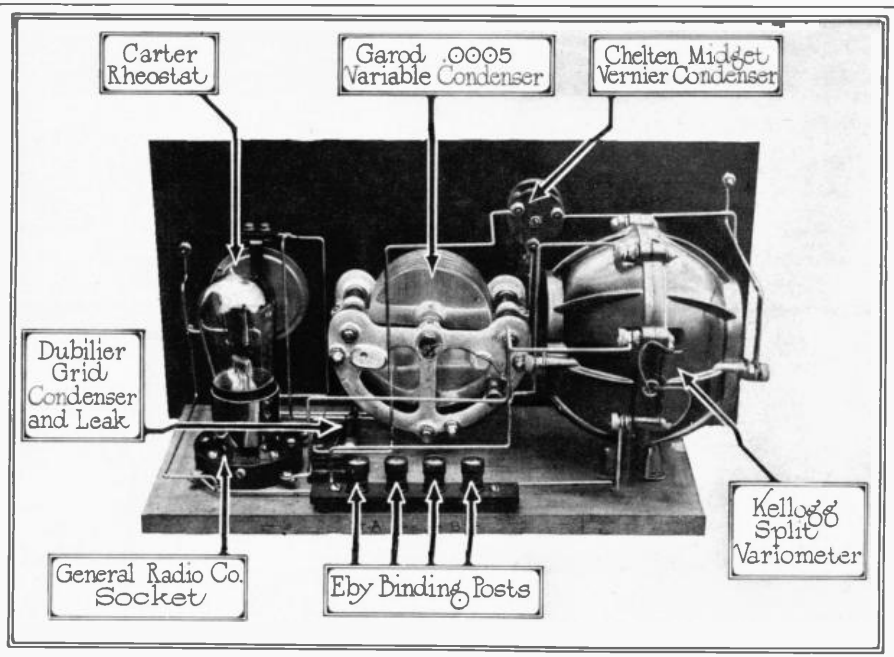


An Ideal Circuit for the Ducon Plug

IT KEEPS the average radio editor or radio experimenter busy trying to satisfy the almost infinite variety of conditions which are met by radio fans all over the country.

I have had so many demands for a circuit which could be used with an indoor loop aerial or without any aerial and with only a ground connection or anything that would get away from the necessity of putting up an outdoor antenna, which seems to be so difficult, that I have paid most attention to that kind of circuit in past issues and have given a number of them.

I have, however, had many questions from people who can put up short aerials which are not very efficient, but who seem unable to reach a good ground connection unless they lead a long wire away from the set to some water pipe or steam radiator in such a way that this wire is constantly getting under the feet of people and causing trouble.

This difficulty in the ground connection is most frequently met with by people who wish to use the Ducon plug to screw into their electric light system and use that for an aerial instead of the ordinary one. Such people usually want their sets placed in the most convenient part of their living rooms in their homes, and these situations are frequently some distance away from radiators or water pipes and so it is difficult to get a satisfactory connection to the earth.

This matter of getting up a good circuit without an earth connection has puzzled me for a long time and I was very much pleased to receive from a reader a letter containing a hookup which he had designed to work without any earth connection.

I immediately took this out to Station 3XP and there we put the set together and found it was everything the reader claimed for it. In my estimation it is the ideal circuit for use with a Ducon plug and this enables the user to operate his set with no ground connection and with no outside aerial.

In case you have no electric lights in your house, this circuit operates with a short indoor aerial with most remarkable efficiency.

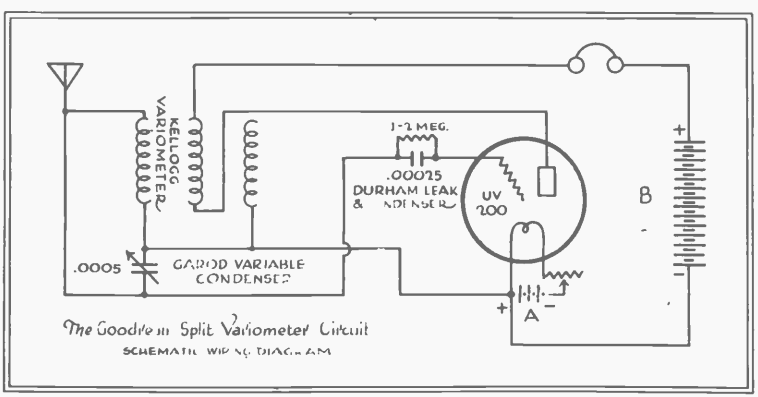
I am going to quote the letter in which this was sent to me because it has such a very human interest touch to it. The writer is W. Francis Goodreau, 40 Walling Street, Providence, R. I.

