

[54] ANTI-RATTLE ASSEMBLY SUPPORT 2,116,720 5/1938 Wiegand..... 313/25 X
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 [51] Int. Cl. H01j 7/00
 [58] Field of Search 313/269, 292, 25, 26, 323;
 248/358 AA; 267/136

[57] ABSTRACT

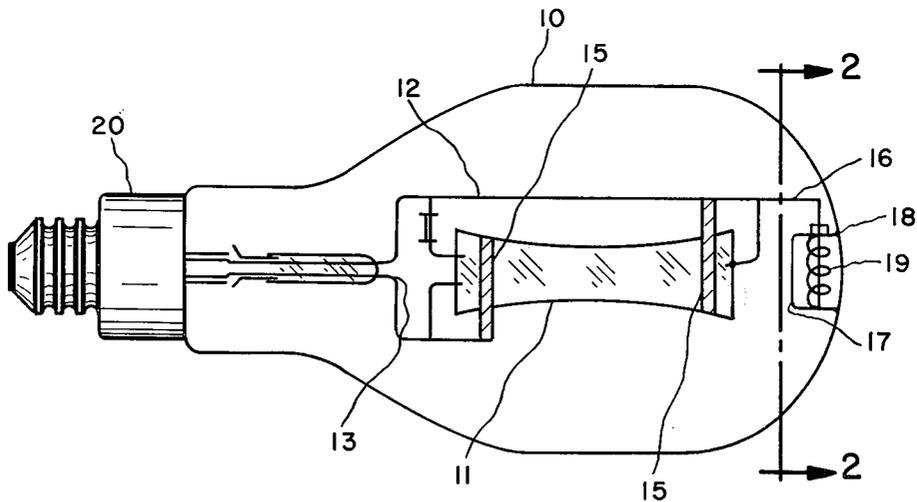
A coiled spring disposed around the top support of a lamp assembly clamps the support firmly to the dimple in the top of the lamp. This arrangement serves to prevent rattle and effectively damps vibration in a discharge type lamp.

[56] References Cited

UNITED STATES PATENTS

2,042,148 5/1936 Gaidies et al..... 313/25

5 Claims, 2 Drawing Figures



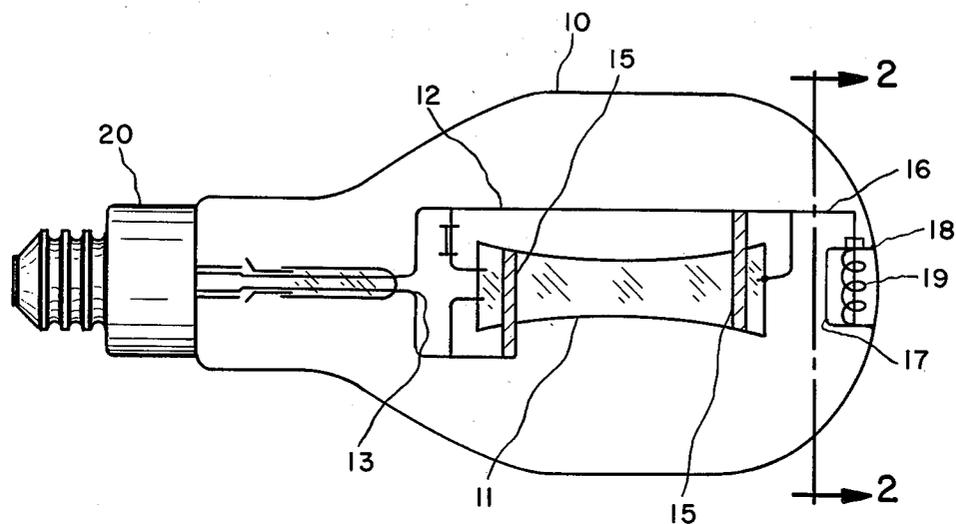


FIG. 1

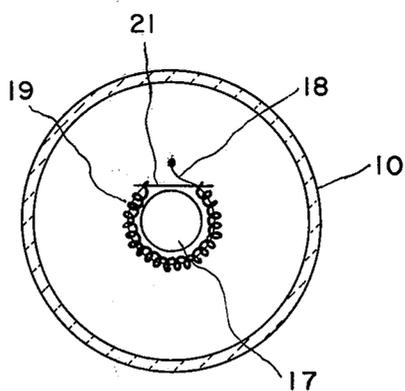


FIG. 2

ANTI-RATTLE ASSEMBLY SUPPORT

FIELD OF THE INVENTION

This invention relates to electric discharge lamps and more particularly to vibration damping supports for such lamps.

In one type of arc discharge lamp, the envelope of the lamp includes an inwardly protruding projection. The principal support for the discharge assembly includes a longitudinal rod at the end of which is a circular loop. The circular loop is disposed over the projection of the envelope to serve as a fairly firm positioning point for the discharge assembly. Extending from intermediate portions of the supporting rod are brackets or welded strips which support the discharge tube itself.

It has been found that such construction, while affording a fairly firm end position for the supporting rod, nevertheless is subject to various kinds of vibration which causes the internal portion of the discharge lamp to rattle. When such rattle occurs within the lamp, it has been found that stresses and other deleterious effects can substantially shorten the lifetime of the lamp.

