

The "Combination" Receiver

A Small Set with Wide Application

By "PENIODE"



THE small crystal receiver and a single stage amplifier will always be popular among those desirous of listening to the local station only, but after a while a little discontent is sure to arise when it is desired to reach a little further on the local's silent day, even though it be only on the headphones. Then, again, there may be a time when all but one member of the family do not wish to listen to the loudspeaker, and the crystal and amplifier has to be partly unassembled in order to use the 'phones only. The little set to be described has several uses and can be changed from one to the other merely by changing the 'phone or speaker plug or throwing over a miniature switch.

Using but a crystal and valve the following combinations are available:—

1. Crystal receiver alone.
2. Crystal set and amplifier.
3. Single valve detector employing regeneration.

To build, it is quite inexpensive; in fact, only a few shillings more than if designed for crystal and amplifier alone, and the construction calls for no great skill or previous experience.

When completed, the front panel contains a tuning dial and reaction or volume control. Mounted in the centre is the crystal detector and just below is a double pole double throw switch. At each corner at the bottom is a jack and these are arranged so that to use the valve in either capacity one has merely to insert the plug to switch on the filament. When inserted in the crystal set plug the filaments are not connected and the batteries not being run down. Controls have been reduced to a minimum, and if built into a cabinet can be totally operated from the front.

Considerable latitude can be given in the choice of components and the only parts that require care when buying are the two jacks. Small diagrams are given and the constructor will be able to tell by the appearance whether he is getting the correct article.

The Coil Construction.

DETAILS for the construction of the coil are given, which has to be made before any assembly can be attempted. If of cardboard, the coil former will have to be thoroughly dried and given one or two coats of shellac varnish or celluloid solution in amyl acetate and acetone. This drives out all the moisture which is often present in heavy proportions in cardboard. The secondary and reaction coil are wound as one coil, and a tapping taken for the connection to the filament of the valve. Starting half an inch from one end, wind on 55 turns and make a loop in the wire. Continue to wind on a further 25 turns in the same direction, and about 1-8in. from the first coil before the loop. Finish off the ends, either by a soldering lug or passing the wire in and out of two small holes drilled conveniently. The aerial coil has to be wound over the lower end of the secondary coil, and consists of twenty turns separated from the inner coil by several layers of empire cloth or paper. Reference to the diagram will make the position of this coil quite clear.

Arrange the leads to this coil so that the three from the reaction and grid coil run out from one side, and the aerial and earth leads run out from the opposite side. This facilitates wiring.

To avoid any absorption of moisture the whole can be given a thin coat of celluloid solution and allowed to dry in a warm place.

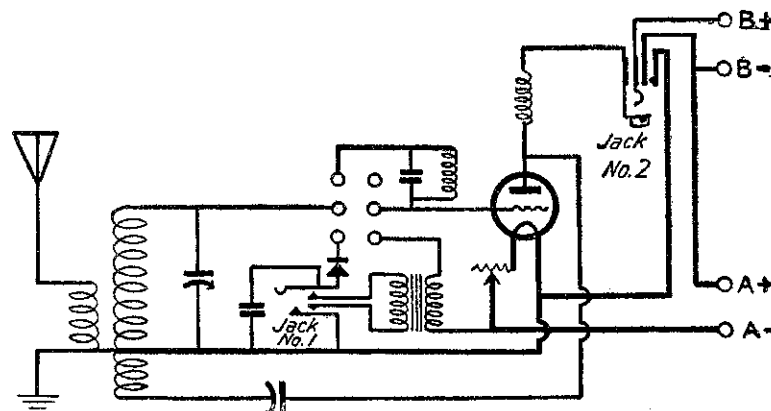
The easiest way in which to mount this component is by using two strips of 1-8in. ebonite or fibre 4 1/2in. long, and drilling holes 1/4in. from each end. One side of the coil can now be clamped when two screws are passed through these holes and screwed to the baseboard, a block being used to keep the coil away from the wooden base.

Unless the builder wishes to make his own R.F. choke, the coil is the only component that requires actual construction. As the choke is used only to throw back sufficient radio frequency energy to get reaction it need not be very efficient and may consist of two or three slots wound full of No. 36 s.c.c. wire. In fact, the writer used an ord-

inary cotton reel filled with this gauge wire, with a screw passing through the centre hole to mount to the baseboard.

switch, but the aim was to cut down all unnecessary controls. In front of this rheostat lies the inter-valve transformer. One should be chosen having a high ratio, as distortion is unlikely to be noticeable in a single stage of amplification. The R.F. choke and valve socket complete the fixed components, as the grid leak and condenser can be made self-supporting by using bus wire.

The rheostat has been fixed to the baseboard, and a suitable one will have to be chosen when buying the parts. It could, of course, have been fixed to the front panel, and used as a



inary cotton reel filled with this gauge wire, with a screw passing through the centre hole to mount to the baseboard.

The Assembling.

ASSUMING that all the individual components are on hand, the next procedure is to mount them in their respective places on the baseboard and front panel. It is always best to start with the panel first as the amount of available room at the back can better be judged with the variable condensers, etc., in position. Screw the front panel to the front edge of the baseboard, and see if, when the condensers are mounted with the centre spindle 3in. from the top of the panel, the fixed or moving plates foul the baseboard. If so, then the variable condensers will have to be mounted a little above the centre of the panel.

A suggested place for these two components so that the whole will give a symmetric appearance when finished can be obtained by drilling the spindle hole 3in. from the top and 3in. from each end. This gives sufficient room between the dials for the crystal and switch. At each of the lower corners of the panel are mounted the two jacks, while between the dials are below, the six connections to the D.P.D.T. switch and—above, the crystal detector.

The diagram given represents a plan of the receiver as it would appear if

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The Wiring Connections.

FOR the wiring, No. 18 or 20 tinned copper wire, with lengths of insulating sleeving, is recommended. It is quicker and easier to use, and chances of short circuits are less possible.

In wiring any set it is a good plan to complete the filament and battery systems first and then go on to the wiring of the coils, etc.

The point-to-point method of describing has helped many to better understand little points not made clear by the diagrams.

Join left-hand terminal, on the strip of four, marked A— to one end of rheostat and to C— on transformer. (This C— terminal may be marked F—, C—, or G.B.) Join the free end of the rheostat to one of the filament terminals on the valve socket. Join the two middle terminals on the strip together, and carry the wire to one of

The "Combination" Set.

1 Ormond L.L. Condenser	
.0005, each	10 0
1 Ormond L.L. Condenser	
.0003, each	10 0
1 Dubilier Fixed Condenser,	
.001, each	2 6
1 Dubilier Fixed Condenser,	
.00025, each	2 6
1 Ormond Crystal Detector,	
each	2 6
(Or 1 Wavelength Permanent Detector)	1 6

1 Dubilier H.F. Choke	2 6
1 Parkin UX Socket	2 6
1 Transformer, prices from,	
each	10 9
1 Unity 25 ohm Rheostat with	
Switch	4 0
1 Trolite Panel, 12 in. long	5 0

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