which are given publicity in these columns, have been **PROVEN**. The pictures that accompany the articles are from sets that have been built in our laboratory by members of the technical staff. At least three members of the staff have given them several days' tests under the usual home conditions. Before publication we know just what the set will do and the writer of the article describing construction and performance gives a truthful report on the same.

That our conclusions are correct is attested by the fact that hundreds of readers write to us and tell us they are getting the same results we have secured in our own experience with the set.

All this brings us to one point: There are too many who do not follow instructions. They read too hastily. They jump at conclusions. They assume that specifications may be ignored with impunity. They seldom read all that an author writes about the minute constructional details. They seem to be indifferent to his warning about using certain values, about keeping leads short, about placing the parts in a certain position on the panel or baseboard.

With a glance at the pictures and the schematic diagram in front of them they plunge into construction. They skimp on parts. They may use a .00025 mfd. variable condenser because they had one handy, when the specifications call for .0005 mfd.

They take a chance on the fixed condensers, also, either using whatever they have handy, or leaving them out altogether. They will wind up a coil that has fifty turns because that is the type of coil they used once before, although the specifications may call for a winding of sixty. They will hook up the filament negative to the stator plates of the condensers when the hookup calls for the rotor plates.

And then they expect to see the set work efficiently and do just what has been said of it.

It can't be done, and we do not mean "maybe." Hookups must be followed faithfully. If a writer specifies a certain piece of apparatus he has a reason for it. Perhaps he has worked weeks on testing out various apparatus with the hookup and decided on the best values only after the tedious siege of experimentation. He should know what works best. His suggestions ought to be followed.

(Continued in Column Three)

Everybody's 5¢ RADIO WEEKLY

Published every Saturday as a weekly, by WELLS PUBLICATIONS, South Union Avenue at Forty-First Street, Chicago. The price per copy is Five Cents. The subscription by the year is \$2 by mail postpaid. In Canada by the year, \$3 postpaid. In foreign countries, \$3.50 the year postpaid. Single copies Ten Cents. On sale at all newsstands and magazine stores.

IVERSON C. WELLS,
Editor and Publisher.

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Lewis B. Hagerman, Associate Editor
Lytton Taylor, Managing Editor

Vol. 1 Chicago, Saturday, Nov. 1, 1924. No. 7

Phans' Phorum

THE comment and opinion of readers of this magazine on timely subjects of general interest is invited for this department.

The only restrictions placed on contributions are: That you write only ONE side of a sheet of paper and that you confine yourself to a legitimate discussion of subjects of general interest.

The editor assumes no responsibility for the opinion of those who contribute to the department. Address your letters to Phorum, EVERYBODY'S RADIO WEEKLY.

Worries Over Super Stations

EDITOR.—Just happened to get hold of a copy of EVERYBODY'S RADIO Weekly and I am certainly surprised that you can give such a big magazine full of interesting items for so little money. I have a very important question to ask you, and I think there are many others that would like this answered for them. How about the super power stations? When they will come out how much difference will it make on a receiver like mine? I have a three-tube Duo Reflex Earla. At present time can go through five or six local stations most any night. Will it be possible to go through the super power station then? I was thinking it would almost be impossible for a few of such super power stations to cut out almost two hundred independent stations. I think the independent station owners would find a way out. Or there is another way out. That is to make different type receiving sets or use the old kind with a different kind of filter. We have so far advanced in radio, why can't we go a little further? Besides it would mean that everybody that owned a broadcast receiver now would be forced to throw it away. As these have cost the radio public millions of dollars most radiophans would not care to go through the same expense again. Let me have your candid opinion on this. I have been reading various radio magazines and so far have not seen a real article on these super power stations.—Leo Kruger, 15 N. Elizabeth street., Chicago.

We gave our candid opinion on this subject in an editorial on page 2 of the October 11 issue. We do not know how we could add anything to the sentiment expressed. It looks like a case of either sharper tuning receivers, such as "Everybody's 100% Low-Loss" receiver or the independent stations adding more power.

Well He Knows

EDITOR.—Some radiophans do not know which circuit to make or what kind of a set to buy. They want something good, that will do the trick and yet must be inexpensive.

I built the "Old Reliable" as per diagram furnished in the magazine that you previously were editor of and if I were to build another set today I would make the same thing but in a more modified form and this modified form is the "Everybody's 100% Low-Loss" receiver now appearing in EVERYBODY'S RADIO Weekly. I would obtain the same results with this hook-up that I am now obtaining with mine, and the cost of the set would be less and the tuning much easier.

With my "Old Reliable" it is a simple matter for me to tune out WTAY (Oak Park) and tune in WTAS (Evanston) with only three meters between these two stations. My location is not so favorable for doing this, but with the "Old Reliable" it is a simple matter. I am located one mile east of WLS, five miles east of WTAY, and about fifteen miles east of WTAS. WTAY and WLS are between me and WTAS, and still WTAS comes in a-roaring.

As said before I am a mile from WLS which broadcasts on 345 meters and still I am able to cut through them and get KDKA, which broadcasts on 326 meters. There is no other three-tube set made that can approach the "Old Reliable" for

(Continued on Page Ten)

We had a reader who hooked up one of "EVERYBODY'S 100% Low-Loss" sets last week. He was quite positive—over the telephone, that he had followed instructions to the letter. Yet, local stations came in so weak they could be heard but faintly on the loud speaker. Outside reception was out of the question.

At our suggestion the set was brought to our laboratory. It was a model piece of construction. He had followed instructions faithfully in every detail, with one exception. He had not connected the primary into the aerial and ground!

The set had been operating on the short eight turns of the primary as its only aerial or energy collector. And, yet, it had delivered sufficient volume to be heard on a loud speaker; faintly, it is true, but heard comfortably anywhere in the room. When the primary was connected to the ground and aerial binding posts the local stations as well as the distant stations roared in.

When a proven hookup or circuit fails to work ninety-nine times out of a hundred it is because its builder did something wrong. The reason the error was committed was because the builder had not read carefully all instructions and had not followed what he had read. It pays "to look before you leap" in building a radio set as well as in any other mental or physical effort.

WRITE US ALL ABOUT IT

We go to considerable expense and trouble in giving our readers model sets from which to build efficient radio receiving apparatus. Each set has been tested and we know they will work. Many readers build these sets. We are interested in knowing just what results they are having. Of course those who have trouble write us. It is the fellow who is successful that dies not write. If we could get reports on their experiences it would act as a guiding hand to others, not so successful.

We are trying to make EVERYBODY'S RADIO Weekly everybody's magazine. The best way to do that is to have everybody help us edit it. You radiophans who have profited by reading our helpful suggestions ought to show your appreciation by writing briefly, but completely, about the set you have built and the reception you are getting. Won't you do this?

Carelessness in operating a radio set will bring the same result in radio as it does in any other human effort. Keep your set in working condition. It pays.

"It is not Everybody that can advertise in EVERYBODY'S RADIO Weekly," is a slogan that is worth much to readers of this publication. It means that the "gyp" manufacturer and dealer cannot buy space at any price in our advertising columns. There are many reputable firms that do not advertise with us. It may be our fault or theirs. However, you can count on the fact that those that do advertise in these columns are worthy of your confidence and trust. If they don't make good with you we will. If you want to play safe let the advertising columns of this magazine be your guide.

Everybody's 5¢ RADIO

IVERSON C. WELLS, Editor

Published every Saturday by WELLS PUBLICATIONS, South Union Avenue at 41st Street, Chicago; Phone Boulevard 2968. On all Newsstands at 5 cents per copy. \$2 the year, postpaid. In Canada, \$3. In Foreign Countries, \$3.50. Entered as second class matter October 4, 1924, at the Post Office at Chicago, Ill., under the act of March 3, 1879.

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Vol. 1—No. 7

CHICAGO, SATURDAY, NOVEMBER 1, 1924

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WELLS PUBLICATIONS

Everybody's 100% Low-Loss One-Tuber Season's Popular Set Now in Everybody's Reach

Now, Everybody can have "Everybody's 100% Low-Loss" Receiver. It appears this week as a one-tuber. Its total cost is just exactly \$13.50. It does everything that its bigger brothers can do, except it won't bring in the distant stations on a loud speaker. It brings in all the same stations, even those on the two coasts; it has all the wonderful selectivity and it has all the clarity of tone. You who have felt that three tubes were too much for your purse can now go to it and enjoy radio this winter with the rest of the world. When you get a few more pennies saved up we will show you how to add two stages of audio without tearing down your one-tube set.

By IVERSON C. WELLS

WE ARE showing "Everybody's 100% Low-Loss" Receiver this week (Model No. 5) as a one-tuber. It is exactly like its big brothers, only it is just the detector unit, minus the audio amplification. Its cost should not exceed \$13.50, using the best of low-loss parts. A home-made tuning unit helps keep the cost down.

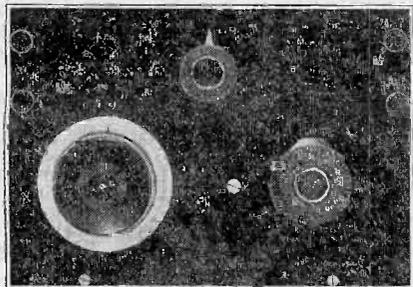
This one-tuber will do everything the three-tube set will do, except deliver loudspeaker volume on the distant stations. It will give the same selectivity. It will bring in the same coast-to-coast stations. It will produce the same clarity of tones. It will deliver the same dependability.

One-tube sets, primarily, are headset outfits. This abbreviated edition of "Everybody's 100% Low-Loss" receiver is no exception. However, on local stations this little fellow will deliver sufficient volume to operate a loudspeaker and entertain a room full of folks.

The model set illustrated and described has done even better than that. In our laboratory tests it has brought WCBD (Zion, Ill.) forty miles away, on a loudspeaker strong enough to be heard comfortably anywhere in a room.

However, do not permit me to mislead you. I do not want to raise any false hopes or lead anyone into expectations that cannot be fulfilled. You will need headphones to operate this little fellow.

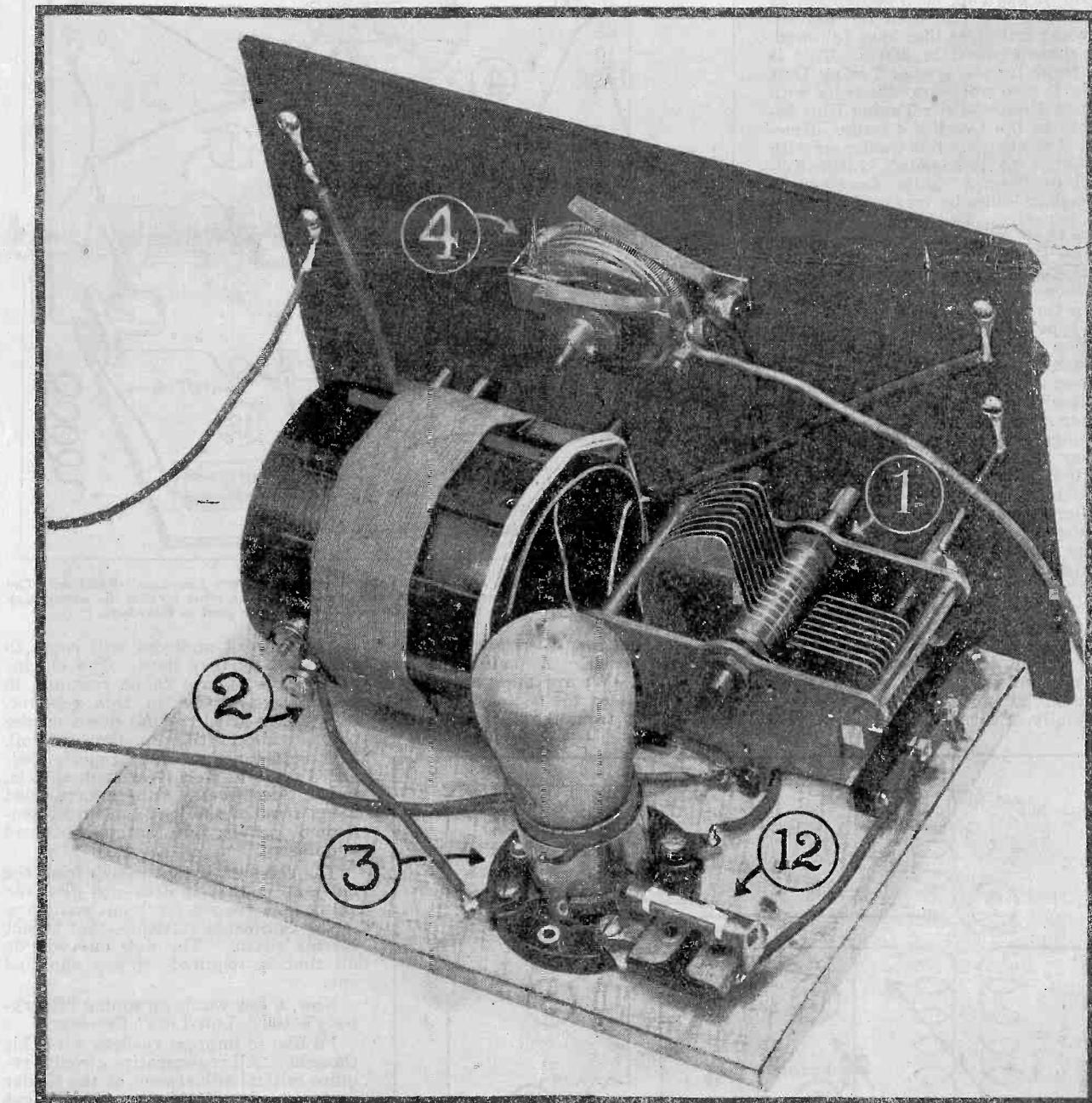
However, you will get all the stations in the country with it and you will get more volume in those old



Here we have the front panel view of the One-Tube "Everybody's 100% Low-Loss" Receiver. The large dial at the left is the "Univernier" dial that aids in giving the Cardwell Variable Condenser a fine adjustment. The large knob at the right is the control for the home-made Low-Loss Tuning Unit. The smaller knob at the top center is the Cutler-Hammer Rheostat.

phones than you ever heard before from a one-tube set, unless it came from a freak super, which will make a lot of noise occasionally and, like a balky mule, refuse to percolate more often.

We have an aerial that is above the



This is the One-Tube "Everybody's 100% Low-Loss" Receiver. While it has lost two of its tubes and its loud speaker volume, it will percolate just the same as the big fellows. You'll have to use a headset on it to hear California, but you can get the coast stations consistently every night and without an alibi. As the writer of these lines is pounding away on the typewriter he is listening to KGO (Oakland, Calif.) through a loud speaker which is operated by the same little one-tube set you see above. Two stages of audio have been added for convenience, but for more than an hour (from 1 a. m. to 2 a. m. Tuesday morning, Oct. 21) he used the single tube just as illustrated with headphones and heard a most enjoyable program of dance music. The index figures used above in this picture are the same as those used under the other illustrations and also in the text.

average at EVERYBODY'S RADIO Weekly Experimental Laboratory. It is of special design, with the minimum of resistance and every precaution has been taken to prevent leakage and losses. This may have helped the little

one-tube fellow get in some exceptional volume. We also used a power Magnavox of the latest type. This, undoubtedly, aided also.

Parenthetically, I expect to describe this aerial of ours some of these days.

It is not an expensive one and can be constructed by most anyone, provided they have room for a good stretch of wire—say from 135 to 150 feet.

And, by the way, don't overlook the fact that "Everybody's 100% Low-

Loss" Receiver is not given a fair shake if it does not have this long an aerial. Volume and far stations only come in on aerials of this type. Broad-tuning sets won't work so well on them, where local interference is severe, but, as we have remarked, "Everybody's 100% Low-Loss" Receiver is a sharp tuning circuit and set. It will be so on any sort of an aerial and the longer and better the aerial, the better it performs.

In constructing this one-tube set, you will need the following parts which were bought on the open market by a representative of this publication at the prices stated:

Fig. 1—Cardwell .00035 mfd. Variable Condenser	\$ 5.25
Fig. 2—Special Home-Built Tuning Unit	1.25
Fig. 3—Premier Lo-Loss Socket	.90
Fig. 4—Cutler-Hammer Rheostat, 30 ohms	1.75
Fig. 12—Dubilier Grid Condenser, .00025 mfd.	.40
Fig. 12—Electrad Grid Leak, 2 megohms	.50
Univernier Dial	1.25
Four Plain Binding Posts	.40
One large knob for Tuning Unit	.25
One Panel, Hard Rubber, 7x10x $\frac{1}{8}$ "	1.40
One Base Board	.15
Two feet Flexible Rubber Covered Wire	.10
Nuts, bolts and screws	.10
TOTAL	\$13.50

In the above list we have used the same index figures on the parts as used in previous models of the three-tube receivers, so no confusion may come from those who have followed the weekly articles. These same guiding figures are shown in the illustrations that accompany this article.

The Cardwell condenser used is one of the first low-loss types manufactured. It has long been recognized as a standard and has been the pattern for many imitators that have followed. The capacity used is .00035. This is just right for the special Tuning Unit used. It also will work efficiently with the new Bremer-Tully Tuning Unit described in the October 4 issue. However, if you employ this condenser with either the "Ambassador," "Little Kel-coil," or "Lopez" units described in succeeding issues be sure to use a .0005 mfd. capacity. Those units require it.

We have placed a "Univernier" dial on the Cardwell to make the tuning easy. The set, as we have remarked on numerous occasions, is an exceedingly sharp tuning one. Either a device of this type must be used or one of the friction vernier knobs that works up against the edge of the dial.

Special treatment will be necessary to attach this vernier. Either the condenser shaft will have to be cut off or bushings employed to place the condenser further back from the panel and thus shorten the protruding shaft. We did the latter. Two or three nuts, washers or collars are used for this purpose.

The Special Tuning Unit (Fig. 2) is a product of our Experimental Laboratory. It is described in full on Page 9 of this issue, full directions being given for construction and wiring.

We were forced to design this unit because there seems to be a decided shortage of tuning inductance of the three-circuit type on the local markets, especially of the quality and type that

we feel is necessary to merit a place in this receiver.

