

# A Power-pack for "250" Valves

(Continued from last week.)

## Tapped Secondary Windings.

CONSTRUCTORS wishing to commence operations on 300 volts with a Raytheon will wind the full secondary coils, tapping each one at a suitable point so that the reduced voltage may be used as long as desired. Care must be taken to follow the proper procedure in placing the taps and in connecting the coils, otherwise the two halves of the secondary may be acting in opposition, and new voltage will be the result.

The number of turns to be utilised will be 1850 on each half of the secondary winding. This will give an initial voltage of 360, which will drop to less than 300 by it reaches the plate of the last valve. The Raytheon is quite equal to handling the voltage.

The first coil is wound with 1850 turns, and a tap is taken out; then the remaining turns are put on. The second coil is to be wound, turning in the same direction and putting on a number of turns equal to those on the first coil in excess of 1850. A tap taken out, and then 1850 turns to complete the coil.

The beginning, or larger number of turns of coil No. 1 is then connected to the end, or larger number of turns of No. 2, and from this connection the centre tap is taken.

The two taps connect to the respective "filament" terminals of the Raytheon socket, and the end of coil 1 and the beginning of coil 2 are coiled up and insulated with adhesive tape.

This same method may be utilised to obtain several tapings—the taps will be near the finish of the first coil, and then repeated in reverse order at the beginning of the second coil. The 300 volts will suit the 245 valve.

## Filament Windings.

AFTER insulating the secondary windings, any filament windings that may be required are put on. These windings are usually of heavy wire, 18's., as heavy current is to be drawn for a.c. valve heating. The actual voltage of each winding and the amperes to be drawn, will depend upon the valves to be used in the receiver.

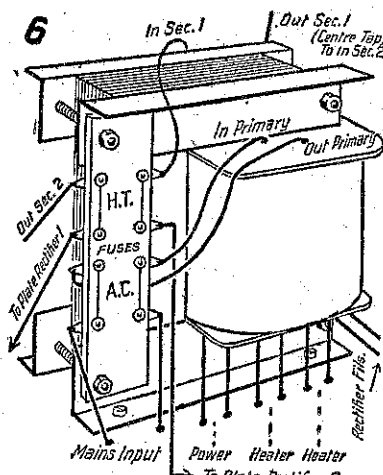
The power stage filament supply may be put on first, and for one or a pair of 7½ volt valves, 47 turns of 18's d.c. will be required, allowing 2½ amperes to be drawn. If a single valve is used, only 1½ amperes will be drawn, which will tend to increase the voltage, so that a tap might be provided at the second turn from one end, or provision made for the introduction of a few ohms resistance into both legs of the filament circuit. The power-valve winding is not centre-tapped, as the electrical centre will be accurately determined by means of a potentiometer of 30, 60, or more ohms across the filaments, giving a variable tap by means of the arm, which is directly connected to earth unless a grid-bias resistance is included in the circuit. This method of centre-tapping power filaments was dealt with in the "Record" of May 24 last.

The Radiotron 227 valve requires 2½ volts, 1½ amps. The De Forest and Ceco equivalents require the same, and the Osram 3½ volts 2 amps. The Philips

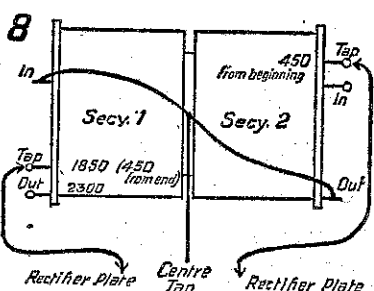
E124 and several others in the heater series of the same make require 4 volts and .9 amp., or just under one ampere.

Windings to give any voltage required by the above or other valves are as follow:—

Volts.	2 amps. turns.	1 amp. turns.
1½	9 to 10	9
2	13	12
2½	16	15
3	19	18
4	25	24
5	32	30
6	38	36
7½	47	45
8	51	48



**Transformer**  
Showing Fuse Panel and Position of Leads



**Tapping High-Tension Coils**

The above table will give voltages as near as possible to those required, but it is necessary for constructors to exercise care with their a.c. heater current in order not to give any excess. A small amount of resistance can always be introduced to reduce voltage, half in each filament or heater leg.

