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AUXILIARY ELECTRODE AND SHIELD FOR A LOW
PRESSURE DISCHARGE DEVICE
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Fig. 1.

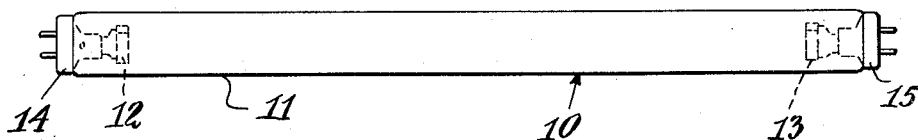


Fig. 3.

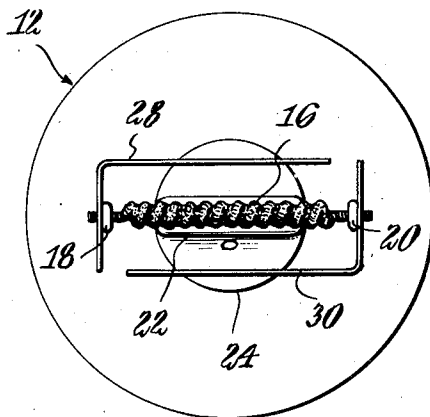


Fig. 2.

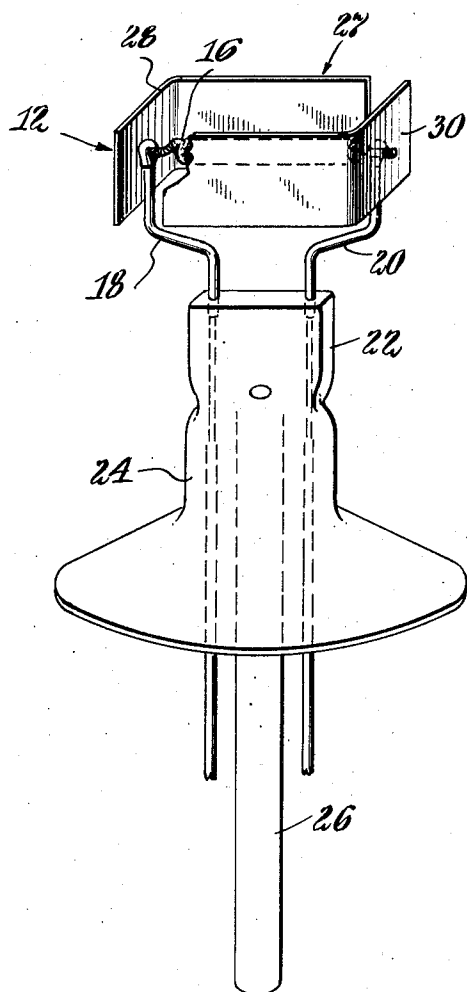
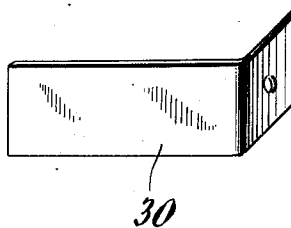


Fig. 4.



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1

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AUXILIARY ELECTRODE AND SHIELD FOR A LOW PRESSURE DISCHARGE DEVICE

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2 Claims. (Cl. 313-216)

This invention relates to discharge devices and, more particularly, to electrodes for low pressure discharge devices of the positive column type.

In the manufacture of low pressure discharge devices of the positive column type, such as fluorescent lamps, the luminous efficiency, namely lumens per watt of power input, of the product has been found to be dependent upon the fact that the gas atoms surrounding the electrodes do not act as efficiently in generating light as do the atoms in the center of the lamp discharge. During the half cycle of operation in which one electrode is functioning as an anode, a deficiency of positive ions occurs near the anode and a negative space charge builds up thereabout. An anode voltage drop resulting from this space charge, is a measure of the energy which must be imparted to the random electrons, in order to overcome the repelling force of the space charge and to accelerate enough of these random electrons to the anode to supply the necessary lamp current. To efficiently draw the lighted lamp current from the random electrons in the positive column and thus minimize accelerating anode voltage drop, an anode of proper size is required.

If the anode area is sufficiently large, i. e., the product of the random electron current and anode area equals the lamp current, the accelerated anode voltage is theoretically zero. Obviously, if the anode area is above this critical value, a negative anode drop should result.

A further defect of present low pressure discharge devices is lamp envelope discoloration caused by the sputtering of the cathode emission material from the filamentary electrodes during the numerous starting cycles involved in the life of a particular lamp. This bulb discoloration adjacent the electrodes is particularly objectionable to the saleability of the lamp from an appearance viewpoint.

