

Feb. 28, 1956

C. E. BECHARD ET AL

2,736,873

LAMP BASE CONNECTION AND METHOD OF MANUFACTURE

Filed Dec. 1, 1951

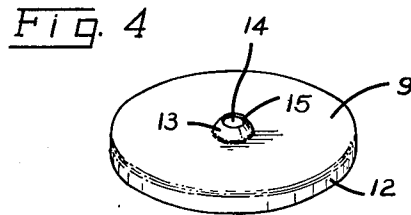
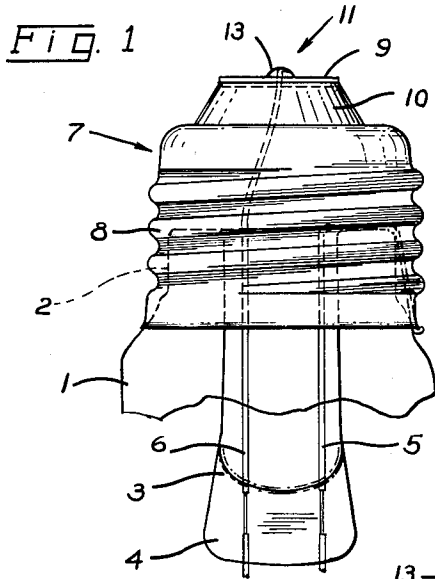
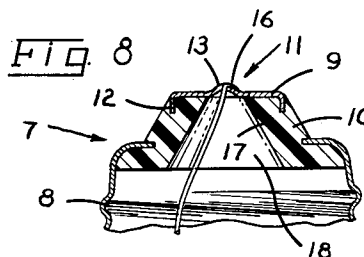
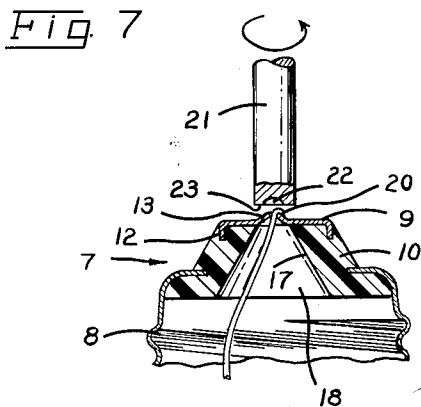
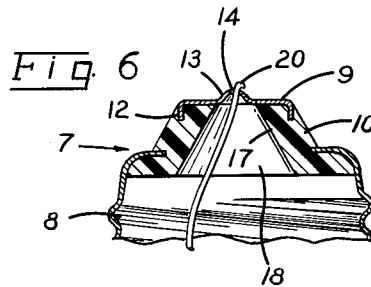
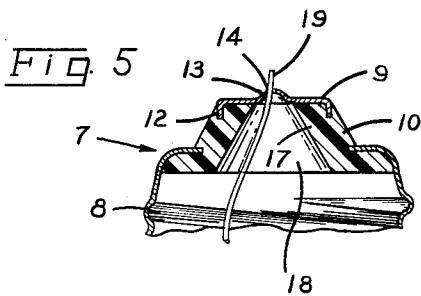
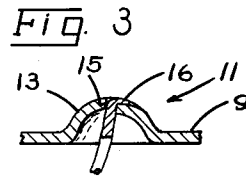
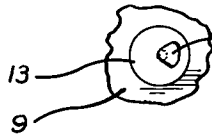


FIG. 2



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LAMP BASE CONNECTION AND METHOD OF MANUFACTURE

Conrad E. Bechard, Mayfield Heights, and Waldemar P. Schoenoff, Cleveland, Ohio, assignors to General Electric Company, a corporation of New York; patent dedicated to the Public insofar as it relates to lamps and lamp parts to the extent stated in document recorded in the U. S. Patent Office, January 4, 1954, Liber U-238, page 394

Application December 1, 1951, Serial No. 259,338

4 Claims. (Cl. 339-146)

This invention relates to electric lamps and similar devices requiring bases having end contacts for making connections to the enclosed filament or electrodes. The invention is more particularly concerned with the means for securing a lead-in wire of the lamp to the end contact and for achieving a firm and effective electrical connection thereto.

In the manufacture of electric lamps, particularly of household type incandescent lamps, it has become standard practice to employ a base, usually comprising a metallic shell having its cylindrical surface threaded and provided with a metallic end contact or eyelet insulated from the shell. This base is applied to the neck of the bulb and is secured to it by a cement or other suitable means. In order to provide external terminal contacts for energizing the filament of the lamp, one of the lead-in wires is connected to the side wall or shell of the base and the other is connected to the end contact or eyelet.

