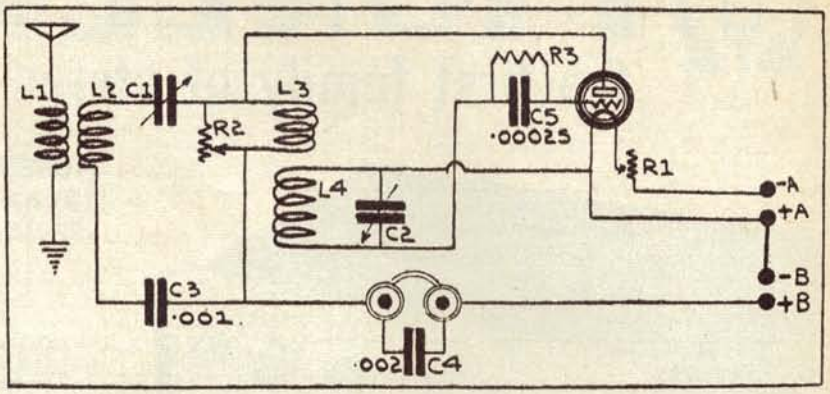
A FILTER TUNER ONE VALVE RECEIVER



Of all wireless sets, from crystal sets to multivalve sets, there is a strong fascination for a single valve receiver. Close to a high power broadcasting station reasonably good loudspeaker results may be expected from a one-valve set. But the owner must be within two miles of this station. The other day the writer listened to a loudspeaker operated by a crystal set, but it was situated right under 2BL's mast. This, of course, is the exception rather than the rule.

When speaking of one-valve sets, the first question asked by the uninitiated is generally, "Will it work a loudspeaker?" Now this question is hard to answer with any degree of authority. It is realised that situation plays a most important part. If the operator lives under the shadow of a big broadcasting station it is possible to have a loudspeaker coupled to a single-valve receiver with quite good results. But again, if one is between 10 and 50 miles away, earphone strength only is available.

Phone strength again is most satisfactory. And if the owner wishes loudspeaker strength the addition of one or two stages of audio amplification will produce wonderful loudspeaker results. Still reverting back to the one-valve loudspeaker results here is an interesting experience which befell the writer, and is worth while relating.

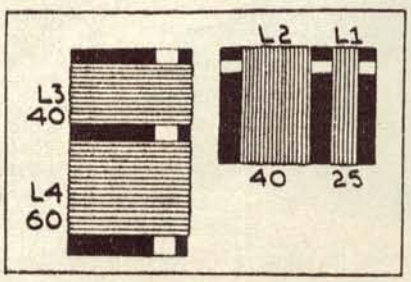
During the cyclonic disturbance which happened during the Easter holidays, the writer's aerial, situated right on the top of a hill in an exposed position, crashed—through the roof by the way. The aerial itself, lying over clothes lines and on the sodden lawn, was to all intents and purposes, rendered useless. Forgetting this fact altogether, on Easter Sunday, the Cock-a-day One Valver recently described, was connected up and by dint of careful tuning and hard effort, 4QG was tuned in. This again proved an exception rather than a rule, but it goes to show that even with a poor aerial reception is still available.

Nevertheless, when the fallen aerial was re-erected temporarily, the volume from 4QG was increased in an astounding measure, which indicates that a good aerial plays a most important part. So remember when building this or any other set, that much better results will accrue from a good aerial than from an inferior one and volume counts to a marked degree.

The time once was when a one-valve receiver had associated with it numerous controls and projecting coils, which had to be movable in relation to one another. This action called for a certain amount of juggling which took quite some time to understand. The trend of radio development today is such that simplicity is the keynote aimed at. Combined with simplicity should be the all important factors, sensitivity and selectivity. These are included in the receiver of this week.

The parts required are published elsewhere in this article, and while no brands are given, the constructor is adjured to use only good parts. The condensers, for example, make a big difference in reception, particularly in relation to selectivity, and to this end we recommend such brands as Heath, Advance, Pilot or Igranic. These are very reliable and can be trusted to do good work as well as last for years. There is nothing more annoying than poor condensers, which have their plates touching at different places, so obviate this by purchasing good quality lines at the beginning — it is cheaper in the long run.

