DF 91 Battery-type R.F. pentode

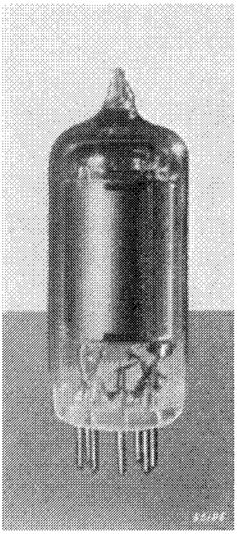

Fig. 1
The DF 91 (approximately full size).

The DF 91 is a pentode for use as R.F. or I.F. amplifier in battery sets. With 67.5 V on both anode and screen grid, the slope is 0.875 mA/V and the internal resistance 0.25 MΩ. If the anode voltage be increased to 90 V (67.5 V is the maximum permissible value for the screen grid) the slope and internal resistance are 0.9 mA/V and 0.5 MΩ, respectively; with 45 V on both anode and screen grid the slope is still 0.7 mA/V, the internal resistance being then 0.35 MΩ. The capacitance between anode and control grid is less than 0.01 pF.

The filament voltage of this valve is 1.4 V with a filament current of 50 mA; the filament is suitable for parallel as well as series feeding. Directions for series feeding are given in the description of the DAF 91.

The maximum permissible voltages for anode and screen grid are 90 V and 67.5 V, respectively.

The DF 91 is a variable-mu valve and, when control is applied simultaneously to the frequency changer DK 91, a suitable A.G.C. curve can be secured. A method of feeding the screen grids by means of a common resistor is described in the chapter dealing with the DK 91.

Anti-vibration mounting of the holder of the DF 91 is sometimes essential to prevent microphony, and it is usually necessary to provide a screening plate between the anode and control-grid pins, to ensure that the capacitance between these electrodes is not increased by the circuit capacitance.

TECHNICAL DATA OF THE R.F. PENTODE DF 91

Filament data

Heating: direct from battery, rectified A.C., or D.C.; series or parallel feed

In parallel with other valves

Filament voltage . . .	V_f	=	1.4 V
Filament current	I_f	=	50 mA

In series with other valves

Filament voltage . . .	V_f	=	1.3 V

DF 91

Capacitances (valve cold)

Input capacitance	C_{g1}	=	3.6 pF
Output capacitance	C_a	=	7.5 pF
Between anode and control grid	C_{ag1}	<	0.01 pF [1])

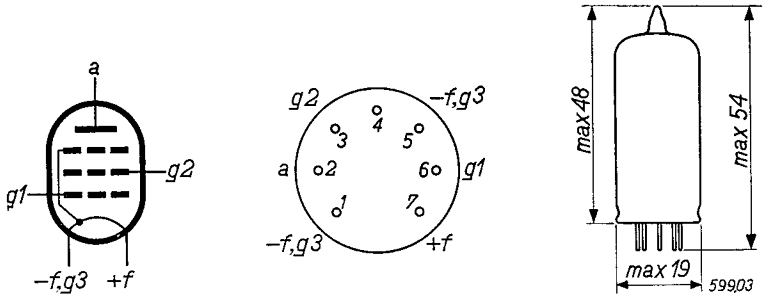

Fig. 2
Electrode arrangement, electrode connections and max. dimensions in mm.

Operating characteristics for use as R.F. or I.F. amplifier

Anode voltage	V_a	=	45		67.5		V
Screen grid voltage . . .	V_{g2}	=	45		67.5		V
Control grid voltage . . .	V_{g1}	=	0	—10	0	—16	V
Anode current	I_a	=	1.7	—	3.4	—	mA
Screen grid current	I_{g2}	=	0.7	—	1.5	—	mA
Mutual conductance . . .	S	=	700	10	875	10	µA/V
Internal resistance	R_i	=	0.35	>10	0.25	>10	MΩ
Amplification factor: second grid with respect to first grid	μ_{g2g1}	=	11	—	11	—	
Equivalent noise resistance .	R_{eq}	=	—	—	20	—	kΩ

Anode voltage	V_a	=	90		90		V
Screen grid voltage	V_{g2}	=	45		67.5		V
Control grid voltage	V_{g1}	=	0	—10	0	—16	V
Anode current	I_a	=	1.8	—	3.5	—	mA
Screen grid current . . .	I_{g2}	=	0.65	—	1.4	—	mA
Mutual conductance . . .	S	=	750	10	900	10	µA/V
Internal resistance	R_i	=	0.8	>10	0.5	>10	MΩ
Amplification factor: second grid with respect to first grid	μ_{g2g1}	=	11	—	11	—	
Equivalent noise factor . .	R_{eq}	=	—	—	19	—	kΩ

[1]) Measured with external screening.

