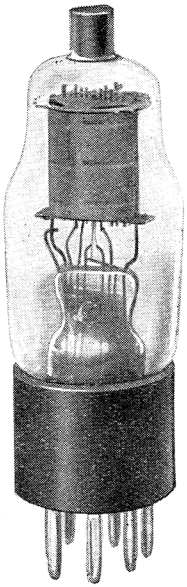


HEPTODE FREQUENCY CHANGER TYPE 15D.1

The BRIMAR 15D.1 is an indirectly heated frequency changer of the heptode or pentagrid type suitable for use in A.C. Universal or Automobile receivers. It is designed to perform simultaneously the functions of mixer and oscillator in receivers of the super-heterodyne class.

These functions are accomplished in a single valve comprising a triode unit and a screened grid or tetrode unit coupled by a common electron stream.

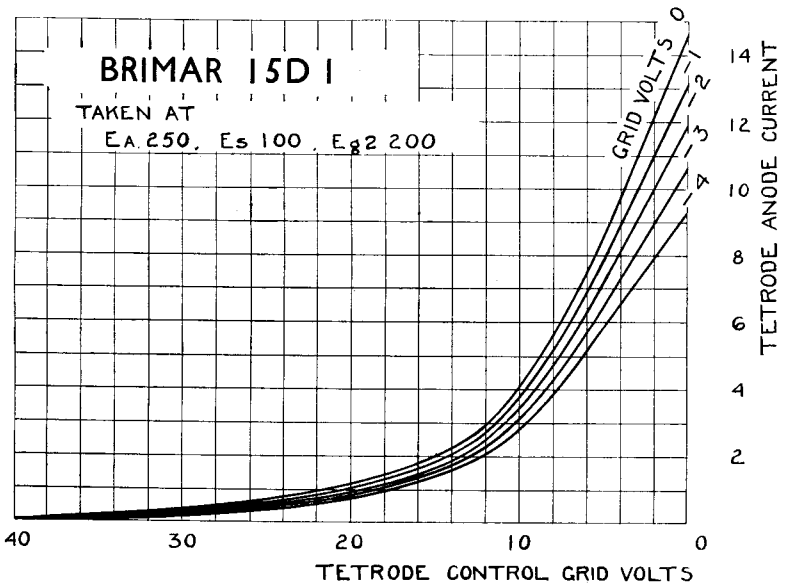
The triode unit functions as an oscillator, the oscillations modulating the electron stream of the tetrode unit, producing in the anode circuit the required I.F. frequency.

The tetrode portion of the valve is designed with a variable mu characteristic; thus enabling the conversion gain to be varied over a wide range by variation of tetrode control grid bias.

Great care has been taken in the design of this valve to eliminate frequency drift. How far the designers have been successful may be gathered from the following information. At 1,500 K.C. the application of 40 volts bias to the grid of the tetrode portion produces a frequency drift of less than 150 cycles.

Operation details and characteristics are given overleaf. The valve is fitted with a seven-pin base, connections being as shown on page 51.

CHARACTERISTICS



Heater Voltage	13·0 volts
Heater Current	0·2 amp.
Tetrode Anode Voltage (maximum)	250 volts
Screen Voltage (maximum)	100 volts
Triode Anode Voltage (maximum)	200 volts
Conversion Conductance	550 micromhos*

* *Taken at anode volts (tetrode)* 250, *screen volts* 100.
anode volts (triode) 200, *control grids*—3 *volts.*

APPROXIMATE OPERATING CONDITIONS

Anode Volts	250	150	100
Screen Volts (G.3 & 5)	100	100	50
Triode Anode Volts (G.2)	200	120	100
Grid Volts (G.4)	—3·0	—2·5	—1·5
Grid Leak (G.1) (ohms)	50,000	25,000	10,000
Auto Bias Resistance (ohms)	300	300	150
Screen Supply Resistance (ohms)	—	15,000	20,000
Triode Anode Supply Resistance (ohms) ...	15,000	10,000	—
Anode Current (mA.)	3·5	3·0	1·5
Screen Current (mA.)	2·0	2·5	2·5
Triode Anode Current (mA.)	4 0	4·0	3·5

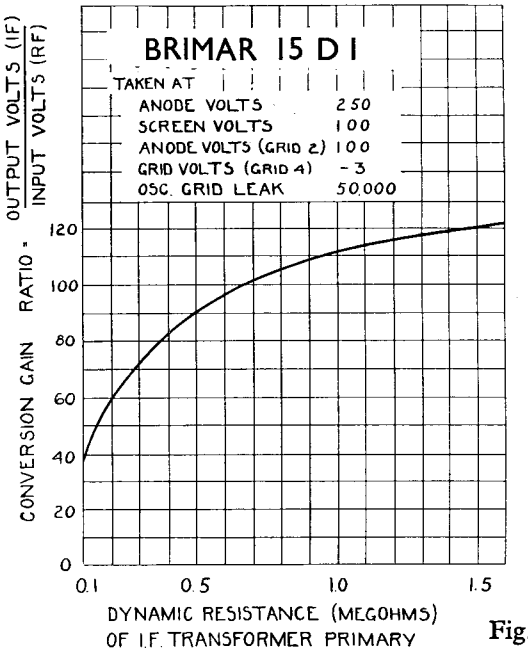
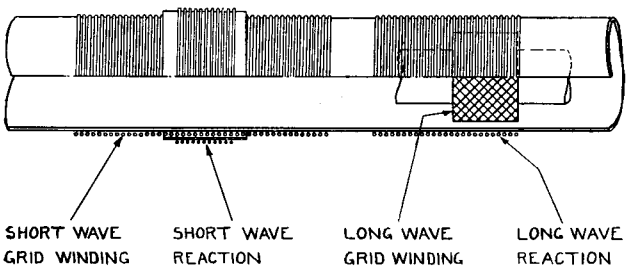


Fig. 1.