1—Dilecto or Radion Panel, 12in. x 7in. x 1/8in. or 3/16in.
1—6in. Length of 3in. Diameter Dilecto or Radion Tubing.
1—4in. Ditto.
1—.0005 Variable Condenser with Dial.
1—.00025 Variable Condenser with Dial.
1—Bradleyohm 10.
1—Bradleystat.
1—.00025 Fixed Condenser.
1—.001 Fixed Condenser.
1—.002 Fixed Condenser.
1—Valve Socket.
1—30 ohms. Rheostat.
1—Terminal Board with Eight Terminals.
1—Baseboard, 11in. x 9in. x ¼in. Sundry screws, busbar, etc. 1lb No. 20 D.C.C. Wire.



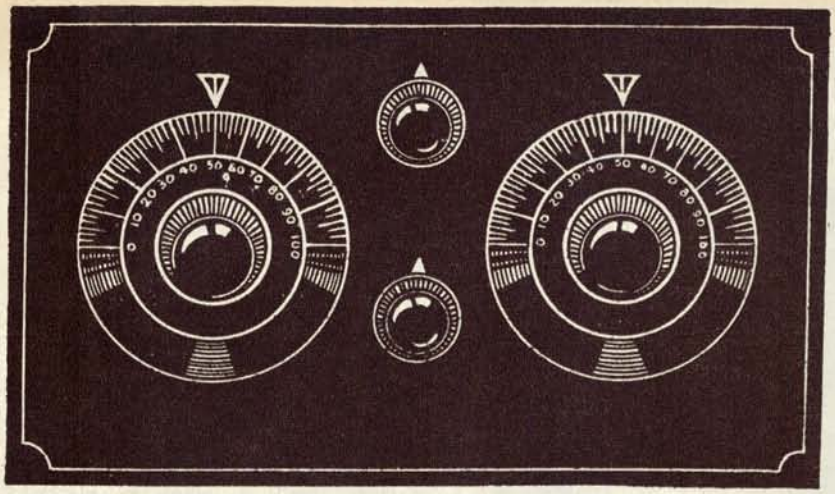
Details of the coils and formers referred to in the article.

The variable resistance is a very necessary article. We have specified a Bradleyohm 10, but if a good variable resistance of from 10,000 to 100,000 ohms, is on hand, use it by all means.

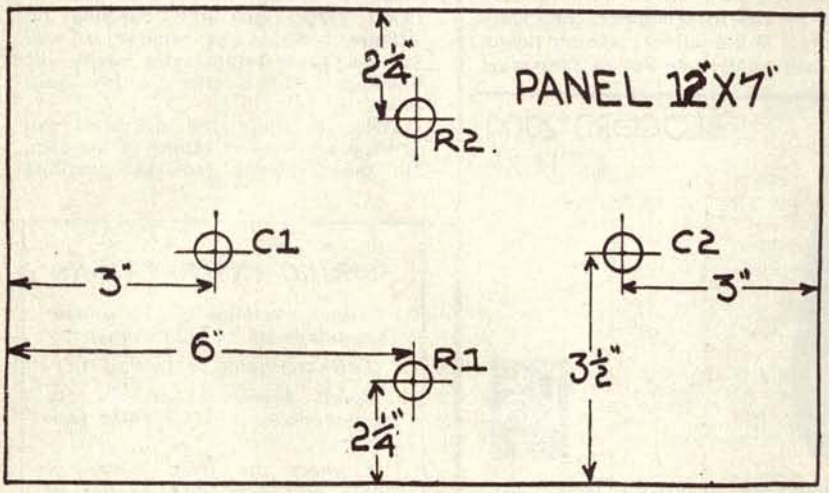
Let us look at the circuit for a moment and analyse its properties. In L1 we have an untuned aerial coil and L4 is the secondary coil tuned by the .00025 variable condenser. The two intermediate coils, L3 and L4, are filter coils. Now the signal from the aerial passes through the untuned primary coil and is filtered from other signals

This article is reprinted from "Wireless Weekly," April 29, 1927. We have tried to follow the original presentation — heading, layout, diagrams, etc. — as closely as possible, "warts and all." It should appeal to newcomers and old-timers alike. It will give newcomers a good indication of what radio was like more than 40 years ago, as well as providing material for what could be a very interesting project; the reconstruction of a piece of historical equipment.

