H-Wave Oscillators

The most recent addition to the range of low-power oscillators designed specifically to meet communications requirements is a device called the H-wave oscillator.

In principle, this is similar to the familiar Heil tube, but instead of beam bunching occurring in a hollow section of short-circuited coaxial line, it occurs across a short-circuited section of waveguide. In this configuration the interaction gaps are put in series, instead of parallel, which gives higher efficiency. These tubes feature very high frequency stability which means that, in many cases, a complex automatic frequency control system is not necessary. The beam drift tube is d.c. isolated, electronic tuning potentials being applied to this electrode. Electronic tuning bandwidths on the current types are typically ± 10 Mc/s, with the exception of the V265A/1M, and linearity is equivalent to that obtained from reflex klystrons. An additional feature is high efficiency at comparatively low voltage operation (500 volts) to give outputs of the order of 1 watt.

These tubes require no forced-air cooling and are packaged with their focusing magnet. Mechanical tuning is by means of a "dumb-bell" micrometer short-circuit, attached by a quick-release clamp mechanism. Output is into standard WG14 waveguide through an adjustable stub matching section.

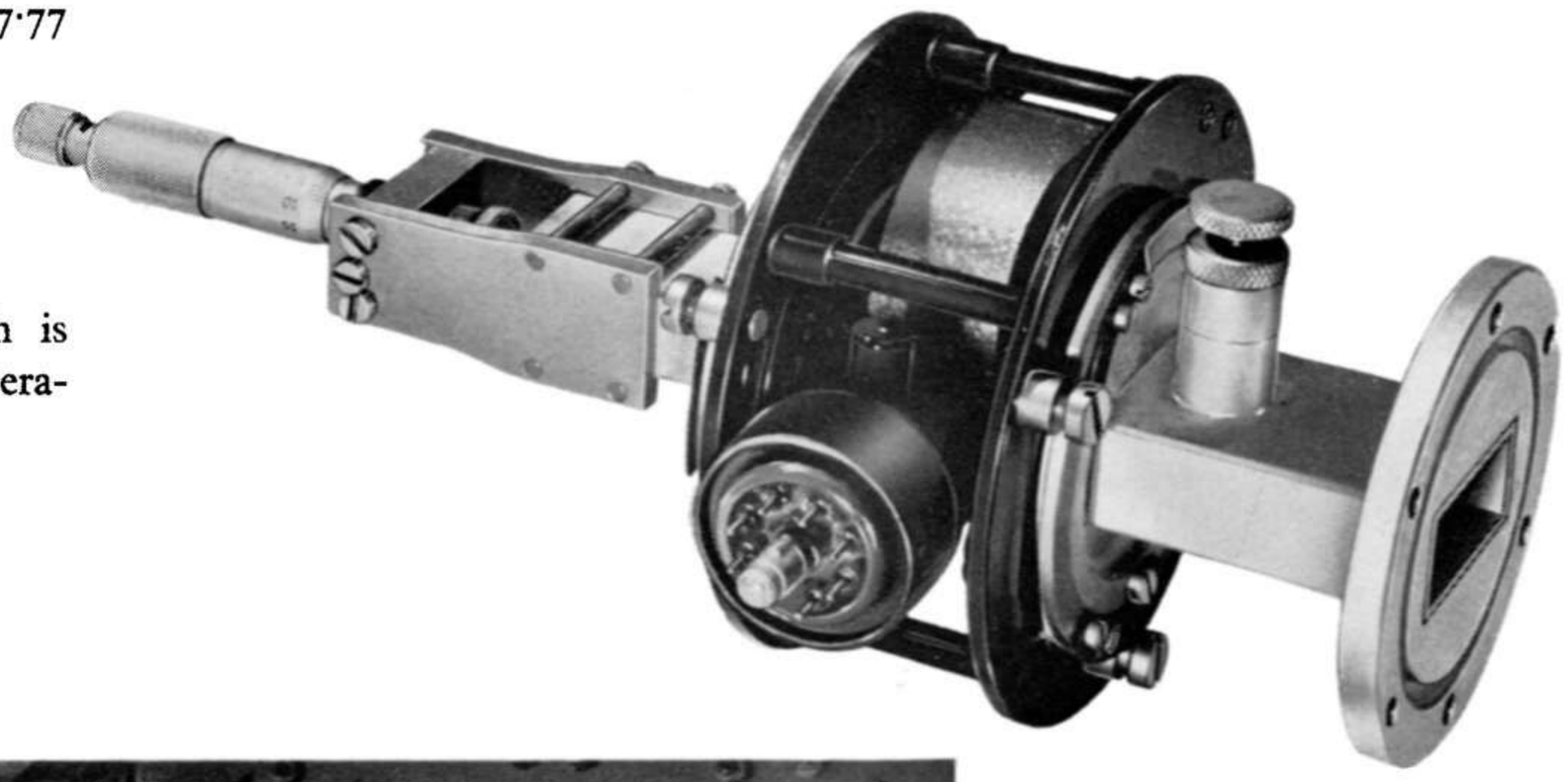
Commercial Code	*Frequency Range Mc/s*	*Minimum Power Output (W)*	*Resonator Voltage*	*Cathode Current mA*	*Minimum Electronic Tuning Range Mc/s*
V261C/1M	5850–6350	0·8	530	60	±8·5
V265A/1M	5850–7100	0·2	230–420	50	—
V266C/1M	6350–6850	0·8	530	60	±8·5
V271C/3M	6850–7350	0·8	530	60	±8·5
V275C/3M	7250–7770	0·8	530	60	±8·5

