

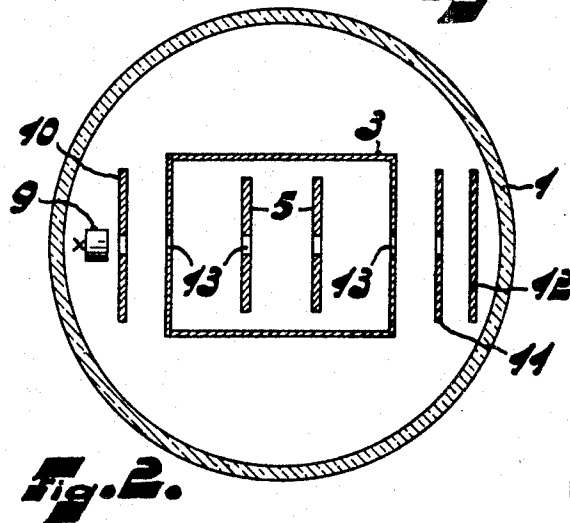
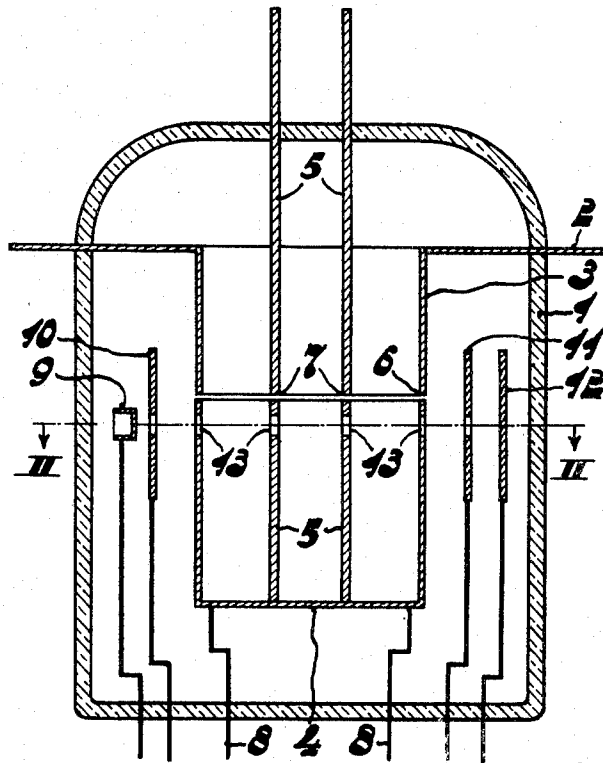
Jan. 29, 1957

F. COETERIER

2,779,892

SELF-CONTAINED VELOCITY MODULATOR OSCILLATOR

Filed June 21, 1951



INVENTOR:

FREDERIK COETERIER

BY

Fred M Vogel
AGENT

AGENT

1

2,779,892

SELF-CONTAINED VELOCITY MODULATOR OSCILLATOR

Frederik Coeterier, Eindhoven, Netherlands, assignor to
Hartford National Bank and Trust Company, Hartford,
Conn., as trustee

Application June 21, 1951, Serial No. 232,747

Claims priority, application Netherlands July 6, 1950

2 Claims. (Cl. 315—5.39)

This invention relates to electron discharge tubes including an oscillatory system comprising one or more Lecher systems and excited by one or more electron beams.

These tubes are known for their simple structure, although the latter has the disadvantage that the natural frequency of the oscillatory system is not determined with sufficient accuracy for many uses due to the thermal expansion of the Lecher system or systems brought about by development of heat during the operation of the tube.

The object of the invention is to minimize this disadvantage.

In an electron discharge tube including an oscillatory system comprising one or more Lecher systems excited by one or more electron beams, the Lecher systems are interrupted at or in the vicinity of a voltage anti-node, the two parts of the Lecher systems being secured, adjacent their ends, in a body of insulating material not heated directly by the discharge and preferably constituted by the wall of the tube. Since the coefficient of expansion of an insulator is, as a rule, smaller than that of the metals from which the Lecher systems are manufactured and, furthermore, since its temperature differences in the various operating positions are also smaller, the length of the Lecher systems varies to a smaller extent than if the interruption were not provided. Since the interruption lies at or in the vicinity of a voltage anti-node, variation in the size of the interruption with thermal expansion substantially does not affect frequency. The interruption preferably lies no more than one tenth of wavelength remote from a voltage anti-node.

The invention will now be explained more fully by reference to the accompanying drawing, in which Fig. 1 is a vertical sectional view and Fig. 2 is a horizontal sectional view of an electron discharge tube according to the invention.

In the drawing, 1 indicates the glass wall of the discharge tube in which a circular disc 2 is sealed at right angles to the axis of the cylindrical tube. Secured to the disc 2 is a rectangular body 3 which forms a cavity resonator the bottom of which is constituted by a plate

2

4. Provided in the body are two conductive strips 5, which are led through apertures in the disc towards and through the wall of the tube. The body and the strips are interrupted over a small distance at 6 and 7 respectively. The lower part of the body 3 is supported by two lead-through pins 8. The tube furthermore contains a cathode 9, a screen electrode 10, a collecting electrode 12, and in front thereof, a perforated brake-field electrode 11. The electrons emitted by cathode 9 are formed into an electron beam by the field existing between cathode 9 and the screen electrode 10.

Between said electrodes apertures 13 are recessed in the body 3 and the strips 5. In operation as a klystron field oscillator tube, the body 3 has applied to it a voltage of several thousand volts with respect to the cathode, whereas the electrode 11 acquires about cathode potential and collecting electrode 12 acquires a potential negative with respect to the cathode.

While the invention has thus been described in connection with specific embodiments and applications thereof, other obvious modifications will be apparent to those skilled in the art without departing from the spirit and scope of the invention as defined in the appended claims.

What I claim is:

1. A velocity-modulated electron discharge tube comprising an insulating envelope, means disposed in said envelope for producing at least one electron beam, and an oscillatory system disposed in said envelope and adapted to be excited into oscillation by said electron beam, said oscillatory system comprising a rectangular metal body and a metal Lecher wire system sealed into a portion of the envelope remote from the electron beam and defining the frequency of the excited oscillations to produce voltage wave patterns within said oscillatory system, said rectangular body and said Lecher system each comprising two separate portions separated by an air gap located in the vicinity of a voltage anti-node point of the wave patterns of the oscillations.

2. A velocity-modulated electron discharge tube as claimed in claim 1 in which the gap is spaced by a distance of less than a tenth of a wavelength from the voltage anti-node point.

References Cited in the file of this patent

UNITED STATES PATENTS

| | | |
|-----------|-----------------|---------------|
| 2,128,232 | Dallenbach | Aug. 30, 1938 |
| 2,128,235 | Dallenbach | Aug. 30, 1938 |
| 2,190,511 | Cage | Feb. 13, 1940 |
| 2,383,343 | Ryan | Aug. 21, 1945 |
| 2,402,601 | Chevigny et al. | June 25, 1946 |

FOREIGN PATENTS

| | | |
|---------|-------------|--------------|
| 250,276 | Switzerland | June 1, 1948 |
|---------|-------------|--------------|

OTHER REFERENCES

"Tele-Tech," for May 1947, pp. 68-69.