For old-timers it will provide nostalgic memories: of the emphasis on interstate reception, without which no receiver description was complete; of the elusive one valve loudspeaker receiver, a much sought-after goal which few achieved; of the uncomplicated valve type situation whereby the author of this article did not see fit to even quote a type number, but simply write "any of the well-known makes . . . will do." Ah yes, those were the days!



The front panel view.



The panel drilling template

by two intermediate or linking coils (L2 and L3) before it reaches the secondary coil (L4). Two features of the filter tuner, giving it a unique place in radio, are the arrangements for reducing the resistance of the linking circuit and for controlling the current used for the purpose. Increased selectivity without loss of volume is accomplished by including one of the linking coils in the plate circuit. Think of the selective qualities of the Marnikay and the Extraordinary One Valver. These are on a par.

The variable resistance controls the strength of the magnetic field produced by the second filter coil L3, which, in turn affects the entire filter circuit. This controls regeneration and volume.

The construction of this receiver may be tackled by the veriest novice. Only the usual household tools are necessary and provided the parts are on hand and provided again the instructions are followed with reasonable intelligence, no difficulty should be met with in building a really efficient receiver.

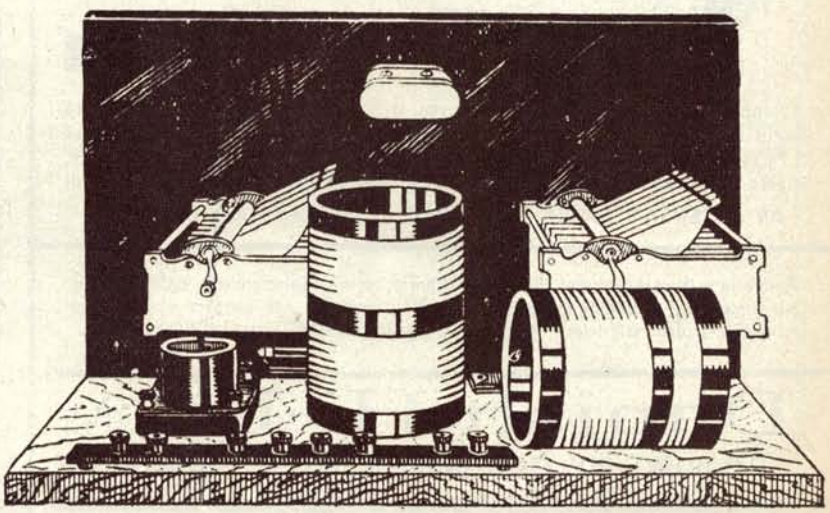
The panel should first of all be marked out and drilled. A centre punch or a nail is pressed into service to make the small indentations on the panel in exact accordance with the panel drilling diagram accompanying this article. The panel being laid on a flat surface, such as a table, should be drilled with a high speed and a slow pressure. It will be noticed that on the panel there is provision for two condensers and the rheostat or Bradleystat and the variable resistance or Bradleyohm — all the terminals, including aerial and earth, and phone terminals, are at the back of the set.

Mount this apparatus on the panel and leave on the one side until the coils are wound. For this purpose the Dilecto tubing is required. Wind the six inch former first with coils L3 and L4. At a distance of three-eighths of an inch from one end drill two small holes ¼ an inch apart and thread the beginning of the No. 20 D.C.C. wire through each hole, to hold it securely. Now wind on 40 turns, each turn close to the other, and finish off by securing through two more holes. One quarter of an inch away begin winding L4, which consists of sixty turns of the same gauge wire. On the 4 inch former wind 25 turns for L1 and a quarter of an inch away start L2, which boasts of 40 turns. Small terminals or contact studs are very useful for connections, and they may be fixed on the tube in each instance, 8 altogether being required.

