

efficient is undoubtedly the new screened grid valve. In this valve the plate and grid are separated by the use of an earthed screen interposed between the two electrodes. No neutralising is here necessary as the capacity inside the valve has been reduced to practically nothing. Also the grid and plate leads are brought out to pins on either end of the valve, so that in the wiring of the receiver the capacity from wire to wire is practically negligible.

#### Practical Hints.

NOW that a general outline of the various methods used to obtain stability have been enumerated, the writer will mention a few practical hints that may be of use to builders who experience trouble in this direction.

Preference to potentiometer control, neutralise the valve by any of the ways suggested.

With some receivers the capacity needed to neutralise may be in excess of that obtainable on the neutralising condenser. If the receiver is most stable with all this capacity in, then the condenser is not large enough. Extra capacity can be obtained by connecting short lengths of insulated wire to each terminal of the neutralising condenser and twisting together. Similarly, the minimum capacity of this midjet condenser may be too large. As a remedy increase the capacity of grid-plate leads by twisting insulated wire as before, only connecting in this case to grid and plate terminals of valve socket.

#### Neutralising a Receiver.

PERHAPS there are some readers who cannot neutralise their receivers and have given up the job in disgust. To these constructors the following suggestion may be useful. If the receiver is of the split primary, only use one half of the coil. Instead of connecting the filament to the bottom end of the grid coil, tap this coil in the middle and connect to the filament via a high-frequency choke or resistance, say 10,000 ohms. The tuning condenser still bridges the whole of the coil. Now connect the neutralising condenser between the P terminal of valve socket, and the lower end of secondary or grid coil and balance in the usual way. Sensitivity will not be so good, but the receiver will more easily neutralise. A marked improvement in quality of reproduction should also be noticed.

When adjustments on the neutralising condenser make apparently no difference to stability, the trouble usually lies in a feed-back taking place between the coils. No amount of neutralisation will remedy this and the constructor is recommended to either shield the coils or check the angles they lie with respect to each other.

It is as well to remember that it is the valve capacity which is neutralised and the substitution of different values invariably means re-neutralising the set.

Run-down B batteries is the cause of many sets becoming unstable after a few months' use. A remedy can be effected by connecting a 1 or 2 m.f.d. condenser across the B positive radio frequency leads to earth, or B negative terminal. The high frequency currents are given a path to earth instead of being choked back by the resistance of the battery.

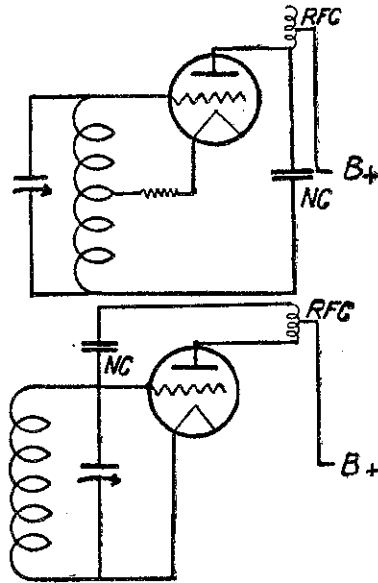
#### Satisfied.

"I HAVE constructed the full wave crystal set described in the 'Radio

Record' of December 14, and must say that it works very satisfactorily when using one crystal detector. One thing however, that I cannot understand is that when one catwhisker is applied and then the other, the second one tends to decrease the volume. Trusting that you will be able to inform me how this fault may be overcome.—'SATISFIED'."

[Correspondents using a nom de plume must sign their names and state their addresses.—Tec. Ed.]

REPLY.—Your inability to obtain more volume when using the two crystals in conjunction may be due to one or two small faults. First of all, try



Methods of Neutralizing.

reversing one of the crystal detectors. Just disconnect both terminals and turn the detector round so that the crystal is connected to the wire on which was previously connected the catwhisker. Reverse only one crystal detector, as to reverse both together would only result in a similar circuit to the one you have now. Make sure, also, that both detectors are working 100 per cent. One faulty detector would bring the other to a low level.

See that both coils are tuned correctly and if the condensers are gauged try incorporating a small balancing condenser across either of the secondary coils.—PENTODE.

#### The Crystal and Valve

"I HAVING constructed this set, would be pleased if you would answer my few queries," writes "E.J.D." (Lower Hutt). "My list of stations is:—1YA, 2YA, 3YA, 4YA, 3ZC, 2FC (Sydney); all these stations have been heard at 'phone strength, the call-signs in each case being given. There are also many stations which I have not heard the call-sign, but heard talking and music. Now with the question:—

"(1) On January 2, while listening to Auckland and Christchurch, found that on putting one finger on the grid leak that volume was much increased. 1YA and 3YA and some station which I heard music about 10.30 p.m. especially, this station not being 2FC.

"(2) On testing my B battery I found that it contained only 9 volts, though Wellington came through at fair speaker strength. Would the volume of all these stations be increased if I renewed the battery to a 45-volt?"

(1) In all probability the grid leak is too small; try a higher value, say,  $\frac{1}{2}$  or  $\frac{3}{4}$  megohm or a H.F. choke. The station may possibly have been 2ZF, Palmerston North.

(2) Most certainly increase the voltage on the plate; 9 volts is far too small, although, as you say, 2YA comes in on the speaker. The B battery should not fall below 30 volts.—PENTODE.

## Tips and Jottings

#### Setting Out Panels.

WHEN marking panels, prior to drilling, paste a sheet of paper over the face, and mark lightly with a pencil. After drilling, this paper can be

washed off, leaving no marks or scratches. A pencil line on ebonite forms a conductor, and if run between terminals or screws, may cause a loss of sensitivity.

#### Calculating Bias.

WHEN no particulars are available, a rough guide as to the correct grid bias to be used can be easily calculated if the amplification factor of the valve is known. Multiply the amplification factor of the valve by two, and divide into the B voltage available for that valve.

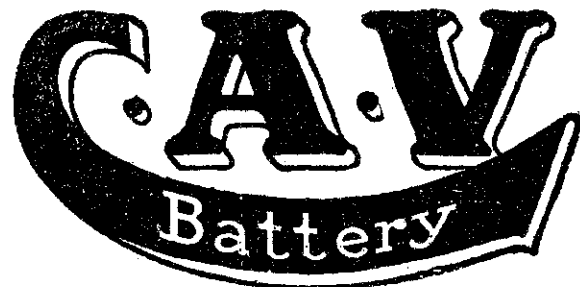
#### Allow for Voltage Drop.

IN the case of a valve, in the anode of which is a resistance, such as the arrangement in a resistance-coupled amplifier, the voltage applied to the plate is considerably less than that of the B battery, due to the voltage drop across the resistance. This is of more importance when using a valve of low impedance, as the drop will be greater. Allowance must be made for this drop when applying grid bias.

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A



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