

GASEOUS ELECTRIC DISCHARGE DEVICE

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Fig. 1

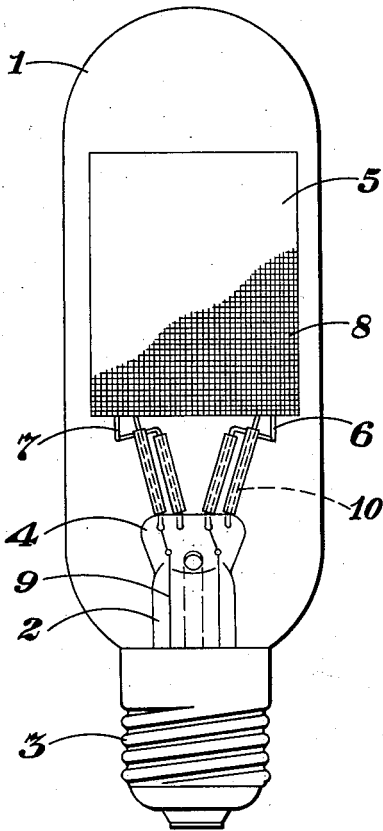
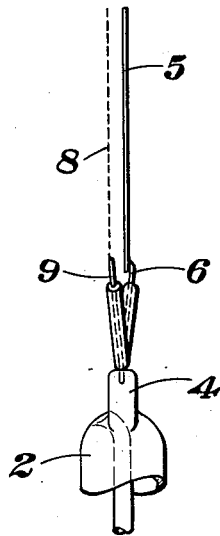


Fig. 2



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GASEOUS ELECTRIC DISCHARGE DEVICE

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4 Claims. (Cl. 176—124)

The present invention relates to gaseous electric discharge devices generally and more particularly the invention relates to such devices in which the gaseous electric discharge is restricted to a negative glow.

It is well known that when such devices are operated on direct current the negative glow discharge covers only one electrode, namely, the cathode. When such devices have been used for advertising or signal indicating purposes heretofore the cathode has been a rectangular metal plate located in the longitudinal axis of the container of the device and the anode has been a metal wire forming a frame or border separated a slight distance from said cathode and covering only the rim parts thereof in order to obscure the negative glow discharge covering the cathode as little as possible. In order to direct the light emitted by such a device in a desired direction it was necessary to cover one of the sides of said cathode with a layer of insulation material such as mica to prevent the formation of the glow discharge thereat. This reduced the efficiency of the device without increasing the intensity of the light emitted in a given direction.

The object of the present invention is to increase the intensity of the light emitted by a negative glow discharge device in a desired direction. A further object of the invention is to provide a gaseous electric discharge device of the negative glow type in which substantially all of the light emitted thereby is sent out in one direction. Still further objects and advantages attaching to the device and to its use and operation will be apparent to those skilled in the art from the following particular description and from the appended claims.

In accordance with these objects the anode of the negative glow discharge device is a metal plate and the cathode thereof is a wire mesh, or net. Said cathode is parallel to said anode and is coextensive therewith where desired. The side of the plate anode facing the mesh cathode is highly polished. During the operation of the device the negative glow discharge completely covers the mesh cathode and the light emitted by said negative glow discharge in the direction of the anode is reflected back by the highly polished face thereof through the interstices of said mesh cathode and around said cathode so that substantially all the light emitted by the device is sent out in a single direction so that the device is of greater efficiency than those now known in the art and the surface brightness of said cathode is increased.

In the drawing accompanying and forming part of this specification an embodiment of the invention is shown in which

Fig. 1 is a front elevational view of the new and novel negative glow discharge device, and

Fig. 2 is a side elevational view of the electrodes and the supporting structure therefor said electrodes being turned 90° from the position shown in Fig. 2.

Like numbers denote like parts in both views of the device.

Referring to the drawing the new and novel negative glow discharge device comprises a container 1 filled with an electric discharge conducting gas such as neon or a mixture of argon and mercury vapor. Said container 1 is provided with a base 3 and a stem 2. A metal plate anode 5 is supported in said container 1 by wires 6 and 7 sealed into the pinch part 4 of said stem 2, and said wire 6 also serves as the current in-lead for said anode 5. A wire mesh cathode 8 is arranged parallel to and is coextensive with said anode 5 and said cathode 8 is supported in said container 1 by wires 9 and 10 sealed into pinch part 4 of said stem 2, wire 9 serving as the current in-lead for said cathode 8. Said anode 5 and said cathode 8 are made of the usual metals of commerce such as iron or nickel or of a high melting point metal such as chromium, molybdenum or tungsten where desired.

The side of said anode 5 facing said cathode 8, and said cathode 8 has a high polish and practically all the light emitted by the negative glow discharge covering said cathode 8 is sent out in a single direction to increase the efficiency of the device and to increase the surface brightness of the negative glow discharge at said cathode 8.

While I have shown and described and have pointed out in the annexed claims certain novel features of the invention, it will be understood that various omissions, substitutions and changes in the forms and details of the device illustrated and in its use and operation may be made by those skilled in the art without departing from the broad spirit and scope of the invention, for example, cathode 8 is, when desired, coated with a material such as barium oxide, having high electron emitting and low work function characteristics.

What I claim as new and desire to secure by Letters Patent of the United States is:—

1. An electric discharge device consisting of a container, electrodes sealed therein, a gaseous atmosphere therein, at least one of said electrodes being a metal plate anode, another of said elec-

trodes being a wire net in front of said anode cathode, said electrodes being flat and in parallel positions in said container and supporting a luminous electric discharge in said gaseous atmosphere and means for charging said plate anode positively and said net cathode negatively.

2. An electric discharge device consisting of a container, electrodes sealed therein, a gaseous atmosphere therein, at least one of said electrodes being a plate anode, another of said electrodes being a wire net cathode in front of said anode, said electrodes being flat and in parallel positions in said container and means for charging said plate anode positively and said net cathode negatively.

3. An electric discharge device consisting of a container, electrodes sealed therein, a gaseous atmosphere therein, at least one of said electrodes being a plate anode, another of said electrodes

being a wire net cathode in front of said anode, said electrodes being flat and in parallel positions in said container the side of said plate anode facing said cathode being highly polished and means for charging said plate anode positively and said net cathode negatively.

4. An electric discharge lamp device consisting of a container, electrodes sealed therein, a gaseous atmosphere therein, at least one of said electrodes being a plate anode, another of said electrodes being a wire net cathode of the same size and shape as said anode and in front thereof, said electrodes being flat and in parallel positions in said container the side of said plate anode facing said cathode and said cathode being highly polished and means for charging said plate anode positively and said net cathode negatively.

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