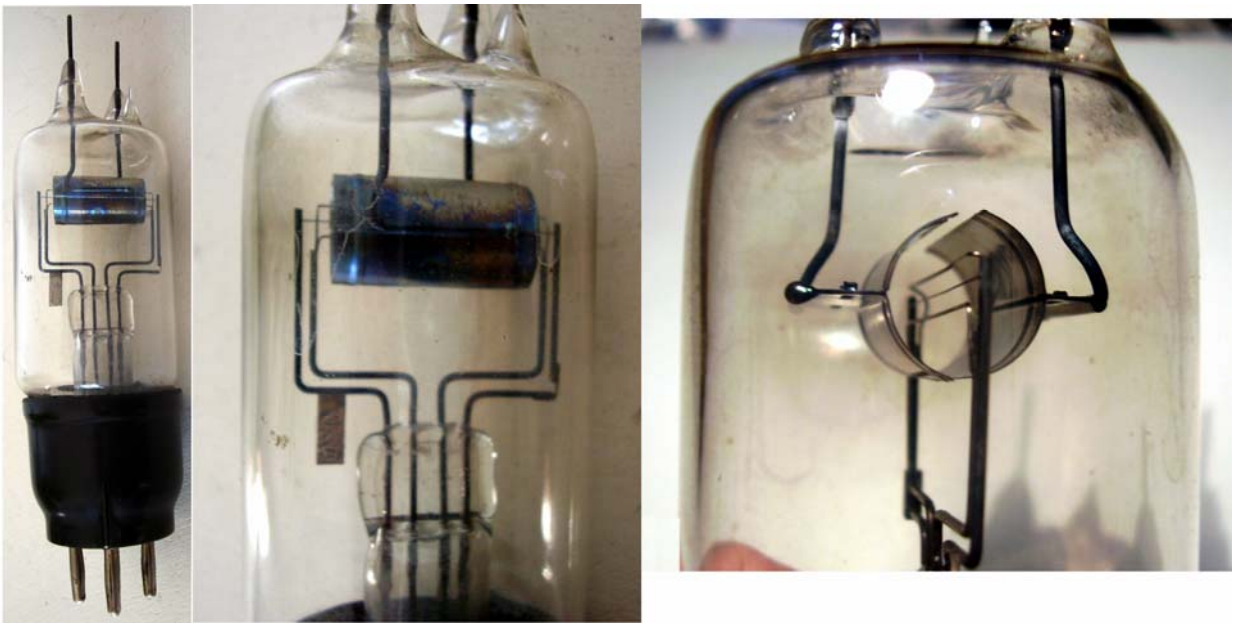
GEC - Type 4 Experimental Magnetron

No doubt that the Type 1 sample is an intriguing one. It is of the split-anode Habann type, the anode cylinder measuring about 1 cm diameter by 2 cm length. It looks to be the third one shown in Fig. 5.7 in the book by Clayton and Algar (*1) on the GEC Research Laboratories. Absolutely remarkable is the presence of three wires in the middle of the anode cylinder. No doubt that the central wire is the filamentary cathode, supported by a couple of double-bend tiny rods. Two more thin wires run parallel to the filament, one above and one below, about 2 mm spaced from it. These wires are taut by another couple of rods, ending to a single base pin. Such geometry of electrodes looks unusual for a magnetron. The presence of the two additional wires close to the filament can only be explained thinking to a sort of grid capable of modulating the flow of electrons. In the available literature we find a mention to a solution proposed by Groszowsjy and Ryzko (*2) and reported by Otto Groos, Research Institute of German Reichspost, in his Einfürung in Theorie und Technik der Dezimeterwellen, May 1937 (*3), just writing of the direct modulation of a magnetron. The current flow into the magnetron is modulated by the electric field generated by an insulated wire twisted to the filament or spiraled around it. Megaw writes theat he tried the direct modulation, working at 0 to -100 V as modulating voltage.(*4).



Megaw himself talks of his investigation on a suitable source of decimetre waves for the secure communication link he was designing at GEC, Wembley for the Admiralty (*5). In this sample he tried two wires parallel to the filament to operate as modulation grid. The two wires also operated as shields to reduce the filament overheating due to the back bombardment issue that he was thoroughly investigating. A resonating line with effective length of 3λ/4 prevented excessive frequency modulation. Unfortunately, though the satisfactory amplitude modulation obtainable, the grid caused unacceptable drop of the output power. The collection also includes other two samples containing modulating grids, one of them is just a modified E880 4-segment prototype.

*1 - Robert Clayton and Joan Algar, The GEC Research Laboratories, 1919-1984, Peregrinus, 1989
*2 - Proc. I.R.E. May 1936, p. 31
*3 - Otto Groos, Einführung in Theorie und Teknik der Dezimeterwellen,, 1937
*4 - The Wireless Engineer, Jyly 1936, No. 154
*5 - Atti del Congresso Internazionale per il Cinquantenario della Scoperta marconiana della Radio, Roma 1947

March 2024 - Emilio Ciardiello