March 13, 1934. H. EWEST ET AL 1,951,138

GASEOUS ELECTRIC DISCHARGE LAMP DEVICE

Filed Dec. 16, 1932

Fig. 1

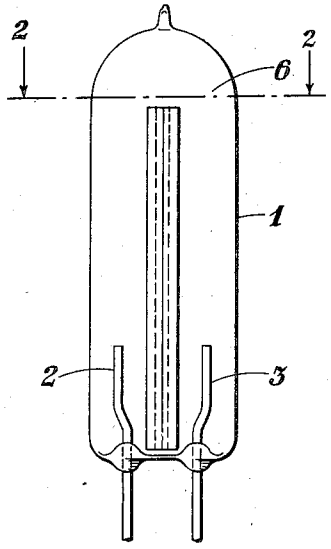



Fig. 3

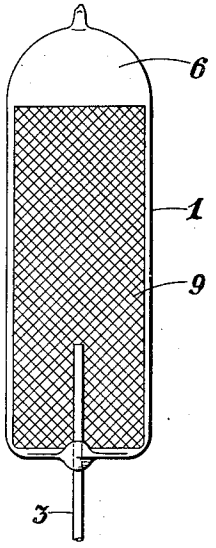
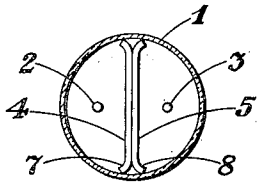



Fig. 2

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## GASEOUS ELECTRIC DISCHARGE LAMP DEVICE

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2 Claims. (Cl. 176—122)

The present invention relates to gaseous electric discharge lamp devices generally and more particularly the invention relates to such devices in which the discharge path between the electrodes is of U shape.

Electric discharge lamp devices having a U shaped discharge path in which a partition extends along the axis of the container of the device and in which the electrodes are located at one end of the container on each side of said partition are now known in the art. The light emission of such a device is, of course, much greater than a device of the same size in which the discharge path follows a straight line. The container walls of such devices having a U shaped discharge path are at a high temperature during the operation of the device and this is of advantage where the gaseous atmosphere comprises a metal vapor as the metal vapor is then maintained in a vaporous condition in the discharge path.

In prior devices of the above type the partition has been made of an electrically insulating material, such as glass or quartz, for it was thought that if the partition were made of electrically conducting material the electric discharge between the electrodes would be short-circuited by the conducting partition.

Applicants have demonstrated that such thought is erroneous, at least in connection with an electric discharge device having certain dimensions and certain electrical characteristics, and that in electric discharge devices of the above type having the proper dimensions and electrical operating characteristics a partition of electrically conducting material can be used, and that such a partition has many new and unexpected advantages which will be explained in detail hereinafter.

The object of the invention is to provide an electric discharge device having electrodes at one end of the tubular container of the device on opposite sides of a partition extending along the longitudinal axis of the container in which the partition is made of an electrically conducting material. 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.

We have discovered that an electrically conducting partition can be used in electric discharge devices of the above type provided the potential drop in the luminous positive column discharge between the electrodes of the device is smaller than the anode and cathode potential drop combined. For example, in an electric discharge device of the above type having a neon filling in which the cathode drop is approximately 90 volts and the anode drop approximately 30 volts the potential drop along the positive column must not exceed approximately 120 volts for the successful operation of the device. Where such device is 10 mm. in diameter and the current strength is 30 milliamperes a potential drop of 120 volts takes place in a positive column discharge of 15 cms. in length and as the positive column discharge path is of U shape that part of the partition extending along the positive column should not be longer than approximately 7 cms.

An electrically conducting partition has many important advantages over an electrically insulating partition. A metal partition simplifies and reduces the cost of the manufacture of such devices and fits the walls of the container very snugly to prevent the passage of the discharge between the edges of the partition and the walls of the container. Further, the metal partition facilitates the starting of the discharge between the electrodes of the device in the same manner that a metal wire extending from electrode to electrode in a straight tubular device facilitates the starting thereof. This dispenses with other auxiliary starting devices.

Two embodiments of the invention are illustrated in the drawing accompanying and forming part of the specification in which

Fig. 1 is a side elevational view of one embodiment of the invention,

Fig. 2 is a top sectional view along the line 2—2 of Fig. 1, and

Fig. 3 is a front elevational view of another embodiment of the invention.

Like numbers denote like parts in all the figures.

Referring to Figs. 1 and 2 of the drawing the new and novel gaseous electric discharge device comprises a tubular container 1 having electrodes 2 and 3 sealed into one end thereof and located substantially in the same plane. A partition 4, 5 extends along the longitudinal axis of said container 1, substantially at right angles to the plane of said electrodes 2 and 3 and is located between said electrodes 2 and 3. Said partition consists of two rectangular metal plates 4 and 5 having flared edges 7 and 8 respectively along their long sides. Said plates 4 and 5 are rigidly connected to each other and the flared edges 7 or 8 thereof respectively face away from those of the other plate as shown. Having this structure the partition is flexible so that it is easily inserted in said container 1 and is kept in position along the lon-

gitudinal axis of said container 1 by the edges 7 and 8 thereof pressing against the walls of said container 1. The container 1 is filled with a gas, such as a neon, or a gaseous mixture, such as argon and mercury vapor.

As heretofore pointed out the anode drop plus the cathode drop should be greater than the total potential drop in the luminous positive column discharge between said electrodes 2 and 3. The length of said partition 4, 5 is determined in accordance with this rule as shown by the example given above.

The embodiment of the invention illustrated in Fig. 3 is similar in all respects to that shown in Figs. 1 and 2 except that in this embodiment of the invention a wire mesh, or net 9 is used in place of the plates 4 and 5 of Fig. 1. The interstices of said net 9 are too small to permit the passage of the discharge therethrough. Said net 9 permits the light emitted by those parts of the luminous positive column discharge facing said net 9 to pass therethrough.

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 partition 4, 5 has a high polish, where desired, to act as a reflector, said partitions 4, 5 or 9 are held in position in said container 1 by other means other than those shown and described as by fusion to the stem or glass wall, for example.

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

1. An electric discharge device comprising a straight, tubular container, electrodes sealed therein, a gaseous atmosphere therein, a partition of electrically conducting material therein, and extending along the longitudinal axis of said container said electrodes being in the same plane, said partition being located between said electrodes and being substantially at right angles to the plane of said electrodes, the length of said partition along the luminous positive column discharge between said electrodes being such that the potential drop in said discharge is less than the sum of the anode and cathode potential drop in said device.

2. An electric discharge device comprising a container, electrodes sealed therein, a gaseous atmosphere therein, a partition of electrically conducting material therein, said electrodes being in the same plane, said partition having a multiplicity of small perforations therein and being located between said electrodes and being substantially at right angles to the plane of said electrodes, the length of said partition along the luminous positive column discharge between said electrodes being such that the potential drop in said discharge is less than the sum of the anode and cathode potential drop in said device.

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