

## GEC 'Squirrel-Cage' CW Magnetron Prototypes



**Fig. 1 - Experimental samples of 8 and 12-segment 'squirrel cage' magnetrons built at GEC in the development of the two tubes shown on the right, the E1429-CV79 and of the E1430-CV89.**

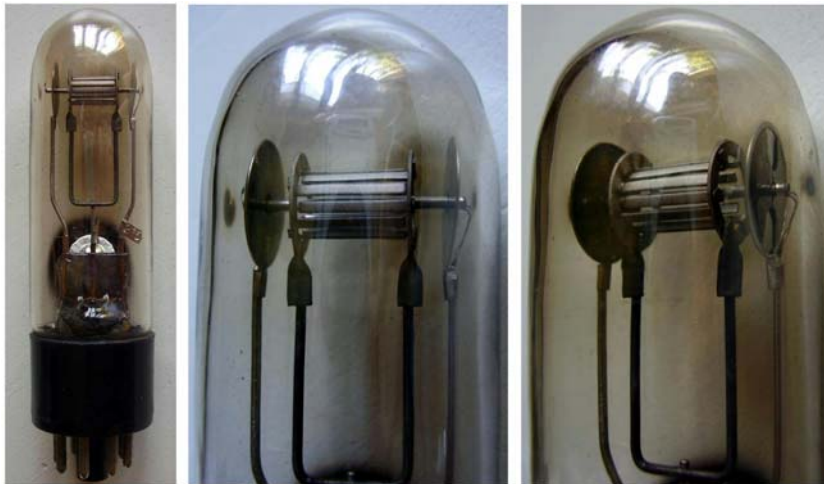
Since the end of 1936 E.C.S. Megaw at GEC Wembley had worked to an early decimetre syhip-to-ship secure communication set based upon a four-segment split-anode magnetron: some laboratory samples of the Megaw's E880/NT75 are shown elsewhere in the collection. Although the first outcome of the research program had followed compromise choices on 50 cm wavelengths depending on readily attainable solutions according to the then available technologies, the GEC and Megaw had been asked to investigate the use of even shorter wavelengths, down to 10 cm. In 1937 W.E. Willshaw joined Megaw on the development of GEC magnetrons. From 1941 onwards the demand for multi-channel microwave communication links became pressing. The GEC Hirst Center, and Megaw himself now as responsible for the Admiralty Signal Establishment, were involved in the development of a new system which became fully operative from 1944, the 'Wireless Set No.10'.

Between 1938 and 1939 at CSF France Henri Gutton has defined multi-segment magnetrons as the M-16, an eight-segment one with oxide-coated cathode, he had discussed with his friend Megaw in their last meeting in Paris in the summer of 1939. In May 1940, through Maurice Ponte, Gutton also sent Megaw two samples of M-16, modified to 12 segments: one of these samples is today in the ase-museoedelpro collection. We know what an important influence these M-16 samples had on the design of the E1189 cavity magnetron. Undoubtedly its innovative geometry also influenced the design of the magnetron for the new microwave communications system that the team led by Megaw was about to define. Since the frequency chosen for the system was rather high, around 4.5 GHz, a multi-segment magnetron seemed the best compromise to operate with reasonably low magnetic fields. Therefore, samples with 8 and 12 segments were tried.

Mainly because of the oxide-coated cathode and of the octal base, our prototypes could be dated from the late 1940 upwards. According to the diary of Sir Clifford Paterson, who directed the Wembley until 1948, the final versions, both visible to the right of the image above and designated as CV79 and CV89, came out around March 1943. They were characterized to have low tapered glass bulb and loctal base. We must assume that much of the development work relating to the magnetrons was in charge of Willshaw while Megaw, although constantly updated on progress, mainly took care of the development and testing of the entire system. By the way the Wireless Set No.10, Mk. I was equipped with the CV79 magnetron, while the Mk. II used the CV89.



**Fig. 2 - 12-segment 'squirrel cage' laboratory prototype.**



**Fig. 3 - A second sample of 12-segment 'squirrel-cage' prototype.**



**Fig. 4 - The third sample looks almost definitive. If we exclude the octal bakelite base, the glass bulb appears tapered and the electrodes are enclosed in a boxed structure.**