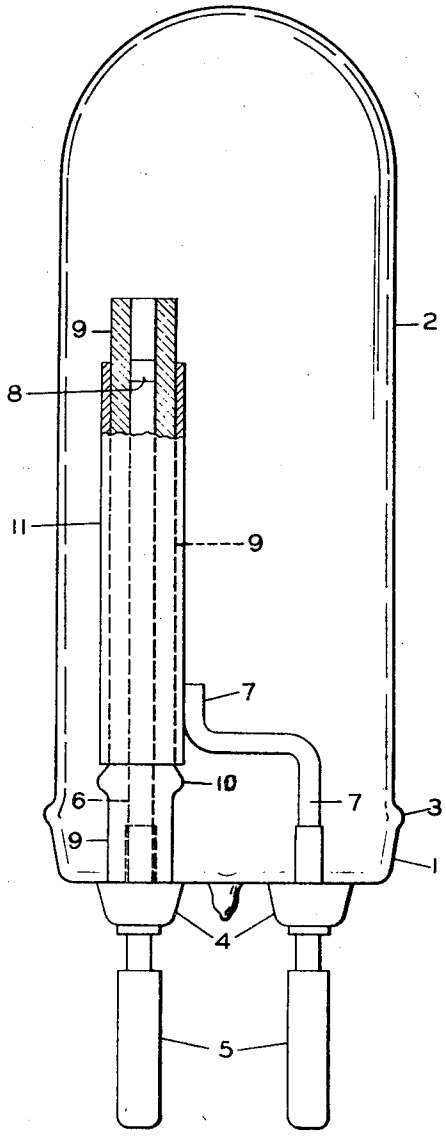
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ELECTRIC DISCHARGE DEVICE

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ELECTRIC DISCHARGE DEVICE

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This invention relates to electric lamps and discharge devices, and is especially adaptable and advantageous for a flash lamp or tube having a relatively short discharge gap. The invention is mainly concerned with internal structural features, including the arrangement and correlation of the electrodes, and with their current connections and their electrical isolation from one another to obviate risk of short-circuiting discharges. Novel features and various advantages of the invention will appear from the description of one species and form of embodiment, and from the drawing.

The single figure of the drawing is a side view of a lamp such as above referred to constructed in accordance with the invention, certain parts being shown partly broken away and in section.

As here shown, the device comprises an envelope having at one end a vitreous cup base 1, and also comprising a vitreous dome portion 2 fusion-sealed to the cup 1 at 3. The parts 1, 2 may be of pressed glass that transmits the desired luminous or other radiation produced by the lamp, such, for example, as borosilicate glass of the familiar type known commercially as "Pyrex." Fused seals for the passage of the current conductors through the envelope end wall 1 are shown as made with dome shaped ferrules 4, 4, which may be a simple iron-nickel alloy, or an iron-nickel-cobalt alloy such as is commercially known as "fernico." Into the ferrules 4, 4 are welded or brazed the external bipost contacts 5, 5, and from these parts current leadwires 6, 7 extend inward into the interior of the envelope. As here shown, the leadwire or conductor rod 6, which is substantially straight, carries a metal electrode tip 8 at its inner end, and is surrounded with an easy-fitting insulative covering 9 which may preferably overlap beyond the electrode 8. This covering 9 should include a portion around and adjacent the tip 8 of refractory material which is transparent to the radiations (whether visible or other radiations) emitted by the discharge, and is here shown as a quartz glass sleeve or tube extending in one piece from adjacent the fused seal of the corresponding ferrule 4 at the base 1 to a point about 4 or 5 mm. beyond the tip 8. Near its base end, the sleeve 9 is annularly enlarged or ridged, to provide it with an external shoulder 10. Around the sleeve 9 is an easy-fitting annular or tubular metal electrode 11, extending from the shoulder 10 to a point behind or about even with the electrode tip 8, some 4 or 5 mm. from the end of the sleeve 9, which is left uncovered, so that light or other

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radiation from the discharge within can shine through it. The electrode sleeve 11 is connected by welding to the leadwire 7, which is laterally offset by two opposite bends to form what I call a "bridge support" for this purpose.

