

A bias is developed across the 50,000 .5 meg. resistance, making the grid of ohm resistor with respect to the grid the 245 more negative, and reducing of the 224; this bias is too low, about its plate current. 14 volts, but is balanced up by the 425 ohm resistance, giving an opposing voltbias of about 2 volts. This resistor is not included in the wiring diagram shown, but is shown in a separate diagram of this portion, showing the flat type of resistances, and should be included if the amplifier is to be used for radio reception, which in most cases it will be. Another justification of its inclusion is because the home-built powerpack will give a slightly higher voltage than the amplifier only, so that other plate supply may be taken without unduly dropping the voltage. Inclusion of this resistor will slightly raise the voltage applied to the screen of the 224. An important feature of the system is the self-adjusting characteristic which automatically adjusts bias on the 224. In radio reception a strong carrier would increase the plate current, increasing the drop across the

Material Required

1 UY 224.

1 UX 245 1 UX 280, Rectifier.

2 Condensers, 1 mfd., 500

test; two 800 test.
2 Condensers, 2 mfds., 800

1 Potentiometer, 200 ohms. Wire-wound resistance,

5500 ohms. Wire-wound resistance,

425 ohms. Resistances, 100,000, 50,000, 25,000, .5 meg.; and mounts

for same. 2 UX sockets, 1 UY. Connecting wire, 6yds,

Output transformer (?) 4 Terminals.

1 Balancer resistance, 30-60

Stalley, 2 doz. Iin. by 3ft. or stock size, cut (transform-

Stalloy, 2 doz. lin. by 3ft. or stampings (choke).

1 lb. 36 swg. enamelled wire

alb. 30 swg. enamelled wire. 10 doz. 18 dcc.

12lb. 32 swg. enamelled.

With the 425 ohm resistor in circuit, the 245 decreased plate current is flowing, which results in a decreased posiage of about 12 volts, leaving a working tive bias to balance that developed in the 50,000 resistor, so the actual bias on the 224 is increased, and conditions revert to normal.

For pick-up reproduction, the amplifier operates with one side of the pick-up connected direct to the grid of the For local reception a tuned coil with loose-coupled aerial may be used for selectivity, or if this is not desired, a single-circuit tuner may be used. When adding r.f. stages, certain precautionary measures have to be taken, and these will be dealt with later.

Tr appears strange at first that it is possible to conductively couple the plate of the first valve to the grid of the second, when the first is positive and the second is negative. They are really at the same potential, but the plate of the 224 is positive, and the grid of the 245 is negative, each to its respective cathode, each latter being maintained at a different potential.

As this amplifier is amplifying at 50 MULLARD VALVES cycles, there must be no hum. The 50,000 ohm cathode resistance has to be by-passed, so the condenser is made to act two parts at once, by selecting a point on the series of resistances where the phase of the mains hum opposes the phase of the hum on the grid; we can connect the high side of the cathode resistor through a 1 mfd. condenser to this point, and reduce the hum to practically inaudibility.

The required position is a little above the grid return, so a 200-ohm potentiometer is introduced and easy variation obtains. The exact point is STEINITE RADIO sometimes critical, and should not be passed over quickly. Once set, the position should remain correct, only to be readjusted to suit another valve.

By properly proportioning the voltage on the first valve we have a very sensitive detector that will. handle heavy signals without overloading. It will be as sensitive as a grid-leak detector, and will carry a greater load than an ordinary power detector.

As long as the screen-grid does not draw grid current, its input resistance is very high, and it is only when input signal voltage approaches in magnitude the negative bias value that grid-current may be drawn. With the automatic bias the grid is kept negative even on strong signals. In actual practice the 245 will overload before the grid of the 224 becomes positive. Thus we have conditions that are almost lacking in the usual detector circuit.

The voltage gain of the 224 and 245 combination has been stated by a good authority as being 450.

given in its entirety, wherein will be noticed slight differences from other published circuits, but whilst small changes are made, chiefly to suit a difference of voltage, the general principle remains the same. The object of the condenser connected to the potentiometer arm is to balance out for radio reception a little care is rethe hum, and this it does very successfully, making the output "dead quiet" so far as hum is concerned.

The 224 acts as an amplifier, but also as a detector when required, and when preceded by r.f. stages, functions as the detector.

With two screen-grid r.f. stages, excellent results are obtained. When a screen-grid r.f. stage precedes the 224. detector-amplifier, a by-pass condenser THE standard Loftin-White circuit is of at least .02 mfds. should be placed across the low potential end of the secondary coil and "B—" The bias connection from the high end of the 425 ohm resistor connects to the secondary coil to bias the grid of the

> For the operation of the amplifier quired to prevent feed-back coupling between the output and the aerial. (Continued on page 30.)

RADIO DIRECTORY

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ALTONA & HAMMARLUND- Johns, Ltd. Chancery Street, Auckland.

BURGESS RADIO BATTERIES, All Radio Dealers.

CROSLEY RADIO

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PILOT 1930 PARTS-PILOT Harrington's, N.Z., Ltd., SUPER WASP KITS, GILFIL. 138-140 Queen St., Auckland, 40-42 Wilkle St., Wellington. LAN, KELLOGG and AT. WATER KENT SETS

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