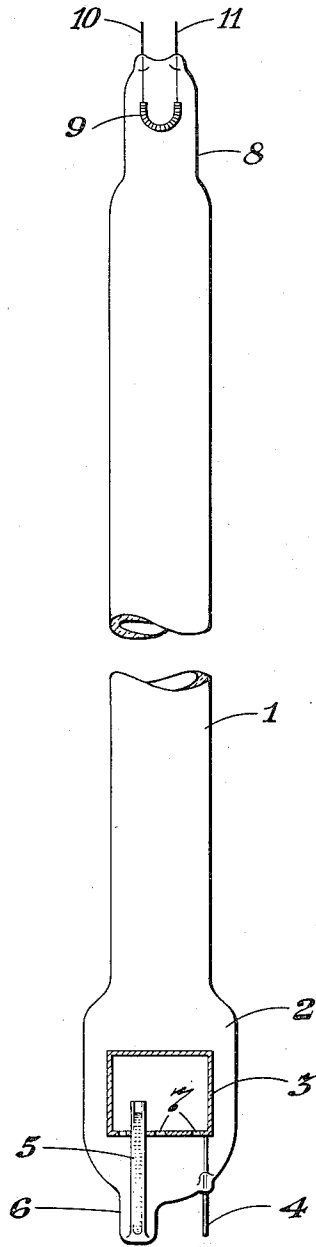


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GASEOUS ELECTRIC DISCHARGE DEVICE

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GASEOUS ELECTRIC DISCHARGE DEVICE

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3 Claims. (Cl. 176—122)

The present invention relates to gaseous electric discharge devices generally and more particularly the invention relates to such devices the gaseous atmosphere of which consists of or comprises a vaporizable material.

When such devices are operated on direct current the metal vapor travels toward the cathode and condenses in the cathode parts of the device. The light emitting characteristics of the device as well as the operating characteristics thereof are changed disadvantageously by this phenomenon. The object of the present invention is to provide a direct current gaseous electric discharge lamp device having a gaseous filling consisting of or comprising a vaporizable material in which the tendency of the vapor to collect around the cathode portion of the device and condense thereat is completely overcome. 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.

In accordance with this object the new and novel lamp device comprises a tubular container having a cathode and an anode sealed therein at opposite ends thereof. The anode is a large sheet metal electrode mounted in an electrode chamber having a diameter larger than said container and the cathode is a thermionic electrode provided with a heater and is mounted in an electrode chamber having a diameter equal to or less than the diameter of said container. During the operation of the device the anode chamber radiates a large amount of heat due to the large surface thereof and is at a low temperature while the cathode chamber is at a temperature equal to or higher than the container due to the heat radiated by the cathode and the small heat radiating surface of said cathode chamber. The metal vapor in a gaseous discharge lamp device of this structure does not collect and condense in the cathode chamber and the vaporizable material is in vaporous condition in the discharge path during the operation of the device. It is to advantage if the supply of the vaporizable material is located in the interior of the anode and a small glass tube having a quantity of vaporizable material therein and opening into the interior of the anode is useful for this purpose. A corrugated surface on the anode chamber to provide a greater heat radiating surface is also advantageous.

In the drawing accompanying and forming part of this specification an embodiment of the

invention is shown in front elevational, partly sectional view.

Referring to the drawing the new and novel gaseous electric discharge device comprises a tubular container 1 having an anode 3 and a cathode 9 sealed into opposite ends thereof. Said container 1 has a gaseous atmosphere therein comprising a starting gas, such as argon and a vaporizable material, such as sodium. Said anode 3 is a large, hollow, sheet metal electrode and is mounted on a current lead 4 sealed into the chamber 2 at one end of said container 1. Said anode 3 has a plurality of openings 7 therein on the side thereof facing away from the discharge path. A glass tube 5 fused to the projecting part 6 of the chamber 2 extends and opens into the interior of said anode 3. A quantity of vaporizable material, such as sodium, is located in said tube 5. Said cathode 9 consists of a curved rod consisting of a sintered, pressed mixture of high melting point metal, such as tungsten, and electron emitting material, such as barium oxide, the composition of the rod being such as to make it substantially a non-conductor of electricity when it is unheated. A heating coil, such as a tungsten filament, is wrapped around said rod. The ends of said coil are attached to current leads 10 and 11 sealed into the cathode chamber 8 of said container 1.

The cathode chamber 8 is of smaller diameter than the part of said container 1 surrounding the discharge path between said electrodes 3 and 9. The anode chamber 2 of said container 1 is of larger diameter than the part of said container 1 surrounding said discharge path. The anode chamber 2, due to the larger surface thereof, radiates heat more freely than the cathode chamber 8 and is at a lower temperature than said chamber 8 during the operation of the lamp device. The cathode chamber 8, due to the smaller heat radiating surface thereof and the heat radiated by said cathode 9, is at a temperature equal to or greater than the temperature of that part of the container 1 surrounding the discharge path between said electrodes 3 and 9.

The metal vapor in a gaseous discharge lamp having the above described structure does not collect and condense in the cathode chamber 8 during the operation of the device. The vapor in the device is thus maintained in vaporous condition in the discharge path which increases the efficiency of the lamp device.

While we 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, the chamber 2 has corrugated walls to increase the heat radiating surface thereof, when desired and the electrode comprises a rod consisting of a mixture of electron emitting materials or their compounds.

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

1. A gaseous electric discharge device comprising a container, a gaseous atmosphere therein comprising a metal vapor, electrodes sealed therein one of which is a thermionic cathode and another of which is an anode having a large surface, electrode chambers for said electrodes, the chamber in which said anode is mounted having a larger diameter than said container, the chamber in which said cathode is mounted having a smaller diameter than said container.

2. A gaseous electric discharge device comprising a container, a gaseous atmosphere therein comprising a metal vapor, electrodes sealed

therein one of which is a thermionic cathode and another of which is an anode having a large surface, electrode chambers for said electrodes, the chamber in which said anode is mounted having a larger diameter than said container, the chamber in which said cathode is mounted having a smaller diameter than said container, said anode being hollow, one wall thereof being perforated and a hollow tube projecting and opening into the interior of said anode, said tube having a quantity of vaporizable material therein.

3. A gaseous electric discharge device comprising a container, a gaseous atmosphere therein comprising a metal vapor, electrodes sealed therein one of which is a thermionic cathode and another of which is an anode having a large surface, electrode chambers for said electrodes, the chamber in which said anode is mounted having a larger diameter than said container, the chamber in which said cathode is mounted having a smaller diameter than said container, said anode being hollow, one wall thereof being perforated and a hollow tube projecting and opening into the interior of said anode, said tube having a quantity of sodium therein.

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