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TUBULAR INCANDESCENT ELECTRIC LAMP

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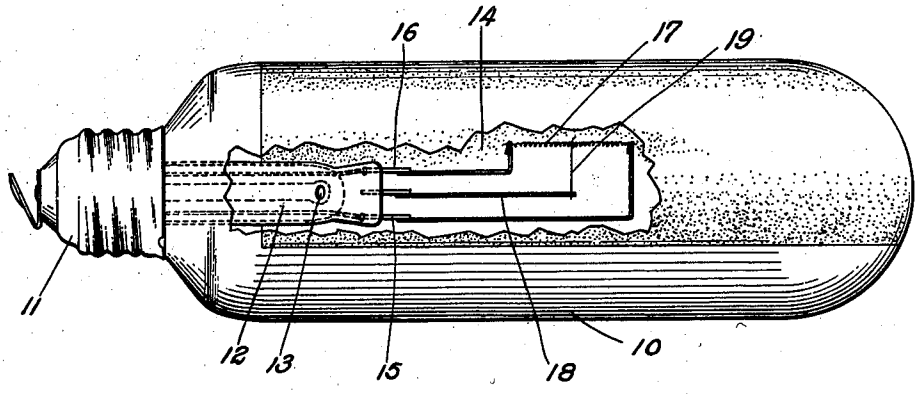

Fig. 1.

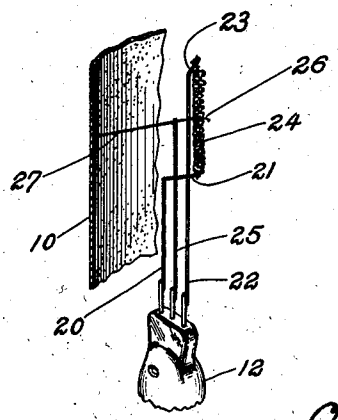

Fig. 2.

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TUBULAR INCANDESCENT ELECTRIC LAMP

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13 Claims. (Cl. 176—34)

This invention relates to incandescent electric lamps and consists in a tubular lamp provided with a reflecting surface and an elongated filament having a novel mounting and being related in a novel manner to the reflecting surface of the lamp.

One important field of use for my invention is in show case lighting or in train lighting where the space available requires a lamp of tubular shape and the field to be illuminated is generally long and narrow in shape. For such purposes a reflector of cylindrical contour is desired and this is provided in the lamp of my invention by applying a reflecting coating to one side of the tubular bulb, terminating in a plane cutting the bulb diametrically, or on either side of a diametrical plane, thus providing an elongated cylindrical reflecting surface greater or less than 180° in circumferential extent.

The filament may be advantageously supported substantially within the coated portion of the bulb and for best results should extend in the general direction of the axis of the bulb, with little or no obstruction between it and the reflecting surface. As herein shown the filament is provided with offset supports connected to its ends at points located between the axis of the bulb and its coated reflecting surface. For purposes of illustration I have shown a single straight strand of coiled filament disposed parallel to the axis of the lamp, but it will be understood that a more elaborate pattern of filament may be employed if desired so long as its longitudinal axis is disposed in the general direction of the axis of the bulb.

My invention contemplates, further, the provision of an intermediate supporting member or members for maintaining the filament in position while in use, the supports being designed to prevent distortion or optical displacement of the filament when subjected to high temperature and vibration. In general it is desirable to locate the ends of the filament well within the tubular portion of the lamp bulb and also within the area of the reflecting surface. This may be brought about by employing a filament of the coiled coil type thereby reducing the overall length of the filament while maintaining its luminous capacity. A single support is adequate for a short filament, whereas two or more supports may be preferable in a lamp employing a longer filament.

The advantages of locating the filament with extreme accuracy with respect to the reflecting surface supplied by the coated walls of the bulb has been noted. In practice the position of the filament is determined by the operator while the seal between the bulb and mount is still plastic and before it fully hardens. In accordance with an optional feature of my invention a gauge may be incorporated in the filament mount for indicating exactly when the proper relationship has been established between the filament and the reflecting surface. One satisfactory means of accomplishing this result consists in a gauge arm arranged to project transversely from any convenient point in the filament support and to indicate by contact with the wall of the bulb when the filament assembly is correctly located.

These and other features of the invention will be best understood and appreciated from the following description of a preferred embodiment thereof, selected for purposes of illustration and shown in the accompanying drawing, in which,—

Fig. 1 is a view in elevation of a tubular reflecting lamp, portions being broken away to expose the mount and filament, and

Fig. 2 is a fragmentary view in perspective illustrating a coiled coil filament having a somewhat different arranged mounting provided with a gauge arm.

