May 23, 1939. J. J. MALLOY 2,159,812

ELECTRIC LAMP OR SIMILAR DEVICE

Filed Sept. 9, 1937

Fig. 1.

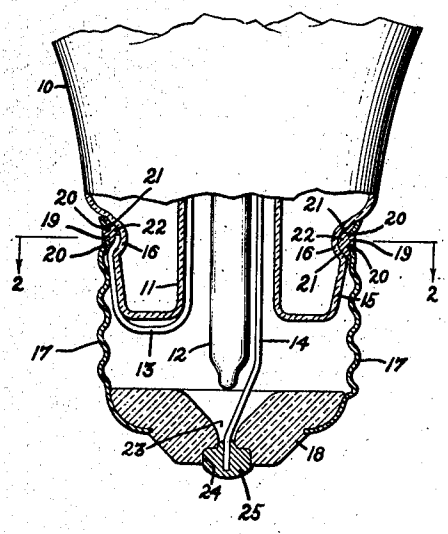


Fig. 3.

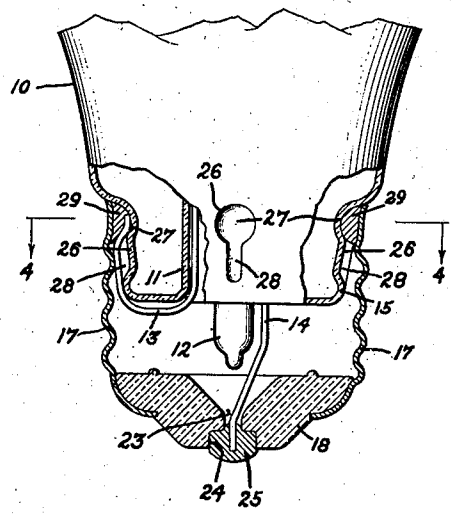


Fig. 2.

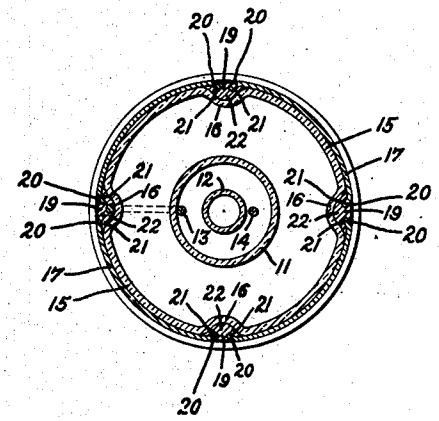
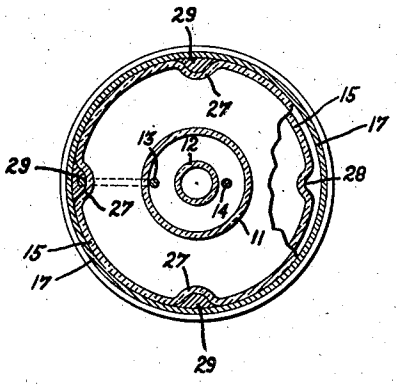


Fig. 4.



Inventor:
John J. Malloy,
by Harry E. Dunham
His Attorney.

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UNITED STATES PATENT OFFICE

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ELECTRIC LAMP OR SIMILAR DEVICE

John J. Malloy, Cleveland Heights, Ohio, assignor to General Electric Company, a corporation of New York

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4 Claims. (Cl. 176—32)

My invention relates to electric incandescent lamps and similar devices comprising a bulb having an electrical energy translation element sealed therein and a base mounted on said bulb. More particularly, my invention relates to bases for said devices, and still more particularly to so-called mechanical bases in which the usual cement which unites the base to the glass bulb is eliminated.

It is well known in the lamp art that where lamps provided with cemented bases are located in damp regions, the cement is likely to absorb a considerable amount of moisture, which has a deleterious effect on such cement. The torsional strength of the bond between the lamp bulb and base is thereby greatly diminished, and the said parts are very likely to become separated during installation of the lamp in its socket or removal therefrom.

Accordingly, one of the objects of the present invention is to provide a lamp base which is firmly secured to the neck of the bulb without the use of cement, and is of comparatively simple construction.

Another object of my invention is to provide a lamp or similar device in which the torsional strength of the joint or union between the bulb and the base is maintained at a more nearly uniform value under varying climatic conditions to thereby obviate the probability of separation of said parts during installation in or removal of the lamp from its socket.

Still another object of my invention is the provision of a lamp or similar device in which the base is firmly attached to the bulb by a plurality of rivets or lugs secured to the base shell and extending into suitable depressions in the bulb neck, the construction of the joint being such that the rivets are subjected to compressive stress when relative displacement of the base and bulb tends to occur, thereby increasing the torsional strength of such joint.

