Crystal Set, Wave Trap and Detector for Valve Sets

Will Cut Out the Local Station

By "Pentode"

CAN you cut out the local station? "That is the question asked everyone who has a multi-valve receiver. Answers vary, and it does not always follow that because a man has six valves, one after the other, he can cut out the local station and "drag in the Aussies." The prospective buyer then asks, "Why the need for so many valves when all one hears is the home programme?" More often than not the nearby station is somewhat distorted by having to use so many valves and depending on de-tuning to cut down the volume. People say that reception on a crystal is so much clearer.

It is not generally known that a valve used in the proper way can give less distortion on a powerful signal than a crystal. However, that is beside the point. In the majority of cases the distortion that arises when using a powerful receiver on a nearby station is due to overloading of the high-frequency and detector valves. And so it is that many people blame the broadcasting station when the trouble is right at home with them.

The writer has often thought of the need for an efficient wavetrap combined with a crystal set. The one now to be described, however, has many salient points in its favour. In itself it is a long-range crystal receiver, and can be used with the 'phones or coupled to a single or two-valve amplifier.

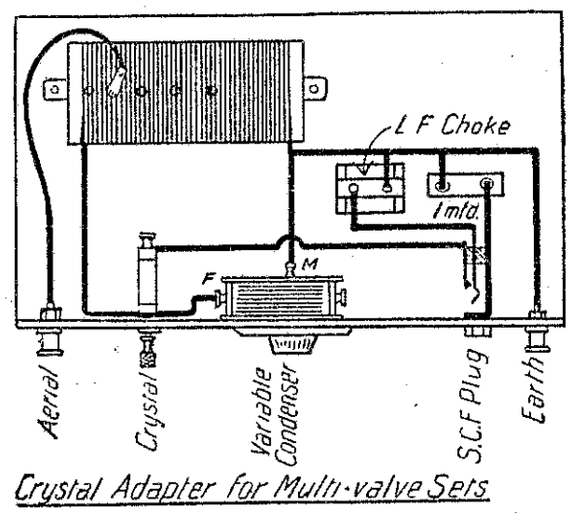
When the 'phone plug is disconnected it forms an efficient wavetrap for use in the aerial lead of any valve set. There is also another use to which it can be put. By making the special adapter, described here, the detector or first audio valve of any set can be taken out and the adapter plugged into their places. When arranged this way, your three, four, five, or six-valve set is converted to a crystal detector with one or two audio stages. The high-frequency and detector valves can then be turned out. Besides a great saving in battery current, there will be a decided improvement in the tone of the local station. It can be used in three different ways, and being easy to construct, the assembly should present no difficulties to the merest novice.

Making the Coil.

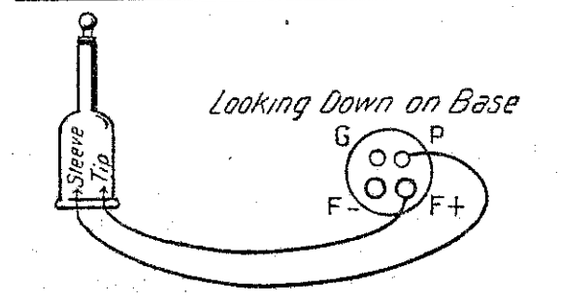
FIRST there is the coil to be made. This is of the space wound, low-loss type, wound on celluloid. Procure a sheet of clear celluloid 10in. x. 6in. and cut two strips half an inch wide from one side. The remaining piece, five inches wide, is wound round a 3-inch former (after winding 2 or 3 layers brown paper to prevent celluloid from binding) and a touch of celluloid cement spread along the overlapping edges. If there is more than ½in. overlap, the surplus should be cut off before cementing. If the wire is inclined to be twisted or kinked on the reel, sufficient should be wound off in an open space (about 48 feet will be required) and stretched slightly until it is quite straight. Two small holes are made at one end of the celluloid former and the end of the wire threaded through. Spacing is done with the aid of thin string, or better still, a length of 22 or 24 gauge wire. Whichever is used for the spacing, it is wound on at the same time as the straight wire already mentioned. When twelve turns have been put on, make a twist or loop in the wire on the opposite side to the cemented seam. Afterwards these twists are cleaned and are used to make variable tappings from the aerial. A similar twist is made after the 18th, 27th, 38th and 50th turn. These loops are made in a straight line all on the same side of the coil and project about ¼in.

