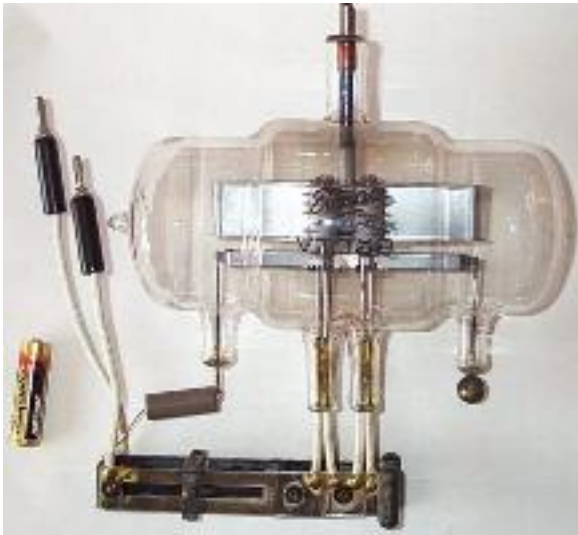




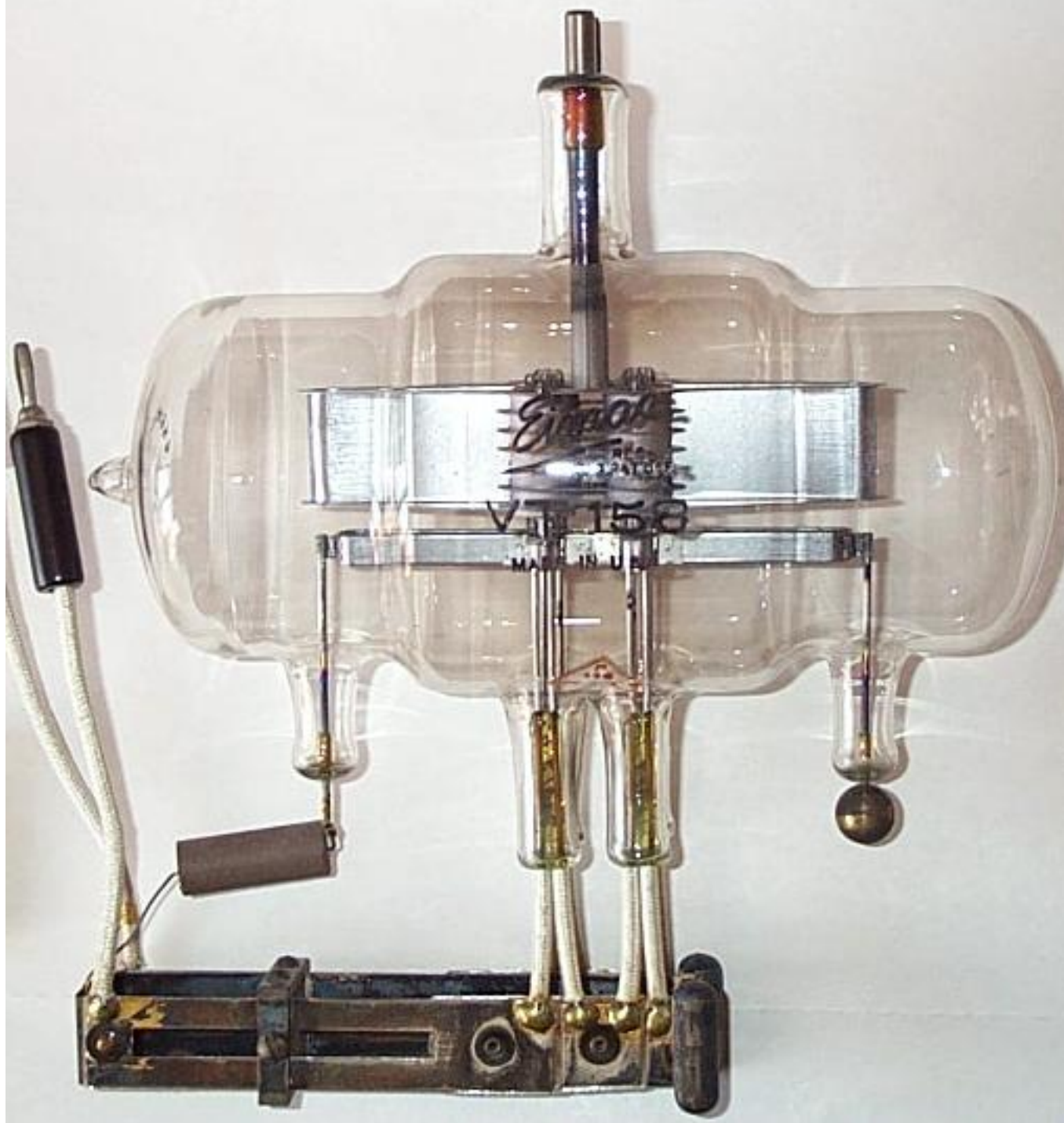
Eimac VT158 "Zahl Tube" push-pull triode UHF oscillator



