

[54] **METHOD OF DOSING LAMPS**
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 [73] Assignee: **General Electric Company**
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[56] **References Cited**

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[57] **ABSTRACT**

Molten lamp-dosage material such as indium triiodide is drawn into tubing of slippery plastic material such as Teflon and allowed to solidify. The tubing and its contents are sliced at suitable intervals for providing desired quantities of dosage material per lamp, and the pellets of dosage material are forced out of the sliced tubing sections and into the lamp bulbs.

5 Claims, 4 Drawing Figures

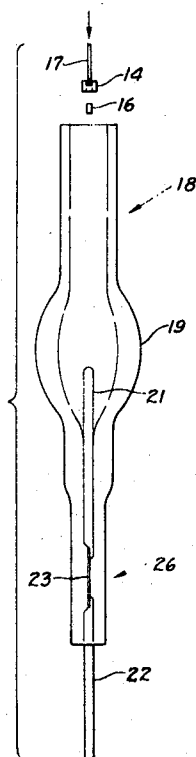


Fig. 1.

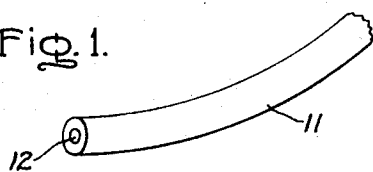


Fig. 2.

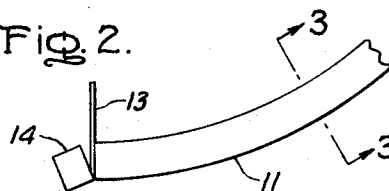
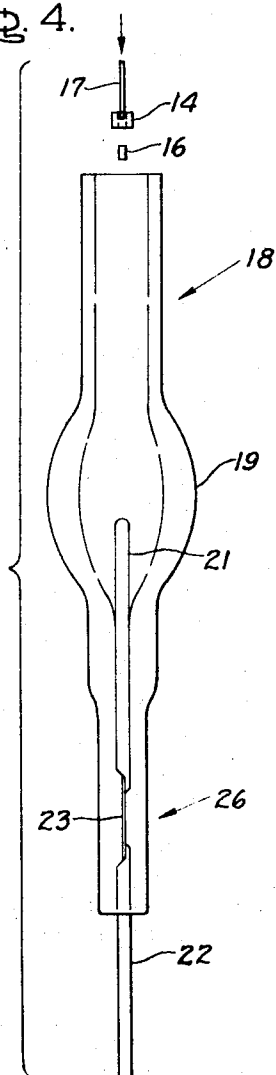


Fig. 3.



Fig. 4.



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METHOD OF DOSING LAMPS

BACKGROUND OF THE INVENTION

The invention is in the field of gas-filled lamp manufacture, and is particularly applicable to the manufacture of compact lamps which operate at high temperature and which contain a gas filling of a halogen or halogen salt such as iodine or iodide. The invention is directed to a method of dosing such lamps to provide the gas fill. Such a gas fill causes a regenerative cycling action which prevents evaporated electrode material (in an arc lamp) of filament material (in a filament lamp) from depositing on the bulb and causing blackening.

U.S. Pat. No. 3,305,289 to Elmer Fridrich, assigned to the same assignee as the present invention, describes a method which has been used for providing a gas fill in lamps, in which an inert gas is fed over heated iodine crystals so as to pick up iodine vapor. The vapor-carrying inert gas is then fed into the lamp bulb which is chilled to cause condensation of the iodine vapor.

A particularly desirable gas fill consists of indium triiodide. A dosing technique for such a fill has consisted of placing a small sphere of indium into the lamp bulb, and introducing iodine by passing argon gas over a heated reservoir of iodine crystals and hence into the lamp bulb. When the lamp is next heated, as by sealing a lead or by test-operating it, the indium vaporizes and mixes with the iodine gas. Upon subsequent cooling, between operating periods, the fill gas partially condenses on the inside of the bulb. To achieve the desired lamp fill of the stoichiometric compound InI_3 , the ratio of indium to iodine must be carefully controlled. Such control is difficult due to the many variable parameters such the size of the indium sphere, and the temperature, rate of flow, and time period of introducing the iodine. If there is an excess of iodine in the lamp fill, the lamp is difficult to start (if an arc lamp) and the useful life of its seals is shortened. If there is an excess of indium, the operating voltage may be too low (if an arc lamp) and the inner wall of the lamp is likely to darken from evaporated filament or electrode material.

SUMMARY OF THE INVENTION

Objects of the invention are to provide an improved method of manufacturing gas-filled lamps, and to provide an improved method of dosing lamps with a gas fill.

