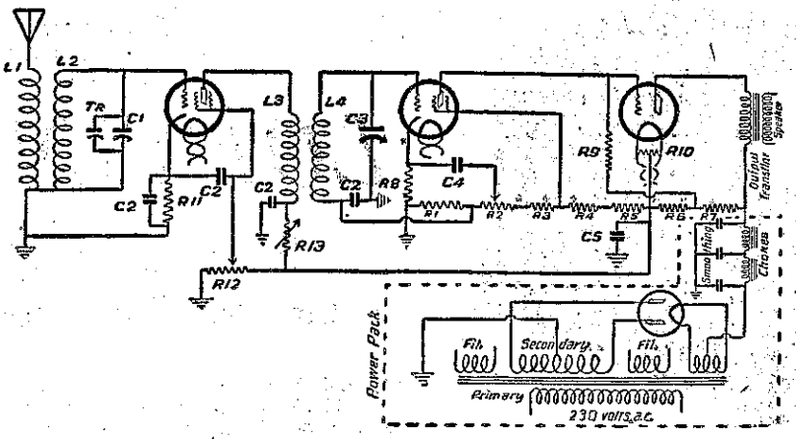
with the panel which is at earth potential. As all grounding is made to the panel and this is of aluminium it will be necessary to attach soldering tags to certain of the screws that are attaching the components to the base. Before proceeding with the wiring it is best to tin all lugs and resistance ends that will come into the business of wiring. It will be found that this simple expedient will save a great deal of time and will also guard against dry joints.

Wiring the Set.

WIRING is not a job that can be accomplished in a few minutes. It necessarily requires a good deal of care, and a mistake may do a great amount of damage to resistances, condensers or valves. All wiring below the base should be carried out with glazite or other similarly covered wire, but constructors are advised against heavy wire of the busbar type, as this is not easy to work with and does not solder well. The theoretical diagram should be followed and the layout used as a check, as it is much easier to go astray when following the latter than when following the former. When wire has to pass through the shield it should be well insulated by a piece of rubber, shellacked cardboard or other insulator as well as the covering on the wire.

See that the filament wires are kept clear of one another and that a separate winding is provided for the power filament. This is essential, as the potential with regard to the ground is not the same in each. Remember that the current comes through the 245 valve, through the balancer resistance and then through the main chain of resistances. A little flows up through the high value resistances to provide the plate voltage of the amplifier 224 and the bias of the 245. The resistances in this main chain must be able to pass the current supplied by the 245.

IN adapting to actual practice many of the angles of wire shown in the diagram can be omitted. Generally avoid wires crossing. Everyone who has done any construction will have his own method of actually doing the wiring, but we have found the easiest method is to measure off the distance between the points to be wired on the glazite and then cut the wire. The ends are bared about a ¼in. from each end by running a sharp knife round the insulation, which then comes off cleanly. Where crossing wires have to be joined it is simplest to place the wire, then make the cuts round the wire on either side of the joint. No more than a ¼in. should be bared, for with a hot iron there will be no trouble in making a join in this space and the likelihood of anything shorting on to the bared wire is effectively minimised.



Theoretical Diagram.—The key to the parts not mentioned in the list are: R1, 425 ohms; R2, 200 ohms pot.; R3, 775 ohms; R4, 4700 ohms; R5, 25,000 ohms (not critical); R6, 100,000 ohms (not critical); R8, 50,000 ohms; R9, 500,000 ohms; R10, 20 ohms (not critical); C4, C5, 1mfd.

It will be noticed that the humbucking potentiometer is placed at the rear. Once the silent point is found there will be no need to alter the potentiometer. The plate resistance is likewise at the back, for once the set is properly adjusted there will be no need to alter the potential of the plate. R12 controlling the voltage on the screen acts as a very effective volume control and is consequently on the front.

Above the Panel.

LITTLE wiring has been left for the top of the panel. Wires to connect with the coils should be left long so that when the coils themselves are brought into place there will be no shortage of wire. Before completing the sub-panel wiring a word must be said about the jacks. The output can be of the simple two spring type and is connected with the output transformer attached to the speaker. The other is a four springed type and is arranged as is shown so that when the jack is pulled out the two wires leading to it are connected. This condition is shown clearly in the diagram.

Of the above base wiring there is only one point of note, and that is the grid wire. This is taken through the top of the can to the grid of the valve and to the fixed plates of the condensers. The fixed plates are connected with solder lugs attached to the base. The two taps on the aerial are brought out to a suitable mounting and the ground wire is attached to the frame anywhere. The plate wire, if neatness is essential, can be taken under the base, but it gets a much better run if allowed to pass through the bottom of the can and run above the panel to the plate of the first valve. Where the English type valve is used some adaptation in the wiring will be necessary, as the plate is brought to the top terminal.

Trying Out.

ALTHOUGH this is the most interesting part of the whole job, it should not be rushed. Check and double check all the wiring and look particularly for resistances shorting to the panel when they are not supposed to be at earth potential. When satisfied in this direction, see that the valves are in their right places and switch on the current. Watch the rectifying valve and if it turns a bluish colour and begins to spark, cut off the electricity quickly and look for a short circuit. If a milliameter is available insert this in the lead to the B+. It should read about 30 milliamps, and if too many are shown there is a short between one of the resistances and the earth. If these are in order, look for an open circuit in the bias chain or a broken-down condenser.

Presuming that the milliameter after reading, say, 50 for a few seconds settles down to 30 and the rectifier does not show signs of distress, then the next stage can be proceeded with. Attach the gramophone where indicated and flick the needle. This should produce a grating sound in the speaker. If it does not a defective connection in the chain of bias resistances or some wires not connected is indicated and examination should reveal the trouble. The signals coming from the loudspeaker should be loud and clear; weakness and distortion indicates faulty resistances, particularly those in the plate 224 bias 245 chain. Other troubles may be that the jack or the volume control is not insulated from the panel. Do not worry about the initial hum as this quietens down when the filament of the 224 has had time to warm up. There will still be

(Concluded on page 28.)