United States Patent [19]

Bock

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[54] **METHOD OF FORMING BEADED LEAD-IN WIRES FOR LAMPS**

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[52] **U.S. Cl.** **29/25.16,** 431/95

[51] **Int. Cl.** **H01j 9/18**

[58] **Field of Search** 29/25.13, 25.14, 25.15, 29/25.16; 313/271; 431/92, 93, 94, 95; 174/111

[56] **References Cited**

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[57] **ABSTRACT**

Lead-in wires for a lamp are beaded together by providing an offset in at least one of the wires, placing a ring of glass around the wires and letting it rest on the offset, and heating the glass so that it forms a bead for holding the wires in mutual relationship. A glass sleeve may be placed around one of the wires so as to rest on top of the glass ring prior to the steps of heating, resulting in an integral set of beaded wires of which one wire is sleeved above the bead.

5 Claims, 4 Drawing Figures

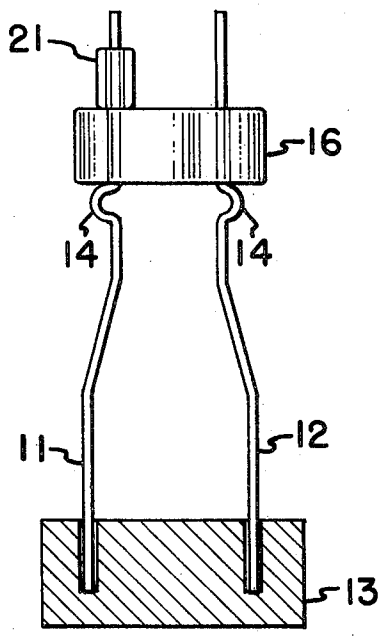


Fig. 1

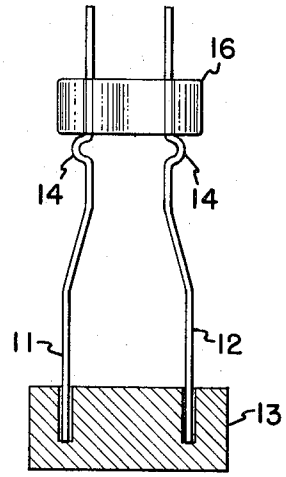


Fig. 2

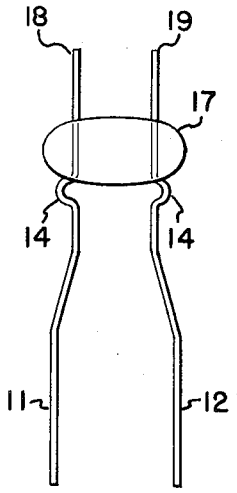


Fig. 3

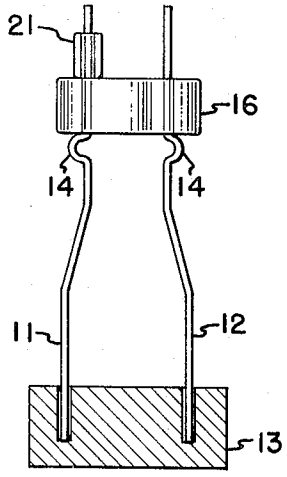
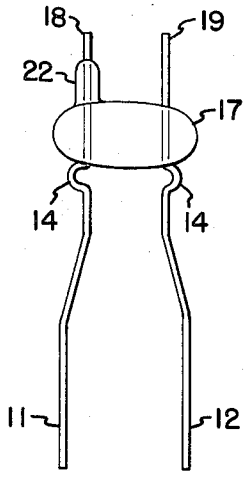


Fig. 4



METHOD OF FORMING BEADED LEAD-IN WIRES FOR LAMPS

CROSS-REFERENCES TO RELATED APPLICATIONS

Ser. No. 356,459, filed May 2, 1973, John Baldridge, Jr. and John C. Sobieski, "Photoflash Lamp Having Non-shorting Construction," now U.S. Pat. No. 3,816,054, issued June 11, 1974 and assigned the same as this invention.