The new Bremer-Tully Unit still is in the factory and no definite promises are made dealers. The local stocks of the Lopez, Ambassador and Little Kel-coils were exhausted within a few days after the issues of EVERYBODY'S RADIO Weekly were on the newsstands containing specifications listing them. Local distributors were unprepared for the rush. Shipments of all of these units have been hurried to Chicago. In a few days all wants will be cared for.

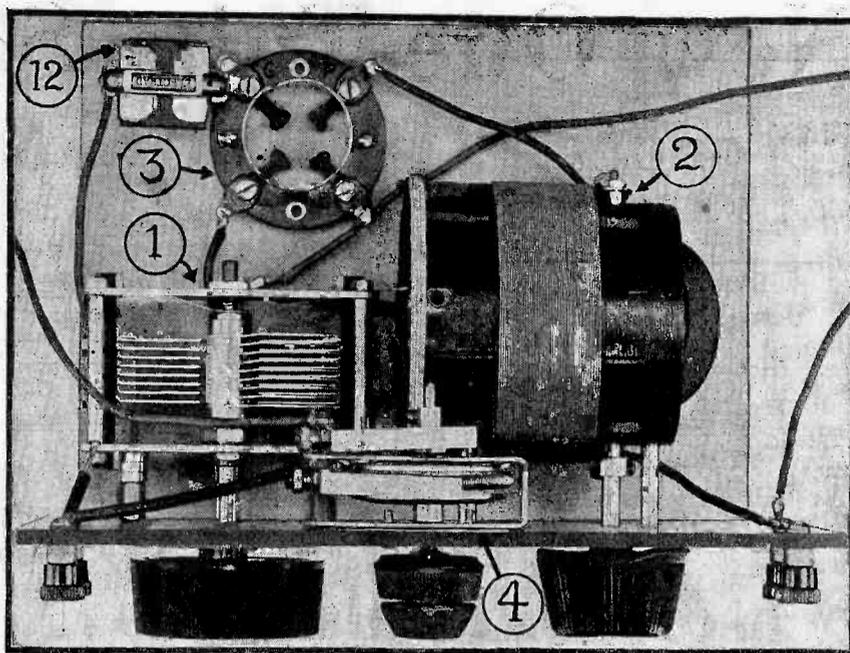
In the meantime, if you grow impatient, why not try your hand and skill at making the simple unit described on Page 9 of this issue?

An old 180-degree variocoupler will supply the foundation for the unit, if you have one. Hard rubber or bakelite tubing of the proper size will be okay, also. A small quantity of wire, a little patience and an hour's time ought to do the work.

This unit gives just as efficient results as any of the more expensive commercial types. In fact it does much better than some of the widely advertised units.

The socket used is a Premier Low-Loss and the rheostat is a Cutler-Hammer 30-ohm. This is intended for a 201-A tube. If you use a 199 type tube a forty-ohm rheostat will be necessary. We do not advise using the dry cell tubes, however, if best results are to be obtained.

The grid leak and the grid condenser



This is the top view of the One-Tube "Everybody's 100% Low-Loss" Receiver. There is no other one-tube set made that will deliver the same efficient results that this little fellow will deliver, seven days and seven nights in a week. It can be built just as you see it for \$13.50. That places GOOD radio in the hands of everyone. Compare the indexed parts with the figures used in the other illustrations and particularly those in the pictorial and schematic diagrams.

nals to the batteries themselves. The posts may be used, however, if desired.

Many radiophans are making the mistake of using the old 1924 Tuning Unit of Bremer-Tully in this receiver.

would pay more attention to a "volume" control than he would to the other, since that guide would remind him to turn the knob if he did not have sufficient volume.

Many owners of regenerative sets operate them year in and year out without getting the full efficiency of their receivers simply because they do not know how to tune them properly. Let me repeat: The maximum of selectivity in "Everybody's 100% Low-Loss" Receiver comes only when the primary and the secondary coils are "loosely" coupled and when the tickler coil is manipulated so that regeneration is at its fullest and the tube is just a hair BELOW the "Spilling" or oscillation point.

To make sure that you get full regeneration keep advancing the tickler as you advance your variable condenser. You can tell when regeneration sets in by the click sound in the phones or in the loud speaker. As it nears the oscillation point of the tube there is a "rushing" sound. The tube begins to oscillate because it is overloaded through excessive regeneration. You can tell when it starts by the "mushy" or distorted sound of the voice or music that comes forth from the loudspeaker. Advance regeneration too far and the tube will howl, whistle and scream. Your set should never get within a mile of that condition.

Next week we will show a two-stage amplifying unit especially designed for this one-tube edition of "Everybody's 100% Low-Loss" Receiver. It will be for those who will have made the detector unit and who may then want to add the amplification or who may want to do so at some later date.

We also have under way "Everybody's 100% Low-Loss Deluxe" model. This is going to be just about the last word in a receiving set as it will have all the little and big refinements that go to make a radio set an attractive thing to have around in the handsomest of drawing rooms. We hope to have it ready for the November 8 issue, but are not making any definite promises. It has to be right and we are going to take all the time that is necessary to make sure that it is.

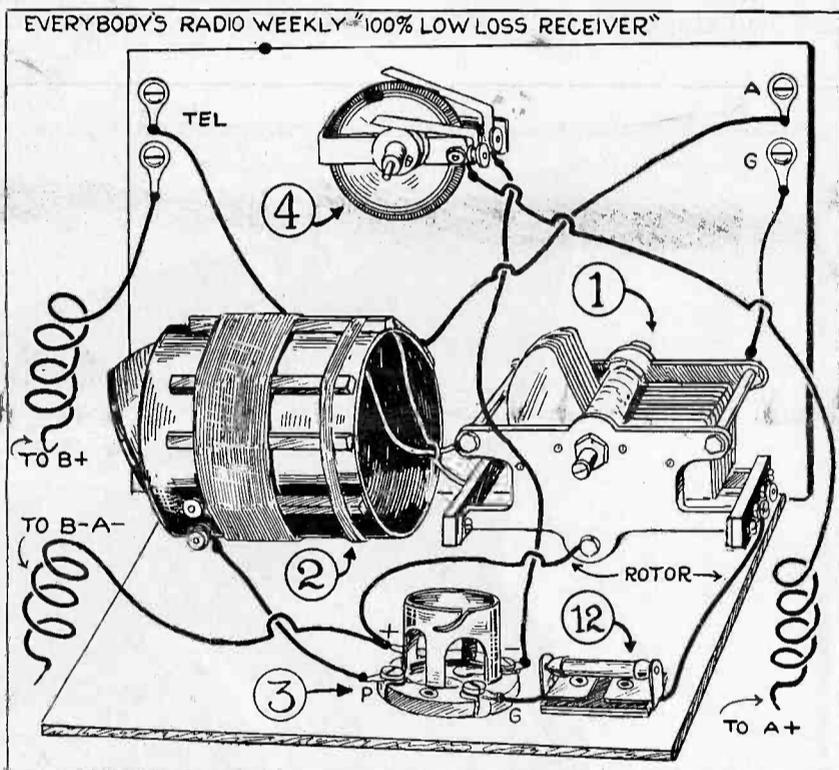
(Back numbers in which various models of "Everybody's 100% Low-Loss" Receiver have appeared are Oct. 4, Oct. 11, Oct. 18 and Oct. 25. Any one of these or the complete set will be sent postpaid upon receipt of Five Cents for each copy.)

PHONE CONDENSER AIDS

It might be a good plan to shunt the phones of your ultra-audion receiver with a variable phone condenser (one of the compression mica variety will be suitable). The condenser should be slowly adjusted until the loudest response is obtained from a station and left alone. It often happens that the signal strength is increased 20 or 25 percent by this addition.

MOUNTING TUBES

Vacuum tubes, such as the UV-200, 201 and 201-A, should not be mounted horizontally, as the filament will sag and touch the grid, and the tube will become inoperative.



This is the pictorial diagram of the One-Tube "Everybody's 100% Low-Loss" Receiver. The sketch shows the parts slightly exaggerated in their relation to each other so that the wiring may be more easily traced. The same index numbers on the parts are used as elsewhere.

are the same that have been used in previous models. A 7x10x $\frac{1}{8}$ panel fills the bill. We are using no battery binding posts as the battery leads are taken direct from the various termi-

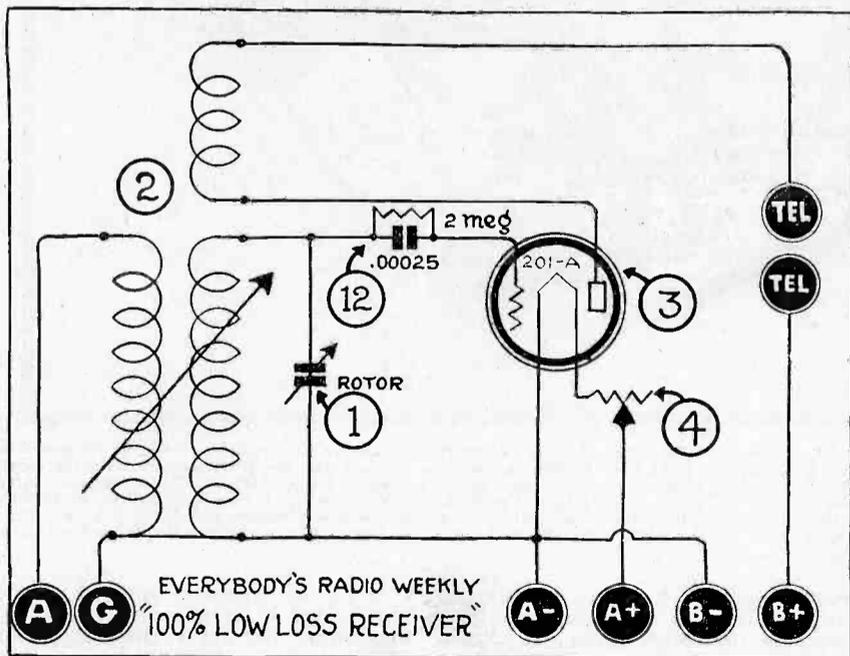
It won't work and you will come to grief just as they have. The old inductance will have to be rewound to be of any service in this receiver. Many have tried cutting down on the primary and cutting out the load coil. The inductance is not properly balanced for even that treatment, that is, not in this circuit. Others have tried using some of the load coil in the secondary circuit, but that means dead end losses.

The chief grief that comes from the old unit is that it does not give the volume, nor will it reach out and bring in the California stations—that is, not in this circuit. The new one will do all that is required—if you can find one.

Now, a few words on tuning "Everybody's 100% Low-Loss" Receiver:

I'd like to impress readers with this thought: All regenerative circuits require critical adjustment of the tickler or feed back coils, if you expect to get the BEST out of them. There are other means of obtaining selectivity and volume, such as the coupling between the primary and the secondary, for instance, but, unless you also have proper control over your regeneration all other efforts are wasted.

So important is this factor, we have had engraved the guide words "Volume," under the tickler knob instead of the usual "Regeneration," guide word in our model receivers built for "Everybody's 100% Low-Loss" Receiver. We figured that the novice



Here we have the schematic diagram of "Everybody's 100% Low-Loss" Receiver. Each part is numbered. These numbers are used in the descriptive text. They also are the same as those used in the hookups of previous models, if you care to refer to them.

New One-Tube Set Works on Loop

"Wonder" Uses No Super-Regeneration or Reflex

Those of you who have marvelled when your three tube set worked with the antenna and ground disconnected will be more than surprised to know that it is possible to get excellent reception from both local and some long distance stations on a loop aerial and with but one tube. This little wonder set uses no antenna or ground whatever, the only energy collector being the loop which is not critical as to direction. A coil of wire as shown in the photo, or even a seventy-five turn honeycomb coil will serve for a "loop." The set's beauty lies in its extreme simplicity and inexpensiveness. There are no trick coils, condensers, or transformers to buy.

Secret of Set Lies in Low Resistance

By LEWIS B. HAGERMAN

FOR phans living under conditions such that they cannot have an outside antenna the ideal set would be a Super-heterodyne or some other multi-stage radio frequency arrangement that operates on a loop aerial.

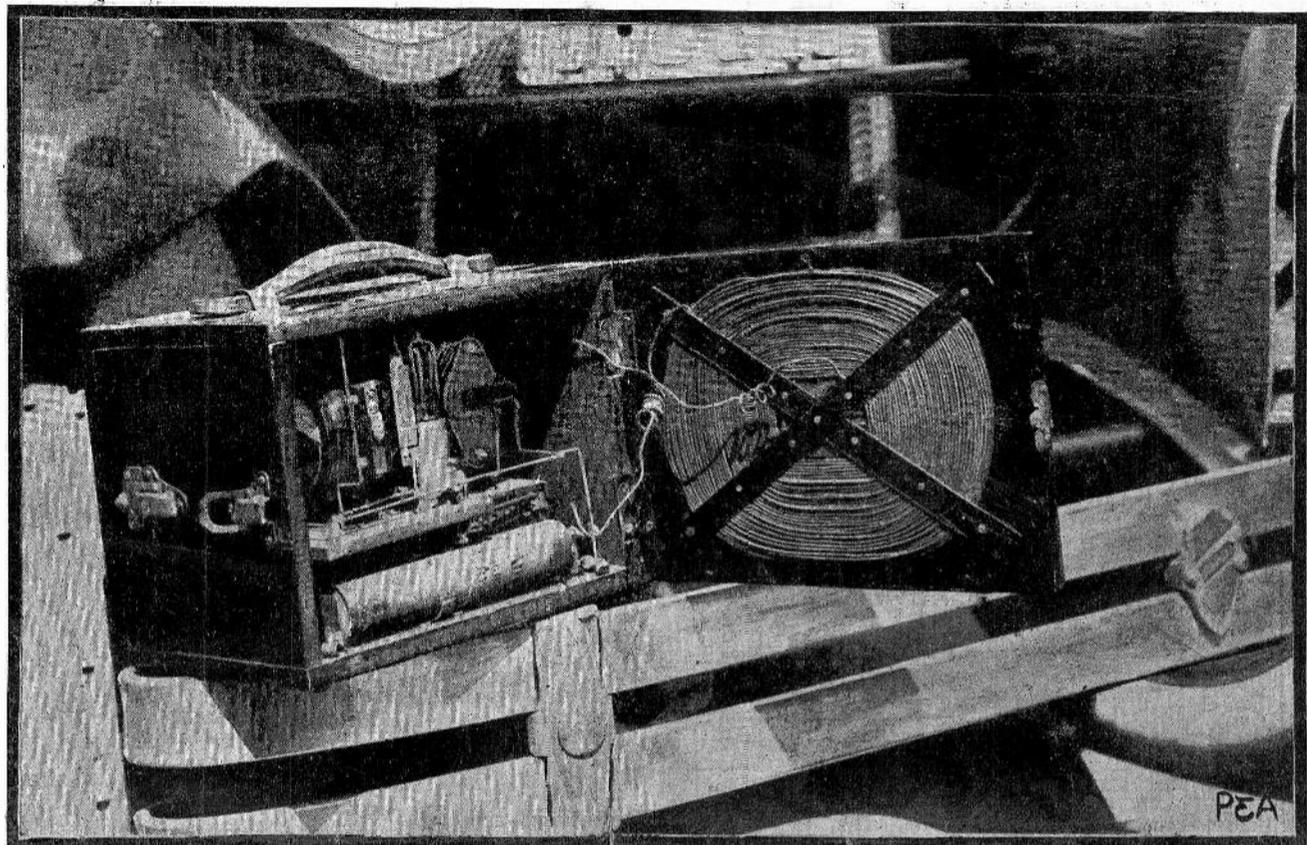
But there are those who cannot afford this and who wish to confine their investment to thirty or forty dollars and yet use a loop aerial.

The set shown in the accompanying photos and plans is a variation of a circuit originated by the author some months ago and will do the seemingly impossible. That is, operate on a loop aerial with almost loud speaker volume and utilizing only ONE tube.

There is no reflex, super-regeneration, heterodyning or "black magic" used to produce the results obtained. The circuit is based on direct coupling, low resistance to the incoming impulse, aided by regeneration. It will operate anywhere and can be built as compactly as desired for a portable outfit.

Using one of these sets with a two stage amplifier, excellent results were had in a moving automobile, a street car and an elevated train. Interference from motors, generators, power lines, etc., is scarcely noticeable. With it the world series games were brought in on the loudspeaker so that the broadcasting could be heard a hundred feet away, although the set was located three feet from telegraph tickers in a steel building in the middle of the loop. As for distance, it is limited. Stations within a radius of five hundred miles come in regularly though.

The set shown on the accompanying photo is in the form of a portable outfit. This is suitable for use on local reception anywhere in the city and is not only a good portable outfit but also a handy set to have in the small apartment, as when one is through using it it can be put away in the closet or a drawer. For the man whose wife objects to the mussiness that goes with some outfits, this radio set is



The photo above illustrates the portability of the Ultraloop outfit when made up in a small carrying case as described in this article. Of course with the small coil loop shown its range may not be more than thirty-five or forty miles. Note the layout of the parts. This is best for utmost compactness and ease of wiring.

ideal, as there are no wires around for her to find fault with, and if she has her bridge club or gossipy neighbors in to visit her, he can pick up his set, run into the kitchen or bed room and enjoy himself to his heart's content. Of course a larger loop antenna would give better results than that shown and should be used for maximum distance and volume.

The secret of the Everybody's Ultraloop set, as stated before, lies in low resistance to the incoming impulse and therefore, the lower the losses the better. The portable set used molded apparatus because of its subjection to knocks and hard uses. For a home installation, low-loss condensers and variometers are essential.

The really vital unit in the set is the

variometer. It must have a perfect ratio of inductance, low dielectric losses, close coupling and good substantial bearings. By a high ratio of inductance we mean that the value of the rotor should be as close to that of the stator as possible. One having about eighty turns on each is satisfactory.

By low dielectric losses we mean that there should be as little frame work as possible used in its construction. Close coupling means that the rotor and stator should come as close to one another as they can be placed. The clearance should not be more than $\frac{1}{8}$ of an inch. Good bearings are those which hold the rotor in perfect alignment with the stator and allow it to move freely but without play.

The connection between the rotor and stator should be made with a pigtail wire. If it is not already connected in this manner, purchase a piece of braided wire, solder one end to the rotor shaft and the other end to the stator connection. Friction contacts, such as those made by brass wipers and brushes are usually electrically inefficient and frequently the source of noises.