Mr. Goodreau writes:

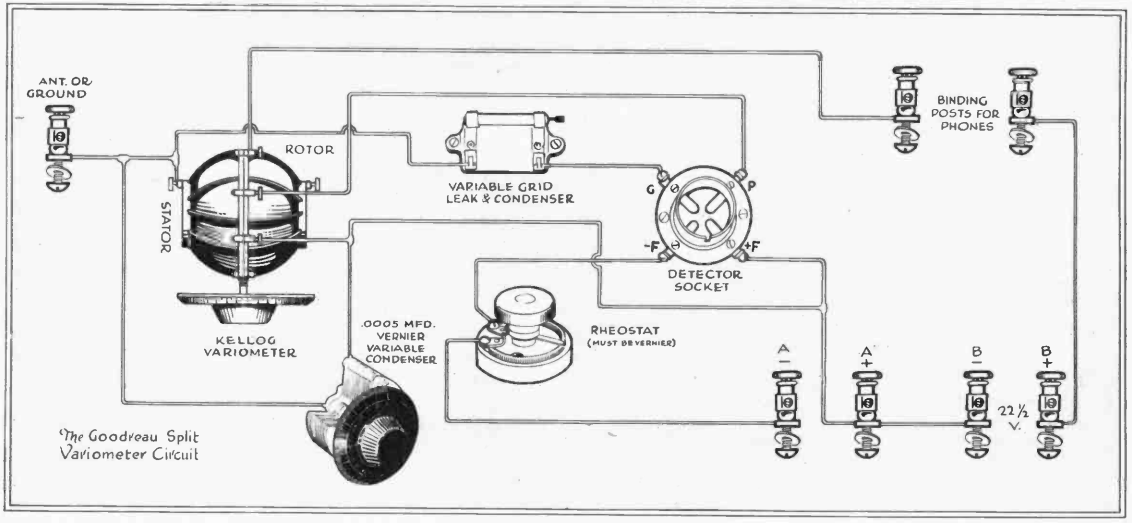
"I read your interesting magazine quite often and think it a real good one, and the articles very interesting. Was more than interested in the Flather's loop circuit published in your October issue. My reason for this is because I have a set using just the same parts.

I have been working on this set for six months and I'm sure satisfied with it. Here is what I do with the set.

"I reach out every night for stations within sixteen hundred miles and if they



Schematic wiring diagram of Goodreau circuit



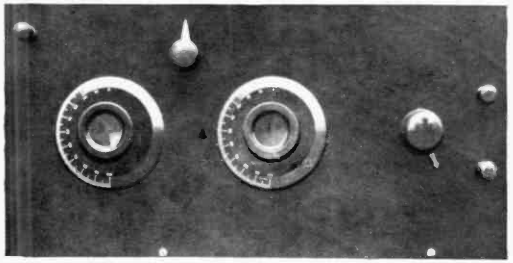
The Goodreau Split Variometer Circuit

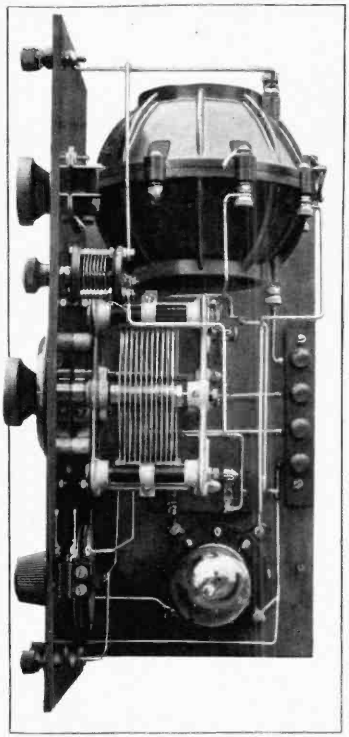
are on the air I get them. I have been doing this all summer and am still doing it.

"Set is so selective I tune out 500 watt station two miles away and bring in distant stations on nearly same wave length, with no interference. Set uses only antenna for DX. Ground should not be used, however. Will work without antenna or ground. The set uses only WD12 tube and parts listed in recently published Flather's circuit.

