Mainly about Construction

By "Megohm."

The Shield-Grid R. F. Booster Unit

ADAPTING THE S625 VALVE

THE shield-grid R.F. unit described on June 1 for use with the UX222 valve is equally well suited for use with the S625, the British type of screen-grid valve.

The only difference necessary in connection with the use of the 625 is i. the actual connections to the valve, and the matter of grid-bias. In the case of the 222, which only requires 3.3 volts on the filament, the small necessary grid-bias is obtained by the "drop" across a resistance or the rheostat in the negative filament leg. In the case of using a 6-volt battery a 10-ohm resistance is placed in the negative leg, and the rheostat in the positive leg. With a 4-volt battery the rheostat is placed in the negative leg, and gives a small amount of negative bias.

THE 625 requires from 5.5 to 6 volts on the filament, so that the necessary grid bias should be provided by a 1½-volt flashlight cell, which may conveniently be one of the smallest size, suitable for inclusion within the shield. It might be said here that in case of using the higher plate voltage of 135 volts on the 222, extra grid bias may be provided on a 4-volt circuit by inserting a dry-cell between the rotor of condenser and the rheostat.

VALVE CONNECTIONS.

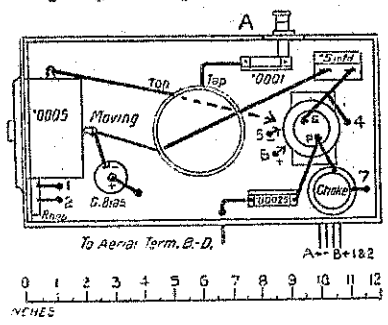
THERE are five prongs on the 625, two at one end and three at the other. The two are the screen grid and plate connections, the latter marked with an A for "anode." At the opposite end are the two filament legs, the third being the ordinary control grid connection, in its usual relative position.

AN ordinary British socket is required, to be mounted in place of the UX type. Only the plate and grid connections will be made to this, the grid terminal in this case being the screen grid. Instead of the two filament wires connecting to the socket, they must be sufficiently long to reach well above the top of the valve, and each wire must terminate in the smallest socket procurable, and these slip over the respective filament prongs, and are easily removable at any time. The control grid connection from the top of the coil may be made by means of a small battery clip, just as in the case of the 222.

WHEN experimenting, the writer placed the valve in the Klosner UX socket already in place, with plate in usual position, and by slightly closing the spring on the opposite filament position and making the screen grid connections to this, the holder answered quite well, so that this type of holder with a flat grip each side of the prongs can be used.

All connections are as shown in the theoretical diagram on June 18, except that the 10-ohm resistance is omitted, and a grid-bias cell is placed in the grid lead at the point marked X. The plan diagram of wiring herewith shows the addition of the grid-bias cell between moving plates of condenser and filament negative. This means that in the pictorial view the dotted lead marked 4v. is omitted, and the 1½-volt cell is placed in the dotted lead marked Gv., which then continues under the board to join filament negative lead.

FROM the battery cable the A positive goes to one side of rheostat, the other side to one of the filament prongs at top of valve. The A



negative lead from battery goes direct to the other filament prong, and is joined under the board by the lead from stator via grid-bias cell.

A PLATE voltage of 90 volts is shown on the original diagram, but any voltage up to 135 volts may be used on the 222 and 120 on the 625, and the latter a maximum of 80 volts on the screen grid. The grid bias on the control grid is from 0 to 1½ volts negative.

Referring to the plan wiring diagram, the wires running down through holes in baseboard are numbered and connect as follows:—1 up through 6 to filament positive; 2 to A positive battery lead; 3 under board to connect to wire coming up through 5 to filament negative; 4 to B battery low voltage lead in cable; 7 to B battery high voltage in cable.

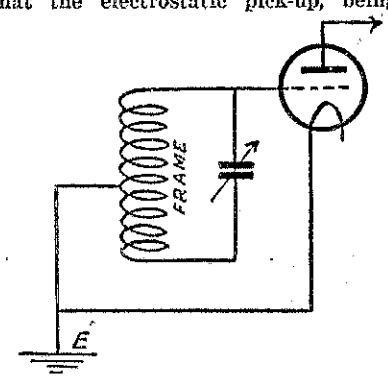
THE three connections to the top of the valve are shown with arrow points, the dotted line from top of coil being the control grid connection with small battery clip or socket. The A battery must always be switched off when connecting or disconnecting filament wires.

