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E. BASTIAANSE

3,233,955

APPARATUS FOR EVACUATING AN ELECTRIC FILAMENT LAMP
OR DISCHARGE TUBE THROUGH A PROTRUDING EXHAUST
TUBE AND FOR SEALING OFF THE SAID EXHAUST TUBE

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2 Sheets-Sheet 1

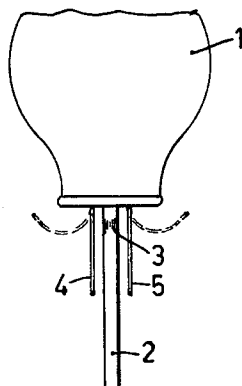


FIG. 1

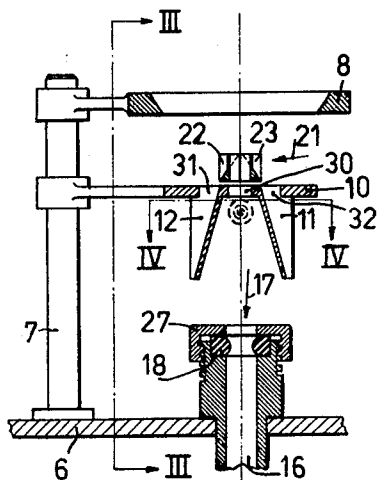


FIG. 2

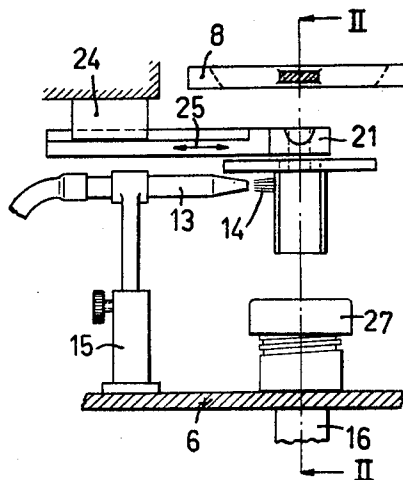


FIG. 3

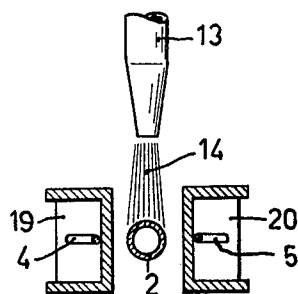


FIG. 4

INVENTOR
ERNST BASTIAANSE

BY
Frank R. Suriani
AGENT

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E. BASTIAANSE

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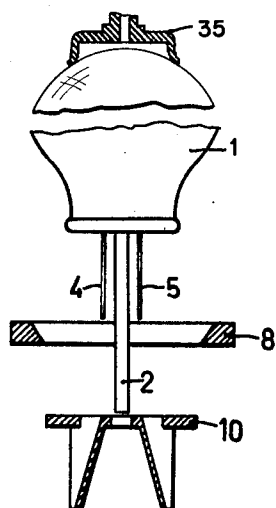


FIG. 5

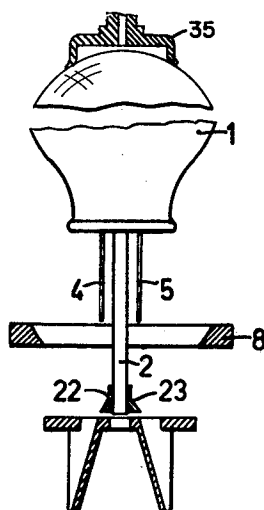


FIG. 6

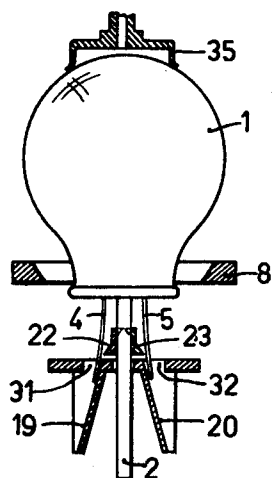


FIG. 7

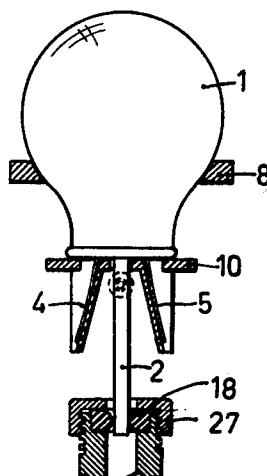


FIG. 8

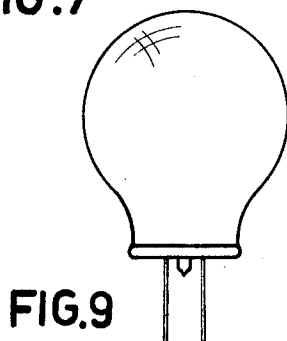


FIG. 9

INVENTOR
ERNST BASTIAANSE

BY
Frank R. Liefman
AGENT

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3,233,955

APPARATUS FOR EVACUATING AN ELECTRIC FILAMENT LAMP OR DISCHARGE TUBE THROUGH A PROTRUDING EXHAUST TUBE AND FOR SEALING OFF THE SAID EXHAUST TUBE

