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ELECTRIC LAMP MOUNT

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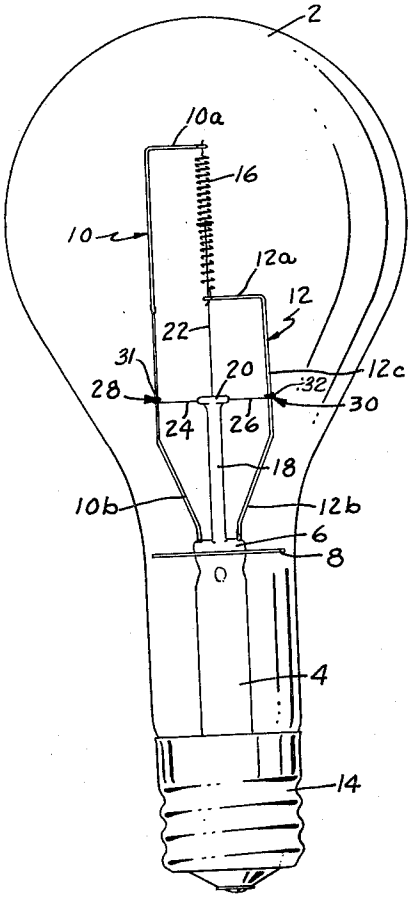


FIG. 1

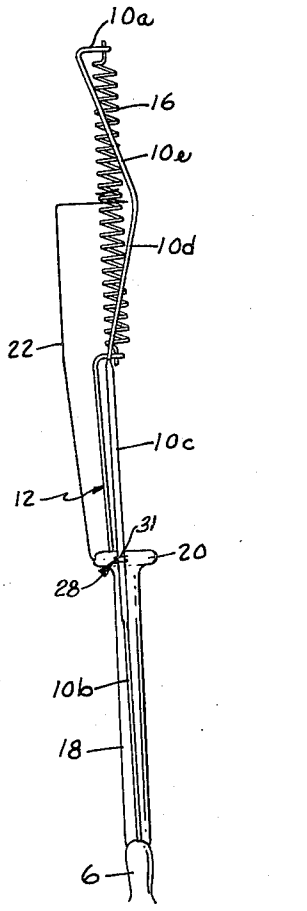


FIG. 2

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ELECTRIC LAMP MOUNT

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This invention relates to the manufacture of electric lamps and more particularly to the manufacture of incandescent electric lamps.

Over the years, many different types, shapes, sizes, etc. of incandescent lamps have been made available commercially. Two of the basic components of many of these lamps are a mount and an envelope, the former being hermetically sealed within the latter to define an unbased lamp. Mount structures differ appreciably from one another depending on the particular type of lamp being made. Basically, the mount structure is an arrangement of electrical conductors, usually called lead-in wires, and support wires for supporting the lamp filament in position within the hermetically sealed lamp envelope. This arrangement of wires must be rugged enough and flexible enough to provide the necessary support for the filament over a broad range of environmental installation and operational conditions as well as during transportation from the manufacturer to the ultimate user. On the other hand, it is most desirable, economically, that the mount structure be as simple as possible and readily lend itself to fabrication on automatic lamp manufacturing equipment. In addition to the foregoing, the attainment of these objectives, of course, should not be accomplished at the expense of light output, light distribution and other lamp performance characteristics.

This invention relates to a mount structure for incandescent lamps in which the filament is disposed vertically within the lamp envelope, i.e., the axis of the filament is substantially coincident with the longitudinal axis of the lamp envelope.

Therefore, an object of this invention is to provide a mount structure for vertical filament incandescent lamps in which the foregoing desiderata are attained.

In the specific embodiment of the invention illustrated in the accompanying drawing, FIGURE 1 is an elevational view of an incandescent lamp with the mount structure therein shown in side elevation.

FIGURE 2 is an end elevational view of the mount structure of FIGURE 1.

Referring now to FIGURE 1, the lamp illustrated therein comprises a glass envelope **2** in one end of which a glass stem **4** is hermetically sealed. The stem **4** is provided with a stem press **6** on which a heat-reflecting shield **8** is disposed. Lead-in wires **10** and **12** are sealed in the stem press **6**, the depending portions thereof extending through the throat of the stem for connection in the usual manner to a base **14** with which the lamp envelope **2** is provided. The upper portions of lead-in wires **10** and **12** are provided with offset portions **10***a* and **12***a* respectively, to which the ends of a filament **16** are attached. A glass arbor **18**, mounted on top of the stem press **6**, is provided at its free end with an arbor button **20**. One end of each of three support wires **22**, **24** and **26** is anchored in the arbor button **20**. The other end of support wire **22** is provided with a loop portion which encircles the filament **16** intermediate the ends thereof to help retain the filament in position. The other ends of support wires **24** and **26** are provided with loop portions **31** and **32** which encircle lead-in wires **10** and **12** respectively at points **28** and **30** respectively.

As is shown in FIGURE 1, the lead-in wires **10** and **12** diverge at their points of emergence from the stem press. The shorter lead-in wire **12** thus extends angularly for a short distance and then substantially parallel to the longitudinal axis of the lamp envelope, these segments being identified as **12***b* and **12***c* in FIGURE 1, and finally terminates in the offset portion **12***a* to which one end of filament **16** is attached. The longer lead-in wire **10** extends angularly for a short distance, this segment thereof being identified as **10***b* in FIGURE 1, and then substantially parallel to the longitudinal axis of the lamp envelope for a short distance, this segment thereof being identified as **10***c* in FIGURE 2. The lead-in wire **10** is then bent angularly to the right and then to the left, as viewed in FIGURE 2, to defined segments **10***d* and **10***e* respectively, finally terminating in the aforementioned offset portion **10***a*.