Limiting values

Anode voltage	V_a	= max. 90 V
Anode dissipation	W_a	= max. 0.35 W
Screen grid voltage . . .	V_{g2}	= max. 67.5 V
Screen grid dissipation . .	W_{g2}	= max. 0.11 W
Cathode current	I_k	= max. 5.5 mA
Grid current starting point .	$V_{g1}(I_{g1} = +0.3\mu A)$	= max. —0.2 V
External resistance between control grid and cathode .	R_{g1}	= max. 3 MΩ

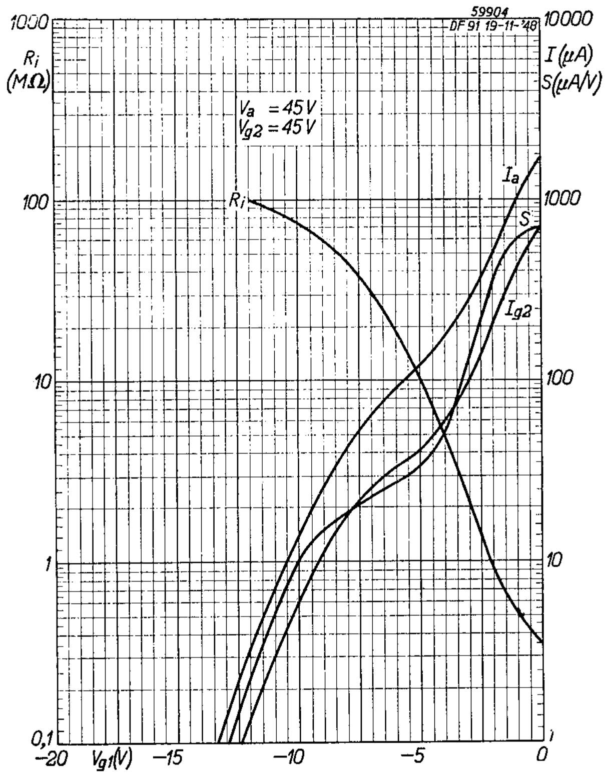

Fig. 3

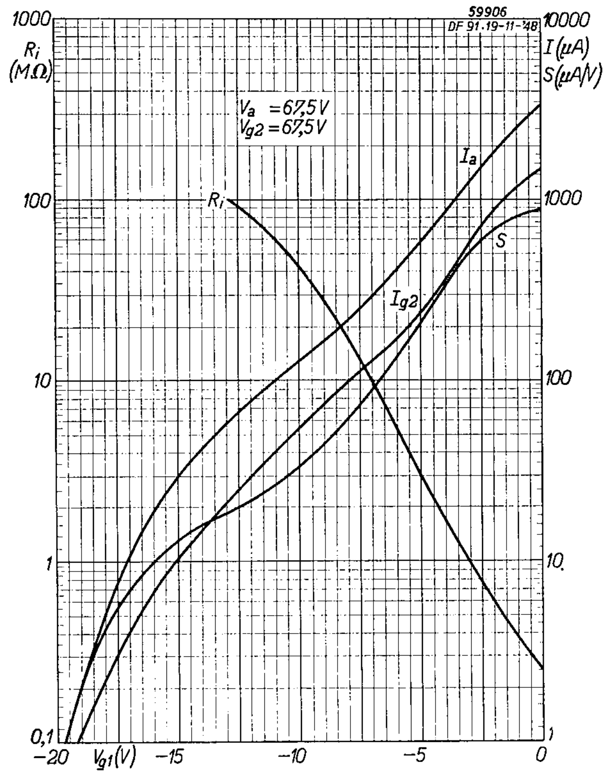

Fig. 4

Anode current (I_a), screen grid current (I_{g2}), mutual conductance (S) and internal resistance (R_i) of the DF 91 as functions of the grid bias (V_{g1}). Fig. 3 for $V_a = V_{g2} = 45$ V ; Fig. 4 for $V_a = V_{g2} = 67.5$ V.

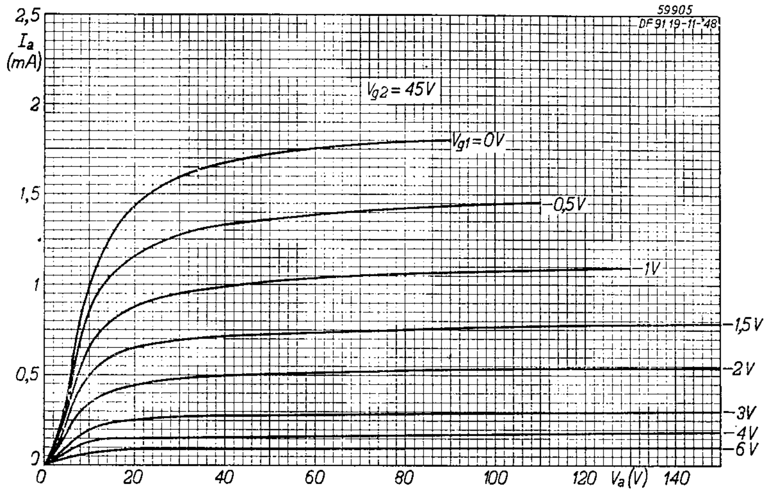

Fig. 5. I_a/V_a characteristics of the DF 91 with $V_{g2}=45$ V.