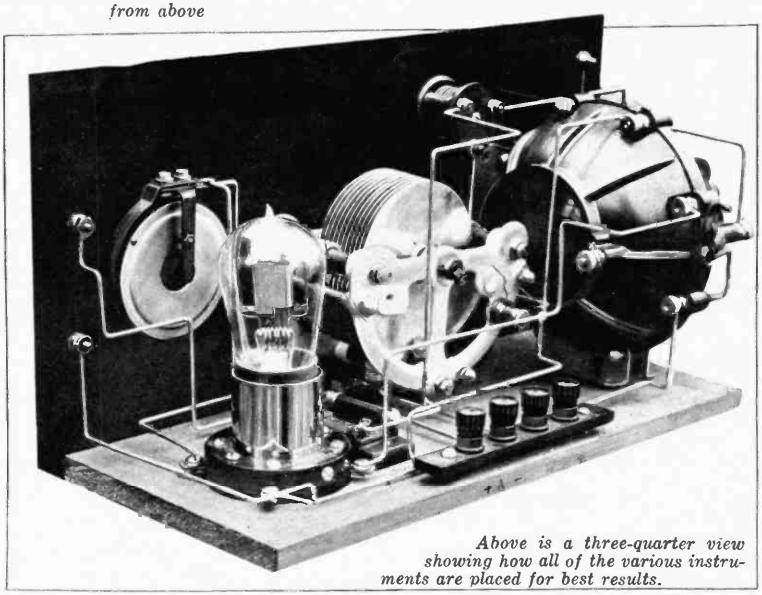
"I am a radio experimenter; have been confined to bed for the last three years, having been ill seven years, but I design and construct radio sets, not for sale, but for my own pleasure. I drill all panels, etc., while flat on my back, and I sure do have a lot of fun. I build all kinds of sets, including the Grimes as described in one of your past issues. Also tried regeneration with Grimes, and my advice is DON'T DO IT. For a living I write for magazines.

"If you are interested in this receiver please let me know and I will be glad to write an article on this set, or should you desire I will give you all the dope on it and you can build it and describe it to your readers. I have several sets now, including a reflex, but this one is my best for distance. My list of (Continued on Page 37)





At the top is the picture diagram of the Goodreau hookup. Next is the panel as we mounted it. To the left is a view of the set looking straight down on the baseboard from above



Above is a three-quarter view showing how all of the various instruments are placed for best results.

An Ideal Circuit for the Ducon Plug

(Continued From Page 23)

calls heard reads like a Broadcast Directory, so I won't name them all, but here are a few I get every time they are on the air:

"WEAN, WJAR, WSAD, WNAC, WBZ, WMAF, WGI, WEAF, WGY, WJZ, WJY, WHAZ, WMAK, WOR, KDKA, WLW, WRC, WDAP, KOP, WBCD, WOC.

"Many others, but would take too long to write them."

Incidentally this circuit gave me my first real opportunity to test a new variable condenser which has just been put on the market by the Garod Corporation of Newark, N. J. I am showing this condenser in the photograph, and the reader will at once notice the difference in appearance between it and the usual type of variable condenser.

This Garod condenser is about as free from losses as it is possible to make a condenser at the present time.

It is not necessary for you to understand just exactly what these losses consist of. Scientists have very long names for them and very complicated explanations of what the losses do.

All you need to know is this: If you have a condenser which is poorly made and in which there are excessive losses, very much of your signal strength is absorbed in this condenser and only the remainder of it is left to give you the signals in your telephones or loud speaker. If you have a condenser made like this Garod condenser or a Kellogg or a Chelten or any of the better ones on the market, there are virtually no losses in the condenser and all of the signal strength is diverted to your circuit and operates in the phones or loud speaker, where you want it.

While it is true that the price of radio apparatus is not an absolute standard by which to judge its efficiency, the fact remains that it is impossible to build a good variable condenser and put it on the market for one or two dollars. It simply cannot be done at the present time.

If you could only put a cheap variable condenser in a circuit, make a thorough test of it and measure the signal strength, then take the cheap condenser out and put in a condenser of good make and then measure the signal strength you get with that and the distance which it reaches, I think you would from then on spurn all offers of the silver-tongued salesmen and would insist upon waiting until you could afford the very highest class of apparatus in putting a radio set together rather than waste your money, your time and your patience on the stuff that is put out by the gyp and the cut-price stores.

