Jan. 20, 1948. W. H. WILLIS 2,434,779

MOUNT STRUCTURE FOR ELECTRIC LAMPS

Filed Feb. 28, 1947

Fig. 1

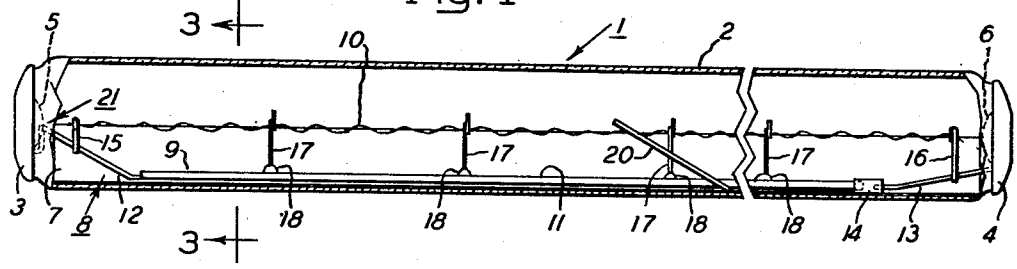


Fig. 2

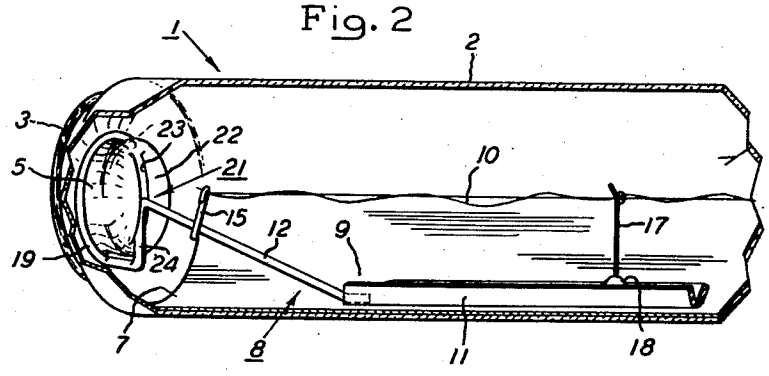


Fig. 3

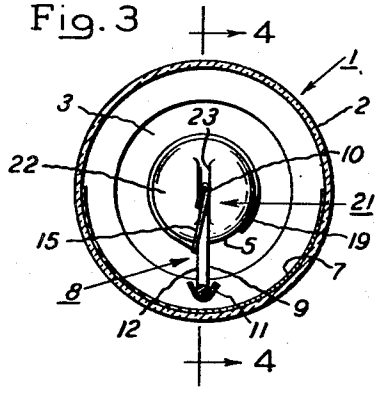
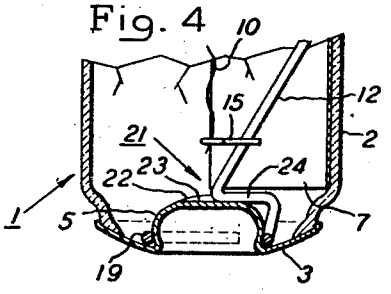


Fig. 4



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UNITED STATES PATENT OFFICE

2,434,779

MOUNT STRUCTURE FOR ELECTRIC LAMPS

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5 Claims. (Cl. 176—29)

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My invention relates to electric incandescent lamps and similar devices, and more particularly to a support arrangement for the mounts of such lamps. The invention is of particular utility in connection with electric incandescent lamps of the double-ended tubular type having a base at each end and a filament extending longitudinally of the lamp, such as shown and described in U. S. Patents 2,032,791, P. O. Cartun, and 2,158,849, H. D. Blake, assigned to the assignee of the present invention.

