An A.C. Power Amplifier

To Operate from Wireless Set, Gramophone, a Short Wave Adaptor

By the Technical Editor

THIS amplifier has been designed to fill a long-felt need—that of an amplifier completely operated from the A.C. mains, and useful for a number of purposes. The amplifier about to be designed can be used in conjunction with any of the pieces of the apparatus mentioned in the heading, and as a voice amplifier by connecting a pair of telephones to the input.

List of Components.

Power transformer to deliver at least 180 volts, rectified and smoothed.
Smoothing chokes.
Filter condensers, either in a block or in the following capacities: 6 microfarad (three 2 m.f.d's. in parallel), Both these to withstand 400 volts working. A 2 microfarad to withstand 800 volts working, two .5 m.f.d.'s condensers, and three 1 m.f.d. (or five 1 m.f.d's.). Two buffer condensers, each one .1 m.f.d.
Three variable resistances, 0 to 8 megohms.
One fixed resistance 1250 ohms (50 mills), and one 0 to 3000 ohms variable.
A pair of push-pull transformers.
One audio transformer.
Two UX valve sockets.
One UY valve socket.
A dozen terminals.
Two jacks and plugs.
Heavy insulated connected wire (insulated square busbar).
Rectifying valve (280, or Raytheon).
Two 171A type valves and one 227 type.

A list of requirements is appended, and a few moments' discussion of these will be worth while.

The power of transformer might quite readily be made by any constructor who has the necessary time at his disposal. A transformer is by no means difficult to make, and full descriptions have quite frequently appeared in the "Radio Record," while a very complete treatise appears in the "Radio Listeners' Guide." For those who intend constructing their own it would be unwise to build one delivering less than 300 volts or 250 rectified and smoothed. The provision of a transformer with this output will enable it to be used for the new 245 type of valve, which will become popular before very long.

It will be necessary to put on to this transformer secondary windings to supply the filament current for both the push-pull valves in the last stage and the 227, or other indirectly heated valve in the first stage. The details of this part of the construction have appeared in the "Listeners' Guide," and with the aid of Table A (page 55) a transformer to suit any need can be designed. Commercially manufactured power transformers are readily available and for those who have not a reasonable amount of time at their disposal, the writer would advise them to purchase one already made up. When more than 300 volts have to be delivered by the transformer the use of two 281 valves as rectifiers is recommended. Otherwise the 280 (filament) or the Raytheon filamentless type should be used.

The construction of smoothing chokes has also been very fully described in both "Radio Record" and "Listeners' Guide." Space will not permit of their redescription here. They also may be purchased in compact form.

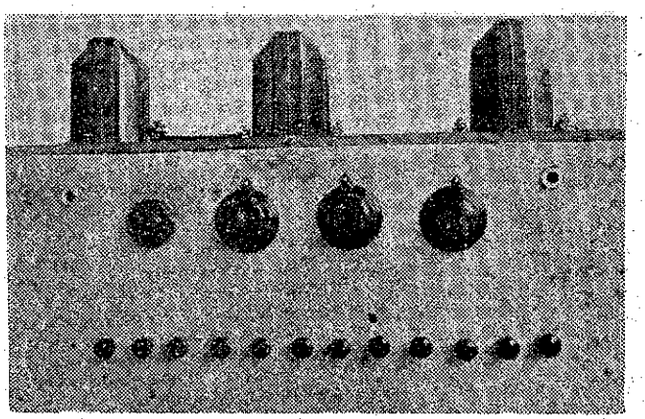
For those who wish to assemble their own condenser blocks, as the writer has done, the specifications given will be sufficient for their purpose. Condenser blocks are, however, available in a very compact form, and these are eminently suitable for the purpose.

The resistances are quite readily obtainable, and if 171 type of valve is not used in the last stage, the equivalent bias resister will be found in the table. For 171A type a 1,000 ohm variable will do quite well.

The arrangement of the amplifier and power unit leaves much to the constructor's initiative, but it is also described in detail for those who prefer to follow instructions explicitly.

Secure a box about 18 inches x 10 x 10. Remove both sides (10 x 18) and top and shellac thoroughly. Assemble the transformer, the condensers and the chokes so that they will fit neatly and so that the filament windings from the transformer will be nearest one side which when replaced will carry the resistances and the terminals.

Diagram No. 4 shows the lay-out of the writer's power pack. In this case a transformer incorporating the choke was used. A slight adaptation is necessary when transformer, choke block and condenser block are uniform.



Photograph showing panel and disposition of resistances. The one on the right controls grid bias, the others 0—8 megohm resistances are for power supply.

Wiring the Power Pack.

PROCEED with the wiring thus:—Take the centre tap of the transformer to the junction between the two buffer condensers or to the common terminal if these are incorporated in the one case. This will be the negative wire and will go directly to the 2 mfd. condenser via the 2 amplifier condensers C4 and C5 with a working voltage of 800. This now connects