Hence it has been found advantageous according to my invention to employ an L anode or auxiliary anode consisting of a pair of L-shaped plates disposed about the filamentary electrode to provide the required amount of additional anode area to theoretically neutralize the accelerating anode voltage drop and to adequately shield the lamp envelope from sputtering cathode emission material. In addition the thin plates provide a large area from which the heat of the lamp discharge may be readily dissipated, thus decreasing the wattage input, increasing lumens per watt output, and lamp efficiency. In its general aspect the present invention has the object of overcoming the afore-mentioned disadvantages of the prior art low pressure discharge devices of the positive column type.

The principal object of the invention is to provide an anode for a low pressure discharge device of the positive column type to effectively reduce anode voltage drop and to increase luminous efficiency.

Another object is to provide an anode for a low pressure discharge device of the positive column type which shields the adjacent lamp envelope area from cathode

2

emission material sputtered from the electrode during starting of the discharge device.

A further object is an anode of sufficient surface area and thin cross section to readily dissipate the heat of the lamp discharge.

Other objects and advantages of the invention will appear to those skilled in the art to which it appertains as the description proceeds, both by direct recitation and by implication from the context.

Referring to the accompanying drawing, in which like numerals of reference indicate similar parts throughout the several views:

Fig. 1 is an elevational view of a discharge device having the L anode of my invention;

Fig. 2 is a perspective view of an electrode mount showing the L anode secured to the leading-in conductors of the stem about the conventional emissive electrode;

Fig. 3 is a plan view of the electrode mount of Fig. 2;

Fig. 4 is a perspective view of one of the L anode or auxiliary electrode of my invention.

In the drawing, and particularly Fig. 1, the reference numeral 10 designates a low pressure discharge device of the positive column type. While a fluorescent lamp has been shown as an embodiment of such a device, it will be understood that the use of this invention is not restricted to fluorescent lamps. This lamp 10 comprises a vitreous envelope 11, suitably coated with a phosphor and containing an ionizable medium for initiating and sustaining a discharge, such as an inert gaseous fill, at low pressure admixed with mercury vapor. Oppositely positioned electrode mounts 12 and 13 are hermetically sealed in each end of the vitreous envelope 11. Suitable bases 14 and 15 are affixed to the sealed ends of the envelope 11 by a conventional cement.

Each of the mounts 12 and 13, shown in Figs. 2 and 3, comprise a filamentary electrode 16, suitably coated with electron emissive material and mounted on the hooked ends of leading-in conductors 18 and 20, adjacent the axis of the lamp discharge. These conductors 18 and 20 extend through a press 22 of a vitreous stem 24. At least one of the stems 24, in the present showing mount 12 is suitably provided with an exhaust tubulation 26 for evacuating the interior of the sealed device. The mounting ends of the conductors 18 and 20 extend, as shown in Fig. 2, upwardly from the press 22, diagonally outward from the axis of the said stem and then vertically upwardly parallel to the vertical axis of the stem for the juncture at the hooked ends with the legs of the electrode 16.

On this vertical upper portion of the leading-in conductors 18 and 20 is secured, as by welding, an L anode 27 of my invention, consisting of a pair of L-shaped plates 28 and 30, suitably provided with a clearance hole in the short side thereof to permit passage of the electrode leg therethrough. This hole is not restricted in shape, but must be sufficiently large to permit the threading of the electrode leg therethrough and yet small enough to provide adequate end shielding. It will be further understood that the other side of the plates 28 and 30 is sufficiently long to provide good shielding and still leave sufficient room between the adjacent ends thereof to permit welding of the opposite auxiliary anode.

Although a preferred embodiment of my invention has been disclosed, it will be understood that modifications may be made within the spirit and scope of the invention.

I claim:

1. A low pressure discharge device of the positive column type comprising a vitreous envelope, oppositely disposed electrode mounts hermetically sealed to the ends of said envelope, and an ionizable medium in said en-

3

velope for initiating and sustaining a discharge, said ionizable medium comprising an inert gaseous fill at low pressure admixed with mercury vapor; at least one of said electrode mounts comprising a stem having a pair of leading-in conductors, a filamentary electrode having conductive connections to said conductors and a pair of L-shaped anodes of sheet material adjacent and about said electrode, and having conductive connections to said conductors, the ends of said filamentary electrode extending beyond said connections of said filamentary electrode and each protruding through a hole in one leg of one of said anodes.

2. An electrode mount for a low pressure discharge device of the positive column type comprising a stem having a pair of leading-in conductors, a filamentary electrode having conductive connections to said con-

4

ductors and a pair of L-shaped anodes of sheet material adjacent and about said electrode and having conductive connections to said conductors, the ends of said filamentary electrode extending beyond said connections of said filamentary electrode and each protruding through a hole in one leg of one of said anodes.

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