The variable condenser is also important, although any low-loss type of .0005 capacity will suffice. The portable set, as can be seen from the photo, used a UV-199 tube. For filament voltage for this tube an ordinary $4\frac{1}{2}$ -volt flashlight cell was employed. Behind this, and under the base board on which the socket is mounted, are placed two small $22\frac{1}{2}$ volt B batteries which are hooked up in series and used as plate potential.

The exact arrangement of the parts in the cabinet is optional. Although to make a symmetrical looking job, the variable condenser can be mounted on one side of the panel and the variometer and rheostat in the center. The connections for the loop are made from the back of the set and the connections from the phones through two Jones color tip jacks on the face of the panel. Schematic and pictorial diagrams are used in this article to show exactly the hookup, but for those

to whom they are difficult to follow, the following verbal diagram will explain the method in detail. We have the following items which are to be hooked up:

- Fig. 1—One loop aerial.....2 connections
- Fig. 2—One variable condenser.....2 connections
- Fig. 3—One variometer.....2 connections
- Fig. 4—One tube socket.....4 connections
- Fig. 5—One grid leak and condenser.....2 connections
- Fig. 6—One rheostat.....2 connections
- Fig. 7—One $4\frac{1}{2}$ volt flash light battery.....2 connections
- Fig. 8—Two $22\frac{1}{2}$ volt B batteries.....(each) 2 connections
- Fig. 9—Two tip jacks (each) 1 connection

Proceed as follows: Mount the units on the panel and the base board. Connect one side of the loop to one side of the variable condenser and to one side of the grid leak condenser. The other side of the grid leak condenser goes to the terminal marked G on the tube socket. The remaining terminal of the loop goes to the remaining terminal of the variable condenser and to a terminal of the tube socket marked F.

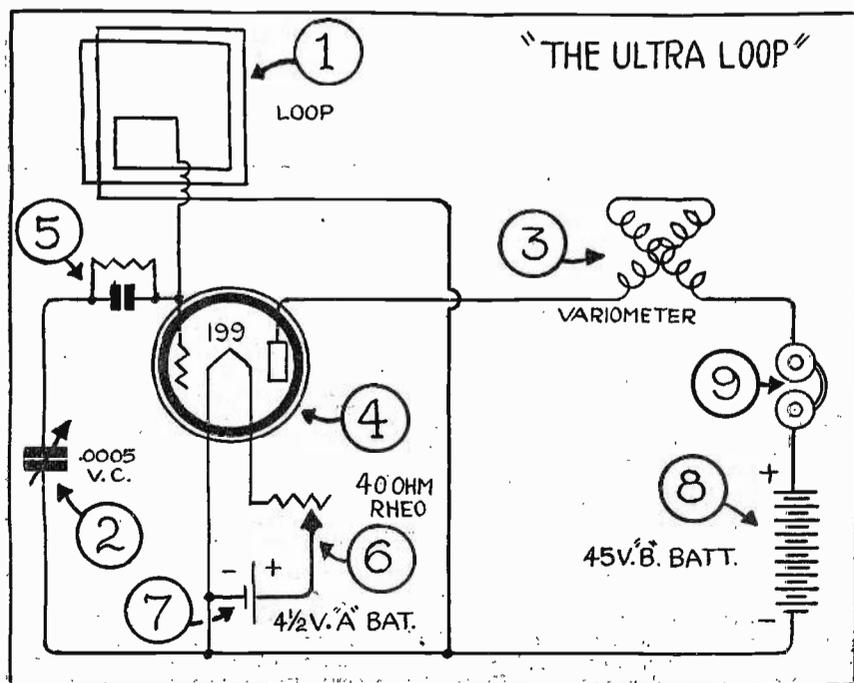
This same terminal marked F goes to the center connection on the $4\frac{1}{2}$ volt flashlight battery and to the terminal on a $22\frac{1}{2}$ volt B battery marked negative. The positive connection of this same B battery goes to the negative connection of the other B battery. From the positive connection of this B battery to one of the tip jacks on the panel. From the other tip jack on the panel to one side of the variometer. From the other side of the variometer to the terminal of the socket marked P.

From the outside terminal of the $4\frac{1}{2}$ volt dry cell to one terminal of the rheostat. From the remaining terminal of the rheostat to the remaining terminal on the socket marked F.

Now, if you will insert your tube in the socket, light it with the rheostat, connect your phones to the tip jacks, the set is ready to operate. Point the loop in the general direction of the station desired. Turn the variometer almost to the hissing point of the tube. Then revolve the variable condenser slowly.

The station will come in on this dial

(Continued on Page Eight)



Above is the schematic drawing of the Ultraloop. The units are numbered as follows: 1—Loop, 2—Variable Condenser, 3—Variometer, 4—Tube, 5—Grid Leak, 6—Rheostat, 7—"A" Battery, 8—"B" Battery, 9—Phones. The simplicity of the Ultraloop is well illustrated by this diagram.

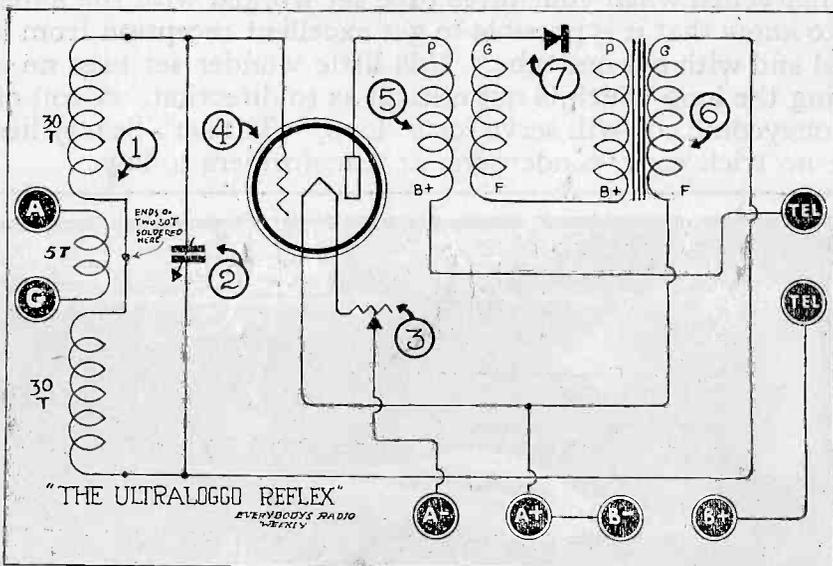
Ultraloggo Reflex "Roars" When Amplified with Two Stages

We showed you last week the correct method of adding two stages of audio frequency amplification to the Ultraloggo set, and told you that the amplifier could be used on the Ultraloggo reflex as well. The hookup for this is shown in the accompanying diagrams.

With the arrangement as illustrated, a set that will deliver almost the same results as a five-tube set may be had through using only three tubes.

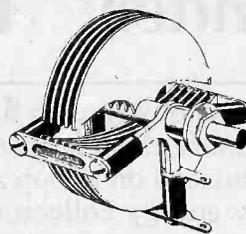
The greatest difficulty with multi-tube reflex sets lies in reflexing the second tube. In this outfit we have eliminated this by reflexing only one tube and amplifying the output of this.

You are cautioned not to use promiscuously chosen apparatus. A list will be given at the end of this article that should be adhered to. The main problem in this hookup is that of preventing distortion in the second stage of amplification. The input at this point is very great. Much greater in fact than the majority of three-tube sets. In order to prevent this causing



Schematic diagram of the Ultraloggo Reflex, which is reprinted in response to insistent demands from readers. It shows arrangement and relationship of all parts clearly.

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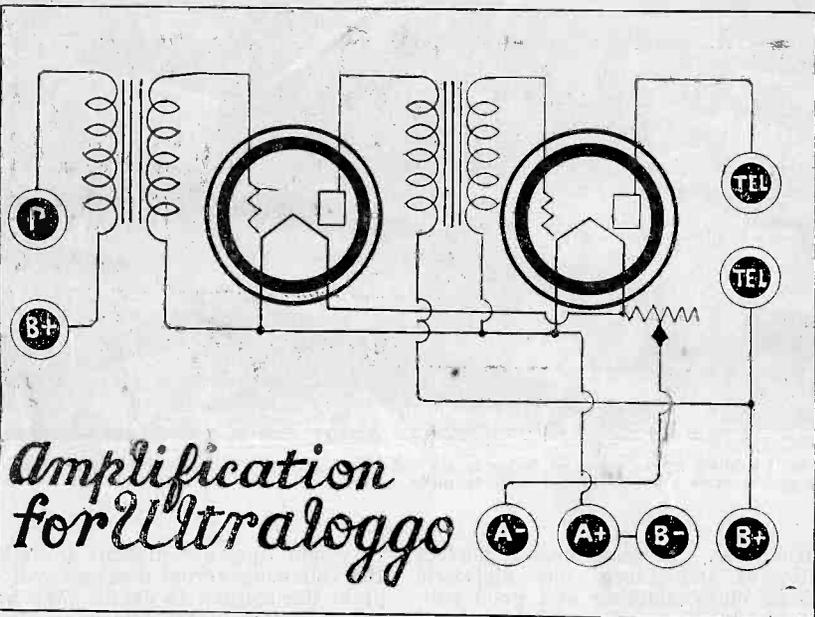
Minimum Capacity	Maximum Capacity	Tuning Ratio	List Price
.00005 M.F.	.0001 M.F.	1 to 19	\$2.75
.00006 M.F.	.00025 M.F.	1 to 42	3.25
.00007 M.F.	.00035 M.F.	1 to 53	3.50
.00007 M.F.	.0005 M.F.	1 to 74	3.75

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Here is a diagram of the amplifier which we recommend for use with the Ultraloggo Reflex. The combination will yield tremendous volume and the builder should be sure that his audio transformers are of the lowest available ratio.

distortion low ratio transformers MUST be employed.

Jacks allowing the user to plug in at the stage of amplification he desires are an essential feature. For local reception three tubes would be almost too loud for any ordinary use and should be necessary only on long-distance stations.

We did not give a detailed description of the method of inserting jacks in the amplification last week. The proper way is as follows:

All that the jacks do is to disconnect the primary side of the audio frequency and connect the phones or loud speaker instead. There are four springs used in the type of jack used here. Starting from the top to the bottom they are numbered consecutively. Nos. 1 and 2 and No. 3 and 4 make contact with each other. When the plug to which the phones are attached is plugged in the jack it pushes No. 1 up and No. 4 down, disconnecting them from No. 2 and 3. Therefore, No. 1 and 4 should be connected to the plate of the tube and the "B" battery. While No. 2 and 3 are connected to the "B" and "P" posts on the audio frequency transformer. Do not think this is hard as it is really very simple. Just follow directions as stated and the set will be wired right.

In the event that you have an amplifier that has higher ratio transformers than specified you may try placing grid leaks of about five megohms resistance across the primaries to "by-pass" some of the surplus energy. Of course this may and may not work. It is suggested purely as a matter of experiment.

The parts as used in the Ultraloggo amplifier (refer to the Oct. 24 issue of EVERYBODY'S RADIO Weekly magazine) are as follows:

- 2 Moore 3 1/2 to 1 audio frequency transformers.
- 2 Carter rheostats.

- 3 Carter jacks.
- 2 Walnut sockets.
- 1-7x9 Bakelite or Radion panel.
- 5 binding posts.
- Base board, screws, wires, etc.

Of course it is not necessary to use exactly the parts as specified. Any of the same type and values may be substituted.

Before mounting the instruments on the panel of the base board, place soldering lugs on every screw connection and tighten them up firmly. This will make wiring easier and will be much more efficient.

To construct the set, mount the parts in the arrangement as indicated and explained. Wire with No. 18 copper wire, making all leads as short as possible. Be sure to solder all connections firmly. Be careful that the insulating washers of the jacks do not get impregnated with the soldering flux. This would cause leakage and its accompanying noises.

SHOCK ABSORBERS FOR SET

Many sets particularly those employing drycell tubes are constantly bothered by microphonic or ringing noises that can not be avoided. A person cannot even walk across the floor of the room in which the set is operated without ruining reception entirely. This trouble may be remedied to a great extent by placing rubber sponges under the four corners of the set. These cushions may be obtained at any drug store or five and ten cent store and are very inexpensive.

CAPACITY NOT PLATES

When purchasing a variable condenser specify the capacity desired, not the number of plates. There are cases where a ten-plate, an eleven-plate, and a thirteen-plate condenser all have a capacity of .00025. Therefore, it can be seen that the plates really mean nothing.

First Aid Tips for Care of Panels

Radio panels can be divided into two classes, those with a polished surface, such as are generally used in receiving equipment, and those with a dull finish, such as slate, composition, fibre, or any of the resinous materials; sometimes rubber or similar products.

The type with polished surfaces quickly become marked, particularly in receiving sets, where the operator's fingers come into contact with the panel when tuning. Such a panel should be rubbed over with a soft cloth occasionally to remove any spots that may appear on its surface. Even with this care, however, one finds that all of the dirt or grease that may accumulate cannot be entirely removed.

The most effective method of cleaning is to rub down the panel with a rag saturated in alcohol, finishing off with a soft, dry cloth.

If the panel is not exposed unduly to dust and dirt the cloth used for frequent cleaning may be used with a few drops of raw oil. This brings out a brilliant lustre on the polished surface without injuring the panel in any way.

The type of panel that has a dull or mat finish, does not show the dirt so easily as the type with a polished surface. Many amateurs and radio phans, who construct their own apparatus, prefer this type of finish. An occasional rubdown with an oily rag, using raw oil in small amounts, keeps the dull finished panels looking neat.

Slate panels, generally used on shipboard for switchboards, charging panels or starting devices are best cleaned with an ammonia solution. These panels should be gone over whenever the bright work on them is polished, as some metal polish is frequently left on the slate, turning that particular spot lighter than the rest and detracting considerably from the generally good appearance of the panel.

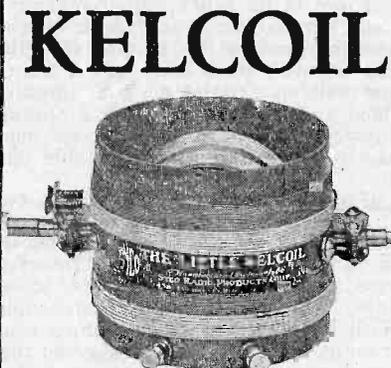
A few pointers on the working of panels in the construction of radio sets may be of help to those who experience difficulty in making these up:

A center punch should be used for laying out all holes. A spring prick-punch is preferable for this.

In drilling holes, begin to drill from the front side, clamping the panel to a board or to a bench to avoid chipping. Use sharp metal twist drills.

To countersink a hole, use a reamer or a larger size drill.

In polishing a panel for the first time use steel wool or sandpaper and raw linseed oil for surfacing. Follow this with a thorough rubbing down with pumice and oil, and then finish off with a few drops of oil and a clean, soft cloth.



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Here's More About the "Superduc" Easy-to-Build Receiver Regains Old Popularity

In this issue we give you additional instruction on building the original "Superduc," which was shown on this page last week. It is a variation of the old DeForest Ultra Audion circuit and enjoyed immense popularity last fall. The article and illustrations also explain the "Superduc De Luxe" which is built on the same principles. Our experimental laboratory is now working on an "Improved Superduc" which will be ready in the near future.

THIS week we are presenting to you more detailed information on the Superduc. For those who wish to try the one-tube and who cannot readily understand schematic diagrams a pictorial sketch is submitted.

This illustrates in every detail the exact hookup of the parts and panel and baseboard layout. It is a miniature copy of the original diagram shown of this circuit, which was one of the first pictorial plans ever made of a popular circuit.

It shows the use of a Bradleystat and leak. These are very good but any other standard parts that are fairly critical in adjustment may be substituted.

Care should be taken in selecting the grid leak. This unit controls the regeneration in a Superduc set to a high degree and should be as efficient as possible to obtain. Its range should be from $\frac{1}{2}$ to 5 megohms, with a very gradual variation. Those going from a minimum to a maximum in a half turn are too rough in their adjustment.

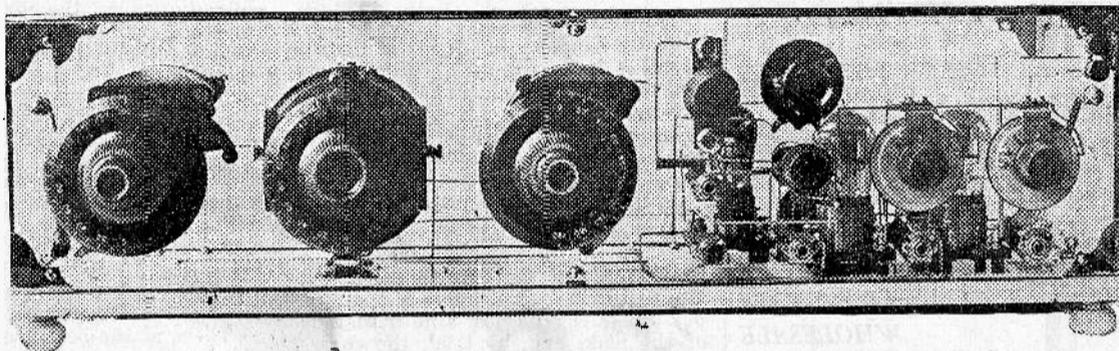
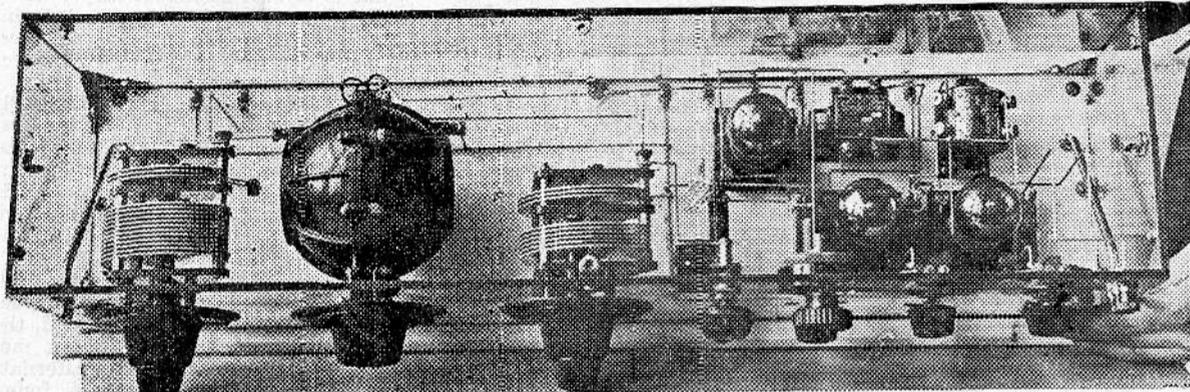
The variometer should be split. This means simply that the rotor coil and stator coil should be entirely separate from each other, leaving a tuning unit in which there are two coils with two connections each.

