Dec. 17, 1957 I. ESKOWITZ 2,816,426

MOUNT CONSTRUCTION FOR BUTT-SEALED LAMPS

Filed July 1, 1955

Fig. 1.

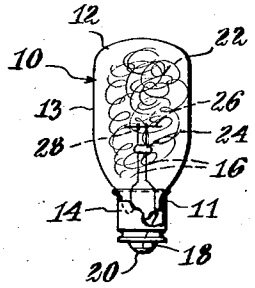


Fig. 2.

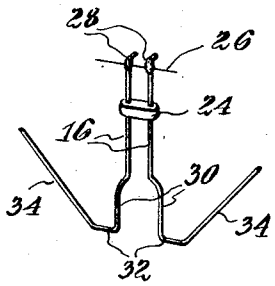


Fig. 3.

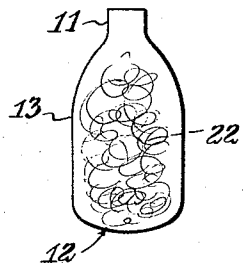


Fig. 4.

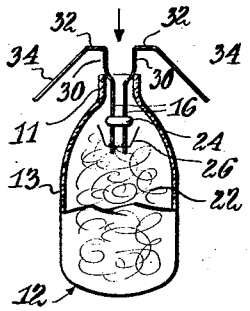


Fig. 5.

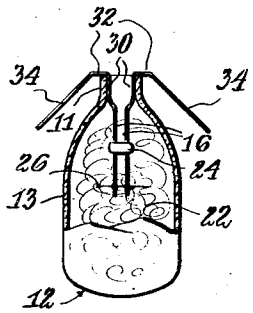


Fig. 6.

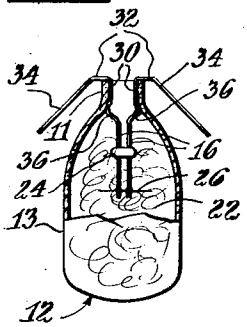


Fig. 7.

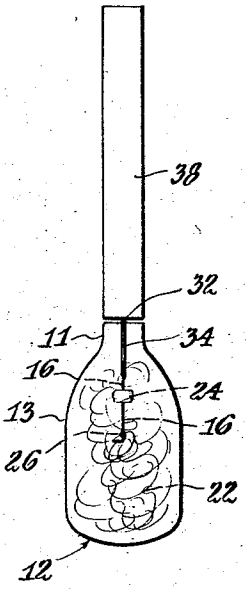


Fig. 8.

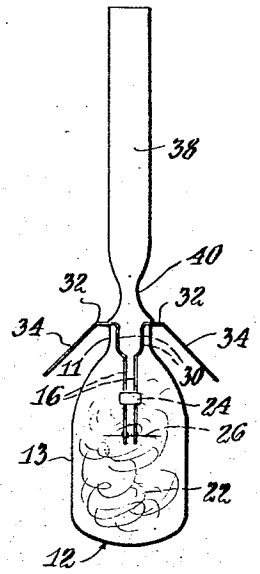
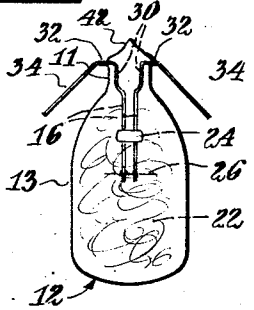


Fig. 9.



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MOUNT CONSTRUCTION FOR BUTT-SEALED LAMPS

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Application July 1, 1955, Serial No. 519,333

3 Claims. (Cl. 67—31)

This invention relates to the manufacture of electric lamps and, more particularly, to an improved mount construction for butt-sealed photoflash lamps.

