May 3, 1966 K. S. PRESCHEL ET AL 3,249,789

ELECTRIC INCANDESCENT PROJECTION LAMP

Filed Aug. 30, 1962

Fig. 1.

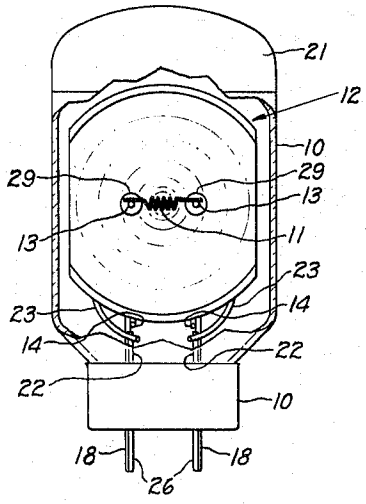


Fig. 2.

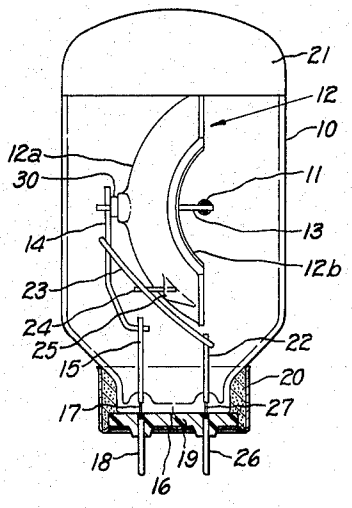


Fig. 3.

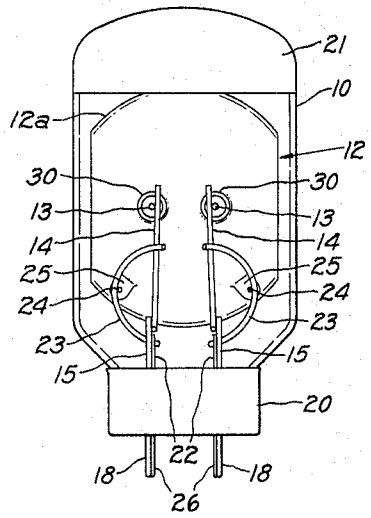
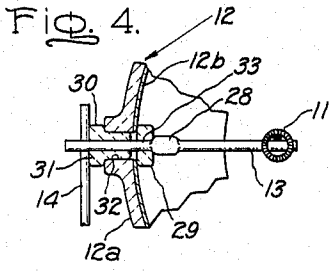


Fig. 4.



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ELECTRIC INCANDESCENT PROJECTION LAMP

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4 Claims. (Cl. 313—113)

This invention relates to electric incandescent projection lamps, and more particularly to lamps embodying an internal reflector associated with the filament to project a light beam in a desired manner.

In such lamps it is desirable to employ a reflector comprising a glass base member having a reflecting coating on a surface thereof. It is further desirable to arrange that the current-carrying lead-in wires extend through the reflector from the back to the coated front surface thereof. The filament is mounted on said lead-in wires at the front of the reflector in accurate relationship thereto. The lead-in wires thus serve to support the reflector at least in part, and are thereby so located as to provide a minimum of interference with the light reflected from the reflecting surface.

As disclosed in co-pending application Serial No. 73,064, filed December 1, 1960, Patent No. 3,160,776, for an "Electric Incandescent Projection Lamp," and assigned to the same assignee, it is necessary in lamps of this type to provide insulating means interposed between the lead-in wires and the glass base reflector member, said insulating material having a resistance materially higher than that of said glass base and sufficient to prevent current flow through said glass base between said lead-in wires. The insulating means has a volume resistivity exceeding 10^{14} ohms per centimeter cube at room temperature (25° C.). Steatite, which is chiefly $MgO.SiO_2$ crystals, is preferred although alumina or any other of the refractory oxides with good high temperature insulating properties would be satisfactory.

It is a principal object of the present invention to provide an improved insulating support means for the reflector which securely holds the filament in the center of the reflector and is easily assembled.