In the development of the above-described mount structure, it was found that the provision of angular bends to provide various segments of various lengths of the two lead-in wires contributed substantially to the attainment of the desired flexibility of the mount structure. In addition thereto, the segments **10***d* and **10***e* of the longer lead-in wire **10** are disposed so as to effect a substantial reduction in lead-in wire shadow.

One of the more critical problems associated with the development of a high quality mount structure for a lamp of this type was the integration of rigidity, flexibility and elasticity characteristics. With an axial filament, this problem becomes particularly acute since one lead-in wire is relatively short and the other lead-in wire is relatively long. During shock tests, in some cases, it was found that the lead-in wires of unequal length flexed an unequal amount and tended to return toward their initial positions an unequal amount. Because of the greater mass and leverage, the longer lead-in wire flexed more and had much less tendency to return to its initial position than the shorter lead-in wire.

The lead-in wires must have some flexibility and some elasticity because excessive rigidity must also be avoided in order to protect the filament from the brunt of a shock to which the lamp envelope may be subjected, during transportation or handling for example.

We have found that these undesirable conditions may be overcome by flattening that portion of the longer lead-in wire **10** which extends substantially parallel to the longitudinal axis of the lamp envelope, i.e., the segment identified as **10***c* in FIGURE 2. We have found that with this structure, the desired flexibility and elasticity as well as stiffness are obtained. We have noted that the flattened portion is stiffer under shock conditions and yet the remainder of the lead-in wire **10** is flexible and elastic enough to absorb most of the shock under adverse handling or transportation conditions. This increased stiffness is probably due to the work hardening of the nickel wire as a result of the flattening thereof. Even further improvement is noted when the support wires **24** and **26** are disposed substantially at right angles to their respective lead-in wires and engage the segments thereof which extend substantially parallel to the longitudinal axis of the lamp and not at the bends, i.e., not at the junction of segments **10***b* and **10***c* of lead-in wire **10** and the junction of segments **12***b* and **12***c* of lead-in wire **12**.

In the specific embodiment of the invention illustrated in the accompanying drawing, a 500 watt incandescent lamp in a PS35 bulb is shown. The support wires **22**, **24** and **26** are .012 inch molybdenum and the lead-in wires **10** and **12** are .035 inch nickel, with the narrower dimension of the flattened segment **10***c* being about .025 inch.

What we claim is:

1. A mount structure disposed within an electric lamp envelope having a longitudinal axis, said mount structure comprising: a filament, the longitudinal axis of which is substantially coincident with the longitudinal axis of said

envelope; a stem press; and a pair of lead-in wires of unequal length anchored in said stem press and extending generally longitudinally within said envelope and along opposite sides of the longitudinal axis of said envelope, each of said lead-in wires terminating in an inwardly extending segment to which the ends of said filament are attached, said lead-in wires diverging as they emerge from said stem press and then extending in part substantially parallel to the longitudinal axis of said envelope, said substantially parallel segment of the longer of said pair of lead-in wires being flattened whereby greater stiffness is imparted to said longer lead-in wire.

2. A mount structure disposed within an electric lamp envelope having a longitudinal axis, said mount structure comprising: a filament, the longitudinal axis of which is substantially coincident with the longitudinal axis of said envelope; a stem sealed in an end of said envelope and extending into the interior thereof, the inner end of said stem being provided with a stem press; an arbor mounted on said stem press, the other end of said arbor being provided with an arbor button; a pair of lead-in wires of unequal length anchored in said stem press and extending generally longitudinally within said envelope and along opposite sides of the longitudinal axis of said envelope, each of said lead-in wires terminating in an inwardly extending segment to which the ends of said filament are attached, said lead-in wires diverging as they emerge from said stem press and then extending in part substantially parallel to the longitudinal axis of said envelope, said substantially parallel segment of the longer of said pair of lead-in wires being flattened whereby greater stiffness is imparted to said longer lead-in wires; and a filament support wire extending generally longitudinally within said envelope, one end of said filament support wire being embedded in said arbor button and the other end thereof being provided with a loop portion substantially encircling said filament intermediate the ends thereof.

3. A mount structure disposed within an electric lamp envelope having a longitudinal axis, said mount structure comprising: a filament, the longitudinal axis of which is substantially coincident with the longitudinal axis of said envelope; a stem sealed in an end of said envelope and extending into the interior thereof, the inner end of said stem being provided with a stem press; an arbor mounted on said stem press, the other end of said arbor being provided with an arbor button; a pair of lead-in wires of unequal length anchored in said stem press and extending generally longitudinally within said envelope and along opposite sides of the longitudinal axis of said envelope, each of said lead-in wires terminating in an inwardly extending segment to which the ends of said filament are attached, said lead-in wires diverging as they emerge from said stem press and then extending in part substantially parallel to the longitudinal axis of said envelope, said substantially parallel segment of the longer of said pair of lead-in wires being flattened whereby greater stiffness is imparted to said longer lead-in wire; a filament support wire extending generally longitudinally within said envelope, one end of said filament support wire being embedded in said arbor button and the other end thereof being provided with a loop portion substantially encircling said filament intermediate the ends thereof; and a pair of support wires for said lead-in wires, one end of each of said support wires being embedded in said arbor button and the other end thereof being provided with a loop portion substantially encircling its associated lead-in wire intermediate the ends of said substantially parallel segment thereof and extending substantially perpendicular thereto.

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