In the manufacture of miniature lamp types the filament is usually connected to the upper end portions of a pair of lead-in conductors held in a given spaced relation by a fused bead of nonconductive material to form a mount which is subsequently inserted into the lamp envelope and hermetically sealed therein by the well known "butt-sealing" process. The term "butt-sealing" as used in the art refers to the method of sealing in the outer lead portions of the mount after it has been inserted into the envelope by interposing the leads between the abutting ends of the bulb neck and a section of exhaust tubing and fusing the members together to form a seal. This type mount construction and sealing-in technique is generally employed in the smaller lamp types inasmuch as the relative size of the parts is such that the filament is adequately supported by the lead-in conductors to which it is connected thereby facilitating lamp manufacture by obviating the glass flare and arbor associated with the more complex pressed-stem type mount required to support the filament in the larger lamps.

Heretofore the outer portions of the lead-in conductors were bent outwardly to form laterally extending and opposing legs at a point calculated to properly position the filament along the lamp axis when the mount was inserted into the open end of the inverted envelope and the lateral extending lead sections were brought into contact with the end surfaces of the bulb neck by the force of gravity. Considerable difficulty, however, was encountered in gravitationally centering and otherwise maintaining the mount in the desired position relative to the bulb walls prior to and during the butt-sealing operation due to the lack of positive seating action and a retaining force sufficient to prevent displacement of the mount by the vibrations of the sealing machine or the disturbing effect of the subsequent alignment of the exhaust tube and sealing thereof to the bulb neck. To overcome this difficulty various means and devices employing mechanical or magnetic principles have been developed in the prior art to align or center the mount and its elements within the envelope.

However, these prior art practices have not been entirely successful, are relatively complex, and are not suited to the manufacture of photoflash lamps where the problem of proper and sustained mount alignment is even more pronounced by virtue of the fact that the bulbs of such lamps are filled with a finely shredded actinic material which tends to entangle the filament and inner lead portions of the mount and resiliently obstruct the entry thereof into the envelope and partially eject or cause its lateral displacement after it has been properly positioned therein. It has been found necessary, therefore, to provide an improved method for accurately orienting the mount of a butt-sealed lamp within its envelope and maintaining the mount in the proper sealing relation after its insertion therein despite the action of

deleterious forces which would displace it before the butt-sealing operation has been completed and the mount is permanently sealed-in.

It is, therefore, an object of the present invention to avoid and overcome the foregoing and other difficulties and objections to the prior art by providing an improved method of accurately and consistently orienting the mounts of butt-sealed lamps in a desired preselected position within the bulb prior to the butt-sealing operation.

Another object is to provide a mount for a butt-sealed lamp which will remain in a desired preselected position after it has been once inserted into the bulb despite the action of disturbing forces encountered during subsequent manufacturing operations.

A further object is to provide a simple economic means of fabricating a butt-sealed lamp in which the mount and its elements are consistently oriented in the same preselected position.

A still further object is to provide a mount which will remain in a desired preselected position within a photoflash lamp bulb despite the resilient displacing force exerted by the shredded actinic material previously disposed therein.

The aforesaid objects of the invention, and other objects which will become apparent to those skilled in the art as the description proceeds, are achieved by controlling the contour to which the outer lead portions of the mount are shaped during the preforming operation. Specifically, a predetermined section of the outer leads are bowed outwardly relative to each other so that the distance between them is substantially greater than the inside diameter of the bulb neck and then the ends are bent outward to form laterally extending or retroverted legs in the usual manner so that the leads are shaped to the contour of the neck and lip portions of the bulb. Upon inserting the mount into the bulb these bowed-out sections are forced into sliding contact with the relatively narrow neck portion of the bulb and are compressed inwardly permitting the mount to resiliently and frictionally engage the interior side walls of the bulb neck, particularly after the mount has been fully inserted and the lateral extending portions of the legs are contiguous with the lip portion of the bulb. Hence, by modifying and properly shaping the outer lead portions the inserted mount is caused to so engage the neck and lip portions of the envelope that it is accurately positioned and tenaciously retained within the bulb. This method of positioning and retaining the mount within the bulb is readily adapted to high speed lamp manufacture since the necessary preforming operations can be quickly and accurately effected by well-known automated shaping techniques thereby enabling the process to be incorporated into the regular sequence of operations required to fabricate the lamp.