A further object of my invention is to provide a simple and inexpensive method for the attachment of a lamp base to the neck portion of a bulb.

Further objects and advantages of my invention will appear from the following detailed description of species thereof and from the accompanying drawing, in which Fig. 1 is a partial longitudinal sectional view of a portion of an incandescent lamp provided with a base structure comprising my invention; Fig. 2 is a transverse sectional view taken on the line 2—2 of Fig. 1; Fig. 3 is a view similar to Fig. 1 of a lamp provided with a modified base structure; and Fig. 4 is a transverse sectional view taken on the line 4—4 of Fig. 3, a portion of the bulb neck being shown in section through the channeled portion of the depressions formed therein.

Referring to Fig. 1, the lamp comprises a bulb 10 provided with a conventional filament mount structure consisting of a stem tube 11, exhaust tube 12, lead wires 13, 14, and an electric energy translation element or filament (not shown) connected to the inner ends of said lead wires and sealed within the said bulb 10. The neck 15 of the bulb is provided with a plurality of dish-shaped, preferably spherical, depressions 16 preferably spaced equally around the periphery of said bulb neck. A base comprising a screw-threaded shell 17 and insulation 18 surrounds said neck portion of the bulb 10 and is secured thereto in the manner comprising my invention. Adjacent the edge of said base shell 17 are provided a plurality of perforations 19 spaced around the circumference thereof, said perforations corresponding to the bulb neck depressions 16 and being disposed in alignment therewith both longitudinally and radially of the lamp. The said perforations 19 are preferably formed by a punching operation which indents or turns inwardly the rims 20 of said perforations a slight amount. It will be noted, however, that the inner surfaces of said indented rims 20 do not conform to or engage the spherical depressions 16, but instead are slightly spaced therefrom so as to provide, in effect, an enlarged cavity 21 between the indented rim portions 20 and the corresponding bulb neck depressions 16. Rivets or lugs 22 of solder or any other suitable fusible material are adapted to extend through the said perforations 19 into the depressions 16 and enlarged cavities 21 to thereby firmly secure the base to the neck portion of the bulb and lock the said parts against relative longitudinal or rotational displacement. The leading-in wire 13 is bent over the neck of the bulb so as to extend between the base shell 17 and the side wall of bulb neck portion 15 up into one of the depressions 16, where it is secured or soldered by the rivet 22 to the said base shell 17. The other leading-in wire 14 extends through an opening 23 in the insulation 18 into the end-contact recess 24 provided in said insulation, where it is secured in place by a button of solder 25 constituting the end contact. The end contact recess 24 is preferably made slightly out-of-round, or of any suitable shape other than truly circular in transverse cross-section, in order to prevent

twisting of the button of solder 25 and the lead 14 when the lamp is screwed into its socket.

It will be noted that the rivets 22, due to the extended cavities 21, are formed with enlarged inner heads, the shell-engaging shoulders of which extend radially outward beyond the planes of the inner edges of the inturned rim portions 20 of the respective perforations 19. Furthermore, because of the longitudinally tapering side wall of the bulb neck 15, the rims 20 of the shell perforations may be indented or countersunk sufficiently to permit certain portions of said inturned rim to extend into and overlap the spherical bulb neck depressions 16, as shown in Fig. 2. It will also be noted that the spherical bulb neck depressions 16 are relatively shallow, so that the major portion of the forces applied to the various rivet heads, when relative displacement of the bulb and base tends to occur, is transmitted to said rivet heads in a direction radial to the longitudinal axis of the lamp rather than in a tangential direction. The combined effect of the above constructional features, when such relative displacement tends to occur, is to place the inner rivet heads under a substantial degree of compression rather than under a shearing stress alone, so that extrusion of the rivet material outwardly through the shell perforations 19 tends to take place. As a result the torsional strength of the riveted joint shown in the drawings is considerably greater than it would be if the rivet heads were subjected solely to a shearing stress when such relative displacement tended to occur.

The above-described lamp construction may be provided first by molding the spherical depressions 16 in the bulb neck simultaneously with the sealing of the filament mount within the bulb. The perforations 19 in the base shell 17 are then formed by a punching operation and the rims 20 of said perforations countersunk or indented the proper amount. The lead wire 13 having been bent over the neck of the bulb so as to extend into one of the spherical bulb neck depressions 16, the base may then be applied to the neck of the bulb and the shell perforations 19 brought into alignment with the spherical bulb neck depressions 16. In this position, a slug of solder or other suitable material, having been heated to a plastic or semi-fluid state, is forced under pressure by a plunger through each of the perforations 19, thereby entirely filling the spherical depressions 16 and enlarged cavities 21 to form, in effect, a plurality of rivets 22 firmly securing the base to the bulb and providing a tight joint therebetween. As a coincident of the above operation the lead wire 13, having been previously positioned within one of the spherical depressions 16, is electrically connected to the base shell 17. The other lead wire 14, left extending through the insulation opening 23 into the recess 24, is then secured in place by filling said recess with solder or other suitable material 25, which thereby forms the end contact of the lamp.