Lamps of the above mentioned double-ended tubular type are in general use at present, such lamps being commonly known as "Lumiline" lamps. As manufactured at present, these lamps comprise a tubular glass envelope having metal end caps or bases sealed to the opposite ends thereof and an elongated mount supported within the envelope between the metal end caps. The mount comprises an elongated filament extending longitudinally of the envelope and supported by an elongated stay member which is resiliently compressible longitudinally between the end caps and which is provided at its opposite ends with terminal wires or end conductors which are electrically connected to the ends of the filament. The said terminal conductors of the stay member are formed with loop portions which bear against the end caps and encircle inward bosses on the said caps.

With lamps of the above described construction, the mounts are free to rotate or turn within the envelope about the longitudinal axis thereof, the only restraint to such rotation being the frictional resistance which is exerted on the terminal conductor loops by the end cap, by reason of the pressure engagement therebetween. As a result, the mounts of such lamps, particularly in those applications where the lamps are subject to frequent shocks and vibration, actually do undergo a certain amount of rotation within the envelope. Obviously, the prevention of such mount rotation is to be desired, especially in those cases where the envelope is provided with a light-reflecting coating around a portion of its circular extent. In such cases it is preferable to maintain the mount in fixed relation to the reflector, with the stay member located within the reflector, in order to prevent the stay member from casting a shadow or producing a dark spot in the projected beam of light.

It is an object of my invention, therefore, to provide an electric lamp of the character described having a mount which will not be subject to rotation within the lamp envelope.

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Another object of my invention is to provide an electric incandescent lamp of the character described having means for positively locking the lamp mount against rotation within the lamp envelope.

Still another object of my invention is to provide an electric incandescent lamp of the character described having a reflective coating on a portion of the envelope wall and a mount structure locked in predetermined relation to the said reflector.

Further objects and advantages of my invention will appear from the following detailed description of a species thereof and from the accompanying drawing in which:

Fig. 1 is a fragmentary elevation, partly in section, of an electric incandescent lamp comprising my invention; Fig. 2 is an enlarged perspective view, partly broken away, of one end of the lamp shown in Fig. 1; Fig. 3 is a transverse section taken on the line 3—3 of Fig. 1; and Fig. 4 is a longitudinal section, on the line 4—4 of Fig. 3, of the end of the lamp shown in Fig. 2.

Referring to the drawing, the lamp there shown is of the double-ended tubular type shown in the above mentioned U. S. Patents 2,032,791 and 2,158,849, and comprises an elongated sealed envelope 1 consisting of a tubular glass bulb 2 having disc-shaped metal end caps or bases 3, 4 fusion-sealed to its opposite ends to form end walls for the envelope and contact terminals for the lamp. The said end caps or discs 3, 4 are preferably made of a metal or alloy which has a coefficient of expansion approximately the same as that of the glass of which the tube 2 is made and which seals readily thereto by fusion. For a soft glass tube 2, the end caps 3, 4 are preferably made of an iron alloy containing about 25 to 30 per cent chromium. The end caps 3, 4 are preferably concave or dish-shaped so that they may be made of thin material while retaining adequate strength, and they are provided with centrally located bosses 5, 6 which project axially inward of the envelope 1. The particular lamp illustrated is provided with a reflector which may be in the form of a reflecting coating 7 on the glass tube 2 extending substantially the full length thereof and around a portion (approximately one-half in the particular case shown) of the circular extent of the glass tube. The reflecting coating 7 may be of aluminum, silver, or other suitable reflecting material. Instead of the reflector 7, the glass tube 2 may be provided with other light-modifying means extending around a portion of its circular extent, such as by frosting

the glass or providing an enamel coating thereon. The envelope 1 is exhausted through an aperture (not shown) at the center of the end cap 4, the said aperture being sealed by a mass of glass which constitutes the tipped-off portion of a glass exhaust tube and which is sheltered within the cavity formed by the boss 6.

Mounted within and extending longitudinally of the envelope 1 is an elongated lamp mount 8 comprising a composite stay member 9 and an elongated filament 10 supported thereby. The filament supporting structure or stay member 9 comprises an elongated straight center section 11 extending longitudinally of the tube 2 adjacent the wall thereof and provided at its opposite ends with terminal wire or end conductor extensions 12, 13. The center section 11 of the stay member 9 is preferably in the form of channel-shaped member of a suitable material, for instance a stainless steel such as that commercially known as "Allegheny metal." The terminal wire 12 is electrically connected, as by welding, to one end of the channel member 11 while the other terminal wire 13 is secured to the other end of the said channel member 11 by a short length of glass rod 14 which is fused to the said parts and serves to insulate the terminal wire 13 from the channel member 11.

