

June 14, 1960

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2,941,108

GAS DISCHARGE DEVICE

Filed Feb. 25, 1959

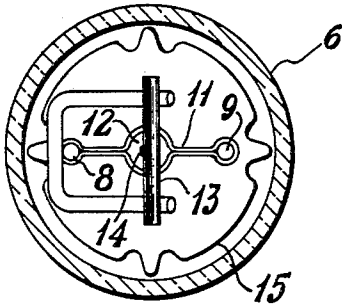


Fig. 2.

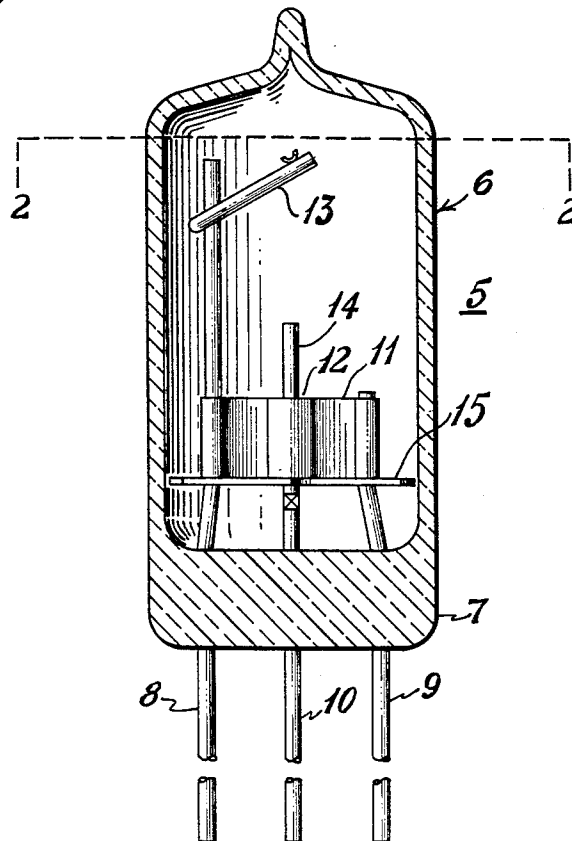


Fig. 1

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GAS DISCHARGE DEVICE

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Filed Feb. 25, 1959, Ser. No. 795,403

4 Claims. (Cl. 313—216)

The present invention relates to gas discharge devices and more particularly to a cold cathode diode gas discharge device.

Heretofore, cold cathode diode gas discharge devices of various tube geometries have been utilized as voltage regulators and insofar as their regulation characteristics are concerned have operated satisfactorily. However, some applications not only require satisfactory regulation, but have the additional requirement of a low noise output. In other words, the random signals generated by the glow discharge must be held to a minimum.

The present invention provides a novel tube geometry which operates satisfactorily as a regulator with a low noise ratio.

It is an object of the invention to provide an improved cold cathode gas discharge device.

Another object of the invention is to provide an improved voltage regulator tube.

Another object of the invention is to provide a voltage regulator tube with a low noise output.

Another object of the invention is to provide an improved glow discharge device.

The above and other objects and features of the invention will appear more fully hereinafter from a consideration of the following drawing wherein one embodiment is illustrated by way of example.

In the drawing:

Figure 1 is a cutaway view of a device embodying the invention.

Figure 2 is a sectional view of the device of Figure 1 taken along the line 2—2.

Referring now to the drawing, a gas discharge device is indicated generally by the numeral 5 which is adapted for use as a voltage regulator. The device 5 comprises an envelope 6 of glass or other suitable material which has a stem 7 through which leads 8, 9 and 10 extend and are sealed therewith. Mounted on the leads 8 and 9 is an anode 11 having a cylindrical opening 12 therein. The anode 11 may be of nickel or other suitable material. A getter assembly 13 may be mounted on the lead 8. A rod-like cathode 14 is mounted on the lead 10 and extends through and is concentric with the cylindrical opening 12 in the anode 11; the cathode 14 may be of platinum or other suitable material. An insulating

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spacer 15, such as mica, is mounted below the anode 11 so as to restrict the discharge to the platinum portion of the cathode 14. The device 5 is evacuated and filled with a suitable gas.

A novel feature of the invention is the anode-to-cathode geometry. The length of the cathode relative to the anode has a direct bearing on the noise characteristics of the device. There is an optimum length of the cathode with respect to the anode to obtain the desired combination of noise, operating voltage and regulation. Lengthening the cathode from this optimum length will increase the noise level, while shortening the cathode length raises the operating voltage and also adversely affects the regulation.

As a specific example, the cylindrical opening of the anode has an inside diameter of .075 inch and a height of $\frac{1}{16}$ inch. The cathode has a diameter of .018 inch and a height of $\frac{1}{8}$ inch. In other words, the length of the cathode, extending beyond the anode, is the same as the height of the anode, thus having a cathode-to-anode ratio of 2 to 1 in length.

Only one embodiment of the invention has been illustrated and described, but various changes in the form and relative arrangements of the parts may be made to suit requirements.

What is claimed is:

1. A cold cathode gas discharge device, comprising an envelope filled with a gaseous medium, an anode supported in said envelope, said anode having a cylindrical opening therein, a cathode supported in said envelope and extending through and concentric with said anode, said cathode having cathode-to-anode ratio of 2 to 1 in length, and connection means for said anode and cathode.

2. A cold cathode gas discharge device, comprising an envelope filled with an inert gas, a cylindrical anode, a rod-like cathode extending through and concentric with said anode, said cathode having a length with respect to said anode to provide an output having low noise and good regulation for a predetermined operating voltage.

3. A cold cathode gas discharge device, comprising an envelope filled with an inert gas, a nickel anode having a cylindrical section, a rod-like platinum cathode extending through and concentric with the cylindrical section of said anode, said cathode having a length of 2 to 1 with respect to the cylindrical portion of said anode.

4. A cold cathode gas discharge device, comprising an envelope having a gaseous filling, a nickel anode having a cylindrical opening therein, a rod-like platinum cathode extending through and concentric with said cylindrical opening in said anode, said cathode having a length twice that of said anode, and shielding means for restricting the discharge between said anode and said cathode.

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