Prepare the baseboard by sandpapering the surface and treating it to a coat of shellac or some other quick-drying varnish. Lay out on the baseboard the valve socket and the coils. A small grid leak clip may be improvised as a bracket to secure the 6in former to the baseboard and two pillars about 1½ or 2in long are handy to raise the 4in former off the baseboard. Long wood screws will fix this unit to the board through the pillars, which may consist of short lengths of 3/8in diameter fibre tube. Raise this 4in former off the baseboard with L2 running opposite to L3, and at right angles thereto. This will be found the best position. The back of panel view is slightly out of alignment to show the position of the variable condenser (.0005 mfd.), but otherwise the layout is quite correct. Follow this out correctly and then begin the wiring.

The wiring is quite simple and easy. Fix the panel to the baseboard and gather together the pliers, soldering outfit and busbar. Study carefully the back of panel wiring diagram, the circuit diagram and reconcile with the wiring instructions appearing elsewhere. Solder neatly and carefully, crossing out on the diagram each wire as it is installed. If using busbar, make neat right angled bends and keep all wiring as low as is possible. Complete the wiring and check over carefully, then test out.

Insert a valve in the socket. Any



Layout of the apparatus.

of the well-known makes of valves will do, a Mullard, Osram, Radiotron, or De Forest, all being worth while. To the A. battery terminals linkup the A. battery required for the valve used. The B. battery may be between 22 volts and 67 volts, according to the valve used.

Hook on aerial and earth and connect the phones to their respective terminals. Turn up the rheostat and turn the two dials slowly. Keep the .0005 condenser a little in advance of the .00025 or secondary condenser, and a station will soon be located. Tuning is very critical, remember, and when the station is received it may be very mushy. Clear this up by slowly and fractionally (spare the word) turning back the left hand condenser (.0005), when good reception will result.

Carefully adjust the variable resistance until a point is reached where all broadcast signals may be heard without further adjustment. Don't forget that this variable resistance controls the volume as well as the regeneration—you won't be likely to forget it after the first hour or so.

After a while the operator will develop a system of tuning of his own, but the foregoing remarks regarding

WIRING INSTRUCTIONS

Aerial terminal to outside (beginning) of L1 (25 turns).

Earth terminal to end of L1.

Joint beginning of L2 to moving plates of .0005 mfd condenser.

Connect the fixed plates of .0005 mfd condenser to top of L3 thence to plate of valve socket, thence to one side of variable resistance.

Link bottom of L2 to one side of .001 mfd fixed condenser, the other side of which goes to one side of phones and thence to remaining side of the variable resistance, and to bottom of L3.

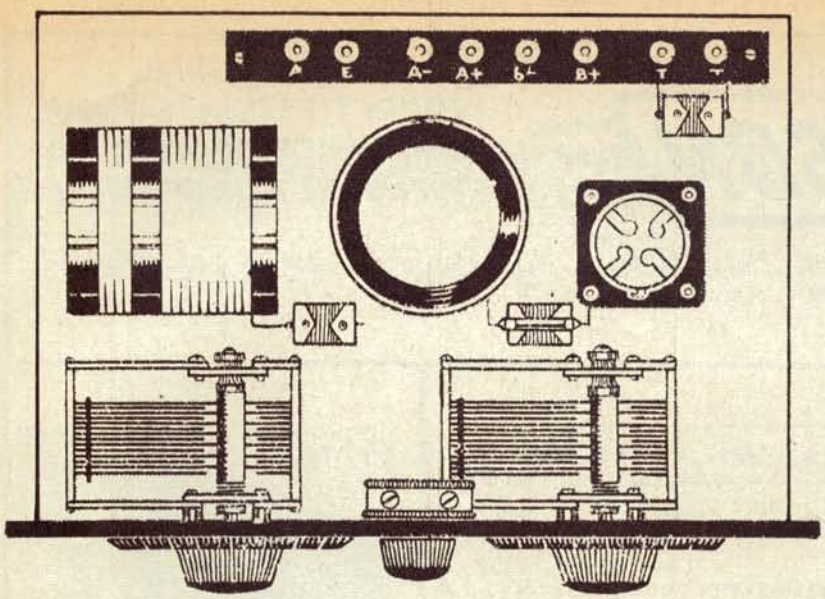
Join top of L4 to moving plates of .00025 mfd variable condenser, thence to F positive terminal of valve socket, thence to A positive terminal or terminal board which terminal is joined to B—terminal adjacent.