In the pictorial sketch the connections that go to the outside terminals of the variometer are those that go to the stator windings, while those that go to the two terminals in the rear are the connections to the rotor windings.

If your variometer happens to be designed differently from that shown, do not let it bother you. Just connect the rotor and stator in place of the connectors above and you will come out all right.

The variometer should possess other features also, besides just being "split." It should have a high ratio of inductance; that is, the rotor should have practically the same number of turns of wire on it as the stator. Those using 60-60 or thereabouts generally are most satisfactory. Never use one with more than eighty-eight turns as it will prevent the reception of low wave lengths. It should be closely coupled, the rotor coming as close to the stator as possible without touching it. This allows the maximum transference of energy without sacrificing fineness of tuning.

The variable condenser used in the original Superduc, as shown last week, was not of the Low-Loss type. This was because at the time the Superduc was first shown there were no Low-Loss instruments. These should be used though, as they will noticeably improve the results. The capacity is



Here are top and front views of the famous Superduc Deluxe. A glass cabinet was used because it allowed the parts and their arrangement to be shown with utmost clarity. As stated in the article, the only advantage in a glass outfit is in its appearance.

.001 mfd., or approximately 43 plates. Smaller capacities cannot be substituted if you desire to cover the complete broadcasting wave length band.

The antenna is next in importance. It must be of ample size. General specifications are, one wire, 100 to 125 feet long, in a straight line, not triangles, squares or two wires, and six to eight feet above and away from all obstacles. Some mouthful, isn't it? But it must be lived up to. A recent survey of antennas on buildings in a city block revealed that out of ninety observed, only four were good, and fifteen fair, while the remaining 71 resemble barbed wire entanglements more than radio equipment. Do not expect to get any results at all from the Superduc or any other outfit, unless you have a good antenna.

The photographs show the Superduc De Luxe, built in a glass cabinet. This illustrates the layout of parts and gives a general idea of the appearance of the set when finished. There is no particular advantage in using a glass cabinet except for appearance sake, as glass is not as good an insulator as either Bakelite or Radion. We used it because it allowed a clear view of the interior.

Possibly there may be some confusion as to the relationship between the Superduc De Luxe and the Superduc. These two sets are exactly the same in principle, the difference being in the addition to the Superduc of a .00025 variable condenser and a potentiometer.

The variable condenser is connected across the rotor terminals of the variometer that lead to the plate and grid connections on the tube. The potentiometer is connected directly across the "A" battery terminals, and the "B" battery negative, instead of going to the "A" positive, goes to the center connection of the potentiometer.

EVERYBODY'S Radio laboratory is preparing for you a 1925 model of the Superduc to be shown to you in the near future. There are going to be no additional parts required, so do not allow it to prevent your building the Superduc now.

The new set will have the fineness of tuning of the three-circuit regenerative, the volume and distance of the ultra and the amazing clarity of the Superduc which has never been surpassed.

NON-BATTERY SPEAKERS BEST

It is very expensive to have a loud-speaker that requires a battery to operate. It is also troublesome to continually have to remember to shut it off so as to prevent its running down the battery. The ordinary type of battery speaker consumes as much juice per hour as four tubes. For all purposes, except where extreme volume is necessary, those speakers operating directly off the set with no exterior source of power, are the most practical and economical.

TESTING "B" BATTERY

Never test "B" batteries with a pair of pliers by short circuiting them to see if you get a spark.

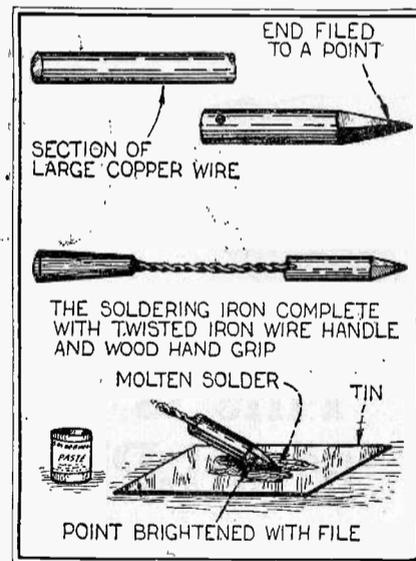
This would be ruinous to even a new battery.

Use a high-resistance voltmeter, and even then, leave the voltmeter connected only long enough to get a reading.

A 22½-volt "B" battery should be dispensed with and replaced with a new one when the voltage drops as low as 16½ volts. Replace the 45-volt size when it drops to 33 volts. This will insure better reception for you.

HOME-MADE SOLDERING IRON

Often a small iron for soldering in particular places is required. One may be made from a section of No.

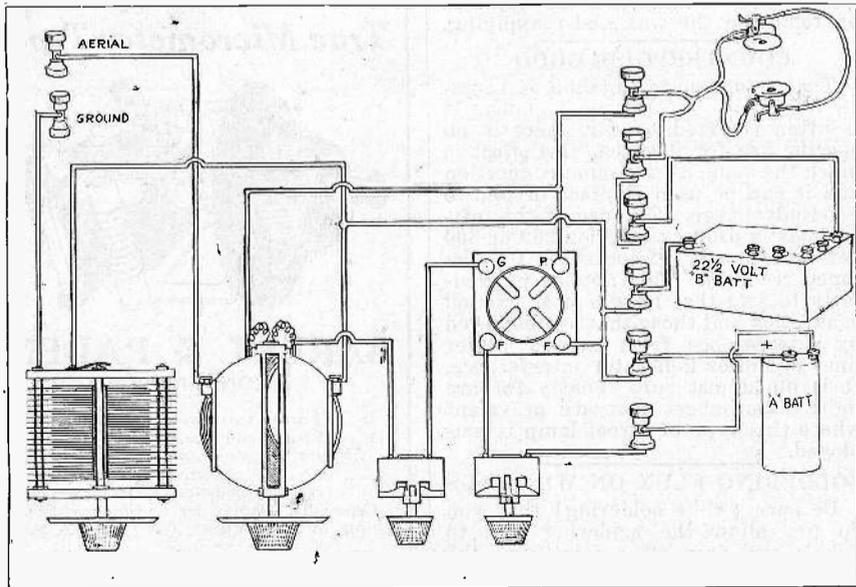


1 or No. 0 copper wire. The end is pointed with a file as shown in the accompanying illustration. A hole is drilled in one end through which is twisted a wire as per sketch, this to be driven or screwed into a wooden handle. This iron may be brought to a working heat in a small alcohol flame. It will retain its heat for a fairly long time.

COUNTERPOISE CONSTRUCTION

A counterpoise antenna consists of a strand of wire of the same gauge as the antenna wire itself stretched two or three feet below the antenna and on the same supports. The lead in from the counterpoise should be kept at least six or eight inches from the antenna until it reaches the set. This reduces the capacity coupling between the two and allows the reception of low wave lengths to more satisfaction. You are cautioned to use just as much care in putting this up as the antenna wire itself. Solder all connections and insulate at both ends thoroughly.

This magazine now is on all newsstands in Chicago every Wednesday. Elsewhere on Thursdays.



Above is the pictorial sketch of the Superduc as it was originally presented to the public. The parts, from left to right, are: .001 or 43-plate variable condenser, one split variometer, one variable grid leak and .00025 fixed condenser, one rheostat, one socket, binding posts, batteries and phones. You should certainly have no trouble hooking up your set from a diagram of this kind.

One-Tube Set Works on Loop This Tells How

(Continued from Page Five)

and can be located with fair accuracy. These same directions apply to any type of this set. It would be preferable though, for permanent installation, to use three dry cells hooked up in series in place of the flashlight battery, as these will give you much longer service and need be replaced but once in three or four months, depending on the amount of use they are given.

The parts used in the EVERYBODY'S Ultra-loop set are as follows:

- 1 loop aerial (home made or any standard make)
- 1 Walmart 23-plate condenser
- 1 Dayton Variometer
- 1 Bestone socket
- 1 Howard .00025 Grid condenser
- 1 Muter 3 meg. grid leak
- 1 40 ohm (small) Howard rheostat
- 1 4½ volt Eveready flashlight battery
- 2 22½ volt (small) Comet B batteries
- 2 Jones color tip jacks
- 1 10x12" Radion or Bakelite panel

Of course it is not absolutely necessary to use exactly the parts as specified. Any of equal value and possessing the properties as described will give excellent results. The loop, if

home made, should be wound of approximately 80 feet of No. 18 multi-strand insulated copper wire.

APPEARANCE MEANS MUCH

There was a time in the history of radio when the cabinet in which a radio set was built was for the purpose of concealing the crude-looking tapped coil arrangement that was within, and to create the impression that the inner workings were mysterious scientific instruments. Luckily this era is passing rapidly, and although some manufacturers and many home-builders continue to put their outfits in fruit crates and cigar boxes, the tendency is to improve the external appearance as well as the internal working. It may be true that you can't tell a man by his clothes, but you can nearly always tell a radio set by its cabinet.

USE A SHARP SCRATCHER

For scratching indicators or centering the position of a hole in a panel use a sharp needle pointed piece of very hard steel. Punches, screw drivers and nails make a messy looking job and are not accurate in their markings.

HOW TO RENEW CRYSTALS

The sensitivity of a crystal may be renewed by scraping the surface or washing in pure alcohol. How much this will help depends upon the type of crystal used. Silicon responds better, generally, than any other material.

TUBE BASE GRID-LEAK

A simple grid-leak can be made by drawing pencil lines on the base of the tube from the grid to one of the filament posts. The greater the number of lines the less the resistance of the leak, and, by trial, the correct value can be ascertained.

AIDS IN TUNING

Many circuits are very critical on the filament control or rheostat of the detector tube. Slowly raising or lowering the resistance by tuning the rheostat aids in tuning.

Tuning Units Operate

Beginners often wonder how the energy is transferred from the primary to the secondary circuit of a variocoupler, loose coupler or other tuning unit when there is no electrical connection between.

This phenomenon is explained by what is known as induction. When a coil of wire has a current passing through it it throws out a field of force of the form and nature of that which surrounds a magnet.

If another coil of wire is brought near the first coil so that its turns are within the bounds of its field of force, it will be found that a momentary current is produced in the second coil. When this happens the second current is said to be induced, in distinction from conducted.

However, if the current in the first coil is steady and the relationship between the two coils remains fixed, the induced current will last but a moment. But if the current is alternating, or oscillatory, such as is found in radio waves, the current in the second coil will be continuous and will follow closely the changes of current in the first coil.

USING INSIDE AERIALS

It is often impossible or inconvenient to have an outside antenna; in this case it becomes necessary to use a loop or some other inside arrangement.

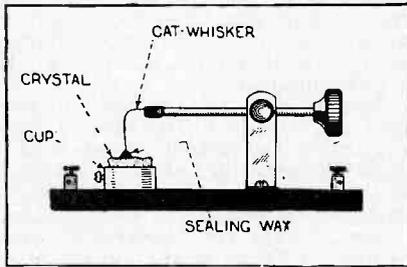
As most sets which do not employ radio frequency amplification will not operate with a loop, the inside type becomes a necessity.

These at the best are not more than fifty per cent efficient. The most practical types are those that are run in a straight line, as long as possible, down a hallway or flight of stairs. Next, a wire is run around the moulding, and the last method is a connection to the bed springs.

It is advisable to try several different types to determine which is best on your particular type set. Because of the various conditions under which they may be built it is impossible to specify fixed values. As stated before, do not expect anywhere near as good results as with a good outside wire.

WAX FIXES CRYSTAL

When you find a sensitive spot on your crystal a drop of melted wax



will hold the cat's whisker on it. Jars and jolts will not affect it. You will have, to all purposes, a fixed crystal, but one which easily can be adjusted by removing the wax and reapplying.

COUNTERPOISE GOOD

The counterpoise antenna is somewhat of a mystery to most of us. It is often referred to, but there is no specific use for it given. Its effect is much the same as a ground connection and it can be used in place of one to good advantage. The use of this oftentimes improves reception 200 or 300 per cent, mostly, of course, in the distance received. This applies particularly to sets that have a poor ground connection and those that are bothered by interference from nearby power lines or motor generator interference. It is an almost sure remedy for arc light disturbances that are prevalent where this type of street lamp is employed.

SOLDERING FLUX ON WINDINGS

Be sure (while soldering) that you do not allow the soldering flux to bubble and drop off a joint onto the windings of your tuning coils, as this destroys the insulation between turns and has been a frequent cause of inefficient operation of an otherwise really excellent set.



The Ideal Variometer

It is one that has the minimum of distributed capacity, the maximum of inductance, goes into and out of oscillation smoothly. It should have a one-hole mount, positive contacts and be economical in space required.

THE ESTRU Wins on All Points

There is no other variometer made like the ESTRU. Its patented design makes this impossible. Every turn of wire is surrounded by air. No bakelite—no rubber—no mud! It comes in two types—Grid and Plate. The Grid Type has Medium Inductance—1.3 MH. maximum. The Plate Type has Low Inductance—1.0 MH. maximum.

SAVES SPACE

It is the SMALLEST variometer made, but no toy! Illustration is one-fourth size. Occupies only 14 cubic inches space, compared to 95 of the ordinary type. Weighs only three ounces. Ordinary type weighs 24. And yet the ESTRU, when at maximum inductance setting has only 30 micro-microfarads distributed capacity, while ordinary type has 188!

Important Announcement

ESTRU'S New Low-Loss Coils are going to be the sensation of the season. Watch EVERYBODY'S RADIO for full details. They are worth waiting for!

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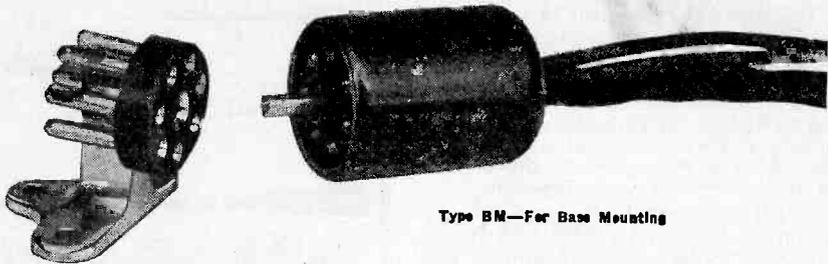
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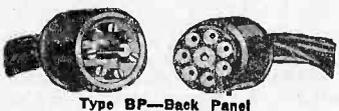
This is the Jones Multi-Plug Cable

Used in EVERYBODY'S RADIO WEEKLY
100% Low Loss Receiver

Described and Illustrated on Pages 3 and 4
of this Issue.

It was used because this set had to be 100% perfect. Many of the high grade factory made receivers are using the Jones Multi-Plug and Cord for the same reason—such as the Zenith, the Howard Five-Tube Neutrodyne and the Workrite Neutrodyne.

The Multi-Plug Cable takes all the danger out of battery connections, makes a receiver sightly, and permits connections and disconnections with a pull of the wrist. All good dealers sell it, or it will be sent by mail postpaid through your dealer. Price: B.M., \$4.50; B.P., \$5.00; P.M., \$4.00.



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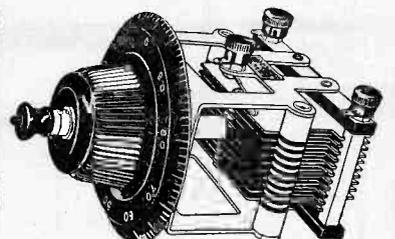
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How to Make Low-Loss Tuning Unit

This Home-Built Inductance Sharpens Tuning Set

This page in EVERYBODY'S RADIO Weekly is devoted every issue to the home constructor and experimenter. It is a clearing house of ideas and readers are invited to send in any new wrinkles or helpful suggestions. If a sketch is sent with the suggestion be sure to make it clear. It is not necessary to supply a finished drawing. A simple pencil sketch will suffice.

This Low-Loss Tuner Can Be Made by You

By JAMES GRAYAR WELLS

Here is a real low-loss three-circuit tuning unit that anyone can build at a cost of \$1.75. It is the equal in efficiency of most of the expensive tuning units on the market. It is superior to many. It is especially designed to operate in "Everybody's 100% Low-Loss" Receiver. The unit is shown on Pages 3 and 4 in this week's Model No. 5 set.

This unit will make the broadest tuning regenerative circuit receiver a selective one. It will give increased range and volume and will simplify both the construction and the operation of a set.

The materials from which it is built may be found at any retail radio store that handles small supplies and "findings." The radiophan who has a "hell-box" probably will have most of the material on hand. Here is what is required with the prices that I paid for each part at one of the local retail shops, the index figures being the same shown in the illustration:

Fig. 1—Bakelite tube, 4" long, 3" inside diameter.....	\$0.50
Fig. 2—Bakelite tube, 1 1/4" long, 2" inside diameter.....	.35
Fig. 3—Ten Bakelite or hard rubber insulating strips, 3" long, 1/4" square (These may be made of hard wood boiled in beeswax or paraffine.)	.20
Fig. 4—Forty-four feet No. 24 D.C.C. wire.....	.25
Fig. 5—Thirteen feet No. 28 D.C.C. wire.....	.10
Fig. 6—Seven feet No. 20 D.C.C. wire.....	.05
Fig. 7—Rotor shaft assembly, nuts, bolts, screws, etc.....	.50
Total.....	\$1.75

The tubing will have to be drilled for the rotor and panel bushing mounts. Take the large tubing and drill two one-quarter inch holes seven-eighths of an inch from the edge exactly opposite each other. Care should be taken on these two holes, otherwise the rotor which fits in them will not turn easily.

