

not large enough to rob the reaction coil of too much of its current. This was quite effective as a compromise, but nevertheless left something to be desired as regards simplicity, while the reaction control still had some effect on the tuning.

With the introduction of the differential type of condenser, the much better scheme employed in the "Differential One" became practicable. If reference is made to the circuit diagram in Fig. 1 it would be seen that with the reaction condenser at its minimum set-

between condenser C4 and the coil socket. It actually consists of a scrap of ebonite on which two valve sockets are mounted, and should be supported above the baseboard so that the valve sockets are clear of the wood; alternatively, the baseboard may have a couple of good-sized holes drilled under the sockets so as to clear them.

A valve-pin is used to make contact with one or other of the sockets, and this is attached by means of a short length of good flex or thin wire to the grid terminal on the five-pin valve

The windings comprise three in number. The aerial coil L1 occupies the topmost position on the former, and consists of 35 turns of No. 30 D.S.C. The next winding down in the tuning coil varies according to the capacity of the tuning condenser used. If a condenser having a maximum capacity of .00035 mfd. is used, this coil should comprise 120 turns of No. 30 D.S.C.; if the condenser has a maximum capacity of .0005 mfd., then 104 turns of No. 28 D.S.C. should be wound on. It will be noted that the bottom ends of these two windings are connected to the same pin on the valve base, this being the only pin to which two wires are connected. The last coil, L3, that at the bottom, is the reaction coil and comprises 40 turns of No. 30 D.S.C. or smaller wire; the precise gauge is not important in this instance.

The arrangement of the windings is shown more clearly in Fig. 3, which also shows the connections to the valve base.

Other Considerations.

THERE are just one or two other little details which must be mentioned in connection with the construction. It will be noticed that in the practical wiring diagram C+ is shown connected to A— and B—. This may seem a very useless proceeding seeing that no C battery will be used for the present, but the connection will have to be made eventually, so may as well be made now. Similarly the whole twelve terminals are shown mounted, although some of them will be unused until the receiver grows up.

The fixed condenser sometimes inserted in series with the reaction condenser has been omitted, as most modern condensers are too well aligned for there to be any possibility of the plates touching. If the constructor feels doubtful about the point, however, there is no reason why a fixed condenser should not be inserted in the lead between plate terminal and reaction coil: this should be of .001 mfd., or larger.

So soon as the wiring has been completed, following the wiring diagram

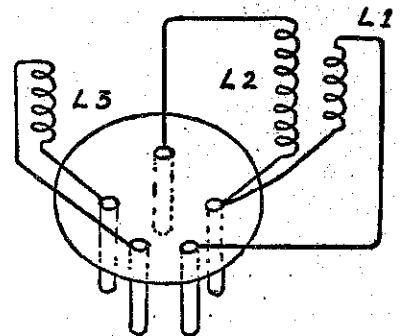
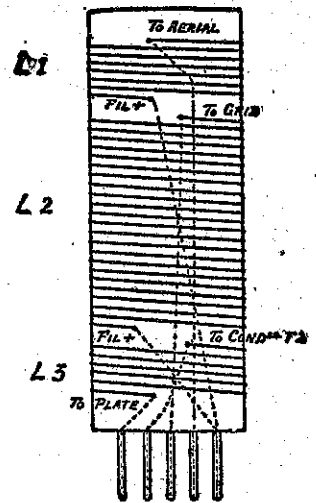


Fig. 3

given in Fig. 2, the receiver may be tested and adjusted. As this process will consist of putting the receiver in and out of oscillation, adjusting the B voltage until the control is as smooth as it can be had, be careful that the receiver is not tuned in to any broadcast station or interference may be caused to other listeners. Once the

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Fig. 2

ting (that is, with the moving vanes fully interleaved with that set of fixed vanes marked F1), the effect is merely to provide a by-pass from plate to filament. As the setting of the reaction condenser is increased so as to bring the moving vanes into engagement with the other set of fixed vanes marked F2, more and more of the current passes through the reaction coil instead of being by-passed via F2.

The reaction effect is thus obtained in more or less normal fashion, but we have secured two notable improvements. Firstly, there is present at all times an adequate by-pass for high-frequency currents in the plate circuit of the detector valve; and, secondly, the capacity between plate and filament is practically constant, so that the tuning effect of the reaction control is reduced to quite negligible proportions even when reception is on the higher frequencies. It will also be noticed that, as distinct from the older system of differential reaction control, the moving plates of the reaction condenser are at earth potential, so that hand capacity effects are entirely absent.

The Coils.

THE construction of the receiver is so simple as to render any very detailed description quite unnecessary. One little point that deserves a word of explanation is the plug and socket arrangement for bringing a fixed condenser in series with the tuning condenser for short-wave work. In the practical wiring diagram (Fig. 2) the little "distributor board" can be seen

between, which does duty as a coil socket; thence a wire goes to one end of the grid condenser and leak.

The only other point which may require a little thought on the part of the constructor is the making of the plug-in coil. The reader will have guessed from the use of a five-pin valve-holder as a coil socket that the coil is to be wound on the base of a disused valve of the five-prong 227 or 224 types. As the coil former will have to be nearly four inches long to accommodate the windings, some extension will have to be arranged to fit over the valve base.

After the bulb of the defective valve has been loosened by methylated spirits or brute force and the wires leading from bulb to pins removed, a couple of thicknesses of thin celluloid may be wound over the base and cemented together and into position with the usual celluloid cement. "Cathode" is bound to confess that his own junkbox did not run to celluloid so that a couple of thicknesses of horn fibre well shellaced and baked were made to suffice without any apparent ill result. If this alternative is used, however, be sure that the former is well dried, as if wet shellac is allowed to soak into the windings and fill the interstices between turns, up goes distributed capacity and down goes efficiency.

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