This circuit uses the Kellogg variometer, which has the windings between the rotor and the stator already split. As you buy the variometer it is virtually a variocoupler. To change this into a variometer, a jumper wire is necessary between the rotor and the stator, but to use it in this circuit it is not necessary to place the jumper wire, as we use the windings separately. The variable condenser is a 23-plate, having a capacity of .0005.

This circuit requires one tube socket. This is just the detector tube that we have shown here on our panel. This socket may be either the General Radio Company or the Na-Ald, made by the Alden Manufacturing Company. The grid leak and condenser is the well-known Durham variable grid leak in conjunction with the Dubilier fixed .00025 condenser.

This circuit works best with the UV200 detector tube. It may also be worked with the UV199 or the WD12 tubes. I do not believe that there is another detector tube on the market as good as the UV200, and if you wish to get the best results with this circuit I would advise using the UV200 tube.

You will notice in the wiring diagram that we do not use a ground connection. All of our reception is done either on the antenna alone or on the ground alone. When you are using an antenna you disconnect your ground. Almost anything will do for an antenna. Mr. Goodreau, the inventor of this circuit, states that he gets Schenectady, 200 miles away from his home, on a gold pencil which he uses for his aerial. He gets Chicago, 900 miles away, on a bedspring, and on an antenna which is about fifty feet long and ten feet high he reaches WOC, which is Davenport, Iowa.

This circuit is very sensitive, as you can see from the results which Mr. Goodreau has had with it. It is not absolutely necessary for you to have an antenna. If you can make a good ground connection, just disconnect your aerial and put your ground connection where we show the aerial and you will have the same results which you had with the aerial.

There is nothing tricky about this circuit. The antenna post comes in and goes to one side of the variometer and the center tap on the variometer—that is, the one which connects the two halves of the stationary windings together—is one terminal to the 23-plate variable condenser. The aerial post goes to the other side of the 23-plate variable condenser.

There is no connection to the other side of the variometer—that is, the opposite half of the windings—and the only connections to the stationary windings are the beginning of the winding on one side or one-half of the variometer and the center winding of that half. The other end winding is left free and the rotor is connected one side to the plate on the detector tube and the other side to the telephones. The grid connections are made from the antenna post over through the grid leak and stopping condenser to the grid of the tube.

The positive side of the filament battery is connected to the movable plates of the variable condenser, which is also connected to the center tap of the windings on the split variometer.

You will notice that we use the little Chelten midget vernier condenser for our fine adjustment. If, however, you are using the Kellogg variable condenser, which already has the vernier attachment to it, it is not necessary for you to include the Chelten midget. This circuit tunes very sharp, and it is necessary that you have a vernier condenser to bring in the stations at their maximum strength.

In building this circuit you require one panel, which is either hard rubber or bakelite, 14 inches long, 7 inches high and 3-16-inch thick. This size panel gives you ample spacing without crowding any of the instruments which you wish to mount in this circuit.

The photographs show the front view of the set. In the left-hand corner we have a dial for the variometer and the next dial is for the variable condenser. Between these two and a little above them we show the small Chelten midget condenser and to the right of this we have the rheostat. This rheostat has a resistance of 30 ohms and is made by the Carter Electric Company of Chicago.

Over on the extreme right-hand side of the panel, in the center, we show two Eby binding posts. These binding posts may be either for the telephone connections or for the connections which would go to a two-stage audio frequency amplifier. The binding post in the upper left-

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I Told You So, Clubwomen

(Continued from Page 45)

and Mrs. Tull, addressing her fellow club-members in the studio, those gathered before the receiver at the club rooms and in their own homes, and the great unseen, unknown, uncounted audience, announced:

"This ends the first and last open meeting of the Philomusian Club," following this with final announcements and bidding her radio audience a very kindly and friendly farewell. Once again came the business of the turning on and off of the very mysterious lights. Opening with the song "America," the session closed with song—a song dear to the hearts of the Philomusian Club—"The Sesqui-Centennial Rallying Song."