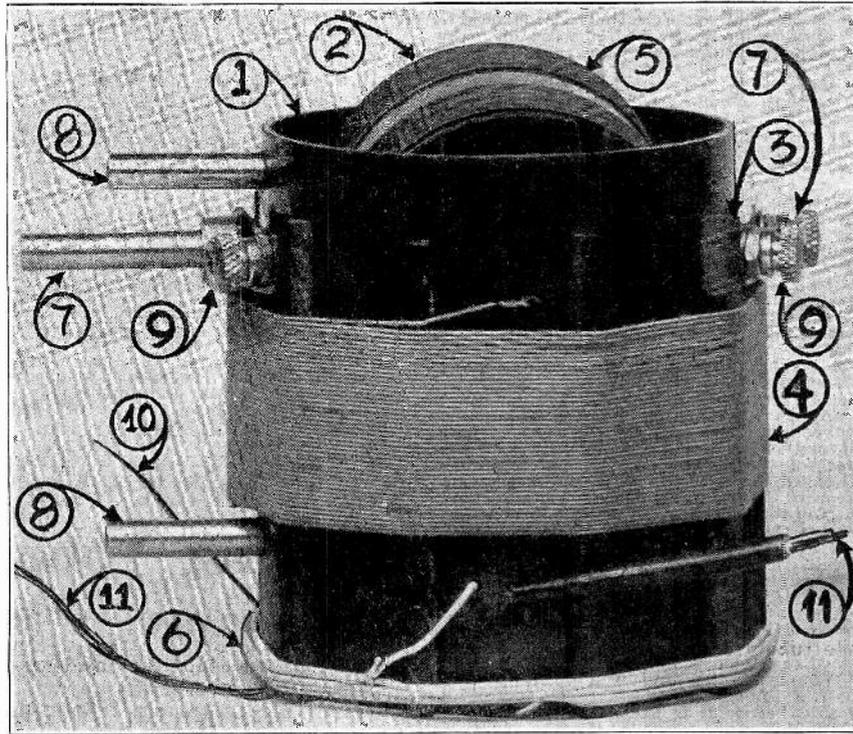
Now, in line with one of the quarter-inch holes, and on the same end, drill a five-thirty-seconds inch hole one-quarter inch from the edge. On the opposite end, and in the same line, drill the same size hole three-quarters of an inch from the edge.

The small tubing is drilled to take the rotor shaft. In the center of the tube two one-quarter inch holes opposite each other are drilled. The utmost care should be taken in drilling these holes or the rotor shaft will not turn true.

Now mount the insulating strips. Ten of these are spaced evenly one inch apart lengthwise on the large tubing. Use a small amount of shellac or collodion to fasten the strips to the tube.

Starting on the end opposite the rotor shaft holes on the large tubing, drill two small holes at the very edge. One end of the No. 20 wire is fastened in these holes. The form of winding may be either straight winding or bank wound. Eight turns are wound (the primary inductance) and the end fastened in two more small holes. One inch away from this ending two small holes are drilled and these are used to fasten one end of the No. 24 wire. Fifty turns (the secondary inductance) are wound tightly side by side and fastened as before. This will about end the winding next to the one-quarter inch hole.

Now, take the smaller tubing, for the tickler or feed back inductance, and, starting on one end, wind clockwise twelve turns, leaving three-



This is "Everybody's 100% Low-Loss" Receiver Home-Built Tuning Unit. Fig. 1 is a bakelite tube 4 inches long and 3 inches inside diameter. On it is wound the secondary, composed of 50 turns of No. 20 DCC wire. Fig. 2—Bakelite tube 1 1/4 inches long and 2 inches inside diameter for tickler winding of 25 turns No. 28 DCC wire. Fig. 3—Bakelite strips for mounting primary and secondary coils. Fig. 4—Secondary coil. Fig. 5—Tickler coil. Fig. 6—Primary coil. Fig. 7—Rotor shaft. Fig. 8—Panel mounting posts. Fig. 9—Tickler terminal posts. Fig. 10—Secondary terminals. Fig. 11—Primary terminals.

eighths inch space in center tubing, continue the winding for thirteen more turns. It is a good idea to leave all ends of wires at least five inches long, so that a direct unsoldered connection can be made to instruments.

The rotor shaft can be mounted inside of the large tubing, either spring contact or pig tail connection will suffice. An argument might arise on the spring connection, but as the resistance in the plate circuit is negligible, there is not much need of low-loss care here.

The large winding is the proper number of turns for a .00035 mfd. condenser. If a different capacity is used, the turns will have to be changed more or less to enable the operator to tune easily and use the whole condenser scale for broadcast wave lengths. Here are the approximate windings for standard condenser capacity:

For .0005 Mfd.....	42 turns
For .00035 Mfd.....	50 turns
For .0003 Mfd.....	54 turns
For .00025 Mfd.....	58 turns

If the dial is calibrated for one hundred degrees, the highest wave length used will be found at about 97. If the dial is calibrated for 180 degrees, the highest wave length will be found at about 175.

Mount the coil, using one and one-quarter inch No. 8 machine screws with a bushing made up of three or four large nuts or collars. This is to extend the unit three-quarters of an inch from the panel. The five-thirty-seconds inch holes are used for this purpose. If the screws are round head, preferably they should be nickled or blued. If the screws are flat head, the panel holes will have to be counter sunk and the screws painted black or blued.

The wiring connections for use in "Everybody's 100% Low-Loss" Receiver are as follows:

Start of eight-turn coil, goes to the aerial. The end of eight-turn coil goes to ground and negative filament. Start of large coil or secondary goes to grid leak and condenser. End of large coil goes to ground and filament minus.

For the winding on small tubing or tickler coil, one terminal goes to plate terminal on socket, the other to "P"

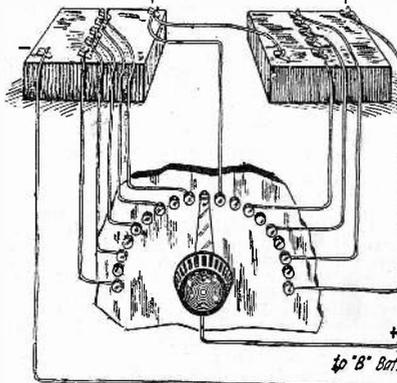
on audio frequency transformer or to phone binding post if a single tube set is used. These ends might have to be reversed to get the proper feedback action. This can be determined after the set is hooked up, and the builder should make the leads long enough to make changes in connections easy.

The phan should stay away from high frequency cable or Litzendrath as it has been proven inefficient for home use, as particular care has to be taken in making connections to the wire. The small increased efficiency of this wire does not warrant the danger or risk from broken strands you are running when you use it.

VARIES PLATE VOLTAGE

The accompanying illustration shows a simple and inexpensive tap switch arrangement to regulate "B" battery voltage that can be put together by anyone in a few minutes' time.

The drawing is self-explanatory except that it might be well to explain



that the purpose of the dead contacts is to prevent short circuiting the cells of the battery in case the switch is left touching two adjacent contacts.

A tap switch comes in handy on sets which are critical as to the amount of current on the plate of the vacuum tubes and especially in the case of experimenters who use the same set of batteries to test out various experimental hook-ups which may use different types of tubes and consequently require different "B" battery voltage.

Makes Loop on Door That Swings

A simple method of arranging an aerial on a door should prove useful to flat dwellers and others whose space is limited.

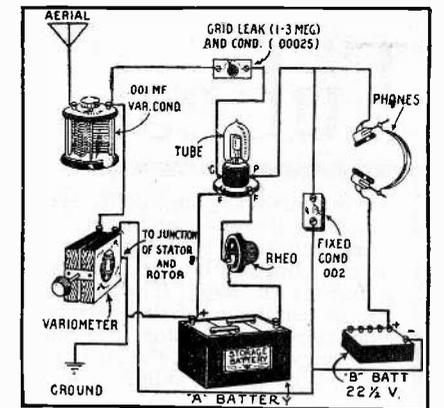
At the top and bottom of the inside of the door a piece of wood is attached having twenty-three saw cuts in it, spaced one inch apart. No. 20 single cotton-covered wire is then wound from top to bottom.

The wood strips are each half an inch thick, two inches wide, and twenty-seven inches long. It is necessary to start the winding on the outside edge of the bottom strip, so that the last winding will bring the free end at the inside of the upper strip. Plenty of slack should be left at this free end, to connect with the aerial terminal of the set.

In actual operation it was found that there was considerable directional effect when used in connection with distant stations, and to overcome this effect, a spring was attached to keep the door closed. A stout cord attached to the door enabled the operator to pull open the door as far as required to bring in the desired station. This arrangement has been found successful, and has brought in distant stations.

SIMPLE SET TO BUILD

A regenerative receiver having but two controls may be connected up as shown below. Note that the ground lead goes to the junction of the rotor and stator. Since this is the case, only



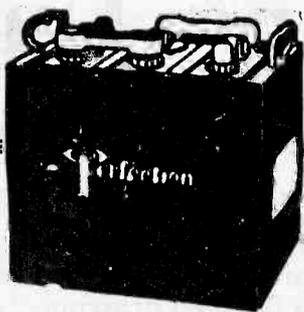
one-half of the total inductance of the variometer tunes the antenna circuit. Therefore, this instrument should be of quite a large size.

The "B" battery should be variable from 16 to 22 1/2 volts. Regeneration is accomplished in this case by means of the well-known ultra-audion effect.

If trouble is found in reaching the required wave-length, the variable condenser may be connected across the variometer from the antenna binding post to the center tap which connects to the ground. In this case, the antenna should be connected directly to the side of the grid leak which goes also to one side of the variometer.

MAKES PANEL MARKER

Many home builders scratch the panel to make a marker for their dials so that they may obtain a reading. Instead of making a vertical line, as is customary, a little round circle may be made with the point of a drill. This may then be filled in with a little white lead or any white paint to contrast with the black panel.



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PHORUM FOR PHANS

(Continued from Page Two)

selectivity and volume, and it does exactly what Mr. Wells claimed it would do, and when Mr. Wells claims anything he has proof to back it up. You cannot make a mistake by making the "Old Reliable" or a modification of same which Mr. Wells calls the "Everybody's 100% Low-Loss" receiver. On two tubes the local stations come in a-roaring but you need the extra tube for distance, and regeneration takes the place of radio frequency. Neutrodyne does not employ regeneration so must have radio frequency whereas the "Old Reliable" does away with the two extra tubes and it even has more volume than a neutrodyne. Some phans may be thinking of making the old Reinartz circuit, but I would suggest that they keep away from it for a three-tube Reinartz has no more volume than a one-tube "Old Reliable," and it is not selective at all. A friend of mine junked his Reinartz, which was a beauty, after he heard the volume and selectivity of my set.

As I said before, do not be afraid to take Mr. Well's suggestions. They can be depended upon. You cannot go wrong by following out his ideas, I and others had success with his ideas, which are practical ones and no guesses about them, and there is no reason why you should not have success.

Remember, when WEBH and WGN were ten meters apart, well the "Old Reliable" cut completely through them and got either of them without the faintest whisper from the other. Selectivity, I should say.

Again I say, why use five and seven tubes when three tubes will do the trick? Every extra tube you have makes the set cost so much more to operate, more tubes to buy, "B" batteries to buy often, storage battery to charge oftener, and other things here and there. I would never think of exchanging my "Old Reliable" for a super heterodyne, for I could not afford to keep up the super. The upkeep would be three times as much as the "Old Reliable." Same thing with autos. I cannot afford a Cadillac or a Packard. I could not keep them up, but I get just the same results with a Ford or a Dodge.

You can't go wrong by making "Everybody's 100% Low-Loss" receiver for as I said before it is the same as the "Old Reliable" and much easier to tune.—Sidney J. Keclik, 2734 West 23rd Place, Chicago.

The editor is mighty glad to get this letter from one of his old followers—not so much because his pride is tickled, although we are but human and like the sweetened words the same as anyone, but because our friend is giving some mighty good advice to our readers, many of whom are new to us. There is no question about the reliability of "Old Reliable." It is all that Mr. Keclik says. There is no receiver any more selective nor one with more volume. "Everybody's 100% Low-Loss" receiver is our 1925 model of "Old Reliable." It does all that its daddy does, but does it with fewer parts, at less cost and with much less effort.

Values Everybody's Like Teeth

Editor—About a week ago I got my first copy of EVERYBODY'S RADIO Weekly from one of the loop newsstands. I didn't think much about it until I got home that night and took a little time to look it over.

Well, my two-tube Reinartz was going at the time, but I want to say that no sooner had I gotten started reading this little magazine of yours than I was on my way also to start making the set I was reading about. It is the one you call the Ultraloggo, and it sure must be a dandy.

Then, again, today I was in the loop and spotted one of your magazines in a radio store. I dug down and passed the clerk a jitney and away I started for a car. I could hardly wait until I got on the car so I could see what the good news was this week. Then when I spotted Mrs. R. M. Smith's article about the Ultraloggo set I knew for sure that I was going through with my plan to make myself one.

So far I have just the two copies of your magazine, but anyone trying to get them away from me would have as hard a job as trying to persuade me to part with my teeth.

I hope I will have the same results as Mrs. R. M. Smith did, and will let you know how things develop. Wish you every success.—J. H. Easson, 2218 Iowa street, Chicago.

We Call "Good Parts" by Name

EDITOR—Your magazine "fills the bill" for amateurs and broadcast listeners and should merit success. Your magazine can easily be sold on its merits alone, and without any premiums, as it fills a long-felt want of the radio enthusiast. We are told in other magazines to use "good parts" but are given no way of accurately determining good parts, except by experience, after we have bought and paid for them (and perhaps scrapped them).

I appreciate that your paper is an advertising medium in your news columns as well as advertising columns, but I would rather have that than a lot of bunk handed down by some so-called papers for the "people." At least you give us something authentic, concise and really useful.

So more power to you and may you grow and prosper as long as you don't prostitute your high office of confidential advisor to countless radio phans, and put your advertisers' dollars ahead of the good services you can render subscribers.—Harry Schott, Cleveland, Ohio.

Former Publisher Offers Aid

EDITOR—Enclosed find \$1.00 for which please send EVERYBODY'S RADIO for six

months. You have an interesting and helpful magazine for those interested in Radio and I send my sincere wishes that it may be very successful. No news or radio dealers in this city know about it, so if you care to send a few sample copies I will be pleased to distribute them where they will be helpful to you. Was a publisher years ago and know the problems of establishing a new magazine. Yours truly, F. A. Draper, Des Moines, Iowa.

Likes Hookups and Guarantee

EDITOR—I would like to have you know that I am certainly pleased with your magazine because I have tried several of your suggestions and have obtained wonderful results from them.

After reading your guarantee which appears on the second page of your last edition (Oct. 25), I am sure your publication will go "over the top," as the average person is very skeptical when buying radio parts and wants results one way or the other.—William Marshall, 3356 Clifton avenue.

Calls It "Everybody's Help"

EDITOR—Your publication is greatly appreciated and is really "Everybody's Help" in radio problems.—Oscar G. Gregory, Chicago.

Destined to Be a Winner

EDITOR—Please send me copies of issues No. 1, 2 and 3. Hagerman's connection with your paper will certainly make it a winner.—W. B. Lathrop, Monadnock Bldg., Chicago, Ill.

Grid Leak Aids Tuning Your Receiver

The grid leak in most receivers is a very critical part of the apparatus. It greatly aids in tuning.

The action of the grid leak must be explained in connection with the action of a vacuum tube.

The tube filament when heated gives off a stream of negatively charged electrons. The plate of the tube is charged positively by the "B" battery. Unlike charges attract and like charges repel, so the negatively charged electrons are drawn over to the positively charged plate from the negatively charged filament.

There is a mesh of wire between the filament and plate through which the electrons must flow, and this is called the grid.

The incoming signals go directly to the grid, and as they are positive they cause the grid to become positive.

The grid being between the filament and plate, and, being positive, adds further inducement to the electrons to leave the neighborhood of the filament and flow to the plate.

When the grid is negative this places a barrier between the filament and plate and practically stops the flow of electrons, and consequently the signals in the phones.

HEAT THE IRON RIGHT

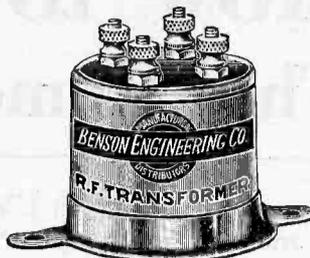
When heating a soldering iron with a blow torch or gas flame do not heat the point, but the body of the iron about two inches from the point. This prevents burned flux from accumulating and hindering the tinning of the iron, which is so essential.

TAKE TUBES OUT

When repairing or changing the battery connections on a receiving set it is wise to remove the tubes from their sockets. By doing this all danger from blowing them out accidentally is removed. It is not necessary to remove the tubes entirely out of the socket. They may be disengaged from the slot in the socket and let lay on the top, the prong on the side holding it away from the prongs.

TALKING MACHINE FAIR SPEAKER

Although the talking machine is a perfect tone reproducer, it is not as good for use as a loud-speaker of the better class of horns. The results obtained are clear and natural, but are nowhere near as loud as with a standard speaker. For an inexpensive method of obtaining loud-speaker results it is, of course, better than a cheap horn, and if equipped with a good unit is very clear and natural in tone.



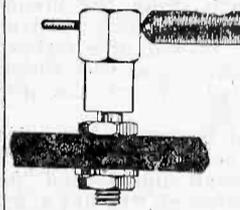
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It is the little wonder that was used in "EVERYBODY'S RADIO Weekly, Oct. 25 issue, for the "Ultraloggo Reflex." Don't take a substitute—they'll disappoint you. Just any transformer won't work. If your dealer hasn't them, telephone us and we will see that you're not disappointed.

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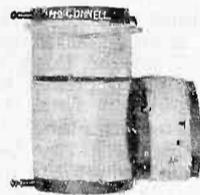
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If Code Bothers, Learn to Read It

Use Potentiometer and Cut Down Tube Squeals

This page is a regular weekly department conducted especially for the operator of home radio receiving sets. Suggestions on efficient tuning, care and maintenance of tubes, batteries and other apparatus and equipment will find space here. If you have suggestions for timely articles let us have them. We will try to see that they are given space.

Learn Code to Keep Tab on Offender

Listeners-in complain that amateurs interfere with broadcasting. They do not actually know who is interfering, but simply that some one transmitting code is interfering with their reception. Half the time it is probably ships which are sending or shore stations handling regular commercial work.