Although some attempts have been made in the past to connect the lead-in wires to the end contact or eyelet, and also to the shell, by mechanical means such as crimping or wedging, such attempts have met with limited success only, at least in the large volume household types of lamps. The general practice has been to use a metal which is readily soldered for the shell and the end contact, and to make the permanent connection to the lead-in wires by means of a solder joint. This soldering operation presents certain difficulties, particularly when performed by the automatic machines used in the mass production of incandescent lamps, and is a relatively costly procedure from the standpoint of the time and maintenance required in connection with the soldering mechanism. Moreover, in the case of low voltage lamps, oxidation of the solder connection in time may become sufficient to preclude the attainment of a good electrical connection with the socket contact, thereby resulting in failure of the lamp to operate. This is particularly disconcerting in the case of a photographic flash lamp where failure of the lamp to flash might result in failure to obtain a certain picture.

The desirability of eliminating the soldering operation in the manufacture of electric lamps has lately been accentuated by reason of the high cost of readily soldered metals such as copper or brass. Concurrently, other metals such as aluminum have become available at relatively low cost. Aluminum constitutes a good conductor and it has a good appearance without any additional treatment so that it provides a highly desirable substitute for brass. Even though it is possible to solder aluminum, this is a relatively costly and generally uneconomical process since cadmium is required in the solder material and the operation is more critical.

It is an object of our invention, therefore, to provide a novel form of solderless connection between a wire and a thin metal contact member.

Another object of our invention is to provide a method

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of mechanically connecting a wire to a thin metal contact member.

Still another object of our invention is to provide an electric incandescent lamp or similar device having a lead-in wire mechanically connected to an end contact on the base of such lamp so as to provide a firm and permanent electrical connection having a neat appearance, and which is not subject to loosening and disengagement during the life of the lamp.

In accordance with the invention, a thin metal contact member or end contact of a lamp base is connected to a wire conductor or lead-in wire of a lamp by inserting the wire through an aperture in a dome-shaped boss pressed from the metal of the contact member, bending a short projecting end portion of the inserted wire over onto the outer side of the boss and then pressing a rotating die against the bent over wire end and against the top of said boss to spin the bent wire end flat down against and flush with the outer side of the boss and roll the annular top edge of the boss inwardly against the said wire to clamp it tightly within the aperture, thereby providing a firm mechanical and electrical connection having a smooth exterior surface and neat appearance.

Further objects and advantages of our invention will appear from the following detailed description of a species thereof and from the accompanying drawing.

In the drawing, Fig. 1 is a fragmentary elevation of the base end of an electric incandescent lamp provided with a terminal end connection according to the invention; Fig. 2 is a plan view, on an enlarged scale, of the end contact of the base shown in Fig. 1; Fig. 3 is a fragmentary sectional view, on an enlarged scale, of the end contact of the base and showing the connection between the end contact and the lead-in wire of the lamp; Fig. 4 is a perspective view of the end contact of the base; and Figs. 5-8 are views illustrating the successive steps involved in connecting a lamp lead-in wire to the end contact of the base by the method according to the invention.

Referring to the drawing, the invention is there exemplified as applied to a connection between one of the lead-in wires of an electric incandescent lamp and the end contact of the base of such lamp. As shown in Fig. 1, the lamp comprises a sealed glass envelope or bulb 1 having a constricted neck portion 2 provided with a reentrant glass stem 3 terminating at its inner end in a press portion 4 through which are sealed a pair of lead-in wires 5, 6. Interiorly of the envelope 1 the lead-in wires 5, 6 are connected to the opposite ends of a suitable filament (not shown) such as a tungsten wire of coiled, coiled-coil, or other suitable form.

Mounted on the neck 2 of the envelope 1 and suitably secured thereto, as by conventional basing cement, is a base 7 according to the invention. The base 7 comprises a metal shell contact portion 8 and a metal end contact portion 9 joined together, in insulated relation, by an insulator 10. The insulator 10 may be made of any suitable insulating material such as glass or a thermosetting plastic material, for instance. The shell portion 8 and the end contact portion 9 constitute the terminal contacts for the lamp. One of the lead-in wires 5 is suitably secured to the shell contact 8 as by soldering for instance. The other lead-in wire 6 is connected to the end contact 9 of the base in a manner according to the invention, as indicated at 11.

