Radio Frequency *and the* Goodreau Split Variometer

By W. FRANCIS GOODREAU

TO MOST of the readers of this magazine, the Goodreau Split Variometer Circuit is well known. Many of you have built it, most of you have been very generous in your praise of it.

Soon after the publication of the article describing this receiver I began to receive letters from all over the United States and Canada. Letters asking questions of all kinds, some of which were answered in a personal letter and the rest in another article which appeared in a later issue of the magazine.

One of the questions most frequently asked was: "Can radio frequency be added to this receiver, and if so how?"

The answer has always been the same, namely, "At the present time there is no method by which radio frequency can be added to this circuit." The reason for this was that this circuit uses regeneration, and radio frequency amplification and regeneration do not get along well together.

However, in spite of the fact that nothing was accomplished, after many trials, in adding radio frequency to this set, I still continued to work on it, because the letters continued to come in, and also I desired to add radio frequency to this receiver for the satisfaction of doing it. You know how it is, I just hated to let this receiver get the best of me, and I was determined to add radio frequency to it or know the reason why.

Well, it's done, and so I am giving you the information on how to do it, and what results to expect when it's done.

You will need a few more parts for the set if you are going to use radio frequency, and you will also have to discard your split variometer and use in its place a variocoupler. I am sorry that this must be done, but because of the close coupling of the rotor and stator on the variometer good results could not be had. With the variocoupler, however, it was quite different. This variocoupler *must* be of the 180-degree type, such as a Remler or Simplex.

For one stage radio and detector you will need the following parts:

1 Variocoupler.
1 Variable Condenser, cap. .0005 mf. (Vernier).
1 Acme Radio Transformer, type R2.
2 Sockets.
Grid condenser, cap. .00025 mf. (Dubilier or Freshman or a "Grid-Denser," which is variable.)
Daven grid leak, 2 megs.
2 Rheostats, one 6 ohm, one 30 ohm (Kellogg, Pacent or Carter).
1 Open circuit jack.
1 Potentiometer, 350 or 400 ohms. (Federal, Pacent, General Radio.)
1 Inductance switch (Marco back-mounted)
6 Binding posts (Eby).
1 Radion or Mahoganite panel baseboard.

Mount the parts on the panel in the following order, from left to right, looking at panel from front of set. First, the variocoupler, next tap switch, next variable condenser, next two rheostats. Sockets, radio transformer, grid condenser and leak, and binding posts may be mounted on baseboard. The potentiometer can be mounted near rheostats.

After all parts are mounted, the set is ready to be wired. In wiring this set proceed as follows:

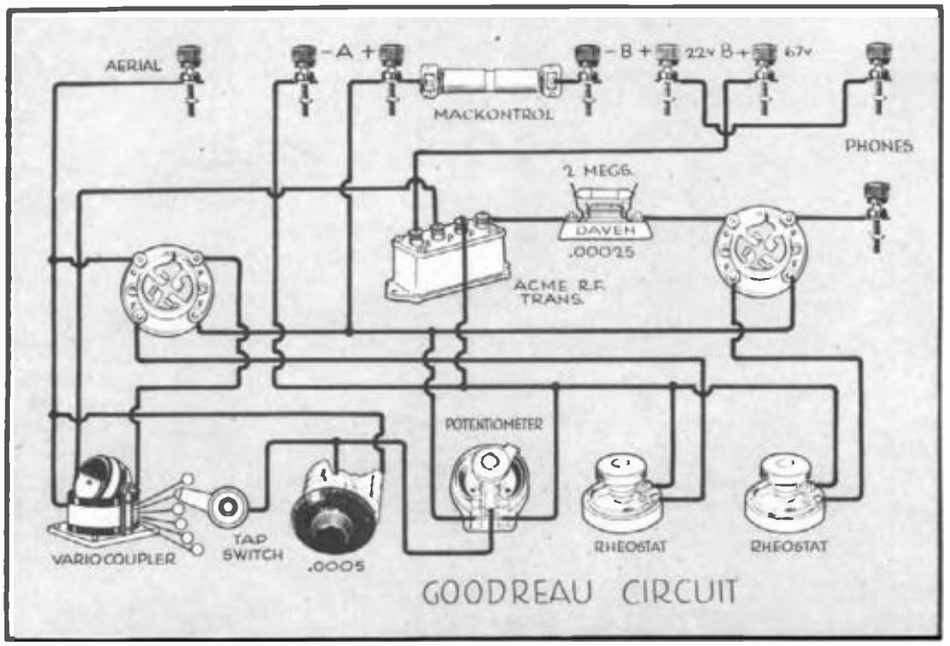
Connect the taps on the primary of the variocoupler to the tap switch. Connect a wire from the antenna post to the tap on the coupler, which is connected to the top of the primary winding. This same wire is now connected to the stator plates on the variable condenser, and is also connected from the same plates on the condenser to the post marked G on the first tube socket.

The tap switch is connected to the rotary plates of the variable condenser, and from there a wire is connected to the center post of the potentiometer.

The potentiometer is connected across the A battery, that is, one of the outside connectors is connected to the positive A and the other outside connector to the negative A. A cut-out switch should be inserted in either one of these lines to open circuits when not in use. The rheostats of both tubes are connected in the negative filament leads.

One end of the rotor of the variocoupler is connected to the plate of the first tube, the other end is connected to the post on the radio frequency transformer marked P. From the post on this transformer marked B, a wire is connected to the binding post marked B, 67½ volts positive.

