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GLOW DISCHARGE DEVICE

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FIG. 1

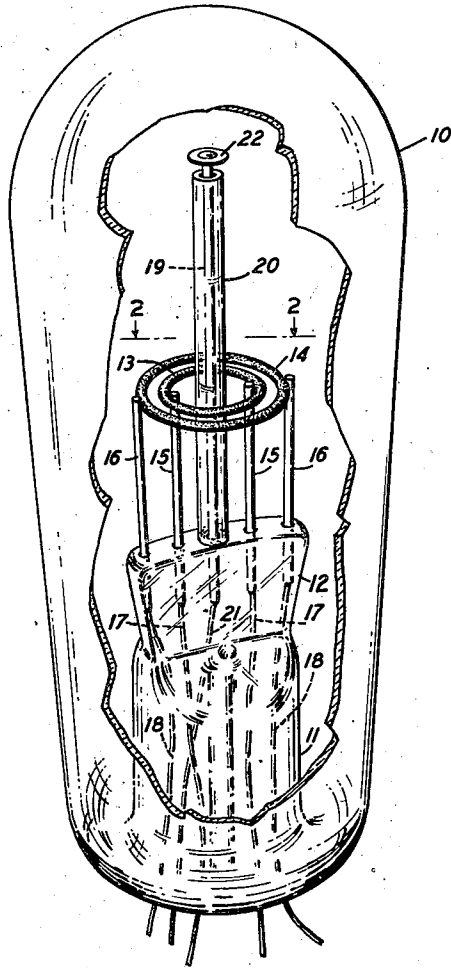
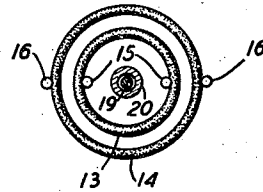


FIG. 2



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GLOW DISCHARGE DEVICE

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6 Claims. (Cl. 250—27.5)

This invention relates to glow discharge devices and more particularly to such devices including a plurality of cold electrodes having surfaces coated with a thermionic material.

One object of this invention is to reduce the transfer currents in multigap glow discharge devices.

Another object of this invention is to facilitate the outgassing of the electrodes in glow discharge devices.

In one illustrative embodiment of this invention, a glow discharge device comprises a pair of concentric electrodes and an anode extending through the inner of the concentric electrodes. The anode may be a metallic rod extending an appreciable distance beyond the concentric electrodes and all but one end portion thereof may be enclosed in an insulating sleeve in order to provide a high work gap potential.

In accordance with one feature of this invention, the concentric electrodes are wire rings coated with a thermionic material, such as barium and strontium carbonates, and are closely spaced, whereby a low breakdown voltage and small transfer currents are obtained.

In accordance with another feature of this invention, each of the concentric electrodes is provided with a plurality of supports serving as leading-in conductors, whereby these electrodes may be outgassed or activated expeditiously by the use of conduction heating.

The invention and the various features thereof will be understood more clearly and fully from the following detailed description with reference to the accompanying drawing, in which:

Fig. 1 is a perspective view of a glow discharge device illustrative of one embodiment of this invention, a portion of the enclosing vessel being broken away to show the electrodes more clearly, and

Fig. 2 is a top view of the electrodes in the device illustrated in Fig. 1, showing the configuration and arrangement thereof.

Referring now to the drawing, the glow discharge device there shown comprises an enclosing vessel 10 having a filling of a rare gas, such as argon or neon, or a mixture of rare gases therein and having also a stem 11 terminating in a press 12. Disposed above the press 12 are a pair of ring-shaped cold electrodes 13 and 14, each of which is supported by a pair of metallic rods or wires 15 and 16, respectively, having leading-in conductors 17 and 18, respectively, connected thereto. The cold electrodes 13 and 14 are concentrically disposed and substantially

coplanar. Preferably they are formed of nickel wire and coated with a thermionic material, such as barium and strontium carbonates.

During the evacuation treatment of the device, the electrodes 13 and 14 may be heated by passing a current therethrough, whereby they are denuded of occluded gases.

A linear wire rod anode 19 embedded in the press 12 extends axially of the cold electrodes and for an appreciable distance beyond these electrodes. All but the inner extremity of the anode 19 may be encompassed by a glass sleeve 20 so that a relatively high work gap potential may be employed and a relatively large output obtained. The anode 19 may be provided with a flattened circular portion or head 22. A leading-in conductor 21 may be connected to the anode 19 and sealed in the stem 11.

Each of the electrodes 13 and 14 may be utilized as a cathode or as an ignition anode for controlling the initiation of a discharge between the other of the electrodes 13 and 14 and the anode 19. The electrodes 13 and 14 may be very closely spaced so that the voltage required therebetween to initiate a discharge is relatively small and also the transfer currents are small. Furthermore, inasmuch as the electrodes 13 and 14 are concentric, a uniform gap is provided between them so that substantially simultaneous activation of all portions of the electrode utilized as the cathode occurs upon the application of the requisite or critical voltage between these electrodes.

Although a specific embodiment of this invention has been illustrated and described, it will be understood, of course, that various modifications may be made therein without departing from the scope and spirit of this invention as defined in the appended claims.

What is claimed is:

1. A glow discharge device comprising an envelope containing a gas, a pair of ring-shaped electrodes disposed one within the other, one of said electrodes having portions coated with a thermionic material, and an anode in cooperative relation with said ring-shaped electrodes.

2. A glow discharge device comprising an envelope containing a gas, a pair of concentric ring-shaped electrodes each having a coating of thermionic material, and an anode coaxial with said electrodes.

3. A glow discharge device comprising an enclosing vessel having therein an inert gas, a pair of thermionically activated ring electrodes disposed one within the other, a rod anode extend-

ing through the inner of said electrodes, and an insulating sleeve encompassing said anode.

4. A glow discharge device comprising an enclosing vessel containing an ionizable gas, a pair of concentric substantially coplanar wire ring-shaped electrodes, each having a coating of thermionic material, a linear rod anode extending through the inner of said electrodes and coaxial therewith, and an insulating sleeve encompassing all but one end portion of said anode.

5. A trigger device comprising a vessel having therein a filling of gas, a pair of concentric ring-shaped cold electrodes spaced to form a narrow annular gap, and an anode in cooperative rela-

tion to said gap, at least one of said electrodes having a coating of thermionic material.

6. A trigger device comprising an enclosing vessel having therein a gaseous filling, a pair of concentric, substantially coplanar ring-shaped electrodes each coated with a thermionic material, said electrodes being in immediate proximity to each other and forming a narrow annular gap, a linear rod anode extending through the inner of said electrodes and to a point removed therefrom, said anode being coaxial with said electrodes, and insulating means encasing all of said anode except a portion adjacent said point.

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