The filament 10 is in the form of a coiled tungsten wire which is stretched out so as to extend practically straight. As shown in Fig. 1, the filament 10 extends substantially the entire length of the envelope 1 and is clamped or otherwise electrically connected at its ends to short spur wires 15, 16 welded to the terminal wires 12 and 13, respectively. The filament 10 is supported at intermediate points along its length by support wires 17 extending from the channel member 11 at spaced points therealong, the said support wires being secured to and insulated from the channel member by means of small glass beads 18 fused to the said parts.

As shown, the terminal wires or end conductors 12, 13 extend from the opposite ends of the channel member 11 at a slight angle relative thereto, and their free or outer ends are bent to extend transversely of the channel member 11 and are formed into loops 19 which encircle the bosses 5, 6 on the respectively adjacent end caps to thereby position the lamp mount 8 within the envelope 1 with the filament 10 extending more or less axially of the said envelope. The loop 19 on terminal wire 13 (and also on the other terminal wire 12 if desired) is initially formed with a slight pitch or spiral shape, i. e., it is formed as a coil of less than one full turn, for the purpose of making the stay member 9 resiliently compressible to a slight extent longitudinally thereof. During the manufacture of the lamp, the spiral shaped loop or loops 19 more or less flatten out as the stay member 9 is compressed between the opposite end caps 3, 4, the loops 19 thus resiliently bearing against the concave inner side of the end caps and so making good electrical contact therewith. Where the mount 8 is of appreciable length, one or more intermediate lateral supports or spring bridges 20 may be provided for the purpose of stiffening the mount and preventing vibration thereof. The said bridge 20 may comprise a U-shaped spring wire disposed transversely of the envelope 1 with its base welded to the channel member 11 and its free ends yieldingly engaging opposite sides of the glass tube 2.

In accordance with the invention, interlocking means 21 are provided on the mount 8 and the end cap 3 for preventing rotation or turning of the mount within the envelope 1 about the axis of the latter. For this purpose, the top wall 22 of the boss 5 (which wall is of convex or dish-shape) is provided with a notch or groove 23 extending transversely of the envelope, and the adjacent terminal wire 12 is bent to provide a laterally extending offset anchor portion 24 which projects into and snugly fits within the said notch 23. The extent of offset of the terminal wire 12 is preferably sufficient to assure the positive interlock of the anchor portion 24 with the notch 23, the anchor portion 24 in the particular case shown extending approximately to the center of the boss 5. As shown, the mount 8 is anchored in a definite rotative position within the envelope 1 with the stay member 9 positioned within the reflector 7 on the envelope, preferably mid-way between the opposite side edges of the said reflector. In this way, the stay member 9 is shielded within the reflector 7 and so does not interfere with the passage of light out through the clear or light transmitting portion of the envelope so as to cast undesirable shadows.

In making the lamp according to the invention, the end cap 4 is first sealed to one end of the glass tube 2 after which the lamp mount 8 is inserted in the tube with its terminal wire 13 foremost and the loop 19 on the said terminal wire 13 then fitted over the boss 6 on the said end cap 4. The other or notched end cap 3 is then sealed to the other end of the glass tube 2 with the boss 5 on the said cap 3 fitted into the loop 19 on the terminal wire 12 and the offset anchor portion 24 of the terminal wire 12 locked in the notch 23 in the end cap. During the sealing of the notched end cap 3 to the end of the tube 2, the said cap is moved or pressed longitudinally inward of the tube to effect a good seal therebetween and to compress the composite stay member 9 between the opposite end caps 3, 4. In this connection, the loop 19 on the offset terminal wire 12 is preferably formed of flat, rather than of the spiral shape mentioned hereinbefore, and is so spaced from the offset anchor portion 24 lengthwise of the envelope as to cause the said anchor portion of the terminal wire 12 to resiliently bear against the end cap 3 rather than the loop 19 thereof, as shown in Fig. 4. In this way, the use of the interlocking means 21 according to the invention permits the mount 8 to be placed under a greater amount of longitudinal compression than heretofore between the opposite end caps to thus assure better electrical contact therewith, without causing a crooked end cap 3, since the expansive pressure of the mount is applied by the anchor portion 24 to the center of the end cap 3 where there is no tendency to cause it to tilt.