What these listeners-in should do, department of commerce officials say, is to learn to read code so they can identify the senders, getting the calls in order to report the offending stations if violations are found. Besides reporting the call letters of amateurs breaking the regulations, efforts should also be made to ascertain and report the wave length used.

Here is a real service those who own receiving sets can render simply by learning the code and reporting breaches of regulations to the district radio supervisors or the department proper. Present regulations make the air free to amateurs on 150 to 200 meter waves, except between 8 and 10:30 p. m.

Amateurs have the right to use spark or tube sets; those owning tube sets can communicate by either code or voice. Broadcasting, as such, is forbidden amateurs; that is, music and entertainment cannot be sent out but two station owners may converse except in the evening broadcasting period. Special amateurs have the privilege of using wave lengths as high as 220 meters.

International Morse is the code used by amateurs, and its rudiments should be mastered within a few months. Amateurs must obtain a government license to transmit.

RADIO FREQUENCY DATA

There are two commonly used forms of radio frequency. They are transformer coupled and tuned. These are very similar in many respects to one another, the main difference lying in the fact that one type is variable in the relation of the primary to the secondary, while the other is fixed. Naturally, from this it would seem that the variable would be preferable to the fixed, as it would be more flexible and could be changed to suit requirements. To a certain extent this is true, but a difficulty arises in getting transformers of the proper mechanical construction. It is really a matter of just what is desired in a set. If extreme finesse of tuning and distance is required the tuned radio frequency is best, although, with it, an outside antenna is required. If simplicity of tuning and compactness of design is desired, the transformer coupled is preferable. Two favorable features of this are that it operates with a loop antenna and will bring in distance. It is used in all portable outfits and is gaining popularity in console and talking machine type installations.

VARIABLE CONDENSER CRITICAL

The proper capacity of the variable condenser is very essential. This unit determines in the majority of circuits the wavelength range of the set, and if it is not exactly right will prevent the set from receiving on those wavelengths that the capacity of the condenser will not cover. If your set will not receive high wavelengths increase the condenser capacity; if it will not receive low wavelengths, decrease the capacity.



Photo by Kadel and Herbert
Modern parts and sets have removed the last drawbacks to radio as the all-around entertainer, and now anyone may enjoy the best of the broadcasters' art without the necessity of the slightest mechanical knowledge. The photo shows Miss Alice Adams, once famous actress, listening in on the work of some of her successors on the stage.

How to Prevent Oscillations in a Set

Regenerative sets that have a tendency to oscillate too freely, even when the feed-back control is set as low as possible, may be stabilized by following one or more of these suggestions:

- A—Cut down the plate voltage on the detector tube.
- B—Reduce the filament current.
- C—Use a larger by-pass condenser across the telephones.
- D—Connect the grid return to the positive side of the "A" battery.
- E—If three honeycomb coils are used for tuning use the next size smaller coil for the tickler.
- F—Use a lower resistance grid-leak (a variable grid-leak would be best).
- G—Use a smaller grid condenser.

By following out one or more of these suggestions the trouble can be eliminated and the set will function much more smoothly. Try out all the schemes on DX reception and you may be able to increase the range of the set as much as one hundred percent.

PREPARING BASE BOARDS

There is a right and a wrong way even with the often-neglected base-board. Be sure it is dry. Kilm dried is preferable. Boil it in paraffine. Never use shellac of the common kind. Do not use paint or stains. Have it heavy enough to be a real support for the panel. It should be at least three-quarters of an inch thick. One inch is better.

SOME HELPFUL HINTS?

If the tube doesn't light it's probably burnt out.

In order to get good results the phones have to be connected to the set.

Dropping your tubes on the floor is apt to seriously impair their efficiency.

A good "B" battery should have at least ten volts of current.

If the call letters sound like California and still resemble Davenport somewhat, it must be California.

If you wish a mandolin accompaniment to your reception try dropping a few pins and needles and a button or so down the loud speaker throat.

For a lot of information about receiving sets, ask the guy who hasn't got one.

TUBE PROTECTS "B" BATTERY

There is no necessity of disconnecting "B" battery when set is not in use. There will be no discharge as long as the filament of the vacuum tube is not lighted by the "A" battery current. This is because the tube is not a conductor of electricity except when a stream of electrons is flowing through the heated filament. It is the heat in the filament and not the potential across it that causes the emission of the electrons. When lighted the tube is a lively piece of mechanism. When cold it is quite dead and almost a perfect insulator. The high resistance in the unlighted tube effectively prevents the discharge of the "B" battery.

Subscribe to EVERYBODY'S RADIO—only \$2 a year for 52 issues.

Traps Howl of Tube and Then Diverts It

In receivers utilizing the principle of regeneration it is not always a simple matter to control the functioning of the vacuum tube closely enough to permit the greatest amplification of the signal without squealing caused by local oscillations in the tube.

While experimenting with a set of this type an amateur has discovered that an ordinary potentiometer of 200 to 400 ohms resistance inserted in the aerial lead-in wire makes it possible to carry regeneration to a higher degree without affecting the stability of the tube.

Without some such scheme as this it is not possible to reach the maximum in regeneration before tube oscillations commence.

CIRCUITS BASICALLY THE SAME

All circuits, regardless of their name, are basically the same in principle. For instance, the three-circuit regenerative includes "The Old Reliable," the Haynes, EVERYBODY'S 100% Low Loss, and several other well known outfits. This does not mean, though, that all of these circuits work the same and are composed of the same type instruments. It means that they consist of three distinct circuits composed in such a way as to make another circuit. In the EVERYBODY'S 100% Low Loss set there are the primary, secondary, and plate, or tickler, circuits. It is how these circuits are controlled that constitutes the difference in the circuits. Suppose we take a practical example: A Ford is a four-wheel car, so is a Cadillac; but that does not mean that they are the same quality of car. It is not fair to say that a man imitates if he uses someone's else circuit and improves upon it by using better apparatus, compacter parts' layout and originality in the design of his instruments, as these features are of even more importance than the circuit itself, just as the material in a suit of clothes is more important than the style.

EVERYBODY'S BEST SCHOOL

It is often asked where a person may go to get a complete working knowledge of the science of radio reception. Some wish to go to schools, others wish a correspondence course. Neither of the above is as yet practical as there are so few teachers that actually know anything about radio, and those that do are probably not fit to be teachers. As for a correspondence course, such a thing is ridiculous. The examples given would be out of date in two months and all that would be learned would be worthless. The best method to really gain a knowledge of the intricacies of this most fascinating of all sciences is by reading and building the various sets as described in a good radio publication. In this manner you are always up-to-date, and the information given and the practical knowledge obtained will give you a radio education that could not be obtained in any other manner.

RHEOSTAT CONNECTIONS

There is no polarity to a resistance and consequently it makes no difference which side of the rheostat you use, or which "F" post of the socket you use for the filament, plus or minus. However, if you should decide to use one post as the filament minus, then continue to do so throughout.

How to Purchase Condensers for Your Set

There is no more important unit in a radio receiver than the variable condenser; yet it is the one with which the public has been most consistently "gypped" by the unscrupulous "fly by night" manufacturer.

Unless the condenser is designed and constructed very carefully, the variable condenser will wreck even the most efficient circuits.

The majority of the cheap variable condensers available on the market suffer from a number of ills, any one of which is fatal.

Their plates are too thin, and easily bent out of alignment with the result that they short circuit at certain settings, or else they are so badly spaced that there is not an even and steady variation of capacity when they are adjusted.

Another bad feature is the losses sustained through had insulation of the rotor from the stator plates.

In condensers which use metal end plates it is extremely important that the bushing in which the rotor shaft revolves be constructed of the highest grade of hard rubber possible. The best arrangement, of course, is hard rubber and plates.

There are two forms of contacting with the rotor plates, one by means of a spring rubbing contact and the other with a flexible joint. Of the two, the latter is by far the most positive and the most efficient. A bad rubbing contact is the cause of more losses in a condenser than anything else.

In many of the condensers of the better type, the only contact arrangement allowed for the rotor plates is a metal extension which fits around

the shaft of the rotor plates underneath the locking nut. Where the mechanical design is not absolutely accurate it is quite possible that a distinct "open" will be experienced at different points in the setting of the condenser.

The best possible condenser design is one whereby there are positive stops provided in such manner that when the rotor plates are completely meshed inside the stationary plates they cannot be turned any further in the same direction, and correspondingly there is a stop which prevents any further movement when the plates are entirely outside the stator plates.

With such a condenser it is possible to solder a flexible copper gauze wire connection to the shaft. The other end of this flexible connector is joined to the binding post provided to enable the user to wire the condenser into his set. This type has a minimum of losses.

The majority of trouble cases in receivers can be traced to bad variable condensers. This is particularly true of sets which are very broad in tuning.

It is not possible to get good selectivity with condensers which are inefficiently designed.

Another difficulty that invariably will result from badly constructed condensers is variable signal strength in the receivers. This is, of course, due to the bad contacting arrangements with the rotor plates. In fact, a lot of extraneous noise in the set can be traced to this very same source.

Just as it is important to use the best of variable condenser, so it is necessary to use every care in mounting it on the panel and wiring it into the set. The holes should not be drilled into the panel until it is absolutely sure that they are accurately placed.

It is always best to use the manufacturer's template for this purpose. The slightest error in alignment of the holding screws will place a tension on the condenser and pull the rotor plates out of the true position.

Radio Waves Get Through Very Small Slits

We are likely to talk rather loosely about the "screening" effects of steel structures, about the impossibility of receiving radio signals inside metal buildings and the like.

No doubt such screening effects do occur, but their exact nature seems never to have been investigated with any accuracy and completeness. Or rather, the first investigations of this character have recently been reported to the Institution of Electrical Engineers (London) by R. H. Barfield.

Loop antennas attached to receiving sets of great sensitiveness were placed inside continuous metal tanks, inside open-ended cylinders of wire or metal, inside cages of wire screen and in various other situations where screening was to be expected.

The results indicate that the most important feature of an effectual screen is the existence of metallic circuits in it. For example, a cage of wire netting is an effectual screen if the wire is electrically connected at all joints. A mere series of wires arranged in closed loops is effectual. But wires that do not make closed circuits or wire netting that is not electrically connected to form a similar closure are not effective.

Perhaps the most striking instance reported by Mr. Barfield is that of a receiving loop that was entirely enclosed in a soldered envelope of tinned iron, as though it were inside the inner tube of an automobile tire. The two terminals of the coil came out through very small insulated holes in the iron. This cover produced a practically perfect shield so long as the metal of it was continuous.

But when a transverse slit was cut in the metal of this envelope around the receiving coil enough of the radio waves to produce a fairly strong signal immediately penetrated the slit. Even when the slit was as narrow as it was possible to make it without producing actual metallic contact a substantial amount of radio energy continued to penetrate it.

It is hard to reconcile these results with the supposedly great screening ascribed to the steel frames of American skyscrapers. It seems evident that the exact effects of such metal structures on the radio waves deserve more careful and accurate study than they have received.

Here is an excellent problem for amateurs who are experimentally inclined. A model of a typical skyscraper, showing the exact strength of signals obtainable on each floor and on each part of the floor, might be of the greatest value to radio science as well as to the problem of how to provide for the reception of broadcasts in such buildings.

USE PARTS SPECIFIED

If a magazine specifies certain values for an instrument use that value. It probably took hours of work to determine the correct specifications. Transformer ratios cannot be varied more than one or one and one-half points. A 23-plate variable condenser cannot be used for a 43-plate or any other, or vice versa. Thirty turns of wire do not mean twenty-five or thirty-five turns. One-inch coupling does not mean three-eighths or five-eighths inch. Cardboard is not the same as bakelite or hard rubber. No. 22 wire is not the same as No. 24-gauge wire. In other words nothing is just as good. Use exactly as specified to the last degree. Otherwise do not blame the circuit if it does not work. An automobile won't run on kerosene. Neither will a radio set work with apparatus that was not made for it.

CRYSTAL SET GOOD REPRODUCER

If one is satisfied to listen to local reception a common crystal set will deliver excellent results. The music coming from a crystal set is as near perfect as can be had from a radio set. Its only drawback is that it will not receive distance and has only telephone volume.



Give Your Tube Perfect Contact

Poor contact between tube and socket causes endless trouble in sets. The troubled phan may hunt an hour for the cause of imperfect signal reception only to find that the tube has poor electrical contact.



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The superiority of the HOWARD Socket lies in the "Sure Contact" which is made to the side of the tube pins and not to the ends. The contact arms have more than twice the spring value found in the average socket, as well as a full one-quarter-inch contact surface applied to the side of the pins. These contact arms cannot lose their spring tension and can be relied upon to make a permanent, perfect contact. The base of the Howard Socket is moulded from the highest grade bakelite. **\$1.25** Each

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The special feature of this binding post is the holding device which positively prevents the binding post from turning after it has been mounted. The top is made of the same high-grade insulating material as used in the manufacture of other Howard products. **20c** Each

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This magazine now is on all newsstands in Chicago every Wednesday. Elsewhere on Thursdays.

Your Questions Are Answered Here

Expert Aid on Construction and Operation of Sets

Questions can be answered only by mail. Write your query on only one side of the sheet and enclose diagram of your circuit whenever it will aid us in locating your trouble. Address all letters for this department to Question and Answer Dept., care of this magazine. Enclose stamp and addressed envelope if answer by mail is desired. In writing to other departments, use a separate sheet of paper.

Asking a Lot of a Set

563—CHICAGO: Will you kindly advise me which of "Everybody's 100% Low-Loss" receivers will serve me best of those published since Oct. 4, 1924. I live at 4909 Winthrop Ave., about 800 to 700 yards from WEBB and the same distance from WQJ, as a matter of fact directly between the two. I want to get a set selective enough to tune these two stations out and get distance, or tune one out and listen to the other. I would deem it a great favor if you would advise me by return mail, stamped addressed envelope enclosed, whether or not any of the three "Everybody's 100% Low-Loss" sets described in your issues since Oct. 4, would serve my purpose and which you would recommend as the best one for me to choose as regards selectivity, distance, volume and clearness, considering my unfavorable location. If possible I would also thank you for some data on the parts to be purchased and the layout of the hookup. I intended getting a three-tube Ambassador set but a neighbor of mine has one and is troubled with interference from WEBB and WQJ. I am thanking you in advance for helping me out of my difficulties as I have been having an awful time trying to find a suitable set for my needs, without expending about \$400 for a super-het. Also please advise, approximately, what distance I can get with the set you describe, and whether it can be operated on dry cells, or if a storage battery is better. I have been interested in a three-tube set and I believe those you described are all three-tube sets.

Model No. 1, described in our October 4 issue, and the Model No. 4, described in our October 25 issue, would best suit your purposes as the two tuning units employed in those receivers have an adjustable primary. By using extremely loose couplings on either one of these units you should have no trouble whatsoever from the interfering stations named, although you are asking considerable of a radio receiving set. Your success in eliminating these two stations not only depends upon the tuning unit and the quality of your condenser, but also, very largely, upon your own delicate touch on the control dials. You will have to pay particular attention to the tickler. This should be worked as close to the oscillation point as you can keep it. The primary coil must be placed as far away as the mechanical limitations will permit, without losing too much volume. You may have to sacrifice some volume to completely eliminate the interference. We know of no radio receiving set or circuit, not excluding the superheterodyne that will tune any finer than "Everybody's 100% Low-Loss" Receiver. If, upon constructing this set, you do not obtain all the selectivity that you require, you must admit that your demands are severe, we suggest that you try the Interference Eliminator described and illustrated on page 9 of the October 18 issue. This device either may be built inside of your cabinet, provisions being made for this installation, or it may be built in a separate unit and attached by the proper connections from the outside. The Ambassador coil, used in "Everybody's 100% Low-Loss" Receiver circuit, as well as the Little Kelcoil, can be made to work with almost equal efficiency. However, it would be necessary for you to rewind the primary. It is too closely coupled to the secondary for extreme selectivity. The primary on either one of these coils consists of 15 to 16 turns of wire. Our circuit calls for only eight turns. You will have to reduce the number of turns accordingly. In doing so, place the eight turns as far away from the secondary as the construction of the turning unit will permit. "Everybody's 100% Low-Loss" Receiver, if constructed of the parts specified by us and if hooked up exactly in the manner and form we have advised, will bring in to you every worth while station in the United States, including both the Atlantic and Pacific coast stations. This receiver may be operated with dry cells and dry cell tubes with better results than other circuits will give using the same tubes and batteries. The smaller tubes, however do not have near the volume nor range of the larger storage battery tubes and you can expect to get less service out of them when it comes to distance and amplification. We would advise in your case that you use the 201A type tube with a six-volt storage battery.

Interference Eliminator

554—CHICAGO: I have October 18 copy of EVERYBODY'S RADIO Weekly. On page 9 I notice plans for making an "Interference Eliminator." Please advise whether it would be a good policy to use same in connection with a three-tube "Reinartz" set. If not, please send me plans for making an Eliminator for my set. If it is practical to use on the above set, please send me hookup. One question about the Eliminator, does the slit in the "Guard Ring" face the same or opposite the slit in the "Collector Ring?" The Interference Eliminator you speak of will work with any receiving set that needs it, the Reinartz included. The Reinartz circuit, however, is a fairly selective one and if properly built and tuned you should not be bothered with local interference. The position of the slit in the guard ring or the collector ring is of no consequence. The chief requirement is that the slits are made in the rings. These slits merely act to

Special Notice to Inquiring Radiophans

Mail Inquiries—Don't Use Phone

In spite of the request which was printed here last week, numerous Phans continue to use the telephone to ask for hook-ups and other technical data.

As a result we repeat that it is impossible for us to talk to our friends all day and design sets and write about them at the same time. Consequently we will be compelled to decline to answer telephone inquiries in the future.

We promise, however, that all inquiries sent in by mail will be answered the same day received, if a self-addressed and stamped envelope is enclosed. Otherwise your answer will be printed in the next issue after receipt.

In addition to the relief that it will give us, the handling of these questions and answers by mail will be much more satisfactory to you in the long run, as all chance of error or misunderstanding will be eliminated.

In sending in your inquiries, number your questions and make them as brief and to the point as possible. Write plainly on one side of paper only, with ink, or better, if possible, with typewriter.

