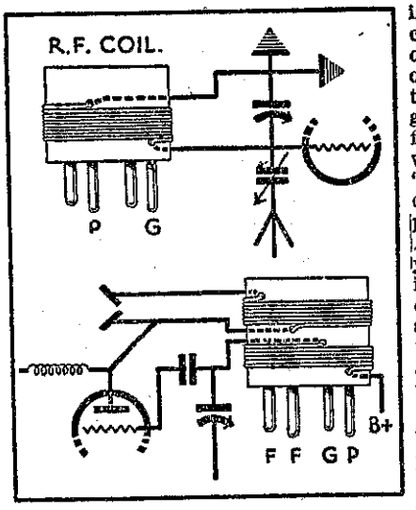
The Coils.

WE are now ready to make the coils. For the broadcast band we are going to use 2in. former and valve bases for the short-wave. Mounting a two-inch former on valve bases will present somewhat of a problem, but there are several ways of tackling it. One way, and probably the best, is to have or cut a disc of three-ply which will just fit into a 2in. former. Place this over a valve socket and mark the position of the four terminals. Now drill through with a 1-8in. drill and fix into those holes four valve pins. These can be prised out until they fit the holes tightly.

If you are using American bases you will find it a little difficult to make the thin pins fit the larger large hole in the base comfortably, but if you use English bases you will have no difficulty. Furthermore, the use of English bases for the coils precludes any possibility of your putting the valve in the place that is intended for the coil. To do this would mean the ruination of your valves, and if you put the coil in the valve socket, the ruination of your battery. The moral is, be careful. It is better to paint the two coil bases a conspicuous colour so that you cannot make any mistake. Another method, instead of fitting valve pins, is to cut an ordinary valve base crosswise, so that only a quarter of an inch or so is left above the four pins, and then screw this to the disc of three ply in such a manner that the hole in the three ply corresponds with the pins. The disc can be held into the former either by screws or by thin brads. Fix in position temporarily. It will have to come out again, so do not make a good job of it. Identify each pin of the valve base by pushing it into a holder and marking the terminals in pencil on the former. By doing this you will bring the end out to the right terminal.

We will explain the making of the coils using the measurements system, as it is much to be preferred. Three-eighths of an inch above the plate terminal drill a small hole, and 1¾in. from the bottom and immediately over the grid terminal drill another hole: 2¼in. over "F+", another hole, and the last, 3in. above "F—" prong. These instructions, of course, are for the regeneration coil. Take out the valve base and thread the 26 d.s.c. wire through the lowest hole and slip the former on to a winder. If a solid wooden core is used as a former, tin-tacks can be pushed through the hole and the wire can be twisted round them.

Commence winding with the 26 d.s.c. and continue until the next hole is encountered. Make the wire fast to this, or to a tack, and commence winding with 30 gauge wire immediately above it. Finish up to the top hole. If you wish to wind the coil by hand and count the turns you will find the numbers in the accompanying panel. You proceed with the r.f. coil in the same manner as before, but it is necessary to drill two holes only in the threeply disc. That is the hole over the plate



at the grid. Take your 2in. former and 3-16in. above the grid terminal drill a hole. The next hole is 3¼in. above the plate prong. Wind this space with 24 d.s.c. wire. Note particularly that the grid terminal connects with the bottom of the coil; it is unusual, but it is absolutely necessary in this circuit.

Your coils are now made and you must assemble your batteries. Of course most constructors will use what they have on hand, but we recommend two 60-volt batteries for the "B," and either two, four or six-volt "A" supply, and nine-volt grid bias. For this circuit you can use the new 230 type valve and an air-cell or the 230 type with an ordinary two-volt accumulator or dry cell. If you use dry cells you had better get a voltmeter from somewhere and put in a resistance until the voltage is down to two. The rheostat will not control voltage on all the screen grid valves, so if a battery in any way higher than the valves used is employed, the voltage must be broken down with a suitable resistance. A ten ohms rheostat would probably be sufficient for most purposes. "A—", "B—", and "C+" are connected together.

The connections to the battery are made in the usual manner. You will find the detector will work best with from 22½ volts to 45 volts on the plate. The detector connection goes to "B" of the audio transformer and in our description, we called it the brown wire. The highest voltage, 120, can go to the plate of the r.f. valve and to the plate of the power valve. In our description it was the white wire and went to the top of the .05 condenser.

The screen voltage must be half that of the plate, so if you use 120 on the plate you must use the 60 terminal tap for the screen voltage, that is, the one going to the plate of the valve-holder, and which, in our description, was brown. If you have an old valve handy, one in which the filament lights up but the emission of which is gone, put it in each of the three sockets in turn and turn on the switch. The filaments should light up in each. If it does not you will know that you have made a mistake in the filament wiring somewhere. If it flashes out, then you will know that you have done the same thing, but be very careful before you put in the actual valve.

A fuse can be fitted to this circuit between "A—" and "B—." If this is done, separate connections must be made to "A—" and "B—". "B—" is not connected to "A—" as was recommended for the usual set, but to one side of the fuse. The other side of the fuse is connected to "A—". Thus the only way the "B" current has of getting back to negative is through the fuse. If you instal a fuse read over what we have said about "A—" and "B—" before you put it in. You can quite easily put it in wrongly and pass all your "A" current through it. Assuming that the valves light up, you can rest assured that your voltage is correct as far as the filament is concerned, and can put your valves and get work. If it does not go we cannot tell you what is wrong. Just look round and check up everything until you find the mistake.

By turning over the differential condenser you will get the set to oscillate. Adjust the potentiometer until reaction is smooth. By turning it toward the positive side the set will become very active and probably ploppy. Turning toward the negative deadens it, so that an intermediate point will give you the best reaction. The set, if constructed to design, will not be unstable. If it is, make quite certain that the high potential end of the r.f. coil is nearest the base—that is the one that is connecting with "G" of the valve socket. This connects with "G" of the valve and the aerial. It must be the lower end. The other side connects to earth and is uppermost. This reverses the field and prevents interaction—otherwise you will never get the set stable. You will find that you will have to alter the midget condenser in the aerial to get best results. Do not leave it out, thinking you are going to get still stronger results than we have ourselves obtained. You may get yourself into trouble if you do so because the set will probably radiate. Furthermore, it will be unselective.

Now, while we are on the subject of selectivity, we might mention that this set is not selective. We do not know of any single stage of screen grid that is, unless it uses a pre-selective circuit such as a band-pass filter, and the cost of this does not justify inclusion. If you wish to separate the local station, use a wavetrap. It will be quite effective and will do the job well.

On shortwave the set is as selective as is desired, the midget condenser in the aerial having the required effect.

Short-Wave Coils

80-metre band, 24 d.c.c. wire valve base. Aerial 20. Detector, grid coil 20, regeneration 9.
40-metre band, 24 d.c.c. wire valve base. Aerial 12. Detector, grid 12 regeneration 7.
20-metre band, 24 d.c.c. wire valve base. Aerial 6. Detector, grid 6, regeneration 4.

Tips and Jottings

IF you are making a set in which a tuning coil is placed somewhere near to a screen, be very careful to see that you keep it the correct distance from the screen, for if it is too close you are almost certain to lose selectivity.

FAILURE in soldering is often due to a dirty iron, to an iron which is too cool, or to dirty wires or terminals.