# ht Hawk"

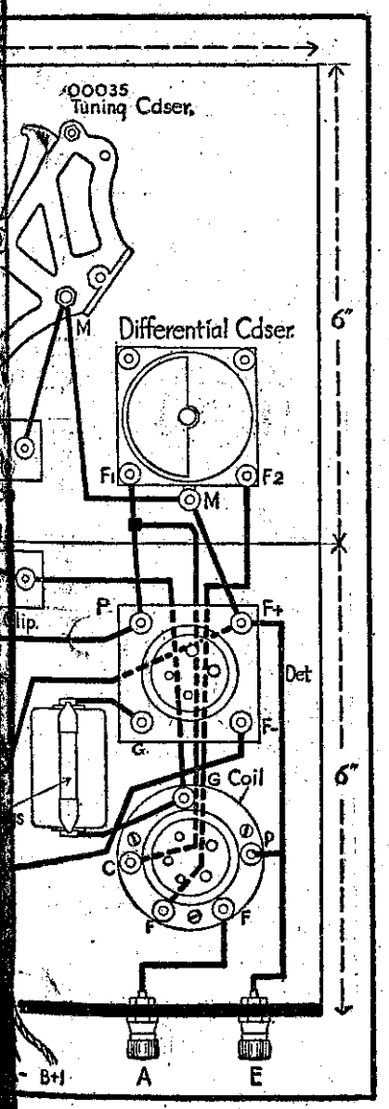
## plete two-valve differential receiver

ICAL EDITOR

The photographs and the sketch will indicate their positions very clearly, but make certain they are right before screwing them down.

### The Tuning Coil.

THERE are very many ways of making the coil, but some prefer to do it on celluloid, as our own was wound. However, it is much more simple to wind the coil on a cardboard former, and we notice that a few firms are turning out the required length of former with the valve base already in position. This will save the constructor a good deal of trouble.




### Wiring.

THERE is little we can say about the wiring other than take every lead by the shortest way, and particularly keep the grid and plate wires short. We have found it not a bad plan to take many of the wires underneath the valve bases, as can be seen from the photograph.

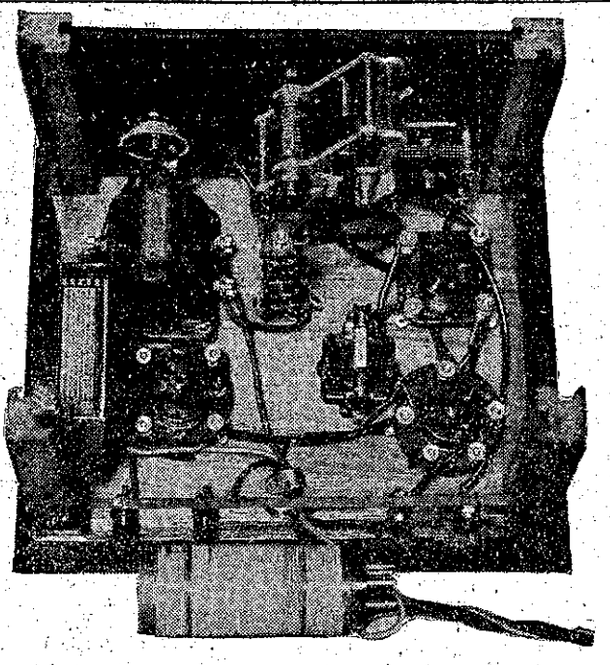
One point where our sketch and our photographs differ might be mentioned. We have omitted in our own model, the condenser, which can be switched in series with the tuning condenser to reduce the lower values for shortwave work. Its position is quite clearly shown in the diagramatic sketch. The wire from the grid terminal of the coil-holder is taken to one terminal on this condenser, but the other terminal continues on to the fixed plates. A shorting clip must be arranged for so that when broadcast is required this clip short-circuits the two terminals and cuts out the condenser. It is a good plan to fasten one end of the condenser to the fixed plates of the moving condenser.

The battery voltages depend very much upon the requirements of the constructor. If he wants good results he will use 90 volts on B+2 and 45 or 22½ volts on B+1. As for an "A" battery, four-volt valves will be quite sufficient and the two-volters are quite good. The value of the "C" battery will depend upon the valve used in the last stage and the voltage applied. If you are not clear on how much bias to use, try nine volts and reduce it until good, clear reception is obtained. Otherwise ask your dealer when you buy the valve. There are quite a number of different valves that can be used for this purpose, and we shall not enumerate them here. We recommend a special detector such as PM4D, A615 or UX 112A. For the second stage we recommend a high-power gain valve, such as B409 or P.M.4.

The value of the grid-leak is best found by experiment, remembering that the higher the value the more sensitive the set becomes, the more difficult is oscillation and the harsher is the tone. We found 5 megohms quite a good value for this set, although it could quite well be reduced to two.

Outside the set B— must be connected to either A— or A+, certainly not to both.

If reaction is ploppy try another grid-leak and reduce the detector voltage to 22½. If now the set does not oscillate easily increase the number of turns on the reaction coil or use a larger reaction condenser. Our regeneration coil was designed for .00013 condenser, but .0002 can be employed by using about 10 less turns on the broadcast band and a proportionately smaller number on the S.W. coils.



### The Set Performs Well.

WHEN we tried out the set it was in the middle of Wellington and early in the evening. Unfortunately we have had to hurry the completion of this set and so have not had adequate time to go DX-ing on it. We leave that for our constructors and can promise them that there are many thrills coming to them when they begin to explore the ether. Our test took place one evening at about 7 o'clock, and when we turned it on the noise of 2YA roaring in our ears was almost deafening, so we put it on the speaker. It came through beautifully clear and the tone was all that could be wished for from a set so small. We were glad that it has been designed to use a moderate power valve in the last stage.

Then we introduced a wavetrap and Wellington disappeared like magic and we could hear how the set oscillated. It went beautifully in and out of reaction without a sign of ploppiness or of that rasping reaction that characterised the sets of a year or so ago. 1, 3 and 4YA all came in on the phones and we could just get the whistle of what was probably 2BL, but it was far too early for such a station and so attempting to tune it in was not worth while.

### Parts List for "Night Hawk" Two.

.00035 Variable Condenser.
Differential Condenser, .00013 or .002 mfds.
.00025 Fixed Condenser.
.0001 mfd. Fixed Condenser.
Switch.
H.F. Choke.
5 meg. Grid Leak.
2 U.X. Valve Holders.
1 U.Y. Valve Holder.
Four Terminals.
Panel, 8in. x 6in.
Valve Base Coils.
Audio Transformer.
1 30-ohm Rheostat.
Five feet of four-wire cable.
Two Valves.

The coil is not difficult to make. A piece of former that will fit tightly over the valve base is all that is required and it should be just over 4¼ inches long. The tubing is then fitted over the coil base. Drill a small hole right through the former into the base so that later a brass brad may be forced in. Just clear of this hole and immediately above the cathode prong, drill another right through into the cavity of the base. From this measure up 7-8in. and above the remaining adjacent filament pin drill another hole. Allow a 1-8in. and measure 2¼in. Now drill two more holes, one at the lower of these two marks immediately above the plate pin, and thereafter through the upper mark immediately over the grid pin. Now, allow another 1-8in. and drill a further hole immediately over the plate pin—that is the second over that pin. The final hole is drilled at the top mark immediately above the free filament pin. This explanation of the positioning of the holes can be made more clear by an examination of the diagram of the coil reproduced on this page. The idea is to bring out each wire right over the pin to which it is to go.

When the holes are drilled take off the base and arrange the former on