In asking about your hook-up send along a diagram. Do not simply say, for instance, that "It is an Armstrong." There are many "Armstrong" hook-ups. Drawings should be made on a separate sheet of paper.

There is no charge whatever for the advice and help we give you. We only ask your co-operation, that we may serve you better.

prevent eddy currents, and have no other purpose.

Asks Comparative Opinion

566—CHICAGO: (1) How does the Ultraloggo compare to the Erla, one-tube each circuit? (2) How does Reflexed Ultraloggo compare to Erla, also one-tube? (3) If possible, please describe characteristics of these two circuits. Use with storage battery is contemplated.

It is not good wisdom to make comparisons between two circuits or receivers built from two entirely different hookups. There is so much that depends upon the human equation when it comes to radio. The Erla one-tube circuit is a most efficient one and might give you or others much more satisfaction than the Ultraloggo circuit. The Ultraloggo, on the other hand, might give others more satisfaction than the Erla. It depends upon the requirements of the individual user. We have described with the utmost pains and with complete details the characteristics of the Ultraloggo circuit, both as a plain one-tube set and as a one-tube reflex set. We also have told you in previous articles just what the Ultraloggo would accomplish for you. Personally, this writer would much prefer the Ultraloggo because of its automatic regenerative features and its refusal to go into oscillation or to howl and hiss, and also because of its extreme selectivity and sharpness of tuning. He has never seen a one-tube reflex set that would equal the Ultraloggo in this respect. This does not mean, however, that that there are not one-tube reflex circuits that cannot do these same things. The one-dial logging feature of the Ultraloggo also appeals to this writer. We would advise the use of 201A tubes with the Ultraloggo in connection with six-volt storage batteries.

299 Tubes and Ultraloggo

569—CHICAGO: I would like to ask you if the Ultraloggo one-tube set will work with a C-299 tube.

The Ultraloggo will operate fairly satisfactorily with a C-299 or UV-199 tube, or others of the same type. However, do not expect as much volume or as much distance range with this small tube on a dry cell as you can get with a 201A type tube, using the six volts storage battery.

Amplifier for Ultraloggo

550—Chicago: I am making an Ultraloggo, and if I have any kind of success with it I will want to add two stages of amplification. What ratio transformers shall I use? Also, shall I use the 199 tubes? I am now using this tube as a detector, with 45 volts on the plate.

Our issue of October 25 contains an illustrated article on adding amplification to the Ultraloggo, which you will find answers all your questions. The 199 tubes will be O. K.,—but don't use transformers of higher ratio than 5 to 1 and 3 to 1.

Wants "Old Reliable" Hookup

551—Chicago: I have been a reader of

your magazine since the first issue and I am sure is the "bees knees." I would like to have you send me a hookup of the three-tube "Old Reliable" set which you published recently.

Thanks for the compliment. Hookup requested has been mailed.

23 Plates Won't Do for 17

552—Chicago: In regard to your "100% Low Loss" receiver, you show a seventeen-plate condenser. Will a twenty-three plate Vernier condenser work instead? Also, I have "All-American" transformers, 5-to-1 and 3-to-1 ratio, and UV-199 tubes. I would like to build one of "Everybody's 100% Low-Loss" set, as the one I have is not selective and will not get DX satisfactorily.

The transformers and tubes may be used in the set you mention, but where a certain capacity is specified in a condenser it is very seldom that any other capacity will work as well. However, if you will refer to your files, you will find that in other issues we have shown hookups in which you can use the twenty-three-plate condenser in "Everybody's 100% Low-Loss" set.

Parts We Name Are O. K.

553—Cicero, Ill.: I am very much interested in "Everybody's 100% Low-Loss" receiver, published Oct. 4. I have made and experimented with several sets and have expended much time and money on many different kinds of parts for same. I am very enthusiastic over this new set of yours, but before I start building will you please answer the following questions: (1) Which are the best of the standard makes of parts? (2) Please state the best kind of tubes. (3) Can you give me the names of the parts with which you have obtained the best results? (4) I understand you have made several sets using different makes of parts for each. Is that correct?

(1) The construction articles each week have named the parts and explained the combinations with which we have had the experiences described in the articles. If you follow instructions any of the parts named will give the same results we described. (2) The 201A or 301A for this particular set. Dry cell tubes will work, but give less volume and consequently the average operator is inclined to overload them. (3) See No. 1. (4) Yes. See Oct. 4, 11, 18, 25 and this week's issues.

Question Not Specific

568—CHICAGO: I am interested in the Ultraloggo Wonder Set. Also would like a little information about a crystal set that works a loud speaker. I have a one-tube set called Steinite special, using a Sonora No. WD-12 tube. Have picked up on my first silent night, Oct. 13: WCB, WHAZ, WTAM, WLN, WCAE, WOC, WTAS, WLAG, WDAE. I have a V-shape 76-foot aerial in my attic. Would I get better results with outside single aerial and UV-199 tube?

You say you wish some information on the Ultraloggo hookup and also Hagerman's long distance crystal set that works a loud speaker. However, you do not state what this information shall consist of and we are powerless to comply with your request. If you will be more specific, we will be pleased to answer

each and every question properly. Your experience with your Steinite receiver is very excellent. You would get much better results if you used a single outside aerial in a single stretch of at least 150 feet, and a ground connection that is positive.

Don't Reflex on 199's

557—CHICAGO: Will you tell me if A-199 tube will work in the "Ultraloggo Reflexed," and the kind of battery to be used? Also the proper tube? We all enjoy your EVERYBODY'S RADIO Weekly very much.

The 199 tubes do not give full efficiency in any reflexed circuit, and particularly so in the Ultraloggo reflexed circuit. They do not have sufficient capacity to carry both the audio and radio frequency transformers. Would advise you to use 201A tubes. Those will operate on four one and one-half volt dry cells, but would have to replace these every four or five weeks, and possibly oftener, if you used your set several hours each day. A six-volt storage battery is the proper kind of battery to use with the 201A tubes.

Substituting Tuning Unit

556—CHICAGO: I am planning on building "Everybody's 100% Low-Loss" Receivers such as you published in October issue. Have all parts on hand with the exception of the Bremer-Tully tuner, which I now understand will not be on the market for three or four weeks. Will you advise if any other tuning unit will give the same results, using the other equipment as outlined in the October 4 issue? Will you also advise description of the flexible wire that you use and where same can be purchased? Am enclosing a sample of the only flexible wire that I have been able to buy and I do not think that this is satisfactory.

We have published in our October 4, 11, 18 and 25 issues model sets of "Everybody's 100% Low-Loss Receiver," showing in each case an entirely different combination of parts and using in each one a different tuning unit. We also gave our frank and candid opinion of the operation of this circuit with the parts used. The Bremer-Turner Unit was used in the October 4 issue. An Ambassador coil was used in the October 11 issue. The Little Kelcoil was used in the October 18 issue. The Lopez coil was used in the October 25 issue. We have not tried any other tuning unit in this particular circuit. It is very likely that other tuning units will work equally as well. The chief requirement is that the primary shall have eight turns of wire and that the secondary be loosely coupled to the primary. We suggest, if the Ambassador or Little Kelcoil units are used that the special instructions given in the October 11, 18 and 25 issues be read. The flexible wire which we have used in these hookups is a rubber-covered fourteen-strand wire. It is a Belden product and is branded by them with the name of "Druid." However, other flexible stranded wire of similar characteristics, if insulated, will answer. Even, on a pinch, ordinary electric light lamp cord, if untwisted and used as a single cord, will do very well. Its chief objection is that it does not look quite so neat. The sample wire you submitted is the same as the Druid wire, with the exception that it has a silk outside covering which, while adding to its appearance, does nothing more than increase its cost.

Building Ultraloggo

567—CHICAGO: Please send copy of your magazine showing how to build the one-tube Ultraloggo set. If you have not back copies of August 1 or the October 4 issues will appreciate wiring diagram of this set. I have already wound the coil from your description in the last issue about the Ultraloggo Reflex, but want to build the straight set first.

We have sent you the back copies of the magazine, including the issues of August 1 and October 4, containing description and details of the Ultraloggo hookup. These also contain the wiring diagram of this receiver, and full instructions on wiring both the low-loss coils and the straight winding coils. You are wise in trying the first hookup at the start. You will have a pleasant surprise in both hookups.

Use Higher Ratio in Reflex

564—CHICAGO: I am constructing the Ultraloggo Reflex and would like to have the following information: (1) I have a Columbia 3 1/2 to 1 audio transformer. Can I use this instead of the 4 to 1? (2) Will it be necessary to use a different Reflex transformer with the 3 1/2 to 1? (3) As I want to wind the Reflex Transformer myself will you please give me details as to number of turns, size of wire and core?

(1) We have not used the Columbia audio transformer in this circuit but any transformer of equal efficiency to the one we specified in this circuit will work all right. The three and one-half-to-one ratio is rather small for this particular circuit. We would advise using, if possible, at least a four-to-one or five-to-one ratio. (2) The Benson radio frequency reflex transformer can be used with any audio frequency transformer. (3) To make the radio frequency reflex transformer which you asked for will require

a core one inch in diameter and one and one-half inches in length. It should be of hard rubber, bakelite, cardboard or wood. If the last two named materials are used, boil them in paraffine or beeswax first. There are three windings. The primary winding should be wound between a split secondary. There are thirty-two turns of wire used in the first winding of the secondary. Leave sufficient wire for another thirty-two turns to be placed on a core later. The primary, consisting of twenty-five turns of wire, should be placed absolutely against the first thirty-two turns of the secondary. Then continue the other thirty-two turns of the secondary, starting absolutely against the primary. When constructed, your winding should consist of sixty-four turns of wire on the secondary coil split exactly at the center with the primary coil wound in between. Use No. 28 double cotton covered wire. Boil the entire coil in paraffine or beeswax.

Asks Ultralogo Blueprints

565—CHICAGO: Enclosed find 12 cents in stamps for which please mail back No. of dates Aug. 1 and Oct. 4. In case you have not these copies in stock send plans of your Ultralogo set. This week's issue is the first of your paper I've seen and am very much interested in it. Also much interested in set described and would like to build one if you have the plans.

We have no other plans, specifications or instructions on the building of any of the receivers which have been described and illustrated in this magazine, other than those published. We go to considerable pains, labor and expense in making our hookups complete as to specifications and constructional details. We

could not do any more than we do for you in our magazine unless we send you blueprints of the panel and baseboard layout. We are not in this particular line of business, and inasmuch as our pictorial diagrams are very clear, we do not feel that you would require blueprints under any circumstances.

"Everybody's" versus "Universal"

555—CHICAGO: (1) How does the three-tube universal set compare with "Everybody's 100% Low-Loss" circuit in selectivity and efficiency? (2) With the following parts could I change to "Everybody's 100% Low-Loss circuit? One Pfanstiel variometer; three Benjamin UV199 sockets; one five to one All-American audio transformer; one three to one transformer one Bradestat; one Filkostat; one Bradley leak, and one Proudfoot .005 low-loss condenser. (3) How can you tell when a tube oscillates?

(1) "Everybody's 100% Low-Loss Receiver" is much more selective than the circuit you mention. It also has greater range and will deliver more volume per tube. (2) The parts you list can be used very satisfactorily in the circuit if an eight-turn primary coil is added to the variometer. (3) A vacuum tube is said to be oscillating when its elements set up a vibration. One may easily tell when a tube begins to oscillate by the click in the head phones and by the rushing sound the oscillations give off. If the tube is pushed too far, this sound will become a whistle and eventually a howl. The whistle and the howl, while not audible in your own phones when the tube is oscillating only slightly, is heard, however, very plainly by your neighboring set owners within a range of a mile or more of your receiver, if your set is of

the radiating type. If you use "Everybody's 100% Low-Loss Receiver" circuit, this radiation, for a greater distance than twenty-five or thirty feet, is negligible. The only distressing effect, in that case, that will come from an oscillating tube would be in either your own phones or loud speaker.

Use 201A Reflex

561—CHICAGO: Am very much interested in your one-tube Ultralogo Reflex circuit, but before building same would like to know what tube is to be used, or what tube you used in your experiment. Also where can I purchase the special coil? Could I make it myself using the twenty-three-plate condenser I have in my present ultralogo circuit? Your advice on this hook-up will be greatly appreciated. Am a constant reader of EVERYBODY'S RADIO Weekly.

We used a 201A tube and a six-volt storage battery in our experiments with the Ultralogo reflexed circuit. The dry cell tubes will not work efficiently in this circuit. Their internal capacity is too small for the amount of volume that is thrown into them by both the audio and reflex transformers. Neither will they give as much volume and distance as the larger tube. The special coil used in the Ultralogo is not manufactured and must be made by yourself. It is very simple to wind. You can find the instructions to make this coil in the issues of August 1, October 4, 11 and 18. It is very likely that your twenty-three-plate condensers used in your ultra audion circuit has too much capacity for the coil specified. The condenser should be no more than .00025 mfd. Do not buy your condenser by the number of plates but by the mfd's. The plates vary in capacity in different condensers owing to their size and construction.

Wiring Ultralogo Coil

562—CHICAGO: Please answer the following questions, concerning your Ultralogo Reflex Set. (1) What size wire is used in winding the special coil? (2) Ratio of "Hegehog" Transformer? (3) Please state "B" battery voltage? (4) Will this set give as good results using a UV-199 tube?

The size of wiring used in winding the Ultralogo Special Coil is No. 20 DCC. This is used on both the primary and secondary windings. Full information on the winding of this special coil is given in our August 1 issue. Complete instructions for winding a low-loss coil for this same hookup is given on pages 5 and 11 of the October 4 issue. (2) The ratio of the Hegehog audio frequency transformer used in the Ultralogo reflex set is four-to-one. (3) The plate voltage depends upon the tube used. If a 201A tube is used, which is preferable, at least 90 volts of "B" battery is correct. (4) If 199 tubes are used, 60 to 90 volts is correct. However, the dry cell tube has too small internal capacity to handle both the audio and radio frequency transformers, and will not give you satisfactory results.

Weekly Since Oct. 4

559—CHICAGO: I do not know whether or not there is a misunderstanding on my part, but I have been laboring under the impression that "EVERYBODY'S RADIO Weekly" was to be a weekly publication after September 15, or thereabout. The last edition I received was a September issue, Vol. 1, No. 2. I am calling this to your attention for fear that my name has not been placed on the mailing list and I am missing some of the copies of the magazine. I will also appreciate it if you will advise me as to a simple and efficient tuner to be used in connection with the Acme four-tube reflex set.

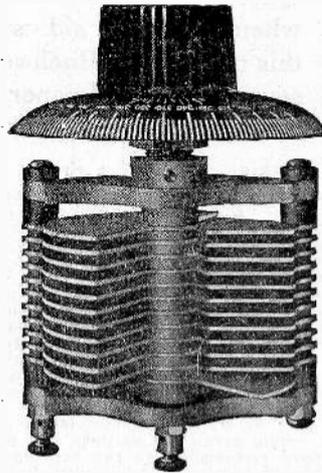
The magazine was converted to a weekly publication with the issue of October 4. Therefore, when you received the September issue and that of October 4, you received the last of the monthly editions and the first of the weekly editions. There are a number of very efficient tuning units on the market that could be used very satisfactorily with the reflex circuit that you inquire about. The standard Acme circuit specifies an antenna, coupler with radio frequency and audio frequency transformers. We have used and would advise the employment of any of the tuning units which we have shown in our model sets of "Everybody's 100% Low-Loss Receiver." These units would be of exceptional efficiency where only one stage of radio frequency is used, as they will give you regeneration without much trouble from feed back in the radio frequency circuit.

Parts for Ultralogo

558—CHICAGO: Am a 100% booster of your magazine, and am very much interested at present in your "One-tube Ultralogo Reflexed Set." And will you kindly give me a little advice as to its construction? (1) What is the ratio of the audio transformer? (2) What is the ratio of the radio transformer? (3) Do the parts mentioned in your magazine have to be used, or can other makes of the same apparatus be used, such as the crystal, condenser, transformers and coupler. (4) Can I use a 199 tube with this set?

We appreciate the boosting our readers give us. As part compensation we strive to publish a magazine that will be helpful to you. (1) The ratio of the audio transformer used in the Ultralogo reflexed receiver published in our October 18 issue was a four-to-one. It was a Premier "Hegehog." (2) The radio frequency transformer was of the Benson make and is the one that is used for a one-tube reflexed set. We are not familiar with its windings. In another question on this page we tell a subscriber how to wind a transformer of this type. (3) None of the parts listed in the October 18 issue are arbitrary. Other makes of the same apparatus, of equal quality and value, should give you equal results. We use the parts specified merely because they were near at hand and worked satisfactorily in the circuit. (4) We would not advise the use of a 199 tube in any reflexed circuit. They will not handle the power sent through them by both the audio and radio frequency circuits, at least not as efficiently as will a 201A tube.

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Losses Cannot Be Measured—Think of it—nearly 100 per cent efficiency in condenser service! You have to see the Proudfoot to appreciate its watch-like precision and accuracy. Two-point stator plate mounting (instead of the customary three-point), wiping contacts and fine bronze bearings all contribute to its superior quality and put it in a class by itself in the field of condensers.

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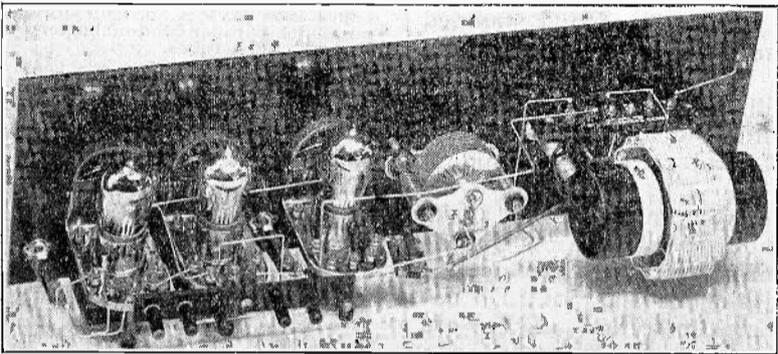
Amazing new development in radio antenna for the private user. A genuine 18 kt. Gold Plated Aerial now within reach of every radiophan. Used by U. S. Government, Ocean Liners, the "Big Bill," Broadcasting Stations and all who want the best.