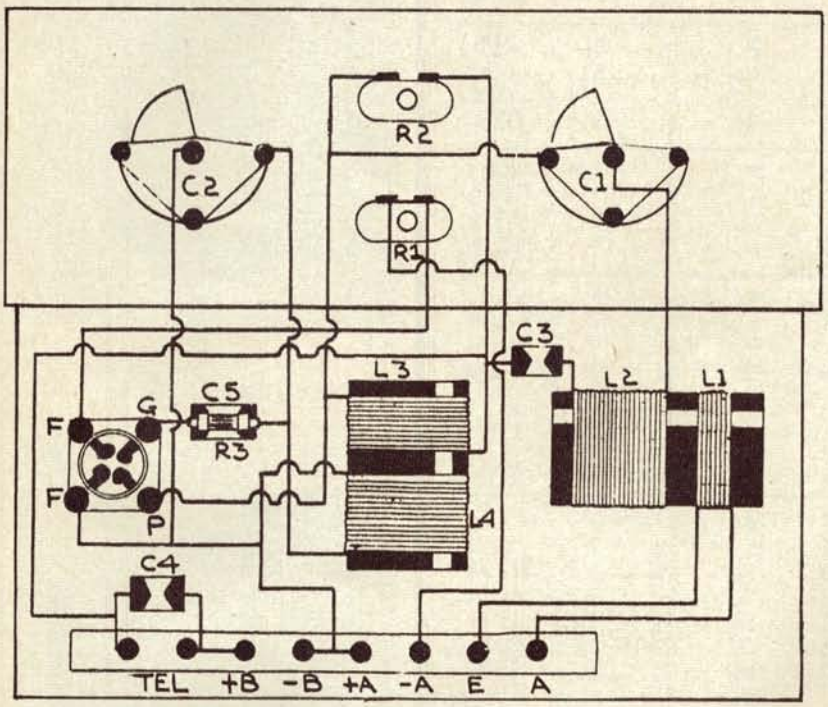
Connect bottom of L4 to fixed plates of .00025 variable condenser, thence to one side of grid condenser (.00025 fixed), the other side of which joins to the grid terminal of valve socket.

Connect remaining F terminal of valve socket to one side of the rheostat, the other side of the rheostat being connected to the A minus terminal of terminal board.

Connect B positive terminal of terminal board to the remaining phone terminal.

Link the .002 mfd fixed condenser across the phone terminals and the wiring is completed.





tuning will prove of great assistance. A long aerial may be used with advantage, as none of the interfering problems common to other one valve sets are encountered.

This was proved at Marrickville on test, as 3LO, 4QG, and 5CL were nicely heard on the phones. The filter circuit requires careful tuning. This is a really good set, and is to be recommended.

EDITOR'S NOTE: The circuit for this set is a rather unusual one, even by the standards of 1927. It appears to be a rather cunning arrangement whereby the function of a preselector stage, main tuning stage, and regeneration were all achieved with only four windings and a minimum of other components. Assuming that everything worked out as intended — and we have no reason to doubt that it did, at least as far as the original model was concerned — then it should have provided quite a high order of performance.

If attempting to duplicate the original construction it may be difficult to obtain all the parts of this vintage, and some compromise may be necessary. On the other hand, it is surprising just how many old parts one can unearth when one starts looking in earnest. And, in any case, there is no "exact" version of the set since, even at the time it was described, no two constructors would have produced identical models.

The absence of a specific valve type number would have been less of a problem in those days than it is now, since there were relatively few types available and roughly, two broad classifications; detector or "general purpose" valves, and power valves. Typical detector valves advertised at the time were: Radiotron UX200A, UX201A, UX199; Philips A609, and "Philips Supreme Detector valve" (no type number); Mullard PM3 and PM5; de Forrest DL5; and the Q.R.S. Super Detector (no type number). ■