This, set to the stirring strains of "John Brown's Body Lies A-mouldering in the Grave," brought other eager spectators to stare through the glass partitions of the studio and to wonder at the sound of militant music from so calm and composed a gathering. Led by Isabella Buchanan Akimoff, at the piano, and Mrs. George M. Ferguson, violinist, who had played during the meeting, the special words, appropriate to the Centennial celebration, sped on the wings of radio thousands and thousands of miles beyond the ken or hearing of the singers. And as the last note died away, the editor-director (and he had the last word after all) stepped to the microphone and announced:

"This is Station WIP, Philadelphia. You have just listened to a stated meeting of the Philomusian Club of Philadelphia, broadcast under the auspices of *Radio in the Home*. This will conclude the transmission for this period. Good afternoon, all!"

Then the mysterious red light blinked, went out and stayed out this time.

An Ideal Circuit for the Ducon Plug

(Continued From Page 37)

hand corner of the panel is either for the ground connection or for the aerial connection.

You will notice in the photograph, looking down on top of the set, that we have four Eby binding posts in the rear. These binding posts are for the "A" and "B" battery connections. Two of them are for the "A" battery and the other two are for the "B" battery. The baseboard which we use is one foot long and five and one-half inches wide by one-half inch thick. This is large enough to mount the socket and the binding posts for the battery and the grid condenser and leak.

Now, just a few words on tuning this circuit. Place the rotor of the variometer at 100 degrees—that is, so the windings of the rotor are assisting the windings of the stator, by placing them in the same direction. Place the variable condenser at about fifty degrees and then light the filament of the tube. With the rotor of your variometer left in this position slowly turn the variable condenser between zero and 100 until it comes to a carrier wave. This carrier wave is the same as you would receive in any other regenerative circuit. Then with the vernier get into the center of this carrier wave and then turn your variometer rotor toward the zero mark until the whistle stops. You will find, however, when you are coming down with the rotor of your variometer toward the zero position that you will have to reset the variable condenser by moving the rotor to throw your circuit slightly out of tune, and this must be brought back into tune with the variable condenser. After you have had the maximum signal strength of your circuit you may probably find that it can be still increased slightly by either increasing or decreasing the filament of the tube by raising or lowering the rheostat.

Radio Kindergarten

(Continued From Page 13)

ly the same throughout the entire transmission. The difference is in the voice or sound mouldings on each wave.

Now these moulded waves go on outward through space and strike our own receiving aerial. Here they set up a similar agitation or vibration in the electrons in the aerial and these electrons rushing back and forth cause currents of electricity to rush back and forth through our set to the ground and return.

This introduces them into our set and by means of various adjustments in tuning, we are enabled to build these tiny currents up to quite strong vibrations by means of our B battery and these strong vibrations are the ones which cause the disturbance of the diaphragm in our head telephones or in our loud speaker.

Here we leave the electrons. From then on it is only a step and this step is not an electrical one. In other words, we reverse the process that went on in the studio of the transmitting station. There the singer's voice caused the air to vibrate and the vibrating air caused the diaphragm of the microphone to vibrate. On our end, the diaphragm in our head phones or loud speaker vibrates and this, causing the air to vibrate, sends the vibrations to our ear drums and the ear drums are made to vibrate in unison. This vibration of the ear drums is what effects our nerves of hearing and we are conscious of what we call "sound."

This is the entire process reduced down to simplest form. During the process there are many changes from mechanical vibration to physical or air vibration and from that to magnetic vibration—which we have in many parts of the apparatus—particularly around the magnet in the microphone and in the head set or loud speaker and also from one coil to the other in both the transmitting and receiving sets. We have already learned about these magnetic vibrations in the lesson in which we studied the effects of transferring electrical energy from one coil to another even though the two coils were not connected by any conducting wire. This process, as you remember, is called induction.

There is a good deal of technical material in this lesson and I do not think it is wise to crowd too much of this sort of thing into your mind at this stage of your progress in the study of radio. And so I am going to make this a short lesson, but I advise you to read it over twice and be very sure that you have a perfectly clear mental picture of everything before going on any further.

This is necessary because the further study of radio is all founded upon the fundamental facts laid down here.

Radio in the Home and in Every Room

(Continued From Page 20)

tery binding posts, by a simple arrangement of polarized plugs which cannot be incorrectly connected.

Radio outlets throughout the house constitute a new field of wiring sales for the electrical contractor and radio dealer.

Already certain progressive builders are incorporating radio wiring into their speculative homes as selling points. But the possibility of multiplying the enjoyment of radio by having its broadcast programs available through radio outlets in every room in his own home, should appeal to any householder as a remarkable enhancement of home comfort which is obtainable at a very small cost.