V265A/1M

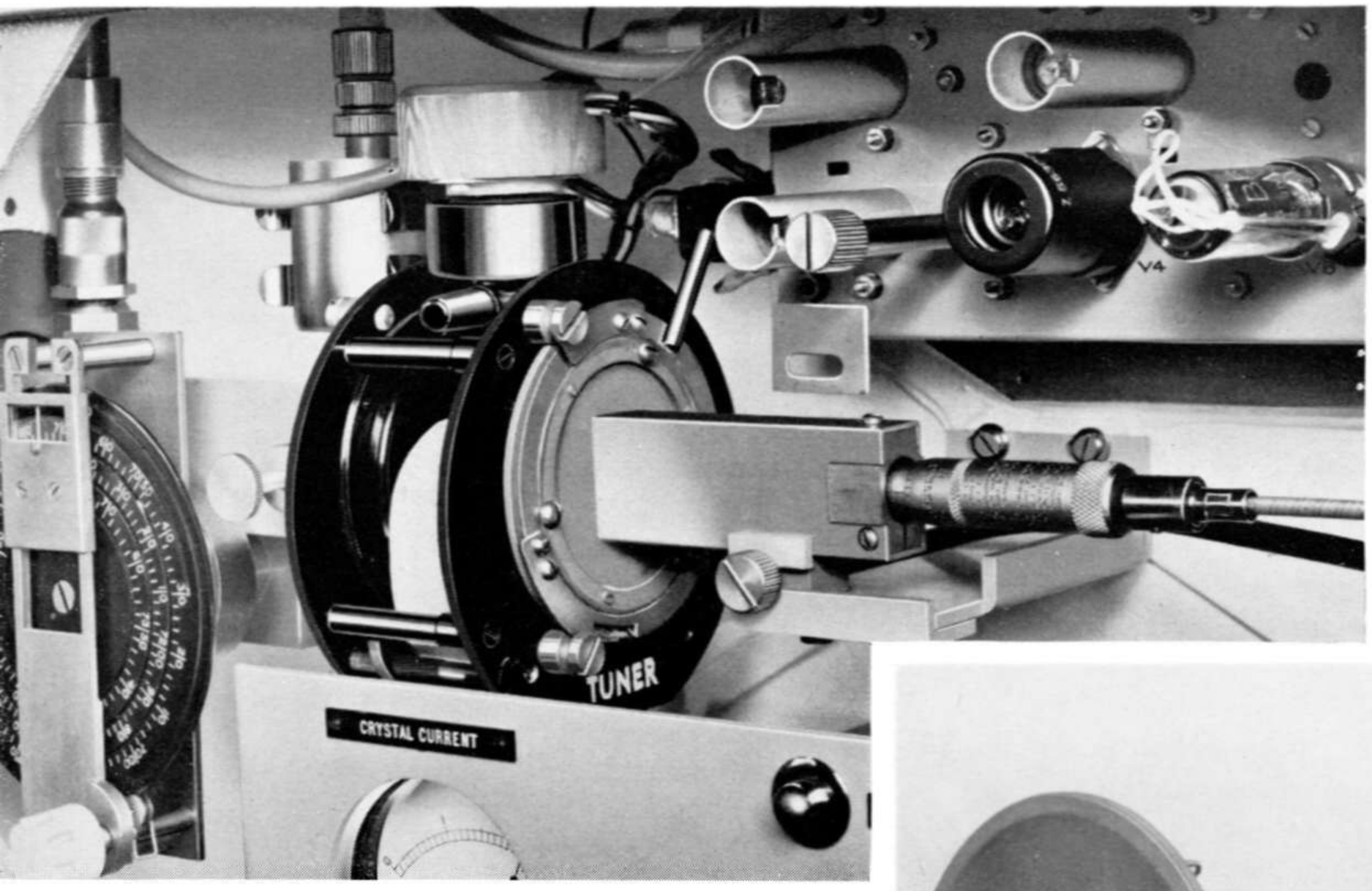
This tube has a useful performance over a wide mechanical tuning range. The power output is typically 400 mW which makes it an ideal device for use as a local oscillator or in microwave test equipment. The tuning range may be extended to 5·7 to 7·5 Gc/s if a lower power output is acceptable.

V261C/1M, V266C/1M, V271C/3M, V275C/3M

These four tubes together cover the frequency band 5·85 to 7·77 Gc/s and are intended for operation at fixed resonator voltage. Frequency modulation is achieved by varying the drift tube voltage the mean of which is varied with frequency of operation.



Complete oscillator assembly for V271C/3M showing tuning and output coupling circuits



The illustration above shows an H-wave oscillator mounted in a STC portable microwave link transmitter. It is both the oscillator and modulated output valve

The illustration on the right shows a complete portable link equipment with both receiving and transmitting units