The end contact 9 is in the form of a thin disc or eyelet of a suitable sheet metal, such as brass, steel or aluminum, and it is firmly secured to the base insulation 10 in a suitable manner, as by means of a peripheral flange or lip 12 (Fig. 5) formed on the contact member 9 and embedded in the base insulation 10. For the purposes of the invention, the end contact member 9 is formed

with a small outwardly protruding apertured boss in the form of a frusto-spherical or frusto-conical dome-shaped projection 13 pressed from the metal of the contact member and located substantially centrally thereof. The lead-in wire 6 of the lamp extends through the aperture 14 of the boss 13 and is tightly clamped therein, the rim or aperture edge 15 (Figs. 3 and 4) of the boss 13 being rolled or pressed inwardly against the wire to tightly clamp it in place within the aperture 14. A short length of the lead-in wire 6 outwardly of the boss 13 is bent over the outer side thereof and is spun down and flattened thereagainst, as indicated at 16 in Figs. 2 and 3, so as to lie flush therewith and form a smooth exterior surface on the boss.

To form the end contact connection 11 comprising our invention, the center lead-in wire 6 of the lamp, which is preferably made of a relatively soft metal such as copper or a copper alloy, or iron or nickel-manganese alloy, is threaded through the aperture 14 in the end contact member 9 during the positioning of the base 7 on the bulb neck 2 preparatory to its attachment thereto. The threading of the wire 6 through the contact member aperture 14 is facilitated by the customary sloping or converging side walls 17 (Fig. 5) of the opening 18 in the base insulation 10. The base 7 is then fixed in place on the bulb neck 2, as by heating a ring of conventional basing cement on the inner side of the base shell to set the same, after which the portion of the lead-in wire 6 projecting outwardly of the dome-shaped boss 13 is trimmed off close to the top of the latter so as to leave only a relatively short projecting end portion, as indicated at 19 in Fig. 5. The short projecting end 19 of the lead-in wire 6 is then bent over the outer side of the boss 13, as shown at 20 in Fig. 6. Thereafter, with the lamp and its base 7 held stationary, a rotating die 21 (Fig. 7), formed of hardened steel for instance and having a dish-shaped recess 22 in its work face 23, is then forced against the bent over end 20 of the lead-in wire 6 and against the top of the boss 13 on the immovably held contact member 9, with the die recess 22 in alignment with the boss 13, to thereby spin the metal of the bent over wire end 20 flat down against and flush with the outer side of the boss 13, as indicated at 16 in Figs. 2 and 3, and to also compress and partially flatten down the boss 13 whereby to roll its top edge or rim 15 inwardly against the lead-in wire 6 so as to clamp tightly thereagainst.

By fastening the lead-in wire 6 to the end contact 9 in the above-described manner, a good electrical and mechanical connection is provided therebetween which possesses adequate strength to preclude loosening thereof during use of the lamp. In addition, the finished connection 11 possesses a neat and finished appearance and assures a good electrical contact with the socket contact at all times.

Although a preferred embodiment of my invention has been disclosed, it will be understood that the invention is not to be limited to the specific construction and arrangement of parts shown, but that they may be widely modified within the spirit and scope of my invention as defined by the appended claims.

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

1. The method of connecting a lead-in wire extending from the interior of an electric lamp to a thin end contact disc on a lamp base mounted on the lamp which comprises, forming the disc with a dome-shaped boss having an aperture, inserting the wire through the aperture in said boss, bending a short projecting end portion of said wire over the outer side of said boss, and pressing a rotating die against the bent over wire end and the top of said boss to spin the said bent wire end flat down against and flush with the outer side of said boss and roll the annular top edge of the boss inwardly against the said wire to clamp it in place within the boss aperture.

2. The method of connecting a lead-in wire extending from the interior of an electric lamp to a thin end contact disc which comprises, forming the disc on a lamp base mounted on the lamp with a dome-shaped boss having an aperture, inserting the wire through the aperture in said boss, trimming off the portion of the wire extending outwardly of said boss to leave a short projecting end portion, bending the said short projecting end portion of said wire over the outer side of said boss, and pressing a rotating die against the bent over wire end and the top of said boss to spin the said bent wire end flat down against and flush with the outer side of said boss and roll the annular top edge of the boss inwardly against the said wire to clamp it in place within the boss aperture.

3. A connection between a lead-in wire of an electric lamp and a thin metal end contact member of a lamp base mounted on the lamp, said connection comprising a dome-shaped boss on said contact member having an aperture receiving the wire therein, the rim of said aperture being wedged in against the wire to tightly clamp the latter in place in said aperture and the said wire projecting outwardly of said boss and being bent over and being spun flat down onto and flush with the outer side of said boss.

4. An electric lamp comprising a sealed envelope, a lead-in wire sealed through said envelope, and a base secured to said envelope and having a thin metal end contact member connected to said lead-in wire, said end contact member being provided with an outwardly projecting dome-shaped boss having an aperture in which the said wire is received, the rim of said aperture being wedged in against the wire to tightly clamp the latter in place in said aperture and the said wire projecting outwardly of said boss and being bent over and being spun flat down onto and flush with the outer side of said boss.

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