Ernst Bastiaanse, Emmasingel, Eindhoven, Netherlands, assignor to North American Philips Company, Inc., New York, N.Y., a corporation of Delaware

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2 Claims. (Cl. 316—30)

The invention relates to an apparatus for evacuating an electric filament lamp or discharge tube through a protruding exhaust tube and for sealing off the said exhaust tube, which is provided with at least one holder for the lamp or tube to be treated, with an orifice of a pipe of a pump system into which this exhaust tube may be inserted, and with a burner for sealing off the said exhaust tube, which is arranged between the holder and the orifice. Usually in such apparatus before the sealing off process the straight current-supply leads projecting from the lamp one on each side of the exhaust tube are permanently deformed by bending so that during the sealing off process they occupy a position in which they are not adversely affected by the flame of the gases from the burner. After evacuation and sealing off the sealed lamp or tube is removed from the orifice of the evacuation pipe and the current supply leads are bent back, that is to say again plastically deformed.

Repeated plastic deformation of the leads may give rise to damage and fracture. In addition the deformed current supply leads must afterwards be aligned again in order to enable a cap associated with the lamp to be slipped over the leads.

It is the object of the present invention to provide an apparatus in which the above-mentioned disadvantages are obviated.

The apparatus in accordance with the invention is characterized in that, viewed in the direction of insertion of the exhaust tube into the orifice of the evacuation pipe, a diverging guide is provided for the current supply leads projecting from the lamp or tube alongside the exhaust tube, the leads on insertion of the exhaust tube being resiliently bent away from the longitudinal axis of the exhaust tube in the said guide. The provision of a guide diverging from the direction of insertion of the exhaust tube enables the current supply leads to be protected during the sealing off of the exhaust tube against the flame from the burner. In this process the leads need only be bent slightly with respect to the exhaust tube so that a bending movement within the resilient range of the material of the leads is sufficient. The fact that the leads are only bent resiliently enables them to relax and to return substantially to their initial aligned position when the lamp or tube is removed from the orifice of the evacuation pipe. Separate aligning of the leads subsequent to the sealing off process is no longer required.

In an embodiment of the apparatus the guide comprises two guiding surfaces situated one on each side of the longitudinal axis of the orifice of the evacuation pipe. This embodiment is particularly suitable for lamps and tubes in which the current supply leads protrude one on each side of the exhaust tube.

In one such embodiment each guiding surface forms a part of a channel provided on a common support.

During the insertion of the exhaust tube into the orifice of the evacuation pipe, according to a further embodiment pliers or grippers for centering the exhaust tube may be used which, when closed, embrace the exhaust tube during

part of the insertion movement and slidably support it in a centered position. In a particular design the plier jaws have a bevelled outer profile which, in the closed position of the pliers, form extensions of the guiding surfaces for the current supply leads, which surfaces diverge from the direction of insertion of the exhaust tube. As a result the introduction of the leads into the diverging guide during the insertion movement is particularly simplified.

In order that the invention may readily be carried into effect, an embodiment thereof will now be described, by way of example, with reference to the accompanying diagrammatic drawings, in which:

FIG. 1 shows a filament lamp to be evacuated in which the current supply leads protruding from the lamp are bent in a known manner during the process of sealing off the exhaust tube;

FIGS. 2 and 3 are side elevations of the apparatus in accordance with the invention showing the principal structural components, FIG. 2 being an elevation along the line II—II of FIG. 3 while FIG. 3 is an elevation along the line III—III of FIG. 2;

FIG. 4 is a sectional view taken on the line IV—IV of FIG. 2;

FIGS. 5 to 9 are diagrammatic views serving to illustrate the operation of the apparatus shown in FIGS. 2 and 3 by showing a number of positions of the lamp during the insertion of the exhaust tube into the orifice of the evacuation pipe.

In the process of evacuating an electric filament lamp 1 and of sealing an exhaust tube 2 at a point 3, in a known method current supply leads 4 and 5 of the lamp are bent back with respect to the exhaust tube 2 into a position shown by broken lines in FIG. 1. In this position the leads 4 and 5 are not adversely affected by a flame from a sealing off burner directed onto the exhaust tube 2 at right angles thereto. After the exhaust tube has been sealed off, the leads are bent back to their initial position and aligned in order to enable a lamp cap to be slipped onto them.

For the process of evacuating the lamp 1 and sealing off the exhaust tube 2 an apparatus as shown in FIGS. 2 and 3 may be used. This apparatus includes a standard 7 secured to a table 6 and supporting an annular lamp-holder 8. A stationary orifice 17 of an evacuation pipe 16 is located below the lamp-holder 8. The evacuation pipe 16 contains a resilient member 18 which is enclosed between the pipe 16 and a nut 27 in the manner shown. The nut is readily rotatable with respect to the evacuation pipe 16 in known manner. By screwing down the nut 27 the internal cross-sectional area of the resilient member 18 is reduced. This resilient member forms a packing for the exhaust tube 2 of the lamp 1 to be passed through. The table further carries a support 15 for a sealing burner 13 from which a flame 14 may emerge.

