The "Tongariro" Portable

A Design for a Powerful Set

(By "CATHODE")

ANYONE who essays to design a portable receiver is at once faced with the difficulty that either performance or the advantage of light weight must be sacrificed. In the design presented here it has been considered desirable to aim at a worth-while performance rather than at the reduction of weight, with the result that the completed receiver weighs somewhere round about 30lb. Not the kind of thing a mountaineer would care to add to his pack, but nevertheless quite convenient for the more usual motor or train picnic or the camp. Also, it must be remembered that a receiver which is conveniently portable over long distances makes for unsociability, since its performance is necessarily restricted to headphones reception by reason of the limited "B" voltage available; some people can tolerate the distortion from a badly-overloaded output valve feeding a speaker, but "Cathode" is not one of them.

As will be seen from the circuit diagram of the receiver, four valves are employed, two of the screen-grid variety operating as high-frequency amplifiers, one three-electrode valve operating as a grid detector, and a final amplifier which may be either a three electrode valve, or, where more amplification is desired, a pentode. A point which may be new to many readers is the use of a fixed tune coupling between the two screen-grid valves. The more usual method of using an untuned coupling incorporating a high-frequency choke has been tried, but the fixed tune transformer (its frequency response curve very much flattened by the 600 ohm resistance was found to give appreciably better results. Actually, this transformer peaks at about 400 metres, but the amplification is almost equal over the entire broadcast band.

The dimensions of the carrying case are really fixed by the dimensions of the batteries employed, and in particular by those of the portable accumulator if one is used in preference to dry cells. The writer unhesitatingly recommends the use of an accumulator for filament supply rather than dry cells, since the consumption of filament current, while by no means excessive is yet such that only a short life could be expected from the ordinary No. 6 cells. Whether a two or four-volt accumulator is employed is a matter for individual preference. Slightly better results may perhaps be obtained from

This week "Cathode" presents the first instalment of an article on his portable receiver. It will be concluded in next week's special portable number. However, there is ample here for the set-builder to start constructing.

4-volt valves, but the smaller ampere-hour capacity of a 4-volt accumulator of such a size as to fit in the available space will necessitate more frequent recharging.

One of the special types of portable accumulator is distinctly desirable, although a small light accumulator of ordinary construction may be readily adapted for portable use by the addition to its electrolyte of the recommended quantity of "Jelectro," a liquid which has the property of partially solidifying the acid electrolyte so that it assumes the consistency of a jelly and is free from an tendency to spill. It is, of course, possible to use the ordinary type of accumulator where the receiver will always be maintained in a vertical position, as, for example, where it is only intended to be moved from room to room, or from the house to garden, but where it is to do much real travelling the use of an ordinary accumulator will almost certainly lead to disaster.

As regards "B" supply, the usual American heavy duty battery is at once ruled out on the score of its size and weight. Most English-made batteries are of a size convenient for use in a portable, the Hellesen being another battery with a high voltage and a fair capacity packed away in a small space. Many English batteries have, in addition, to 120 volts "B" supply, a "C" voltage up to 9 volts tapped off the same block. These are very convenient and compact, but if the dimensions to be given are adhered to, there will be no difficulty in packing away up to 135 volts "B" battery and a separate bias battery of 9 volts.

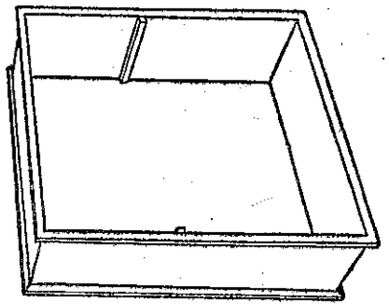
The performance of this receiver makes it a serious challenger to the more conventional type of home receiver. Many people will wish to use it as a permanent receiver and may consider the rather short life to be obtained from the small batteries contained in the case something of a disadvantage. The remedy for this is the provision of a separate block of heavy-duty "B" batteries or a suitable mains unit, for use when the receiver is at home, the small batteries only being used abroad. A second "B" wander plug may be provided to avoid the necessity of disturbing the one inserted in the small battery, but the positive plugs must be shifted from the small battery to the exterior "B" supply. It is quite permissible to move only the high-voltage tapping from the small battery to the exterior "B" supply, as the current taken from the other tappings (detector valve and screening grids) is so small that it will have no adverse effect on the small batteries. Some constructors may consider it worth while to put in a two or four-pole double throw switch and a suitable plug and socket arrangement, so as to make the change-over more convenient. These could be mounted immediately below the baseboard.

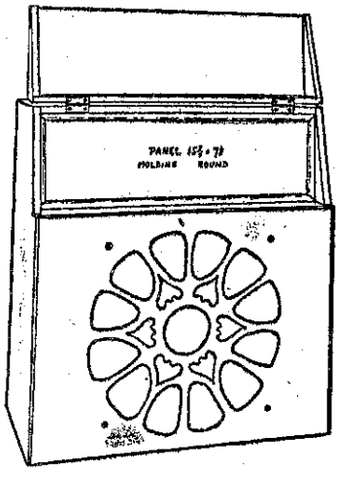
The Cabinet.

The overall dimensions of the cabinet illustrated are: Length 16½in.; depth 17½in.; width 8½in. As has been previously mentioned, the accommodation for batteries is fairly generous, and it is possible that the depth might be decreased a trifle. It must be remembered, however, that if the dimensions are thus modified, it will be necessary to put another turn or so on the frame aerial to maintain a proper tuning range.

The construction of the cabinet may be carried out in any light timber, a thickness of three-eighths of an inch being suitable. The overall dimensions have already been given and the sketches will render the mode of construction readily apparent. The wooden "panel" which carries the speaker is nearly 16½ inches by 12 inches, so that only the upper five inches or so of the panel is exposed; thus the heads of the screws holding the two horizontally mounted valve-holders are hidden.

The inner framework on which the frame aerial is wound and within which the receiver proper is mounted is but 5 5-8 inches in width; consequently there is a space between the receiver panel and that on which the speaker is mounted, the space being conveniently filled by a narrow wooden shelf.





Inner frame ready for winding of frame aerial round outer surface. The small battens are to support the baseboard of the receiver, the space beneath this being occupied by the batteries and the back of the speaker.