For a better understanding of the invention reference should be had to the accompanying drawings, in which like numerals of reference indicate similar parts throughout the several views, wherein:

Fig. 1 is a front elevational view of what is now well known in the art as an M–2 type photoflash lamp, partly broken away and in section, showing the improved mount construction of the invention;

Fig. 2 is a perspective view on an enlarged scale of an M–2 photoflash lamp mount modified in accordance with the invention;

Fig. 3 is an elevational view of an M–2 photoflash lamp bulb filled with shredded actinic material;

Figs. 4 and 5 are elevational views, partly in section, illustrating the initial and final steps, respectively, in positioning the mount within the bulb according to the invention;

Fig. 6 is a view similar to that shown in Fig. 5 but illustrates an alternative embodiment of the invention;

Figs. 7 and 8 are side and front views, respectively, showing the relative positions of the bulb, mount and exhaust tubulation before and after the butt-sealing operation;

Fig. 9 is a view similar to that shown in Fig. 8 but shows the lamp tipped-off and ready for basing.

Although the principles of this invention are broadly applicable to the manufacture of other types of butt-sealed lamps, the invention is usually employed in conjunction with the manufacture of M–2 type photoflash lamps and hence has been so illustrated and will be so described.

Referring now to the form of the invention shown in the accompanying drawings, particularly Fig. 1, an M–2 type butt-sealed photoflash lamp 10 is shown which has been modified to include the improved mount construction of this invention. As is well-known, lamps of this type generally consist of a sealed vitreous envelope 12 having a bulb portion 13 and a neck portion 11, a suitable electrical connector or base 14 attached to said neck portion 11, and a pair of lead-in conductors 16 hermetically sealed through the neck portion 11 for connection with said base 14. The base 14 has a generally hollow cylindrical shell configuration and may be fabricated from brass or other suitable conductive material. An insulating button 18 centrally disposed at the bottom of the base 14 carries an eyelet 20 which is electrically connected to one of the lead-in conductors 16. The other lead-in conductor electrically connects with the shell portion of the base 14 to facilitate electrical connection of the lamp. The upper end portions of the lead-in conductors 16 are held in parallel spaced relation by a cross-member or bead 24 of suitable nonconductive material, such as fused glass, whereas the lower portions thereof are preformed in a manner as will be hereinafter described. To insure an airtight seal throughout the life of the lamp the lead-in wires 16 may be fabricated from a conductive material having essentially the same coefficient of expansion as glass, such as "Dumet," which is the well-known trade name for wire having a nickel-iron core enclosed in a copper sheath the total thickness of which is approximately 25% of the finished wire diameter. A filament 26 is transversally connected to the upper extremities of the lead-in-wires 16 which carry a primer 28, such as the well-known mixture of potassium perchlorate, nitrocellulose binder and zirconium. A finely shredded actinic material 22, as for example aluminum and/or magnesium, is sealed within the envelope 12 along with a suitable oxidizing atmosphere, such as oxygen at a pressure of approximately 625 mm. mercury, which materials combine when ignited by the primer 28 to give the well-known flash of intense light. Since the combustion of the actinic material 22 is a highly exothermic reaction and might possibly cause the envelope 12 to violently erupt when the lamp 10 is flashed, a lacquer coating (not shown) is applied to the inner and outer bulb surfaces as a precautionary protection and to also strengthen the bulb walls.

The essence of this invention resides in the construction of the lamp mount, and, in particular, the configuration of the outer portions of the lead-in wires 16 and the manner in which they engage the lamp envelope 12 to orient and maintain the mount in a preselected position therein, and these are hereinafter more fully described.