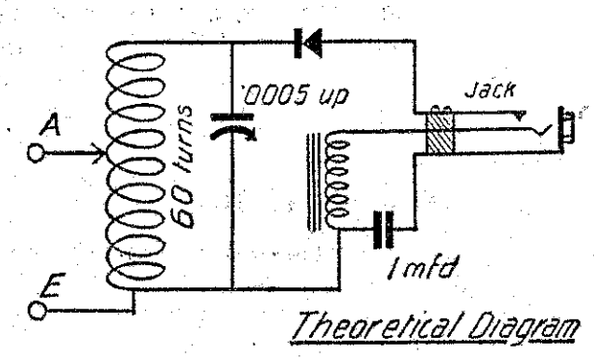
Wind both the spacing wire and coil wire on fairly tightly and when 60 turns have been put on fasten the coil wire to the celluloid. A good plan is to wind on a few more turns than necessary, drill a hole through celluloid and former and fasten the wire tightly at the end.

NOW carefuliy unwind the spacing wire or string, taking care not to disturb the even spacing of the wire on the coil. The whole should then be given a liberal coating of celluloid cement. A good formulae for making celluloid cement is to get a chemist to mix equal parts of amyl acetate and acetone, into which should be placed a few strips of clear celluloid. Amyl acetate alone takes too long to dry, while acetone dries quickly but tends to peel off as a consequence. Put the coil in a warm place to dry as moisture makes the cement go milky. When quite dry slide out the centre former. Unwind the few turns extra and leave about six inches of wire at each end. Both ends can now be trimmed off close to the wire with a small pair of scissors. The two strips ½in. wide are now cut to a length about one inch longer than the coil and a quarter of an inch from each end an ⅛in. hole is drilled. When put one on each side of the coil seam and screw down to the baseboard on two blocks of wood, about ½in. high, this makes an excellent holder for the coil. So much for the hardest part of the construction.



Crystal Adapter for Multi-valve Sets.





Theoretical Diagram

THE plan below will give an idea of the disposition of the components. The ebonite panel is drilled and screwed to the front of the baseboard. In the centre of the panel is mounted the variable condenser, while on either side at the bottom are the detector and single circuit filament jack. At the two top corners holes are drilled for two terminals. Just behind the variable condenser the choke is screwed. The secondary winding of a burnt-out transformer will do quite well in place of this choke. A 1 m.f.d. condenser is fixed in place immediately behind the jack. By following the wires on the wiring diagram, no difficulty should be experienced in the wiring up of the parts. Thick wire, square busbar or No. 18 S.W. and tinned copper, should be used in this receiver, as when used as a wave-trap. The whole tuning unit has to have as little high-frequency resistance as possible.

Here is a point to point wiring list. Join left-hand free end of coil to back holding nut of detector and also to the moving vanes of the variable condenser. The other end of coil winding is connected to the following points: Moving plates of condenser, one terminal of choke coil, one terminal of fixed condenser and then to the earth terminal at the top of panel on left. The other end of choke joins to the centre lug of the jack. The top lug of the jack runs to the other end of the detector. The third or frame of the jack is connected to the free terminal on fixed condenser. On the aerial terminal is joined a length of flexible wire with a small metal clip fastened to the other end so that the clip can be moved along the variable tappings on the coil until the best position is found. When completed thus far we are all ready for a trial run. A plug will have to be attached to the 'phone cord and inserted into the jack. Join up the aerial and earth to their respective terminals. By tuning the variable condenser the local station should come in strong and clear.

As a Wave-Trap.

WHEN used as a wave-trap the aerial is still connected to the aerial terminal, but the earth terminal is joined, by a length of wire, to the aerial terminal of the set. The ground or earth is connected to the receiver as usual. When it is being used in the capacity of a wave-trap the 'phone plug should always be taken out. This automatically breaks the detector circuit and leaves just the coil and condenser free. To operate, set the receiver dials to the readings of a distant station. The local will be heard in the background more or less stronger than the desired station. Now turn the variable condenser