# The "CATHODE"

HERE appears to be some doubt prevalent regarding the correct way to connect up a pentode of the five-pin type. If however, the reader will remember that grid and plate are normally connected, it is not difficult to appre-

flate that the "priming" or "accelerating" grid is necessarily connected to the pin, which in a 224 or 227 type of valve is connected to the cathode. A very common error in wiring up the 247 valve (or any other pentode) is simply to connect plate and primings grid in parallel. The constructor argues that both are connected to B positive. Reference to the diagram, however (published last week), discloses that plate and priming grid are actually connected to opposite ends of the output transformer, and this requirement must be observed when wiring up.

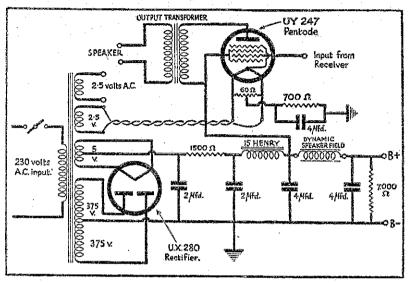
The 247 pentode is biased by means of a 700 ohm resistance connected be-\*ween an external "centre tap" and earth. In view of the large audio currents involved, this resistance is bypassed with the comparatively large capacity of 4 mfd. This condenser need not be of a very high voltage type, however. The resistance must be wirewound and capable of carrying a curgent of 30 milliamps.

The 247 pentode with the voltages employed is capable of feeding upward of 2 watts into a properly matched speaker. The power detector is, as a matter of fact, fully capable of loading top a pair of push-pull output valves, but it is felt that any increase of the output mentioned is quite uncalled for, except, perhaps, for such exceptional purposes as entertaining in a theatre or hotel lobby. It may be noted that when the pentode is operating so as to provide a fair volume in the speaker, a faint bluish glow may be observed just within the glass envelope, this brightening and dimming in accord with music or speech in the most fascinating manner. This glow need not cause any alarm. It does not indicate softness in the valve, and, in fact, seems to be most pronounced in the better types

pentode.

(Part III)

By "CATHODE"



A separate theoretical circuit of the power-pack and pentode output stage.

A fairly heavy component should be the period of service lengthens. chosen for the smoothing choke. This has actually to carry a current not far short of 100 milliamps, so that the smaller type of choke is quite useless. It is, of course, entirely possible to construct a suitable component, and any one who wishes to do this in preference to obtaining a commercial product is recommended to refer to the last issue of the "Guide."

The smoothing condensers in unit must have a test voltage of at least 1200. It is, as a matter of fact, strongly advised that condensers of the 1500 volt test type be employed, in order to provide a satisfactory margin of safety. It is all very well for production engineers to pare their products of everything but a coat paint, but the amateur constructor will find that a little generosity in the way of safety margins is a vast comfort as

is, indeed, where the difference arises between cheap receivers and more highly-priced products. Safety-margins are expensive, but most decidedly worth while.

The reader is reminded that some of the terminals on the power unit have quite high voltages applied to them. The terminals to be particularly considered in this respect are those which make connection to the speaker field and to the output transformer of the speaker; a fair voltage is also applied to the terminal which supplies B current to the receiver proper. Therefore, unless the power unit is definitely safe from prying fingers by reason of a totally enclosed console. it is strongly advised that these terminals be mounted within the screening box and leads brought through the box to them. The same remarks apply, of course, to any terminals to which a.c. is applied.

With the exception of the filament wiring, there is no object in using very heavy connecting wire. The greatest attention must, however, he paid to insulation. For instance, the The connections for the detector covering on Glazite wire cannot be coil for the broadcast band are de-

regarded as adequate insulation for voltages of the order encountered in this unit, and should itself be covered with good quality insulating sleeving, preferably of varnished cambric.

It is felt that the constructor will now have little difficulty in satisfactorily completing the power unit.

#### Winding the Coils.

THE next item can well be the construction of the coils. In all there are seven of these required, three being broadcast coils; of the other four one pair is used for the 80-metre band, the other pair for the 20-40 metre band.

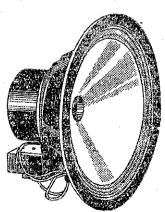
It will be gathered from the fact that three coils are employed on the broadcast band as against two on the shorter wave bands, that the highfrequency stage is not employed for shortwave reception. Instead, an alternative aerial connection is made to that end of the detector coil which connects with the grid, the remaining circuit changes being effected automatically by making use of the contacts of the plug-in coil employed for the detector tuning. Thus it is important that the instructions for the making of this coil should be curately followed.

The first, and simplest, coil to be made is the aerial coil. This is a straightforward winding of 52 turns on a 3-inch former tapped at the 12th turn up from the low-potential end of the coil for the aerial connection. The coils in the original model are wound with 22 S.W.G. enamelled wire a former threaded 24 turns to the inch, but a winding of 22 S.W.G. double cotton covered wire close wound will have almost exactly the same inductance and any loss of efficiency will be unimportant. This coil is mounted horizontally at the extreme left-hand end of the chassis, being kept about 1 inch clear of the metal by a couple of small brackets.

The remaining coils are all wound on 6 pin plug-in coil formers, the bases for which are located centrally in the coil screens which should already be in position on the chassis, The formers for the broadcast coil must be of the type which is thread. ed 40 turns to the inch.

The connections for the detector,

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