The method of the invention comprises, briefly and in a preferred embodiment, the steps of placing lamp-dosage material in tubing of plastic material, slicing the tubing and its contents at intervals for providing desired quantities of dosage material, and removing the dosage material segments from the sliced tubing segments and placing them into respective lamp bulbs. A preferred dosage material is indium triiodide, and a preferred plastic tubing material is Teflon.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of a length of plastic tubing containing lamp-dosage material;

FIG. 2 is a side view of the dosage-filled tubing being sliced into segments;

FIG. 3 is a cross-sectional view of the tubing and its contents taken on the line 3—3 of FIG. 2; and

FIG. 4 is a side view of a lamp bulb and a section of the sliced plastic tubing, showing the dosage material being ejected from the tubing segment and into the lamp bulb.

DESCRIPTION OF THE PREFERRED EMBODIMENT

As shown in FIG. 1, a length of tubing 11 of plastic material having a slippery surface, such as Teflon, is filled with lamp-dosage material 12. This may be accomplished by placing an end of the plastic tubing 11 into molten dosage material, such as indium triiodide, and applying sufficient vacuum at the other end of the plastic tubing 11 to draw indium triiodide into the tubing whereupon it cools and solidifies. If storage is desired, it should be sealed in dried-out glass tubing. The tubing 11 and its contents are sliced, as shown in FIG. 2, by means of a sharp thin knife or razor blade 13, to provide a plurality of segments 14 of sliced tubing each containing the proper amount of dosage material for a lamp.

As shown in FIG. 4, the sliced segment or pellet 16 of indium triiodide is ejected from the sliced segment of tubing 14, by means of a plunger 17 inserted into the tubing segment 14, whereupon the pellet 16 drops into a lamp bulb 18. Instead of ejecting the pellet 16 directly into the bulb 18, the pellet 16 may be temporarily stored in a dispenser means from which it is placed into the bulb 18. The bulb 18 is shown, by way of example, as being a partly assembled lamp of the type shown and described in the aforesaid U.S. Pat. No. 3,305,289, the bulb being made of quartz and containing a bulbous arc chamber region 19. An electrode assembly consisting of an electrode 21, connection lead 22, and interconnecting metal foil 23, has been pinch-sealed at 26 in one stem of the bulb 18. After the lamp has been dosed with the pellet 16, it is evacuated and filled with argon at suitable pressure, and another electrode is sealed at the remaining stem of the bulb 18.

While making the aforesaid final electrode seal, or upon initial test operation of the lamp, the lamp becomes sufficiently hot so that the pellet 16 contained therein vaporizes, thus providing the desired final gas fill.

It will be apparent that the invention achieves accurate dosing of a lamp in a low cost manner, as it is much quicker and more economical to dispense the pellet 16 into bulb 18, rather than to flow a gaseous vapor therethrough for a period of several seconds or minutes. Also, a solid compound such as indium triiodide can be utilized for generating the gas fill, in accordance with the method of the invention, to provide a gas fill of true stoichiometric characteristics, thereby insuring proper operation of the lamp.

The method of first placing the dosage material into the plastic tubing, and slicing the tubing into accurate-length segments, insures proper amounts of dosage material for the lamp, and the plastic material is easily sliced accurately, and leaves no burrs at the sliced surfaces, such as would be the case if metal tubing were used, whereby the invention permits the pellet 16 to be readily forced out of the tubing segment 14. Ejection of the pellet 16 is also facilitated by the use of a plastic material such as Teflon, having a slippery surface, and the inherent slight resiliency of the plastic material

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further aids in ejecting the pellet 16. Also, the plastic tubing does not contaminate the dosage material as would be like if metal tubing were used. The aforesaid desirable characteristics of the plastic tubing for the purposes of the invention are extremely important, due to the small size of the pellet 16, which, for use in a typical 300-watt arc discharge lamp having an arc chamber of approximately one cubic centimeter or less, is only 0.020 inches diameter and approximately 0.050 inches long. Teflon and similar plastic materials have a melting point of 300°C or higher, whereas the dosage material indium triiodide has a melting point of 210°C, so that there is no problem in the initial step of drawing molten indium triiodide into the plastic tubing.

While a preferred embodiment of the invention has been shown and described, other embodiments and modifications thereof will become apparent to persons skilled in the art, and will fall within the scope of the invention as defined in the following claims.

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

1. A method of providing pellets of dosage material

in lamp bulbs in the manufacture of gas-filled lamps, comprising the steps of placing an end of a length of plastic tubing into molten dosage material, applying vacuum at the other end of said tubing to draw molten dosage material into the tubing, allowing said dosage material to cool and solidify in the tubing, slicing the tubing and its contents into segments each containing the desired amount of dosage material for a lamp, and ejecting the solid dosage material segments from the tubing segments by means of a plunger and placing them in respective lamp bulbs.

2. A method as claimed in claim 1 in which said plastic tubing is of a material having a slippery surface.

3. A method as claimed in claim 2 in which said plastic tubing is made of Teflon.

4. A method as claimed in claim 1 in which said dosage material is indium triiodide.

5. A method as claimed in claim 1 in which said plastic tubing is made of Teflon and in which said dosage material is indium triiodide.

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