CV14 - Silica Valve Triode

- Click on the image to enlarge.

CV14 is a mystery tube indeed. CV register numbering started in 1940 and titles up to 500 were assigned to new developmental and special purpose tubes, most of which designed for radar applications. We must assume then that a tube with the code CV14 drawn by hand on the body with a molten silica string was not earlier than 1940. Anyway CV14 was already obsolete in the 1944 register, no equivalents, no replacements, no documents at all. Just few words stating that CV14 derived from an 'XN' prototype governed by Admiralty specs (AD). In a 1946 register we see that the tube is made to the Admiralty Pattern W3206. Yet from the Paterson's diary we know that this tube was still manufactured by Mullard and GEC in September 1942. The only data found are:

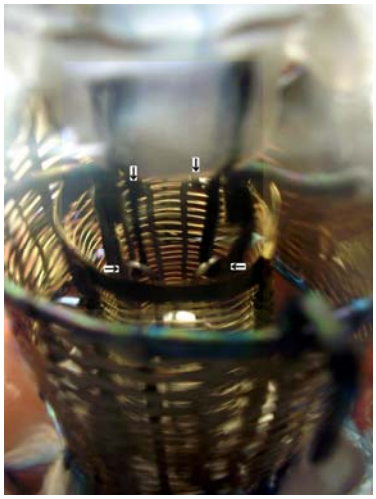
- Filament 9 volts at 61 amps, typical values of tungsten type filament.
- Anode 3000 volts at 50 mA (probably a typo for 50 A or maybe the average current, assuming 0.001 duty)

The tube is quite small, less than 20 cm high excluding flying leads, and about 10 cm diameter. Its size is slightly smaller than that of NT57, the first silica tube designed for radar transmitters. The basket-like anode is quite short, less than 5 cm, probably made of molybdenum ribbons double woven around a structure that recalls a squirrel cage. Grid looks to be made in a similar manner, using wires instead of ribbon. Both the grid and the plate are held in place by two connecting rods each one protruding from the top and by two legs each anchored to silica stems on the opposite side. Most of the connections from electrode cages to rods used as legs or as pins look welded. Some junctions are visible in which two ends of connecting wires are overlapped and tied to each other by several turns of what looks to be molybdenum wire or ribbon, depending upon the specific connection. Probably they are joints made in some repair shops. Highly unusual is the filament, a thick wire going up and down in twelve

vertical segments, arranged in two sections around the surface of an ideal 1-inch cylinder. Vertical segments are joined by U-shaped hairpin bends at each end. The two sections are firmly held by short rods fastened between the middle point of each U bending and multi-stranded wire rings, molten in two silica doughnuts at top and bottom of the envelope. The two filaments, each forming one half of the cathode virtual cylinder, are series connected out of the bulb. Internal details can be appreciated in the photos below.

In my opinion a cathode is compatible with an emission well exceeding 50 amperes, rather than with the rated 50 mA value. Electrodes look very similar to those of NT57D with six filament hairpins instead of the two used in the latter. Almost certainly CV14 was designed for pulsed operations in high-power radar systems. Other details confirm this idea, as the small size of electrodes and the twin connections to both anode and grid, typical when handling heavy bursts of RF energy. The same small size can be explained assuming pulsed low duty operations.

Probably this tube was an improved variant of NT57, with much higher emission, and was abandoned in favor of the new external anode types, as the VT98 / CV1098.



Details of the internal construction. The external electrode is the anode, made by molybdenum ribbons double woven around vertical rods. A similar construction is used for the intermediate electrode, the control grid, with the difference that molybdenum wires are used. Visible portions of the filamentary cathode, in the shape of vertical rods joined by hairpin bends and arranged into the grid cylinder, are evidenced by four small arrows. Click on the image to enlarge.

- One of the wrapped joints made on the grid connecting internal wires. Click to enlarge.