Golden Rod Aerial "Best Because It's Gold Plated"

Solid Phosphor Bronze wire, heavily plated with 18 kt. gold. Special springs to hold taut. Brings in stations you never heard before. Makes set more selective and easier to tune. Never corrodes—lasts lifetime—always same. Experienced radio users know that their set is no better than their aerial. Goldenrod is unquestionably the best.

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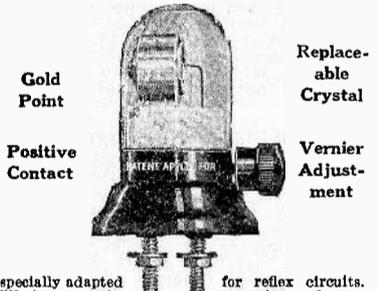
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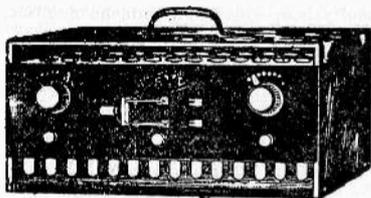
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New knowledge not found in any other books

Amateurs Can Make Filter Condensers

False Harmonics Can Be Overcome by Grounding

This page each week will be devoted to the problems and interests of the amateur code worker. Hook-ups, construction and operation data and information of a general nature will be given space. Amateurs are invited to send in hook-ups, lists of stations worked, or suggestions as to ways to make the department more helpful to their fellow workers. We are particularly interested in having descriptions and pictures of amateur stations.

False Harmonics Overcome by Grounding

Most of the so-called "harmonics" encountered in an amateur station are due directly or indirectly to radiation or reradiation from a near-by conductor such as a power line, wire clothesline, tin roof or waterspout.

Such trouble can be ended by grounding the objects, passing them either directly through a resistance or through a condenser. This destroys their effect altogether or throws them to an uninterfering tune.

If this does not eliminate such "harmonics" it is possible that you have the true harmonics.

Of course the true harmonics can be detected easily because they are on exact multiples of your main wave, namely, one-half, one-third, one-quarter, etc. If they are overwhelmingly strong the cure will require getting rid of your old style outfit and getting a more efficient loose coupled one.

MAKE YOUR OWN DRY CELL

This cell is contained in a glass jar and on account of its size may be expected to last much longer than the ordinary dry cell purchased in the stores.

The container is fairly large, three inches in diameter and six inches high.

A zinc cylinder made out of reasonably heavy sheet zinc, 2 1/2 inches in diameter and 5 1/2 inches high, sits inside it.

Within the zinc cylinder and against it there is a lining of thick blotting paper to prevent the paste from coming in contact with the metal.

In the center of the jar there is a carbon from a discarded dry cell. When the paste is in position and the sealing compound poured on, the carbon will be held fixed in place.

The paste is made as follows: Hydrochloric acid is diluted with three volumes of water. Next measure out with a cup or even with a teaspoon or tablespoon four parts of crushed charcoal, two parts of flour, and one part of plaster of paris.

After the dry powders are well mixed, the acid solution is added thereto, and all is thoroughly stirred, and holding the carbon in a central position, the mixture is poured into the jar. There must be sufficient to fill it up nearly to the top of zinc. After it has set, the sealing compound is melted and poured over the contents so as to come up practically level with the top of the jar.

A contributor claims that this cell will last a long time, because it is unaffected in operation, even if the zinc is perforated through and through.

SECOND WAVE INTERFERENCE

It seems surprising to some that interference from a nearby station, broadcasting on say two hundred meters, is encountered again at four hundred meters, or twice the station's natural wavelength.

This happens in some cases even with a perfect C. W. transmitter. The solution of this problem lies in the receiving set and is due to oscillation of the tube. It is more pronounced of course if the transmitter is forcing his tubes and if a direct coupled transmitter is being used.



Folks, meet Wendelin Luckner. Wendelin, who is only 11 years, is believed to be the youngest licensed amateur radio operator in the country. He lives in Bridgeport, Conn., and is the holder of first grade license No. 30504.

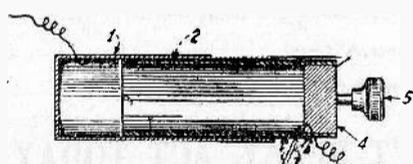
ELIMINATE DIELECTRIC

Cut all bakelite that is possible from the forms on which your inductances are wound. For instance, on a solenoid, strips one inch wide and almost the length of the tube may be cut out without seriously interfering with the stability and sturdiness of the unit. The result will be a coil wound on a sort of lattice-work cylinder that has probably fifty percent less dielectric losses than if the inductance was wound on a solid tube.

SIMPLE VARIABLE CONDENSER

A French amateur has told in the publication "L'Antenne" (The Antenna) how he built a small capacity variable condenser out of simple parts for use in a resistance-coupled radio frequency amplifier.

The condenser uses the zinc can (Fig. 1) from a pocket flashlight bat-



tery for one plate. After the can has been cleaned and the interior scoured with emery paper a wire is soldered to it and it is ready. Next a small pill bottle (Fig. 2) is found of such a size that it will be a sliding fit within the can. Inside the bottle and cemented to its wall is coiled some brass, tin or copper foil (Fig. 3), likewise provided with a wire. A cork (Fig. 4) in the bottle, and a suitable insulating handle (Fig. 5) attached to the cork, and the job is done. This condenser, being of extremely small capacity, also has been found of value as a vernier in tuning.

BANK WIND COILS

Bank winding of inductances is generally avoided by the majority of "hams" when building up their outfits. This should not be, as the resultant unit if built in this manner is more efficient, presentable, and compact. There are several methods to use. The easiest is the pyramid style, which is a series of individual windings of three turns, on which are wound two turns, on which is wound one turn. This method is very popular among the new low-loss types of receivers.

SAVE YOUR TUBE

Don't unnecessarily overload or push your tube. It is better and cheaper in the long run to increase your power by adding an extra tube than to be continually put to the expense of buying new ones.

TAG YOUR BATTERY LEADS

Leads from the "A" battery and the "B" batteries should be tagged with little tags marked with the voltage and polarity for each lead. This will prove a reminder and prevent mistakes in selecting the proper lead wire to use.

A GOOD SPACE SAVER

The use of a combination rheostat and socket is a good space saver in a receiver where compactness is one of your particular requirements.

MAKES UNIT PANELS

Phonographic records are made of a composition that makes a fair insulation. If squares are cut from them and mounted at right angles to small baseboards these can be used as unit panels for tuning units, variocouplers, variometers, condensers, etc. These units come in handy for experimental work in hookups.

How to Make Your Filter Condensers

It isn't everybody that can afford to dig down in their pockets and plank down money promiscuously for experimental apparatus. It's mighty handy sometimes to be able to make some of our own stuff.

For instance, filter condensers. These can be built at very little expense and in a very short time. All that is required is a visit to a hardware store, a drug store, and a dollar or so and some patience.

The theory is the same as any other condensers except that aluminum pie tins are used as conductors. Ten of these are employed and are filled to a depth of one-half inch with a saturated solution (all that water will take up) of sodium phosphate.

These containers are then stacked one on top of another, separated by glass rods that are bent over a flame to fit over the edges, and placed in a crock large enough to allow about an inch clearance all around.

On the bottom of the crock is a tin plate to which is attached a wire that is one of the terminals of the condenser and runs to the top of the jar through a glass tube. The other terminal of the condenser is connected to the top plate.

Now fill the jar to the top with transformer oil and the unit will be complete.

Don't be afraid to use it as it will handle 1500 volts safely and is self-healing.

MAKE COILS SELF-SUPPORTING

Dielectric losses may be eliminated and the inductance made much more pleasing in appearance and efficiency by removing the form on which it is wound and dipping the coil in a solution of collodion. This will harden and hold the wire in the form wound without any other support.

STATIONS WORKED

Amateurs are invited to send in their lists to this department. Stations worked should be enclosed in brackets. Spark and C. W. stations should be arranged in separate groups. Note the style used in this department and follow it closely.

9ASW—977 West Central Ave., St. Paul, Minn.

1abf, 1abt, (1are), (1avf), 1ayt, 1bbp, 1ber, (1bel), 1bge, 1bgo, 1bie, (1brl), 1cit, 1cmx, 1ga, 1gb, 1sk, 2aay, 2afp, 2al, 2ate, 2axf, (2bbn), (2be), 2bgo, 2bxd, 2cbg, 2cdp, 2cee, 2cgg, 2cla, 2rk, 2sq, 2wr, 2xn, 2xq, (3abw), 3amr, 3apy, 3aqr, 3bei, 3ccu, 3ccj, (3cjin), 3cz, 3dt, 3hh, 3lg, 3ly, (3qt), 3qv, 3wx, 3xas, 4af, 4ag, 4ba, 4eb, 4jn, 4oh, 4xc, 5aar, 5aas, 5adb, (5aju), 5ajv, 5ajj, 5amo, (5cn), (5eh), 5ek, 5lv, 5jb, (5ka), 5lr, 5nw, (5ph), 5qd, 5sg, 5sz, 5zav, 6aao, 6agk, 6aoc, 6arb, 6bql, 6but, 6buo, 6cdg, 6cef, 6ccl, 6cka, 6cmr, (6ema), 6cnf, 6cyl, 6gq, 6ih, 6jj, 6rn, 6zed, 7afe, 7agi, 7ajj, 7akk, (7co), 7dr, 7ej, 7em, 7ew, 7ey, 7fs, 7gr, 7gw, 7if, 7iw, 7lk, (7no), 7nr, 8aaj, (8acm), (8alm), (8alk), 8apt, 8awj, 8avj, 8bec, (8bgw), 8bk, (8bqs), 8bwb, (8csl), 8ctz, (8cwr), (8dae), (8bgw), (8dae), (8dgp), (8djd), (8gx), (8lg), 8qb, (8ry), 8sr, 8tj, 8uk, 8vn, (8xhc), 8xe, (8yac), fone, 9ry, (9eco). Can. 3co, 3pz, 4ba, 4cb, 4dd, 4co, 4fv, (4ft), (4ws).

By 7ALI, James Wallace, Mf. Vernon, Wash.

1bbo, 5ns, 5aaq, 5lr, 5qy, 6adb, 6agk, 6alc, (6alw), 6amm, 6atn, 6avj, 6aym, 6awt, 6bbh, 6bcp, 6bdt, (6bls), (6bwl), 6ccb, 6cck, (6cgl), 6cgv, 6chl, 6clj, 6cka, 6cgo, 6crr, (6crs), 6gu, (6l qra?), 6nk, 6pl, 6pu, (6rf), 6rm, 6ry, 6tl, (6ub), (6xad), 6zco, (7aeb), 7mn, 8cww, 8zwp, 9amb, 9caa, 9crl, 9ckd, 9cpu, 9dnh, 9dpx, 9mc, 9mf, 9zt.
Can.: 4av, 4br, fone—6ry, 5-Watts CRACCW hr pse QSL if u hr me. Cards to above on request es gid to hr fm them.

Any Boy Can Have One of These Radio Sets *FREE*

What boy doesn't want to own a REAL radio receiving set—one that will bring in ALL the stations far and near on a loud speaker—a set that is complete in every detail—a set with all the tubes, all the batteries, the phones and the loud speaker, the aerial, the ground—everything and absolutely NOTHING to buy?

What boy doesn't want an expensive Low-Loss Variable Condenser, a set of high-priced Low-Loss Tuning Units, a head set of the sensitive type or a loud speaker that can be heard blocks away? What boy doesn't want one or more of the high-grade parts that go to make up a REAL radio set or amplifier?

Well, here's a chance for EVERY boy that reads this announcement to have his every wish fully gratified and without spending a single penny.

We're Conducting a Big Contest

Enroll at any time *with Real Prizes* Closes Dec. 31, 1924

You Can Win One of These Four Wonderful Radio Sets

First Prize—UNILOG

Model D—Five-Tube Set—Value \$200

Tunes with only ONE dial. Stations permanently logged for you BEFORE you get the set. Printed list of stations goes with set. Simply turn the ONE dial to station number and the music and voice rolls in. Changes in location, tubes or aerial make no difference in logging. Range 1,500 to 2,500 miles on a loud speaker under favorable conditions. Most selective five-tube set in the world—equal to a ten-tube super heterodyne. Tunes out the most powerful stations close by.

Has two stages of radio frequency amplification without neutralization and its evils. Has three-circuit regenerative detector. Has two stages of audio amplification. Occupies HALF the space of the ordinary five-tube set.

This set comes completely equipped in a mahogany-finish cabinet with five 199 tubes, necessary dry cell "A" batteries, two 45-volt "B" batteries; headphones; loud speaker with Baldwin unit; aerial and ground wires and ready to operate the minute you get it. Value.....**\$200**

Second Prize—UNILOG

Model C—Four-Tube Set—Value \$150

This model is identical with the above, except it uses one stage of radio frequency, the three-circuit regenerative detector and two stages of audio amplification. It has a range of from 1,500 to 2,500 miles on a loud speaker under favorable conditions and has the permanently logged, one dial operation features. It has the same selectivity of the Model D UNILOG and almost as much volume. Occupies HALF the space of the ordinary four or five-tube set. Gives more volume than the five-tube neutrodyne.

Comes completely equipped with everything the same as the Model D type, Mahogany-finish cabinet; four 199 tubes; necessary dry cell "A" batteries; two 45-volt "B" batteries; headphones; loud speaker, horn with Baldwin unit; aerial and ground wires; insulators, etc. Ready to operate the minute you get it. Value.....**\$150**

Third Prize—UNILOG

Model B—Three-Tube Set—Value \$125

It uses the UNILOG three-circuit regenerative circuit detector with two stages of audio amplification. It will not radiate, it tunes on ONE dial and is permanently logged for you at the factory and comes to you with a printed list of the stations and their number on the dial. Simply turn to the station number you want and your station comes in.

The most selective three-circuit set in the world. Has the same extreme selectivity of the Models C and D type already described and will tune out the most powerful local station with EASE. Has more volume than any other three-circuit set and most stations under favorable conditions come in with loud-speaker, reception. Its range is from 1,000 to 1,500 miles under proper conditions. Occupies half the space of ordinary three-tube sets. Same equipment as the other models. Value.....**\$125**

Fourth Prize—UNILOG

Model A—One-Tube Set—Value \$75

This set is the same as Model B, UNILOG except it is without audio amplification. It has the same ONE dial and permanently logged features, the set being permanently logged for you at the factory and supplied with a printed list of the stations and their logging numbers. It is just as selective as either Model B, C or D.

Model A comes in a 7x9 cabinet—the smallest three-circuit regenerative detector unit made. Separate radio frequency amplifiers may be added to make it a four-tube or a five-tube set. These amplifying units also come in 7x9 cabinets to match the detector units. Prize winner may obtain these units without spending a penny. (See plan at right.)

The Model A set comes completely equipped with all the necessary batteries, one UV-199 tube, head phones, aerial and ground wires, insulators, etc. No loud speaker goes with this set. Prize winner may obtain one without spending a penny. (See plan at right.) Value of Model A set.....**\$75**

It's a subscription-getting contest for EVERYBODY'S RADIO Weekly. Every ambitious boy can enter this contest. There's no entry fee. You don't have to buy anything to be a contestant. The boys that get the most subscribers get the prizes. EVERY contestant wins SOMETHING. There won't be any BLANKS. You're paid for every subscription you obtain, whether you win a prize or not.

The contest may be entered at any time up to the day it closes, which is MIDNIGHT, Dec. 31, 1924. The award of prizes will be announced shortly after in EVERYBODY'S RADIO Weekly.

HOW ANY BOY CAN WIN THE PRIZE

If you want to enter this contest all you have to do is to have one of your parents or your guardian fill out the coupon below and mail to us. Promptly we will send you sample copies of EVERYBODY'S RADIO Weekly, an identification card showing that you are an AUTHORIZED Agent of ours empowered to obtain subscriptions and collect and receipt for the same, full instructions how to start about your work, and enroll your name as a contestant.

There's nothing hard about getting subscriptions for EVERYBODY'S RADIO Weekly. It is from one-half to one-fifth the price of other magazines, comes out every week and is just what the radiophans WANT. All you have to do is to show your friends and neighbors a copy, tell them that it costs only \$2 for a copy every week for a full year, take their \$2, give them a receipt and send the money and names and addresses to us.

YOU GET GOOD PAY FOR YOUR WORK

We will credit you in the contest with each cash subscription sent us for the big prizes, and besides will send you for each subscription sent in a credit coupon valued at 50 cents, with which you can BUY any radio set or parts made by anyone, anywhere. If there should be any ties for the prizes, each contestant so tied will receive a set. Even if you do not win one of the big prizes you will be getting good pay for your work, as the credit coupons you get can be saved up until you get enough of them to buy what you want to buy. Then go to any radio store or look at any advertisement of any standard radio sets or apparatus, pick out what you want and send the coupons to us and we will see that you get what you order promptly without you spending one cent of money. The coupons are transferable and each one worth 50 cents in radio equipment when presented to us.

HOW TO ENROLL—Clip and Mail Today

There's a coupon below. Get one of your parents or your guardian to fill it out for you. Fill in each blank line carefully in ink and be SURE to sign your name and address PLAINLY. If you prefer you can copy the coupon on a sheet of paper. It is not necessary to write a letter.

Boys' Contest Editor, EVERYBODY'S RADIO WEEKLY,
South Union Avenue at 41st Street, CHICAGO

I wish you to enroll (Write in boy's name here).....

(His Street Address).....

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In your prize contest for a Radio Set. I stand sponsor for his honesty and integrity and guarantee that he will send you the full amount of all moneys collected by him for subscriptions and that he will in no way bring discredit upon your publication. I am his and will give him every assistance possible in helping him win one of the prizes. Send the identification card, sample copies, and instructions to me and I will see that he gets them.

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(His Street Address).....

(City and State).....

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Delay has cost many a victory. Clip and mail the coupon immediately and get started in this contest. One day's work—one afternoon's effort, may bring you just the one subscription that will win the prize you want. You CAN win one of the prizes—if you work hard enough and begin at once. You are sure to get good pay for every subscription you get whether you win a prize or not. Clip the coupon, have it filled out today and win a real Radio Receiving Set. Address

Boys' Contest Editor

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