LONG WAVE GRID WINDING:- WAVE WOUND OR HONEYCOMB ON ½" OR ⅝" DIA. MANDREL.

OTHER WINDINGS :- ON 1" DIAM. FORMER. S.W. REACTION INSULATED FROM S.W. GRID WINDING

Fig. 2.

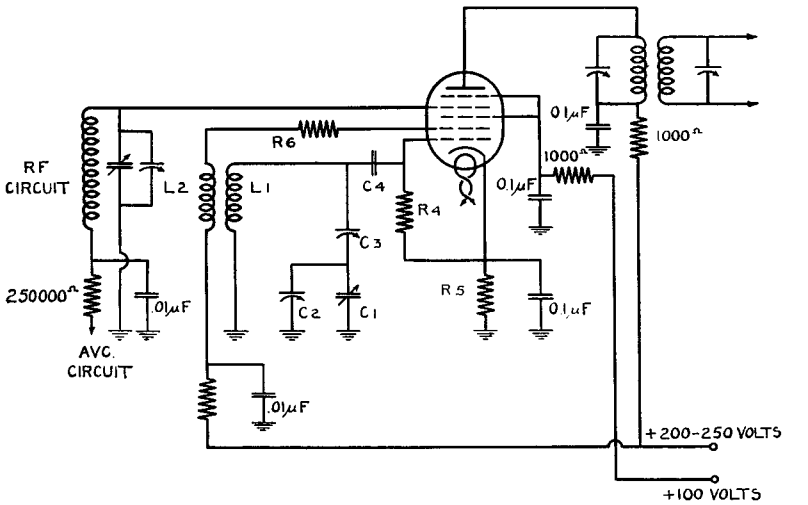


Fig. 3.

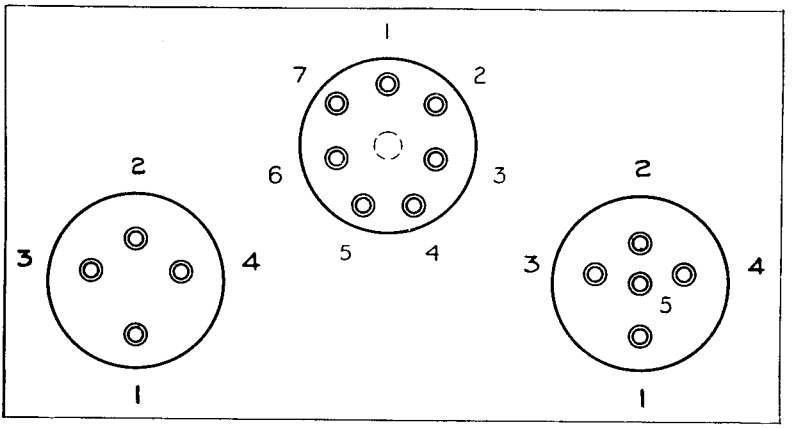
The curve on page 4 shows the tetrode anode current characteristic for various values of triode grid voltage. Fig. 1 page 5 gives the variation of conversion gain against dynamic resistance of the I.F. transformer primary.

Under operating conditions the conversion gain of a BRIMAR 15D.1 (used in a circuit as Fig. 3 above) measured from the grid of the valve (G.4) to the grid of the I.F. amplifier using a reasonably efficient step-up I.F. transformer will be of the order of 200 times.

In Fig. 3, which is a typical circuit employing a 15D.1, L.1, L.2 is the oscillator coil assembly ; C.1 is the oscillator section of the condenser gang ; C.3 is the padding or tracking condenser ; C.4 and R.4 are the grid condenser and leak, which should have values of approximately .0001 mfd. and 50,000 ohms respectively; R.6 is a damping resistance wired as close as possible to the triode anode socket G.2 to prevent the possibility of spurious frequencies being produced, it may have a value of 1,000 to 6,000 ohms as may be required ; R.5 is the auto bias resistor of from 150 to 300 (see table on page 4).

In order to obtain the maximum conversion gain with stability the valve should be shielded and the lead to the top cap made as short as possible.

BASE CONNECTIONS OF VALVES



UNDERSIDE VIEW OF BASES

4-PIN VALVES

TYPE	1	2	3	4
HLB.1, PB.1	A	G	F.M	F
R.1, R.2, R.3, 1A.7	A1	A2	H	H.C
4037A.	A	—	F	F

5-PIN VALVES

TYPE	1	2	3	4	5	Top Cap
8A.1, 9A.1 ...	G2	G1	H	H	C.M	—
HLA.2, PA.1 ...	A	G	H	H	C.M	—
PenB.1, PenA.1 ...	A	G1	F	F	G2	—
4039A	A	G	H	H	C	—
1D5	A	—	H	H	C	—

7-PIN VALVES

TYPE	1	2	3	4	5	6	7	Top Cap
4D.1 ...	—	—	—	H	H	C	A	G
7A.3, 7D.8, 7D.6, 7A.2, & 7D.3 ...	—	G1	G2	H	H	C	A	—
9D.2 ...	—	A	G3	H	H	C	G2	G1
11A.2, 11D.3	D1	M	D2	H	H	C	A	G1
15A.2, 15D.1	G2	G1	G3.G5	H	H	C	A	G4

A. *Anode.* G1, G2, G3, G4, 1*st*, 2*nd*, 3*rd and* 4*th Grids.*
F. *Filament.* H. *Heater.* C. *Cathode.* D1, D2, *Diodes.*
M. *Metallising.*