One attempt to make the lamp assembly rattle-free is with the use of a dimple, over which a spring clip attached to the supporting rod would be disposed. While this arrangement prevented rattle in the final assembly of the lamp, nevertheless, substantial difficulty was encountered in the assembly of such lamps. The difficulty was because the dimple mentioned above has very little taper in its external walls, the inside dimensions of the spring clip must be fairly close to the outside dimensions of the dimple over which the loop must fit. It is therefore an awkward operation to slip the spring clip over the dimple. This operation is even more difficult when using a phosphor-coated bulb in which the dimple and spring clip cannot be seen by the assembling operator.

It is accordingly an object of the present invention to provide a support for the discharge elements in an arc discharge lamp which is immune from rattling.

Another object of the present invention is to provide an anti-rattle device in a discharge lamp support which is relatively economical to manufacture and easy to assemble.

BRIEF SUMMARY OF THE INVENTION

In accordance with the present invention, in a gas discharge and/or filament lamp, an anti-rattle support structure comprises a lamp envelope having an inwardly directed projection at one end of said envelope distal from the base of the lamp. The support structure also includes a supporting rod extending in the axial direction of the lamp for supporting the lamp elements. The rod has an approximately closed loop formed at one end thereof. A helically-coiled spring is disposed over the loop of the supporting rod to form a coil-on-loop arrangement. The inwardly-directed projection is inserted into the coil onloop arrangement whereby the helically-coiled spring tightly and resiliently embraces the projection of the envelope.

Other objects of the present invention will become apparent by reference to the following description and drawings while the scope of the invention will be pointed out in the appended claims.

DESCRIPTION OF THE DRAWINGS

In the figures,

FIG. 1 illustrates a discharge lamp constructed with a support in accordance with the present invention;

FIG. 2 is a sectional view taken along line 2 — 2 of FIG. 1.

DESCRIPTION OF THE PRINCIPAL EMBODIMENTS

Referring to FIG. 1, a gas discharge lamp is shown which includes an outer envelope, 10, and a mounting base, 20. The lamp includes a discharge tube, 11, in which an arc may be generated in an atmosphere which will sustain such arc, such as mercury vapor, sodium vapor or metal halide vapor. The tube is supported and supplied with electrical current through electrodes 12 and 13. Electrode 12 is typically a supporting wire rod having a circular loop at the extreme end indicated as 18 in the figure.

The discharge tube, 11, is supported from the electrode supports by straps, 15, which are welded to the supports. As is conventional, the electrode supports are connected to flexible conductors which are connected appropriately to the base of the lamp.

The lamp envelope is constructed with an internal projection or dimple, 17. Projection 17 is typically cylindrical in shape. About the wire loop portion of the electrode support, 19, is inserted the helically-coiled anti-rattle device of the present invention. The helically-coiled spring, 18, is sufficiently flexible to clamp the outer walls of the dimple and yet be sufficiently resilient to absorb vibratory effects imparted to the lamp assembly.

For a dimple having an approximate diameter of $\frac{1}{2}$ inch and for a supporting wire having a diameter of approximately $\frac{3}{4}$ inch, a coiled spring having a diameter of $\frac{3}{16}$ inch — $\frac{1}{4}$ inch has been shown to be particularly effective.

Referring to FIG. 2, the assembly of the coiled spring on the loop of electrode wire may be more readily appreciated. In this figure, there is also shown the inclusion of a bar of wire, 21, which is affixed to the open end of the loop and the initial portion of the loop to close the loop. The purpose of the bar, 21, is to fix any movement of the spring, 19, to prevent it from descending along the axis of the wire rod, 18. The bar, 21, may also be affixed to the wire loop, 18, by a technique such as welding. The coiled spring may be made of any material which retains its spring tension when operated continuously at a temperature of 400°C., a typical operating temperature of such discharge lamps.

In other arrangements of the coiled spring, the spring may be welded directly to the ring, 18, or it may completely encompass the ring, 18, and the ends of the spring may be hooked together, or it may be held in place by friction. If welding of the spring is performed, no embrittling of the spring material can occur. As a result of the anti-rattle construction of the present invention, the assembly of such discharge lamps is greatly facilitated, particularly since the contour of the spring enables the supporting electrode assembly to act as a guide in insertion on the projection or dimple, in the envelope. It has been found that in a production assembly line a substantial improvement may be obtained with this approach in contrast to the use of the spring clip structure mentioned in the earlier part of this specification.

There has been a general discussion of the use of the coiled spring support in gas discharge lamps. The prin-

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ciple may be used as well in filament-type lamps where similar axial elements are used to support the filament of filaments.

While the principal embodiment of the present invention has been thoroughly described above, those changes in modification which may occur to individuals skilled in the art are also encompassed by the appended claims without departing from the true spirit and scope of the present invention.

What is claimed is:

1. In a gas discharge and/or filament lamp, an anti-rattle support structure comprising:

a lamp envelope having an inwardly directed projection at one end of said envelope distal from the base of the lamp;

a supporting rod extending in the axial direction of the lamp for supporting the lamp elements, said rod having an approximately closed loop formed at one end thereof;

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and a helically-coiled spring disposed over the loop of said supporting rod to form a coil-on-loop arrangement, the inwardly directed projection being inserted into the coil-on-loop arrangement whereby the helically-coiled spring tightly and resiliently embraces the projection of the envelope.

2. The anti-rattle structure as described in claim 1, wherein the coiled spring is welded to the loop.

3. The anti-rattle structure as described in claim 1, wherein the coiled spring ends are hooked together.

4. The anti-rattle structure as described in claim 1, wherein a bar is affixed to the loop ends so as to close the loop.

5. The anti-rattle support structure as described in claim 1, wherein the projection is approximately circular in cross-section and the loop defines a circular configuration.

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