For a full understanding of the invention attention is directed to the following detailed description and to the drawing wherein:

FIG. 1 is a front elevation of a lamp comprising the invention;

FIGS. 2 and 3 are side and rear elevations thereof respectively; and

FIG. 4 is a fragmentary sectional view of the assembly of the glass reflector and one of the lead-in wires.

Referring to the drawing, the lamp illustrated thereby, by way of example, comprises a sealed tubular glass bulb or envelope **10** containing a gaseous filling, for example nitrogen or argon at a pressure of about 1000 mm. at room temperature. The bulb **10** contains a filament **11** herein illustrated as a coiled coil of tungsten wire extending transversely of the bulb and offset from the longitudinal axis thereof. The filament **11** is mounted at or near the focus of an internal reflector **12** of any desired shape, for example ellipsoidal, the filament **11** being mounted at or near one of the foci of the ellipsoid. The filament **11** is connected across and between the ends of a pair of transverse inner lead-in conductor wires **13** which extend through the reflector **12** and also serve as a support therefor.

The reflector **12** is a pressed glass base member **12***a* (FIG. 4) (of the usual lime or lead glasses used in lamps) having on its front surface a reflecting coating **12***b* preferably of vapor-deposited material such as silver or a composite dichroic coating which reflects visible light but transmits the heat or infrared rays incident thereon from

the filament. Such dichroic coatings are well known and may consist of an extremely thin coating of suitable metal or a composite coating constructed of a film of a semiconductor such as germanium, silicon, antimony sulfide or selenium, coated with a thin film or films of a dielectric material or materials such as zinc sulfide, magnesium fluoride or aluminum oxide. For instance, there may be employed a layer of germanium of such a thickness as to transmit about 20% of the visible radiations and coated with a layer of zinc sulfide having an optical thickness of about 250 A.

The ends of the inner lead-in wires **13** at the back of the reflector **12** are connected to, and supported by, intermediate lead-in support wires **14** which are, in turn, connected to and supported by the ends of a pair of outer lead-in wires **15** sealed in a disk-shaped glass press **16** which closes the end of the bulb (FIG. 2). A seal wire **17** having a composition such as to thermally expand at the same rate as the glass is sealed through the press **16**. Exterior of the envelope contact pins **18** are connected to the seal wires **17** and provide the exterior electrical connection for the lamp. To suitably support the contact pins a plate **19** of insulating material is provided which seats closely adjacent to the glass press **16** and secures the contact pins **18** against movement relative thereto. As is conventional, the lower end of the bulb carries a base **20** and its upper end or dome is masked by an opaque coacting **21** which may be an internal vapor-deposited coating of metal such as an aluminum-copper-iron alloy.

The reflector **12** is additionally supported from a pair of dummy lead-in wires **22** by arcuately shaped struts **23** connected as by welding between each of the dummy lead-in wires and the intermediate lead-in wires **14** thus preventing misalignment of the intermediate lead-in wires with respect to the lamp base. The manner of attachment of the reflector **12** to the dummy lead-in wires is illustrated in FIGS. 1 and 3 wherein the reflector is provided with a pair of support pins **24** sealed into bosses **25** provided on the back of the glass reflector and embedded in the glass sufficiently deep to securely hold them therein without coming in contact with the reflective coating **12***b*. The outer ends of the support pins **24** are attached to the arcuate-shaped struts **23** and therefor securely locate the lower part of the reflector with respect to the base. The dummy lead-in wires **22** are sealed in the glass press **16** and connected to dummy contact pins **26** by seal wires **27**.

The inner lead-in wires **13** are provided with an expanded portion **28** (FIG. 4) which, in cooperation with steatite ceramic insulating washers **29** and steatite ceramic insulating bushings **30** provided with flanges **31**, securely hold the reflector **12** to the intermediate lead-in support wires **14** when the inner lead-in wires **13** are inserted through openings **32** in the reflector and holes **33** in ceramic disks **29** and are then welded to intermediate lead-in wires **14**. The arrangement is such that the body bushing **30** extends into the opening **32** in the reflector to thereby hold the lead-in support wire out of contact with the reflector and insulate it from the reflecting coating **12***b*. The intermediate lead-in wires **14** are biased against the ceramic bushings **30** when the weld is made so as to slightly tension the reflector lead-in wires **13** while the weld is made.