When the lamp 1 is to be evacuated and the exhaust tube 2 is to be sealed off, the lamp is lowered, with the exhaust tube 2 pointing downwards and with the leads 4 and 5 bent back, into the holder 8 and the exhaust tube 2 is inserted into resilient member 18. The nut 27 is then screwed down. Subsequently the lamp 1 supported by the holder 8 is evacuated through the exhaust tube 2 and this tube is sealed off with the aid of the flame 14.

By arranging a construction shown in the drawing between the holder 8 and the orifice 17 of the evacuating pipe the leads 4 and 5 protruding from the lamp need not be bent into the position shown by broken lines in FIG. 1. Said construction comprises a plate 10 which is secured to the standard 7 and contains two inclined or divergent sheath-like guide members 11 and 12 for the leads of the lamp. In the plate 10 are further provided an aperture 30 through which the exhaust tube may be passed

3

and two apertures 31 and 32 through which the leads may be passed when the exhaust tube 2 is inserted into the orifice 17. The sheath-like guide members 11 and 12 each comprise a guide surface 19 and 20 respectively diverging from the direction of insertion.

Further pliers or grippers 21 are provided which, when closed, occupy the position shown in FIG. 2. The jaws 22 and 23 of the pliers have bevelled surfaces which, in the closed position of the pliers, effectively form extensions of the guide surfaces 19 and 20. The pliers 21 are adapted to slide in a stationary guide member 24 in the direction indicated by an arrow 25.

The apparatus operates as follows (FIGS. 5 to 9): with the aid of a holder 35 in the form of a suction cup the lamp to be treated is moved to a position above the holder 8 and lowered until the exhaust tube almost reaches the plate 10 (FIG. 5). The pliers 21 are then moved in the guide member 24 towards the lamp so that the jaws 22 and 23 embrace the end of the exhaust tube 2. In the closed position of the pliers the exhaust tube is then centered (FIG. 6). Adjustment is such that the exhaust tube is slidably embraced and centered by the closed pliers. The holder 35 is now lowered further and the centered exhaust tube 2 is passed through the closely encircling aperture 30 of the plate 10. In this movement the leads 4 and 5 engage the bevelled surfaces of the jaws 22 and 23 so as to be spread apart. The insertion movement is continued until the leads 4 and 5 enter in the apertures 31 and 32 of the plate 10. The leads now bear on the guide surfaces 19 and 20 (FIG. 7). Then the pliers are opened and returned to the rest position along the guide 24. Subsequently the lamp 1 is lowered as far as possible and the exhaust tube 2 is inserted into the orifice 17 (FIG. 8). In this position the lamp is mainly supported by the upper surface of the plate 10 and in this position may be evacuated and sealed off.

The leads 4 and 5 spread in the sheath-like guide members 11 and 12 are protected against the flame 14 in the sealing off process (FIG. 4). This flame now extends between the sheath 11 and 12 so that it cannot reach the leads 4 and 5.

By the provision of the described guide surfaces 19 and 20 diverging from the direction of insertion of the exhaust tube 2 into the orifice 17 it is sufficient for the leads 4 and 5 to be spread apart comparatively slightly so that they are bent resiliently only. After removing the lamp 1

4

from the orifice 17 the leads 4 and 5 return substantially to their initial aligned position (FIG. 9). Due to the fact that the leads 4 and 5 are resiliently relaxed subsequent aligning of the leads in order to enable a lamp cap to be slipped onto them is no longer necessary.

What is claimed is:

1. In an apparatus for evacuating an electric filament lamp through a projecting exhaust tube and for sealing off said exhaust tube, a holder for the lamp to be treated, an evacuating system having a pipe, said exhaust tube being adapted to be inserted in the orifice of said pipe, a burner arranged between said holder and said orifice and having a flame for sealing off said exhaust tube, the improvement comprising guide members being divergent as viewed in the direction of the insertion of said exhaust tube in the orifice of said pipe, said divergent guide members being directed downwardly and being spaced sufficiently to permit the projecting exhaust tube to be inserted therebetween, and each of said divergent guide members forming an enclosure for said leads that prevents direct contact of the flame of said burner with said leads, the angular position of said guide members relative to the longitudinal axis of said exhaust tube being such as to resiliently bend the leads of said lamp a relatively small distance from said axis of the exhaust tube when the latter is inserted in said orifice whereby said leads return automatically to their normal position when the leads are released from said divergent guide members.

2. An apparatus for evacuating an electric filament lamp as claimed in claim 1 further comprising grippers for said exhaust tube, a stationary guide member, said grippers being adapted to slide in said stationary guide member toward and away from an area above said divergent guide members.

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FRANK E. BAILEY, *Primary Examiner.*

RICHARD H. EANES, GRANVILLE Y. CUSTER, Jr.,
Examiners.