In the modification shown in Figs. 3 and 4, the base shell is preferably formed without the perforations 19 employed in the previous form of the invention, thereby permitting the use of a standard base shell. However, such perforations may be advantageously employed, if desired, and may be formed either with or without the inturned rim portions 20 previously described.

The said modification shown in Figs. 3 and 4 differs from the previous form in that the rivets or protuberances of solder or other fusible material are actually sealed to the base shell by providing the inner surface of said shell with a non-corrosive flux adjacent the edge thereof, prior to lamp assembly. The result is a fused joint between the base shell 17 and the rivets or protuberances in contradistinction to the purely mechanical joint illustrated in Figs. 1 and 2.

The bulb neck depressions 26, in addition to having spherical portions 27 corresponding to the spherical depressions 16 in the first form of the invention, are further formed with narrow elongated channels 28 extending downwardly therefrom, thus providing, in effect, keyhole depressions in the bulb neck (Fig. 3). The base is fastened to the bulb neck by protuberances or projections 29 of solder or other suitable fusible material firmly secured to the inner surface of the base shell by fusion and extending into the spherical depressions 27 in the bulb neck. The lead wire 13 is electrically connected to the base shell by one of the projections of solder 29, while the lead wire 14, as before, is embedded in a button of solder 25 constituting the lamp end contact.

The method followed in affixing the base to the bulb consists, as before, first in providing the keyhole depressions 26 in the bulb neck. The inner surface of the base shell, adjacent the edge thereof, is then provided with a suitable non-corrosive flux. Before applying the base over the neck of the bulb, short straight lengths or slugs of solder or other suitable fusible material are placed within each of the keyhole depressions 26 and the lead wire 13 bent over the neck of the bulb so as to extend into one of the spherical depressions 27. The base shell is then slipped over the bulb neck, said shell thereby serving to retain the aforementioned slugs of solder within the keyhole depressions 26. The lamp is next inverted from the position shown in Fig. 3, so that the base is uppermost, and heat applied to the base shell opposite each keyhole depression to melt the slug of solder therein. The melted solder flows down by gravity from the channels 28 into the spherical portions 27 of the depressions, where it fuses to the fluxed inner surface of the base shell to form, on cooling, the projections or protuberances 29 thereon. The lead wire 13 is simultaneously soldered to the base shell by this heating operation, and the lead wire 14, as before, is embedded in a button of solder 25 constituting the lamp end contact.

While I have shown four rivets 22 or projections 29 as constituting the attachment means for securing the base to the bulb, it should be understood that a greater or less number may be successfully employed for the same purpose, depending, of course, upon the degree of torsional strength desired in the completed joint.

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

1. An electrical device comprising a bulb having a neck portion and a base comprising a metal shell surrounding said bulb neck, said bulb neck having a plurality of shallow dish-shaped depressions therein and said base shell having a plurality of openings opposite said depressions, and a plurality of rivets of easily fusible material filling said openings and said depressions in said base shell and bulb neck to lock them together.

2. An electrical device comprising a bulb having a neck portion and a base comprising a metal shell surrounding said bulb neck, said bulb neck having a plurality of depressions therein and said base shell having a plurality of openings opposite

said depressions with inwardly turned edges at least portions of which extend into said depressions, and a plurality of rivets of easily fusible material filling the said depressions and openings in said bulb neck and base shell to lock them together.

3. An electrical device comprising a bulb having a neck portion and a base comprising a metal shell surrounding said bulb neck and an end contact, said bulb neck and base shell having interlocking engagement means for preventing relative displacement therebetween, said means comprising a plurality of depressions in said bulb neck, a plurality of openings in said base shell opposite said depressions having inwardly turned edges at least portions of which extend into said spherical depressions, and a plurality of rivet heads of easily fusible material entirely filling the space between said spherical depressions and said base shell, a leading-in wire electrically connected to said base shell by one of said rivet heads, and a second leading-in wire electrically connected to said end contact.

4. The method of attaching a base comprising a metal shell to a bulb having a neck portion, which consists of molding a plurality of depressions in said bulb neck, providing a plurality of perforations in said base shell, aligning said perforations with said depressions, and forcing a quantity of fusible material in a plastic state, under pressure, through said perforations into said depressions to thereby entirely fill the space between said depressions and said base shell.

JOHN J. MALLOY.