As applied to lamps of the character described, the feature of an elongated reflector or other light-modifying means on the glass tube in combination with means for locking the mount against rotation and in a definite rotative position relative to the reflector or other light-modifying means is disclosed and claimed in co-pending U. S. Application LD1077, P. O. Cartun, filed of even date herewith and assigned to the assignee of the present application.

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

1. An electric lamp comprising a tubular glass

envelope having metal end caps sealed to and closing its opposite ends, each of said end caps having a boss projecting inwardly of the envelope, a mount within said envelope comprising an elongated filament extending longitudinally of the envelope and a filament-supporting elongated stay member extending longitudinally of and compressed between the end caps of the envelope and provided with end conductors electrically connected to said filament, said end conductors each having a loop portion encircling the boss on the respectively adjacent end cap, and means on said stay member engaging one of said end caps to lock the said mount against rotation within the envelope.

2. An electric lamp comprising a tubular glass envelope having metal end caps sealed to and closing its opposite ends, each of said end caps having a boss projecting inwardly of the envelope, a mount within said envelope comprising an elongated filament extending longitudinally of the envelope and a filament-supporting elongated stay member extending longitudinally of and compressed between the end caps of the envelope and provided with end conductors electrically connected to said filament, said end conductors each having a loop portion encircling the boss on the respectively adjacent end cap, and interengaging means on one of said end conductors and the adjacent end cap for locking the said mount against rotation within the envelope.

3. An electric lamp comprising a tubular glass envelope having metal end caps sealed to and closing its opposite ends, each of said end caps having a boss projecting inwardly of the envelope, a mount within said envelope comprising an elongated filament extending longitudinally of the envelope and a filament-supporting elongated stay member extending longitudinally of and compressed between the end caps of the envelope and provided with end conductors electrically connected to said filament, said end conductors each having a loop portion encircling the boss on the respectively adjacent end cap, and means comprising an anchor portion on one of said end conductors fitting into a notch in the adjacent end cap to lock the said mount against rotation within the envelope.

4. An electric lamp comprising a tubular glass envelope having metal end caps sealed to and closing its opposite ends, each of said end caps having a boss projecting inwardly of the envelope, a mount within said envelope comprising an elongated filament extending longitudinally of the envelope and a filament-supporting elongated stay member extending longitudinally of and compressed between the end caps of the envelope and provided with end conductors electrically connected to said filament, said end conductors each having a loop portion encircling the boss on the respectively adjacent end cap, and means comprising a notch in the top wall of the boss on one of said end caps and an anchor portion on the adjacent end conductor projecting into and locked within the said notch to thereby prevent rotation of the mount within the envelope.

5. An electric lamp comprising a tubular glass envelope having metal end caps sealed to and closing its opposite ends, each of said end caps having a boss projecting inwardly of the envelope, a mount within said envelope comprising an elongated filament extending longitudinally of the envelope and a filament-supporting elongated stay member extending longitudinally of and compressed between the end caps of the envelope and provided with end conductors electrically connected to said filament, said end conductors each having a loop portion encircling the boss on the respectively adjacent end cap, one of said end caps having a notch formed in the top wall of the boss thereon, and the end conductor adjacent the said one end cap having an intermediate portion thereof bent to provide a laterally extending anchor portion projecting into and locked within the said notch to thereby prevent rotation of the mount within the envelope.

WINFIELD H. WILLIS.