Ser. No. 382,737, filed concurrently herewith, John J. Bock, "Photoflash Lamp Having Sleeved Inner Lead," assigned the same as this invention.

BACKGROUND OF THE INVENTION

The invention is in the field of beaded inleads for electric lamps.

Certain electric lamps, particularly some of the small incandescent lamps such as flashlight lamps and photoflash lamps, are conventionally made by sealing and securing the lead-in wires with a glass bead to hold the wires in substantially parallel spaced-apart relationship, attaching a filament across one end of the lead-in wires, and then sealing the assembly into a bulb, the bead being inside the finished lamp. The beading of the lead-in wires facilitates handling and holding the assembly when attaching the filament and when sealing it into the bulb. The bead also provides mechanical rigidity in the finished lamp. The bead is formed by holding the lead-in wires vertically, positioning a platform member between the lead-in wires where the bead is desired, placing a glob of glass or a quantity of powdered glass on the platform between the wires, or placing a glass ring on the platform around the wires, and heating the glass so that it melts on the platform and forms a bead sealed around and between the wires.

SUMMARY OF THE INVENTION

Objects of the invention are to provide a new and improved method of manufacturing beaded lead-in wires for lamps.

The invention comprises, briefly and in a preferred embodiment, the steps of providing a plurality of lead-in wires to be beaded together, shaping at least one of the wires to provide an outwardly extending offset immediately below where the bead is desired, supporting the wires in substantially parallel spaced-apart relationship with at least one of the offsets extending outwardly, placing a ring of glass or other vitreous material around the lead-in wires and resting on the offsets, and heating the glass ring so that it forms a bead on the lead-in wires. In a modification, a sleeve of glass or other vitreous material is placed around one of the wires so as to rest on top of the ring prior to the step of heating, resulting in an integral set of beaded wires with one of the wires being sleeved above the bead.

BRIEF DESCRIPTION OF THE DRAWING

FIGS. **1** and **2** are side views illustrating steps of making beaded lead-in wires in accordance with a preferred embodiment of the invention; and

FIGS. **3** and **4** are similar to FIGS. **1** and **2,** and show a modification in which a sleeve is provided on one of the lead-in wires.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In FIG. **1,** a pair of lead-in wires **11** and **12** are held in substantially parallel vertical spaced-apart relationship by any suitable means, such as by placing their lower ends into openings of a holding fixture **13.** Each of the wires **11** and **12** is shaped to provide an outwardly extending U-shaped offset **14** at a point just below where it is desired to provide a bead for holding the lead-in wires together. The lead-in wires **11** and **12** may be made of dumet, Kovar, or other suitable material for ultimate sealing through a bulb or envelope of a lamp. A ring **16** of glass or other suitable vitreous material is placed around the upper ends of the lead wires **11, 12** so that it rests against the offsets **14.** Obviously, the inner diameter of the ring **16,** the outwardly extending dimensions of the offsets **14,** and the spacing apart of the lead-in wires are so proportioned that the ring **16** will rest upon the offsets **14.** Preferably, the upper ends of the lead-in wires above the offsets **14** are substantially parallel to one another, or may taper toward each other at the upper ends, to facilitate placing the ring **16** in position. However, the upper ends of the lead-in wires can extend outwardly from one another, and the wires would have to be sprung to put the ring **16** in position, or the ring **16** can be placed in position prior to holding the lead-in wires in the fixture **13.** The ring **16** is then heated by suitable means, such as by gas flames, to melt it sufficiently so that it will collapse and seal onto the lead wires, thus forming a bead **17** as shown in FIG. **2** which supports the lead wires and holds them together in spaced-apart relationship. Thereafter, a filament may be connected to or across the top ends **18,** 19 of the lead-in wires **11** and **12.** This provides a filament mount structure, which may then be sealed into a lamp bulb or envelope in conventional manner.