After the mount has been assembled as previously described, the outer portions of the lead-in wires 16 are preformed as shown in Fig. 2. In order to obtain the desired prehensile or retentive interaction between the lamp mount and envelope 12, the outer portions of the parallel spaced leading-in conductors 16 are flared outwardly relative to each other by bending the leads into opposing arch-like and substantially symetrical members which gradually decrease in curvature until they again lie straight and parallel to each other thereby forming bowed-out arcuate sections 30 and effectively increasing the distance between the leads. The curvature of the flared or arch-like portions is so determined that the distance between the parallel portions of the bowed-out arcuate sections 30 is substantially greater than the inside diameter of the neck portion 11. At a predetermined point beyond the bowed-out arcuate sections 30, the leads 16 are bent outwardly at right angles and in opposing directions relative to each other to form laterally extending portions or arms 32 which contact the edges of the neck portion 11 to properly position the filament 26 along the lamp axis. The remainder of the outer leads are bent at an acute angle upwardly to form retroverted ends 34.

After the preforming operation has been completed the mount is inverted and is ready to be inserted into an envelope 12 which has been previously filled with actinic material 22 (Fig. 3). With the envelope 12 vertically held in an inverted position by a suitable means, such as a bulb holder or a vacuum cup (not shown), the upper end portion of the mount is inserted through the neck portion 11 and into the bulb portion 13 where the shredded actinic material 22 disposed therein entangles the mount extremities and the filament 26 mounted thereon tending to resiliently obstruct the mount and resist any further entry, as shown in Fig. 4. As the mount is inserted further into the bulb portion 13 the bowed-out arcuate sections 30 are forced into firm sliding contact with the inner surfaces of the walls comprising the relatively narrow neck portion 11 and are compressed inwardly. When the mount is in the fully inserted position the laterally extending arms 32 are pressed into firm contact with the edges of the neck portion 11 in a positive seating action and the mount is resiliently and forcibly held in proper sealing relation with respect to the edges of the neck portion 11 and centrally located at the preselected position with the bulb portion 13, as illustrated in Fig. 5. The prehensile force exerted by the frictional engagement of the bowed-out arcuate sections 30 of the mount and the walls of the neck portion 11 is of sufficient magnitude that the resilient displacing force of the actinic material 22 or other disturbing forces, such as machine vibrations or stresses resulting from the butt-sealing operation itself, are counteracted to effectively lock the mount in the desired preselected sealing position. As an alternative embodiment, the arch-like portions of the bowed-out sections 30 may include outwardly extending blisters or nodules 36 located so that when the mount is fully inserted into the bulb portion 13 said nodules 36 engage the inner bulb shoulder joining the neck portion 11 with the bulb portion 13 with a snap-fitting action resiliently interlocking the members together and even more forcibly retaining the mount in the proper sealing position.

After the mount has been fully inserted into the bulb 12 and forcibly retained in the desired preselected position therein, as heretofore described, a section of exhaust tubing 38 is brought down endwise into axial alignment with the bulb neck 11 by a suitable transfer means (not shown) so that their respective edges coincide and the laterally extending arms 32 of the mount are interposed, as shown in Fig. 7. By means of suitable sealing fires (also not shown), the exhaust tubing 38 is then fused to the neck portion 11 and the section immediately above and adjacent to the butt-seal joint drawn out to a relatively small exhaust neck or constriction 40 as shown in Fig. 8, and as disclosed in U. S. Patent 1,742,153 to Stiles, Wagener and Donovan. The laterally extending arms 32 of the mount are thus hermetically sealed through the neck portion 11 of the lamp envelope 12. The lamp is subsequently evacuated through the exhaust tube 38 and filled with oxygen to a suitable pressure, such as 625 mm. mercury, after which the tube 38 is heated to plasticity and sealed-off at the constriction 40 to form a central upwardly projecting exhaust or seal tip 42, as shown in Fig. 9. After this final sealing-in operation the lamp is ready for basing and complete fabrication in the usual manner.