The S625 is retailed at 30s. The supply of all shield-grid valves is at present very low in New Zealand, but good stocks will arrive at an early date. Amalgamated Wireless, Ltd., imported as an initial stock what was considered to be a large quantity of the 222, but so popular has the valve proved that the stock was soon cleared, and those at present available are any that remain in the retailers' hands. The Marconi S625 shipment is due to arrive shortly, and the same applies to the Osram S625, for which the British General Electric Co. are wholesale distributors.

CUTTING OUT INTERFERENCE

WITH THE FRAME AERIAL

IN a recent issue of "Wireless World" it is pointed out that the directional effect of a frame aerial can be considerably improved by centre-tapping the frame and connecting this tap to earth and to the valve filaments, as shown in the figure. The idea underlying this mode of connection is that the electrostatic pick-up, being



more or less evenly distributed over the frame, should be balanced out, leaving an approximation to pure electro-magnetic pick-up. The degree of success attained in eliminating the static pick-up can be gauged by the extent to which the local station can be eliminated by turning the frame into the position of minimum signals.

THOSE who live in large towns are very frequently annoyed by finding that all reception, save from the local station, is impossible, owing to the noises due to the electrical machinery which is now found everywhere. All moving electrically-driven machinery, from a vacuum cleaner up to an electric tram, seems to generate disturbances which are carried along the electric light mains ("wired wireless") for very considerable distances from their point of origin. These disturbances, which are usually classed together under the vague but inclusive title of "earth noises," make themselves known to the user of wireless receivers in the form of a wide variety of scratches, cracks, bangs, buzzings, and indeterminate uproar of all kinds whenever he ventures to tune in a station at any distance. In bad cases even the local station may have its programme punctuated by the louder of the noises, while every other station may be completely blotted out by a continuous roar. Since these noises are completely untuned, it is not possible to eliminate them by making the receiver ultra-selective.

APPARENTLY, however, the majority of the noises are introduced into the receiver through electrostatic rather than electromagnetic pick-up, for if the frame aerial connections shown in the figure are employed, the ratio of noises to signals can be very considerably reduced. It is found that a frame, connected in the usual manner to the receiver, does not offer any very great relief from noise, but that if the connections shown in the figure are adopted, a very considerable improvement results. In bad cases it becomes necessary to extend the precautions beyond that of the simple centre tap by making the tapping on the frame, which must for this purpose be wound with bare wire, by means of a spring clip, adjusting its position carefully to give the minimum of interference.

AVOID STATIC PICK-UP.

THE lead from tuning condenser to grid, having no counterpart at the other end of the tuned circuit, must be shielded, which implies, in practice, that the tuning condenser must be within the set, and the whole enclosed in an earthed metal screen.

It is also essential to look very carefully after the leads connecting the two ends of the frame to the tuning condenser and to take every precaution to ensure that the static pick-up by them is identical. This could be achieved by using twin flex for the connections, but the high capacity between the wires makes it unsuitable.

A good method is to make a kind of rope-ladder, the two wires forming the uprights, while the rungs consist of ebonite or wood spacing strips. Alternatively, the two wires may be sewn into opposite edges of a piece of webbing, with the connection for the centre tap, if desired, down the centre.

THESE precautions may seem very elaborate, but it must be emphasised that half measures give but little relief from the earth noises, while a whole-hearted attack on them, on the lines laid down in the present note, will at the least make it possible to obtain some sort of entertainment from any station which, on an open aerial, is not so entirely blotted out by noise that its transmissions are unintelligible.

The accompanying circuit is one that will give comparative freedom from earth noises, but in most cases would only be suitable for short-distance reception, except in the case of using headphones.

QUERIES BY CORRESPONDENCE.

1. Every communication enclosing queries is to be addressed to "Megohm," Box 1032, Wellington, and must be accompanied by a stamped addressed envelope for reply by post.

2. Questions must be written so that a space is left in which the reply may be added.

3. No charge is made for replies.

CHOOSING A VALVE.

THERE is now a good choice of receiving valves on the market, many of them particularly suited for some special function which in many cases requires more or less exclusive characteristics. Experimenters and constructors should accordingly not hesitate to mix the products of various makers if by so doing they may more nearly approach the ideal laid down in the various constructional articles.

A BATTERY VOLTAGE.

THE voltage of a discharged cell should never be less than 1.8 volts. A newly-charged cell may show 2.25 volts, but on standing it rapidly drops to 2.2 volts, and your battery should show this value when connected to your set. In discharging the voltage drops gradually from 2.2 to 2 volts, remains constant at that figure for a fairly long period, and then drops to 1.8 volts. If discharged after this the drop to 0.5 volt is very rapid.