From the post marked F minus on this transformer a wire is connected to the post marked F minus on the second or detector tube socket. From the post on



this transformer marked G, a wire is connected to one side of the grid condenser and leak, and from the other side of the grid condenser and leak a wire is connected to the post on the detector tube socket marked G.

From the post on this socket marked P a wire is connected to the binding post marked B, 22½ volts.

From the binding post marked B minus a wire is connected to the positive A battery post. It is wise to insert a Mackontrol in this lead to protect the tubes. This is shown in the picture diagram. From the positive A battery post a wire is connected to the post on detector tube socket marked F plus, and from there it is connected to one side of potentiometer and from there to post on first tube socket marked F plus.

This completes the wiring.

In tuning this set you will find very little difference. It tunes just about like the original, except that more care is required, and the addition of a tap switch. This switch is used for selective tuning and need not be varied unless you wish to do so. You will find it helpful in cutting out local stations.

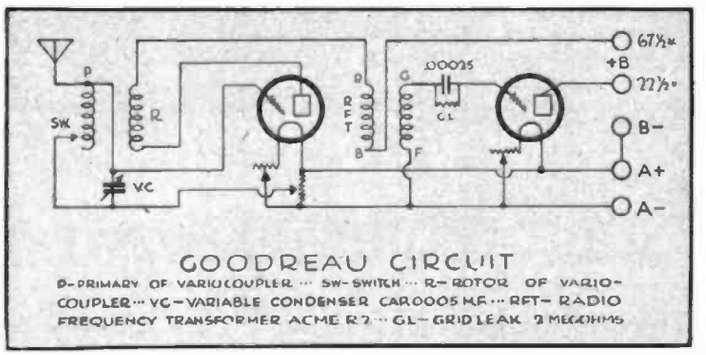
Keep the rotor of the variocoupler at right angles to the stator when tuning and vary it but slightly. If you bring the rotor too close to the stator you will lose the station you are trying to tune in. Handle this control carefully. It is the only critical control on the set.

The potentiometer needs very little adjustment—just a slight turn once in a while.

If you are at present using the original circuit and are satisfied with it, I would advise that you leave it alone, and not tackle this unless you have had a little experience with radio frequency amplification. *It is not suitable for the novice* and this article was not intended for them, but is given in response to requests from many readers who have some experience with this type of amplification.

In tests with this receiver it was found that signals were louder than with one tube and the distance range was increased somewhat. *It was much sharper in tuning than the original*, and should prove useful to those who are having trouble tuning out local stations.

I shall be glad to hear from all who build this receiver whether they are successful or not. Please address me in care of the editor of *Radio in the Home*.



GOODREAU CIRCUIT
P-PRIMARY OF VARIOCOUPLER ··· SW-SWITCH ··· R-ROTOR OF VARIOCOUPLER ··· VC-VARIABLE CONDENSER CAP.0005 MF ··· RFT-RADIO FREQUENCY TRANSFORMER ACME R2 ··· GL-GRID LEAK 2 MEGOHMS

Trouble Shooting in the Grime's 3XP

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paratus. To overcome the effect of long battery leads, a .005 mf. condenser should be placed across the negative B and the 90-volt binding posts at the set. To reduce the feed-back oscillation tendency in closely mounted equipment, reduce the number of turns on the primary windings of the tuned radio transformers. The last remedy is least desirable but is sometimes necessary.

The trouble may also appear if you have the windings of one of your radio frequency transformer coils in too close coupling with the windings of an audio frequency transformer.

There are other ways to recognize the "air hammer" noises than by their mere sound. To make certain that the noise is really a radio oscillation and is to be treated accordingly, remove the antenna wire from the set. The "air hammer" noise should then occur at certain settings of the tuning condensers and only at those settings.

Audio Howl—Audio howl is often experienced in an audio frequency amplifier, especially if the amplifier has three stages of amplification. The 3XP Inverse Duplex has three audio stages. The greatest tendency toward audio howl comes from the feed-back between the audio transformers or in the B battery circuit.

To prevent audio feed-back between the transformers, care should be exercised in placing them at right angles to each other, mounting their

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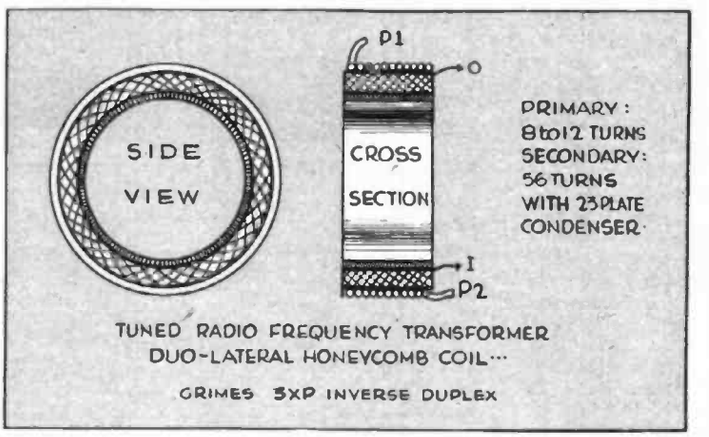

TUNED RADIO FREQUENCY TRANSFORMER
DUO-LATERAL HONEYCOMB COIL···
GRIMES 3XP INVERSE DUPLEX