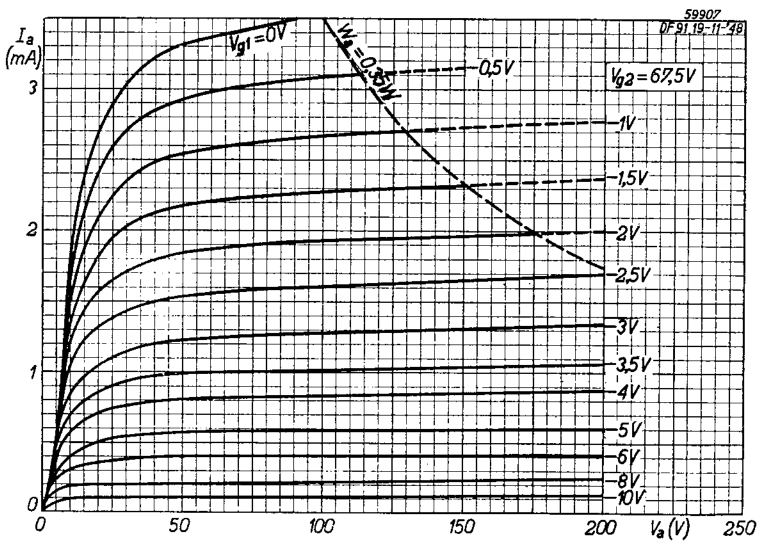

Fig. 6. I_a/V_a characteristics of the DF 91 with $V_{g2}=67.5$ V.

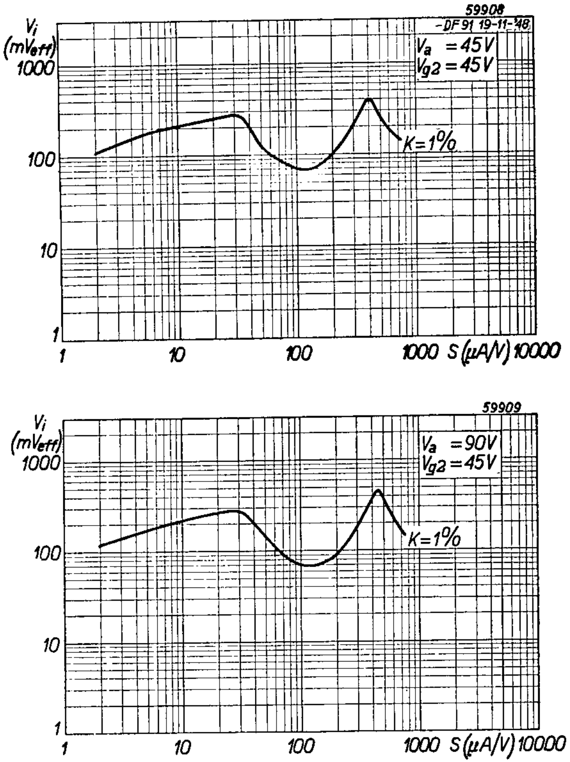

Fig. 7
The input voltage (V_i) of an interfering signal producing 1% cross-modulation, as a function of the slope (S).
Upper: with $V_a = V_{g2} = 45$ V. Lower: with $V_a = 90$ V and $V_{g2} = 45$ V.

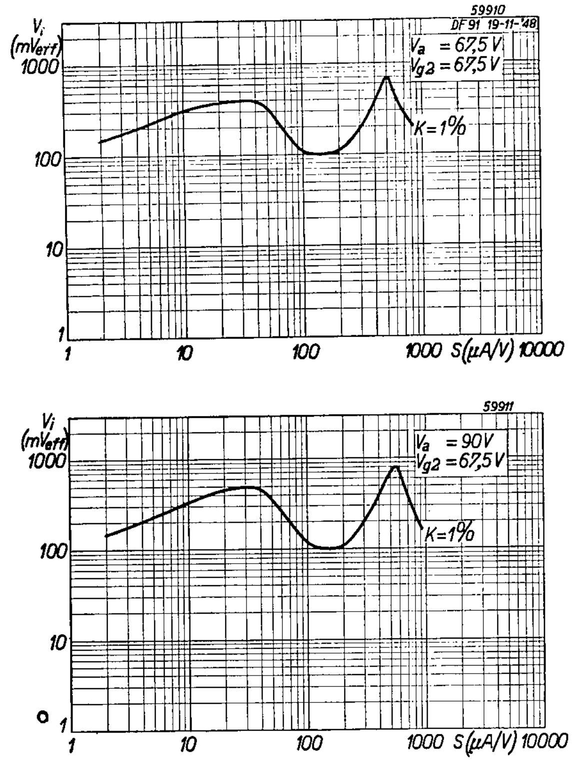

Fig. 8
As Fig 7. Upper: with $V_a = V_{g2} = 67.5$ V
Lower: with $V_a = 90$ V and $V_{g2} = 67.5$ V.