The above table is correct for 18's wire, which is easier to manipulate than heavier gauges when winding. A good plan is to provide a separate winding for each 2 or 2½ amps., as good regulation is thereby secured. Heavier wire gives rather less drop when large current is drawn.

Two 4-volt windings are easily accommodated in one layer, and three 2½-volt. Centre-taps are not required on these windings, as the centre is usually determined by the tapped resistance method, though it is not critical with some valves.

Shellac all filament windings, and allow it to dry before covering with insulation.

If any filament windings are put on for future use, one end should be connected to earth (metal floor) and the other coiled up small and insulated by wrapping in adhesive tape.

The transformer dimensions given allow for one layer of 18's for rectifiers between primary and secondaries, and outside the latter one layer 18's for power valves, and three other layers for heater supply.

The outer windings may project very slightly outside the spool ends on the straight sides, but not at the corners.

## The Smoothing Chokes.

TWO smoothing chokes of identical proportions are to be provided, and the specifications here given will produce a pair of chokes that will be equal to the task imposed upon them.

The inductance will be about 30 henrys each, when carrying up to 130 mills, with two gaps of 1-16in. in each. The number of turns of 30's s.w.g. on each will be 5750, but constructors not having a revolution counter may save the trouble of counting by simply filling each spool, which will take half of the 3½lb. of wire allowed for the pair.

The cores are constructed of 1½in. stalloy, built to the same thickness. The long piece—that which is packed inside the centre of the spool—is 4½in. The other sizes are 3½, 2, and 1½-in., all 1½ wide. The spool ends are 2½in. square, and the outside length 2½in. bare. Remember that there will be a high potential difference between the winding and the earthed core, so let the preliminary insulation be good—empire cloth or two brown papers in addition to a layer of tape.

The only great difference between the construction of a choke and a transformer is in the arrangement of the core. In order to provide the "gap" in the choke, it is necessary to cut four sizes of stalloy, one heap of each to the thickness to which the core

is to be built. The centre of the spool is packed tightly with the longest pieces, to which the thicknesses of cardboard which determines the gap may be fastened with secotone, when the remainder of the core may be assembled with the three smaller sizes.

The direct-current resistance of each choke will be 260 ohms, or 520 ohms the pair, which is fairly low for an eliminator choke. If a current of 50 mills is passing through the pair the drop will be 26 volts, 70 mills will drop 38 volts, and 100 mills will drop 52 volts.

This drop in voltage is well provided for in the specified turns, especially when it is noted that the drop in filament rectifiers of the 281 type is practically negligible up to 60 mills, after which the internal resistance gradually rises.

Wooden clamps 1½ wide by 3-8 thick and 4 5-8in. long are drilled with bolt holes, centres 3 7-8in. apart.

The chokes are secured to the baseboard by means of holes drilled through it, and through which screws are passed from underneath to secure the lower edge of the bottom pair of clamps. The lead-outs should be at the lower end of the spool, as they pass through the baseboard in every instance in order to connect to the smoothing condensers.

The wire is run in "without" insulation, but it is just as well to put in a layer of tissue-paper occasionally as a precaution, keeping it close at the ends.

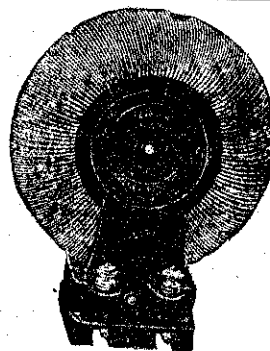
Two dozen 3ft. lengths of stalloy will be required for each choke, about 80 of each size of cut piece for each.

The chokes and transformer cores are earthed by placing under them a few thicknesses of tinfoil folded up, thus making good contact with the metal floor. The tinfoil in which adhesive tape is packed answers well.

For a greater output than 130 mills the chokes would have to be constructed of 1½in. stalloy built to the thickness, and the window enlarged in both directions to take the same number of turns of 28's wire.

## The Smoothing Condensers.

A DIAGRAM shows a neat arrangement of the smoothing condensers in the base, but other makes may necessitate a different arrangement in order to suit the space. It is a wise plan to make the container after the condensers have been procured. The four 4 mfd's must be of 800 to 1000 volts test—half the test voltage is the working voltage, and a margin is always good.



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