The bulb herein shown is elongated and cylindrical in shape having a rounded outer end and a metal base 11 which may be of any conventional construction serviceable to facilitate the accurate and permanent positioning of the lamp at the proper angle in the socket. For this purpose the lamp is provided with a spring contact terminal at its base end. A hollow mount 12 is disposed within the bulb and sealed to its neck through the medium of a flare, not shown. The mount contains the lead-in wires and an exhaust tube 13 of the usual construction.

The bulb 10 herein shown is provided with a reflecting coating 14 internally applied and covering an elongated area of the bulb surface extending from a line near the base of the bulb and including its rounded outer end. Circumferentially the reflecting coating covers approximately 240° of the circumference of the bulb. A thin continuous coating of metallic silver or aluminum serves as a satisfactory reflecting medium.

The filament 17 herein shown comprises a single straight strand of coiled tungsten wire and in this instance the lead wires 15 and 16 are utilized not only to supply current to the filament but to support it in position. To this end the two lead wires are provided with end portions bent at right angles and extending upwardly as herein shown, the lower lead wire 15 having a long angular extension and upper lead wire 16 having a short angular extension so that the two

supporting ends are brought into a line parallel to and above the axis of the bulb 10. The lead wires 15 and 16 are sealed into the press of the mount 12 as usual, and also sealed into the press is a straight intermediate supporting wire 18 having an arm 19 extending angularly from its inner end and providing a loop or hook for supporting the middle portion of the filament 17 against sagging.

It will thus be seen that the filament is supported in position parallel to the axis of the bulb and of the reflecting coating in a position substantially nearer the coated side of the bulb than its axis and without any obstruction between it and the reflecting coating. The filament, of course, is located substantially within the boundaries of the reflecting coating 14 so that it is completely hooded thereby and all the light of the lamp concentrated in a downwardly directed elongated beam included in an angle of divergence of approximately 120°. The lamp herein shown is therefore effective to illuminate a narrow elongated field directly beneath the bulb and rays which would otherwise pass outside this field are cut off by the reflecting coating which is substantially opaque in character.

In Fig. 2 is shown a somewhat differently organized filament assembly having the additional feature of a gauge for indicating the correct transverse location of the filament in the tubular bulb. The filament assembly is designed for use in the same tubular bulb 10 which is shown more completely in Fig. 1. Lead wire 20 having an angularly disposed end 21 and lead wire 22 having an angularly disposed end 23 are shown as sealed into the press of the mount 12. The straight portions of the wires 20 and 22 lie in a common plane and their respective end portions are inclined inwardly and obliquely to this plane thus supplying supporting points for the filament 24 which are located in a line parallel to the axis of the tubular bulb 10. The filament itself is shown as a coiled coil filament extending in a straight line between these supporting points.

An intermediate supporting wire 25 projects from the press between the two lead wires and is provided at its end with a transverse arm. One branch 26 of the arm encircles the filament 24 as a support located substantially midway between its ends. The other arm 27 constitutes a gauge and is designed to contact with the inner wall of the bulb 10 when the filament 23 is correctly positioned transversely in the bulb. As already explained the operator has an opportunity to shape the seal between the neck of the bulb and the mount while the glass of the seal remains soft. He may thus bend the soft glass until the end of the gauge arm just touches the wall of the bulb and then allow the seal to harden with the assurance that the filament is accurately located. In the illustrated case the gauge arm is arranged to contact with an uncoated area of the bulb where its point of contact may be readily seen. It extends away from the filament and in a location to clear the lead wires but it is obvious that the useful function of the gauge arm does not depend upon its precise location in the filament assembly.

While the distribution of the reflecting area shown in Fig. 1 is most advantageous for certain uses, it will be understood that its pattern may be widely varied depending upon the use for which the lamp is intended. For example, the coating may cover in its length a shorter portion of the bulb surface or it may extend to a circumferential terminal plane lying in the axis of the bulb or it may be terminated in a plane located entirely above the axis of the bulb.

Having thus disclosed my invention and described preferred embodiments for purposes of illustration but not in a limiting sense, I claim as new and desire to secure by Letters Patent,—

1. An electric lamp comprising a tubular bulb having a reflecting coating covering an elongated area extending circumferentially at least 180 degrees, substantially straight lead wires of unequal length extending into the bulb and having angular end portions extending toward the coated side of the bulb, a substantially straight coiled filament mounted between such end portions in unobstructed relation to said coating, and a support for an intermediate portion of the filament.

2. An electric lamp comprising a tubular bulb having a reflecting coating covering an elongated area extending circumferentially over more than one half of the bulb, a mount within the bulb, substantially straight lead wires of unequal length projecting inwardly from the mount and having angular end portions extending toward the coated side of the bulb, a substantially straight coiled filament mounted between such end portion in unobstructed relation to said coating, and a support also sealed in the mount and having an angular portion engaged with an intermediate point of the filament.