FIG. **3** is the same as FIG. **1** except that a sleeve **21** of glass or other vitreous material has been placed around one of the lead-in wires **11** so as to rest on the top surface of the ring **16.** Upon heating the ring **16** so that it forms a bead sealed around the lead-in wires **11** and **12,** as described above, the sleeve **21** melts sufficiently to become sealed to the bead, and also may become sealed to the lead-in wire **11,** thus providing, as shown in FIG. **4,** a sleeve integrally held around a portion of the lead wire **11** above the bead **17.** This type of filament mount, when used in a photoflash lamp, helps to insure that the lamp will become an open circuit after flashing because, when the lamp flashes, the unsleeved lead-in wire **12** burns farther down from the filament than does the sleeved lead **11,** as is more fully described in the above-referenced patent application of John Baldrige and John Sobieski, and also in the above-reference patent application of John Bock, which discloses an arrangement of an offset provided in a lead-in wire for positioning a glass sleeve.

The invention provides a method of making beaded lead-in wire structures, without the need of any temporary supporting platform to hold the glass while being heated to form a bead, and thus the invention simplifies the mount-making machinery and reduces the cost thereof. While one way is shown of shaping the lead-in wires **11, 12** to provide suitable shoulders **14** for supporting the ring **16** prior to melting it, the lead-in wires may be shaped in numerous other ways to provide suitable offsets for supporting the ring **16.** Also, satisfac-

tory results might be obtained by providing an offset **14** in just one of the lead-in wires, although preferably an offset is provided in each of the wires, as has been shown and described.

Somewhat surprisingly, the bead made in accordance with the invention does not sag appreciably even though it is made without resting on a supporting platform. This is primarily due to the fact that filament mounts for which beaded lamps are usually used, i.e., photoflash lamps and flashlight lamps, have small beads and the lead-in wires are close together, ranging from about one-eighth of an inch to one-sixteenth of an inch apart at the beaded region. Any tendency for the bead to sag can be reduced by tilting the lead-in wires from the vertical and rotating them as a unit about an axis parallel to the wires while heating and sealing the bead. However, a certain amount of bead sag, which would tend to occur mostly at the middle part of the bead, is generally tolerable and of no consequence.

While preferred embodiments of the invention have been shown and described, various other embodiments and modifications thereof will become apparent to persons skilled in the art, and will fall within the scope of the invention as defined in the following claims.

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

1. A method of making beaded lead-in wires, comprising the steps of providing a plurality of lead-in wires to be beaded together, shaping at least one of said wires to provide a lateral U-shaped offset immediately below where the bead is desired, supporting the wires in substantially parallel spaced-apart relationship with at least one offset extending outwardly below the desired bead location, placing a ring of vitreous material around the lead-in wires so as to rest on said offset, and heating the ring so that it forms a bead sealed to the lead-in wires.

2. A method as claimed in claim **1** in which there are two of said lead-in wires and each is provided with a lateral U-shaped offset, said wires being positioned so that their offsets extend outwardly from each other below the bead location.

3. A method of making beaded lead-in wires, comprising the steps of providing a plurality of lead-in wires to be beaded together, shaping at least one of said wires to provide a lateral offset immediately below where the bead is desired, supporting the wires in substantially parallel spaced-apart relationship with at least one offset extending outwardly below the desired bead location, placing a ring of vitreous material around the lead-in wires so as to rest on said offset, placing a sleeve of vitreous material over one of the lead-in wires so as to rest on top of said ring, and heating the ring so that it forms a bead sealed to the lead-in wires, whereby during said step of heating the sleeve becomes sealed to the bead.

4. A method as claimed in claim **1** in which said lead-in wires are positioned less than about one-eighth of an inch apart at the bead location.

5. A method as claimed in claim **1** including the step of positioning said lead-in wires at an angle from the vertical and rotating the wires as a unit about an axis substantially parallel to the wires during said step of heating and forming the bead.

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