By proper dimensioning and assembling of the parts 6, 8, 9, 11, and proper location of the shoulder 10, it is assured that when the sleeve 9 abuts the ferrule 4 (or its seal) and the sleeve 11 abuts the shoulder 10, the inner ends of the parts 8, 9, 11 will all be correctly located relative to one another. Thus a desired length of the discharge path from internal electrode tip 8 to sleeve 11 around the end of sleeve 9 is insured. With the parts proportioned and located as shown, this discharge path is considerably shorter than the shortest distance between any part of electrode 11, lead 7, or its ferrule 4 and any exposed part of lead 6 or its ferrule 4, thus obviating risk of short-circuit discharges between parts of opposite polarity at the base of the lamp.

It is preferred, in general, to make the internal electrode tip 8 the emissive cathode, and to make the external electrode 11 the anode. For example, the cathode tip 8 may be a small thick disc or slug of tungsten-nickel alloy containing a minor proportion of barium oxide, such as the material described in U. S. Patent No. 1,719,128 to Reeve, and showing by analysis some 87% of tungsten, some 10% of nickel, and some 3% of barium, present as oxide. The anode sleeve 11 may be of iron or steel. The envelope may contain a gaseous filling of argon at some 600 mm. pressure and also hydrogen at a partial pressure of 10 mm., or xenon alone at some 600 mm. pressure. Such a device may be operated or flashed on an applied voltage of the order of 5000 volts.

It will be understood that the dimensions and materials hereinbefore mentioned are illustrative, and are not to be taken as defining or limiting the invention, since in practice the dimensions may be widely varied and other materials may be used.

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

1. An electric discharge lamp comprising a sealed envelope containing a gaseous atmosphere, a pair of rigid rod-like conductors extending through a wall of said envelope, one of said conductors projecting into the envelope substantially beyond the other conductor and terminating in an electrode tip, a tube of refractory insulating material closely surrounding said one conductor for its full length within the envelope, a sleeve-shaped electrode closely surrounding said tube,

the said other conductor extending laterally toward said sleeve-shaped electrode and being secured thereto to retain said electrode in place, and engagement means on said tube serving to retain the tube in place on said one conductor by engagement with said sleeve-shaped electrode.

2. An electric discharge lamp comprising a sealed envelope containing a gaseous atmosphere, a pair of rigid rod-like conductors extending through a wall of said envelope, one of said conductors projecting into the envelope substantially beyond the other conductor and terminating in an electrode tip, a tube of refractory insulating material closely surrounding said one conductor for its full length within the envelope, a sleeve-shaped electrode closely surrounding said tube, the said other conductor extending laterally toward said sleeve-shaped electrode and being secured thereto to retain said electrode in place, the said tube having a projection thereon adjacent that end of the sleeve-shaped electrode which is closest to the aforesaid wall of the envelope whereby said tube is fixed in place by inter-engagement between said electrode and said wall of the envelope.

3. A luminous electric discharge lamp comprising a sealed transparent envelope containing a gaseous atmosphere at a pressure of several hundred millimeters, a pair of rigid rod-like conductors extending through a bottom wall of said envelope, one of said conductors projecting upward into the envelope substantially beyond the other conductor and terminating in an electrode tip, a tube of transparent refractory insulating material closely surrounding said one conductor for its full length within the envelope and projecting beyond the electrode tip end thereof, a sleeve-shaped electrode closely surrounding said tube for a major portion of its length and terminating short of the upper end of said tube at a point adjacent the said electrode tip, thereby forming a luminous discharge path between said electrode tip and said sheet-metal electrode around the inner end of said transparent tube, the said other conductor extending laterally toward said sheet-metal electrode and being secured thereto adjacent its lower end to retain said electrode in place.

4. A luminous electric discharge lamp comprising a sealed transparent envelope containing a gaseous atmosphere at a pressure of several hundred millimeters, a pair of rigid rod-like conductors extending through a bottom wall of said envelope, one of said conductors projecting upward into the envelope substantially beyond the other conductor and terminating in an electrode tip, a tube of transparent refractory insulating material closely surrounding said one conductor for its full length within the envelope and projecting beyond the electrode tip end thereof, a sleeve-shaped electrode closely surrounding said tube for a major portion of its length and terminating short of the upper end of said tube at a point adjacent the said electrode tip, thereby forming a luminous discharge path between said electrode tip and said sheet-metal electrode around the inner end of said transparent tube, the said other conductor extending laterally toward said sheet-metal electrode and being secured thereto adjacent its lower end to retain said electrode in place, and means whereby said tube is retained in place on said one conductor by engagement with said sleeve-shaped electrode.

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