3. An electric lamp comprising a tubular bulb having a reflecting coating in an elongated area on one side of its axis, longitudinally disposed supporting wires lying in a common plane in the bulb and having angular ends inclined in opposite directions to said plane, and a coiled filament suspended between said ends substantially parallel to the longitudinal axis of the bulb.

4. An electric lamp comprising a tubular bulb having a reflecting coating in an area on one side of its axis, a filament supported substantially parallel to the axis of the bulb, and a transversely disposed gauge member associated with the filament and movable therewith in the manufacture of the lamp to indicate the correct position of the filament with respect to the walls of the bulb.

5. An electric lamp comprising a tubular bulb having a reflecting coating, an elongated filament mounted opposite to the coating, a support engaging the filament at an intermediate point, and a gauge projecting transversely from the support in position to contact the walls of the bulb when the filament is properly located.

6. An electric lamp having an elongated tubular bulb enclosing a mount in one end and having a reflecting coating on one side, parallel lead wires extending inwardly from the mount and being disposed side by side in a common plane with angular end portions of unequal length terminating in a line parallel to the axis of the bulb, and a filament suspended between said end portions and offset toward said reflecting surface.

7. An electric lamp comprising a tubular bulb having a reflecting coating on one side, lead wires of different lengths having angular arms turned toward the coated side of the lamp, an elongated filament suspended between said arms, and a supporting wire having a transverse arm engaging at one of its ends the filament and at its other end the wall of the bulb.

8. An electric lamp comprising a tubular bulb having a reflecting coating on one side and a mount in one end, a long lead wire having a long angular arm turned toward the coated side of

the bulb, a short lead wire having a short angular arm disposed in the same manner, and a straight coiled filament suspended between the ends of said arms and offset from the axis of the bulb toward the coated side thereof.

9. An electric lamp comprising a tubular bulb having a rounded outer end and a metal base and having an internal metallic reflecting coating extending over its rounded end, terminating in a line spaced from the base and covering more than half of the circumference of the bulb, a mount having a flattened press within the bulb, spaced parallel lead wires projecting from opposite sides of the press and having angular arms turned toward the coated side of the bulb and converging so that their ends lie in a line parallel to the axis of the bulb, and a coiled filament disposed between said ends in unobstructed relation to said reflecting coating.

10. An electric lamp comprising a tubular bulb having a metallic coating on one side, a mount including a flattened press, spaced parallel lead wires projecting from the press at opposite sides of its end and having arms turned toward the coated side of the bulb which converge so that their ends lie in a line parallel to the axis of the bulb, a coiled filament extending between the ends of said arms in unobstructed relation to the reflecting coating of the tube, and a supporting wire located equidistant from the two lead wires and having an angular arm arranged to support the filament midway between its points of connection with the lead wires.

11. An electric lamp comprising a tubular bulb having a metallic coating on one side terminating in parallel longitudinal edges less than 180° apart, a mount including a flattened press located within the bulb, spaced parallel lead wires projecting from the press different distances beyond it and each having an arm turned toward the coated side of the bulb and at an angle to the plane of the lead wires, the arms converging so that their outer ends lie in a line parallel to the axis of the bulb and equidistant from the longitudinal edges of the reflecting coating, and a coiled filament extending between the ends of said arms in unobstructed relation to said reflecting coating and adjacent to the coated side of the bulb.

12. An electric lamp comprising a tubular bulb having a metallic coating on one side terminating in parallel longitudinal edges less than 180° apart, a mount including a flattened press located within the bulb, spaced parallel lead wires projecting from the press different distances beyond it and each having an arm turned toward the coated side of the bulb and at an angle to the plane of the lead wires, the arms converging so that their outer ends lie in a line parallel to the axis of the bulb and equal distances from the longitudinal edges of the reflecting coating, and a coiled coil filament which is short as compared to the length of the bulb and which extends between the ends of said arms in unobstructed relation to said reflecting coating and adjacent to the coated side of the bulb.

13. An electric lamp comprising a tubular bulb having a metallic coating on one side terminating in parallel longitudinal edges, a mount including a press located within the bulb, spaced lead wires sealed into the press and projecting different distances from it, each having its end turned toward the coated side of the bulb so that the two ends lie in a line parallel to the axis of the bulb and between the coated side of the bulb and its axis, and a coiled coil filament which is short as compared to the length of the bulb and which extends between the ends of the lead wires in unobstructed relation to said reflecting coating, whereby the filament is completely hooded by the coating and the light from the lamp concentrated in a narrow elongated beam.

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