The main body of this valve measures 185x90mm. It is 170mm from the filament seals to the anode connectors.

Filament voltage	10.5V
Filament current (each filament)	10.5A
Peak anode voltage	30kV
Peak anode current (all four triodes)	70A
Amplification factor	13 to 16
Typical peak power output	150kW
Anode dissipation (60cu ft/min forced air cooled)	400W
Power output at end of life	135kW
Capacitances	
Cag	11.8 to 16.0pF
Cgf	11.9 to

	16.1pF
Caf	1.25 to 1.69pF



This valve is actually a four triode push-pull UHF oscillator with tuned anode and grid lines in a single envelope. Used in the AN/TPS3 radar it was invented by Major Harold A. Zahl, see US Patent 2454298.

Referring to the main picture above, the two anode connections uppermost form a 50 ohm balanced line from where the output power is extracted. The internal structure consists of the (larger) anode resonator and grid resonator. The upper loop is connected to all the anodes and has a large flat surface to aid cooling. Two anodes are connected in parallel and in push-pull with the other two via U sections. The anode and grid loops are tantalum which has excellent getter properties.

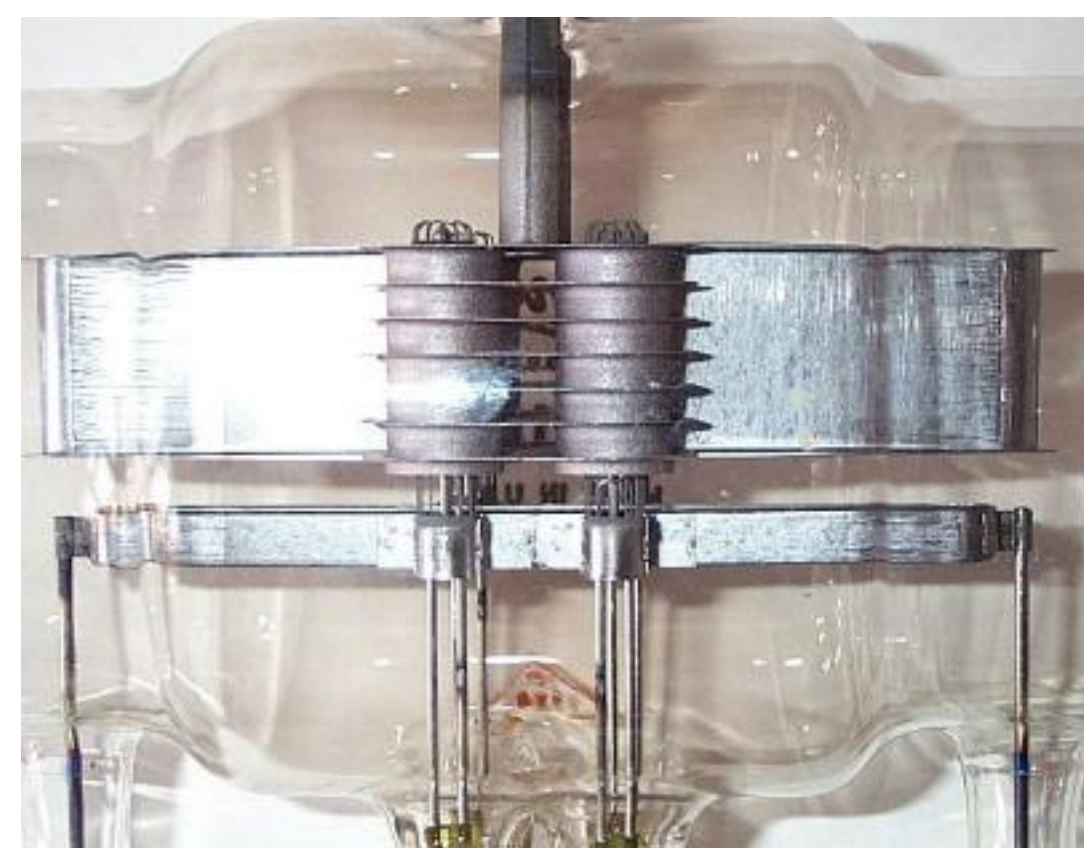
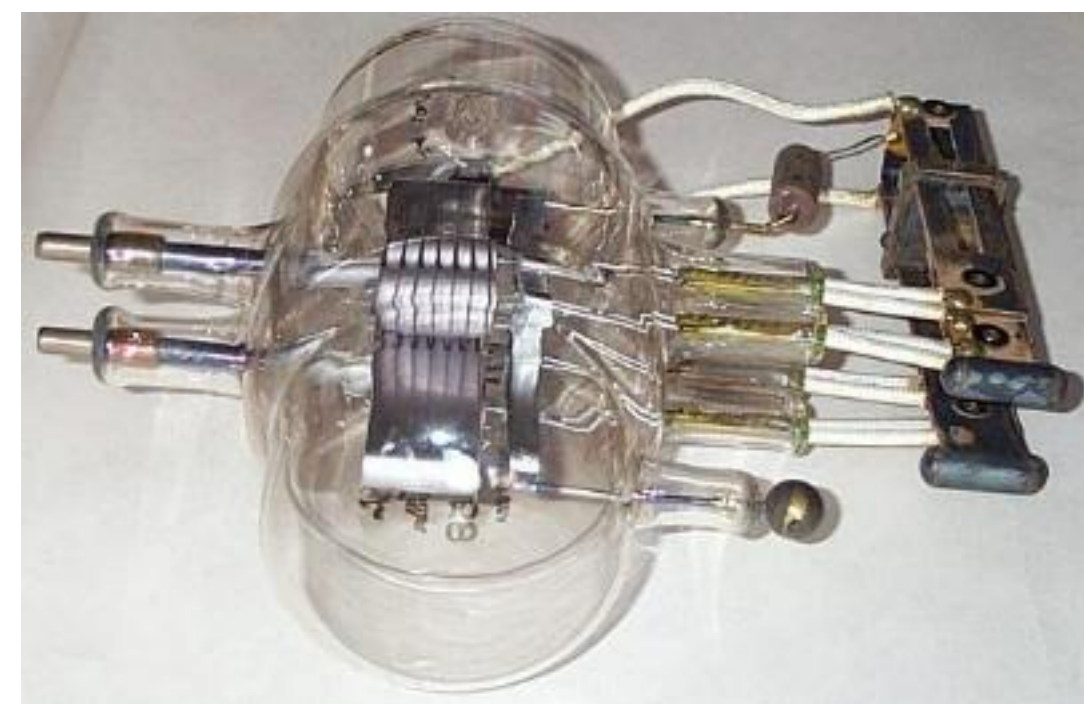
The lower grid loop is coupled to the anode loop and derives grid drive power this way. Leads are taken from the two zero voltage points. Of these two grid connections, one has a corona ball attached and the other is connected via an 80 ohm resistor to the zero voltage point of the filament line for grid bias.

Connected to the filament leads is a tuneable 600MHz resonant line. The filaments are connected in such a way that they are at zero RF voltage. The line can be adjusted to give output over the range 590 to 610MHz with peak power at 600MHz. In the AN/TPS3 radar the transmission line, and thus the anodes were at ground potential. Negative pulses of 24kV of 1.5 μ s duration at 200pps were fed to the filaments.

It could produce up to 240kW pulses. The valve would not actually oscillate with less than 5kV

applied so it cannot be used in CW as the anode dissipation would be far too high. In normal operation the anodes would run at red heat.

See below for more pictures and text.



Above: Closeup of the anode and grid resonators. Below is a view down onto the anode resonator showing three of the four grids.





Below: closeup of the balanced anode lines.



Above: the filament lead seals are all individually labelled. The markings are: I4-24968, I4-26786, I4-27641 and I4-27642.



Above and below: views of the individual grid/filament structures.



Above and below: the 600MHz tuneable resonant line.



Thanks to Ludwell Sibley for information on this valve

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