It will be recognized from the foregoing that a simple

but most effective means of orienting and maintaining a lamp mount in the proper sealing relation within a bulb, particularly one filled with a finely shredded actinic material, has been provided. Moreover, this is accomplished primarily by shaping the outer portions of the mount to the contour of the inner neck and lip portions of the bulb so that the mount resiliently and tenaciously engages the inner neck walls when its laterally extending portions are contiguous with the lip of said bulb neck. By utilizing the positive seating action and prehensile force thus effected, the mount is oriented in the desired preselected position within the envelope and forcibly retained in such position despite the action of disturbing forces which would otherwise displace it.

Although a preferred embodiment of the invention has been illustrated it will be understood that other modifications may be made without departing from the spirit and scope of the appended claims.

I claim:

1. A lamp comprising, a vitreous envelope having a neck portion closed by a sealed-off segment of exhaust tubing fused to said neck portion in abutting relation therewith, a filament within said envelope, and a pair of lead-in wires held in parallel spaced relation by an insulator and connected to said filament, said lead-in wires, filament and insulator constituting a unitary mount structure adapted to be inserted into said envelope through the neck portion thereof and support said filament in a preselected position within said envelope, portions of said lead-in wires at a predetermined point remote from said filament and within said neck portion being contoured to form bowed-out sections terminated by laterally extending arms which project from said envelope through the butt-seal formed between the said exhaust tubing segment and said neck portion, said bowed-out sections axially extending along the inner surface of said neck portion and having a spacing normally greater than the inside diameter of said neck portion, whereby said sections are resiliently compressed inwardly by said neck portion and frictionally locked in intimate line contact with the inner surface thereof to hold said mount in a preselected inserted position within said envelope during the fabrication of the lamp.

2. A lamp comprising, a vitreous envelope having a bulb portion and a neck portion, a sealed-off segment of exhaust tubing fused to said neck portion in abutting and closing relation therewith, and a mount sealed within said envelope and axially extending through the said neck portion and into the said bulb portion thereof, said mount comprising a filament connected to and supported by a pair of lead-in wires held in parallel spaced relation by an insulator, the outer end portions of said lead-in wires

at a predetermined point remote from said filament and within said neck portion being contoured to form bowed-out arcuate sections and laterally extending arms, the said bowed-out arcuate sections axially extending along the inner surface of said neck portion and having oppositely-disposed nodular protuberances formed therein which are coincident with the shoulder formed by the juncture of said bulb and neck portions, and the said laterally extending arms projecting from said envelope through the butt-seal formed between the said exhaust tubing segment and said neck portion, the spacing between said bowed-out arcuate sections and protuberances being normally greater than the inside diameter of said envelope at said neck and shoulder portions, whereby said sections are resiliently compressed inwardly by said neck portion and said protuberances engage the said interior shoulder portion of said envelope in snap fitting relation to frictionally and mechanically interlock said mount in intimate line contact with an interior part of and in a preselected inserted position within said envelope prior to and during the butt-sealing operation.

3. The method of accurately orienting a filament within a butt-sealed lamp having an envelope with a neck portion which method comprises, securing said filament to a pair of lead-in wires held in parallel spaced relation by an insulating member, the spacing between said wires being less than the inside diameter of said envelope at said neck portion, shaping said lead-in wires at a predetermined point remote from said filament to provide oppositely-disposed preformed sections having a spacing greater than the inside diameter of said neck portion and a configuration corresponding to the longitudinal contour of the inner wall and edge surfaces thereof, inserting said conjoined filament and lead-in wire structure into said envelope through said neck portion until the said preformed sections of the lead-in wires are resiliently compressed by said neck portion and contiguous with the edge thereof to thereby orient and frictionally lock said filament in a preselected position within said envelope, and thereafter fusing an exhaust tubulation to said neck portion in abutting relation with the edge surface thereof to seal-in said lead-in wires and permanently secure the filament in its preselected position within said envelope.

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