Thus, it will be noted that there is provided an improved lamp which eliminates the need for a glass seal or extra clip fastening members for the mirror as were necessary in prior constructions, while still providing the insulation required between the reflector and the lead-in wires. The support pins **24** which are not in the direct current path and are spaced relatively far away from each other need not be insulated. While the preferred

embodiment of the invention has been given, it will be understood that it is merely exemplary thereof, and the invention may be widely modified within the terms of the appended claims.

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

1. An electric incandescent projection lamp comprising a sealed glass envelope; a glass base reflector member in said envelope having a reflecting coating on a front surface thereof and a pair of support pins embedded in a back surface thereof out of contact with said reflecting coating; a pair of lead-in conductors extending through said reflector having expanded portions adjacent said front surface; a filament connected across and between said lead-in conductors at the front of said reflector member; first insulating members between said expanded portions and said front surface; separate insulating means surrounding said lead-in conductors adjacent the rear surface of the reflector, and a pair of lead-in support wires secured to said lead-in conductors immediately adjacent said separate insulating means whereby said insulating members, said reflector, and said separate insulating means are securely fastened together and supported by said lead-in support wires, said envelope being provided with a relatively flat press base portion having a pair of electrical contact pins and a pair of dummy contact pins mounted therein; said lead-in support wires being mounted on said contact pins; and struts interconnecting said dummy contact pins and said lead-in support wires and connected to said support pins sealed in the rear of the reflector member.

2. An electric incandescent projection lamp comprising a sealed glass envelope; a glass base reflector member in said envelope having a reflecting coating on a front surface thereof and a pair of support pins embedded in a back surface thereof out of contact with said reflecting coating; a pair of lead-in conductors extending through said reflector having securing portions adjacent said front surface; a filament connected across and between said lead-in conductors at the front of said reflector members; a pair of lead-in support wires secured to said lead-in conductors, insulating means surrounding said lead-in conductors and engaging said front and rear reflector surfaces between said securing portions and said lead-in support wires whereby said reflector and said insulating means are securely fastened together and supported by said lead-in support wires, said envelope being provided with a relatively flat press base portion having a pair of electrical contact pins and a pair of dummy contact pins mounted therein; said lead-in support wires being mounted on said contact pins; and a strut interconnecting a respective dummy contact pin and corresponding lead-in support wire and being connected to a corresponding support pin sealed in the rear of the reflector member.

3. An electric incandescent projection lamp comprising a sealed glass envelope; a glass base reflector member in said envelope having a reflecting coating on a front surface thereof; a pair of lead-in conductors extending through said reflector having expanded portions adjacent said front surface; a filament connected across and between said lead-in conductors at the front of said reflector member; insulating washers between said expanded portions and said front surface; flanged insulating bushings surrounding said lead-in conductors adjacent the rear surface of the reflector, and a pair of lead-in support wires welded transversely across and to said lead-in conductors and biased against said flanged insulating bushings with slight tension in said lead-in conductors whereby said insulating washers, said reflector, and said flanged insulating bushings are securely fastened together and supported by said lead-in support wires.

4. An electric incandescent projection lamp comprising a sealed glass envelope; a glass base reflector member in said envelope having spaced openings therethrough and a reflecting coating on a front surface thereof; a pair of lead-in conductors extending through the openings in said reflector and having expanded portions adjacent said front surface; a filament connected across and between said lead-in conductors at the front of said reflector member; first insulating members between said expanded portions and said front surface; separate insulating means surrounding said lead-in conductors adjacent the rear surface of the reflector and extending into said openings to insulate said lead-in conductors from said reflecting coating; and a pair of lead-in support wires welded transversely across and to said lead-in conductors and biased against said separate insulating means with slight tension in said lead-in conductors whereby said insulating members, said reflector, and said separate insulating means are securely fastened together and supported by said lead-in support wires.

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