

Sept. 21, 1954

W. HONING ET AL  
ELECTRIC INCANDESCENT LAMP

2,689,924

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2 Sheets-Sheet 1

FIG. 1.

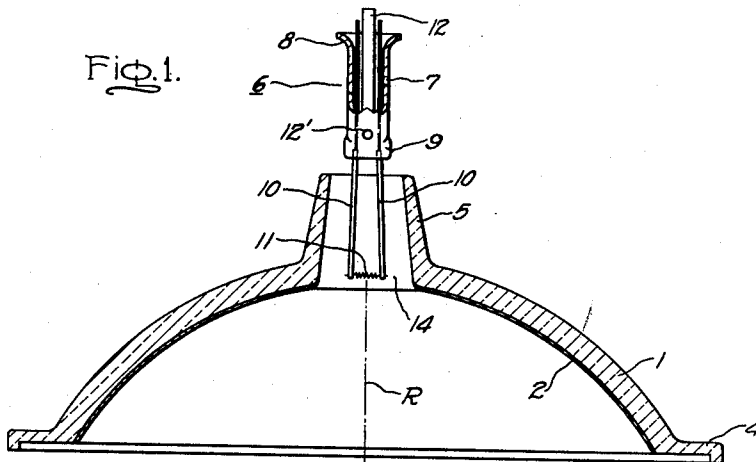


FIG. 2.

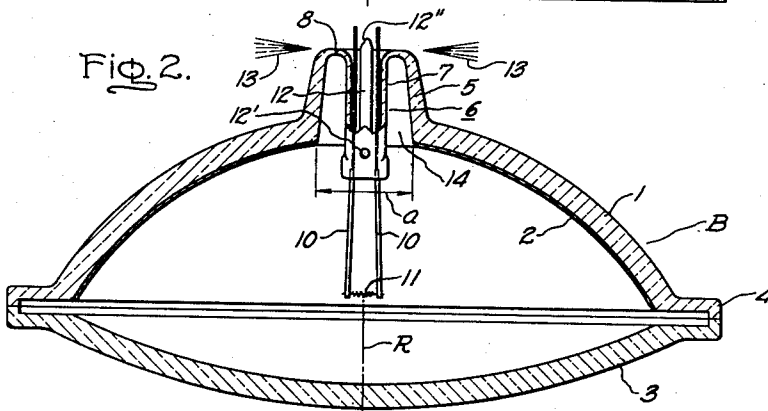


FIG. 3.

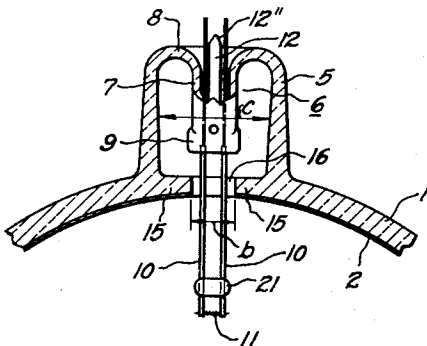
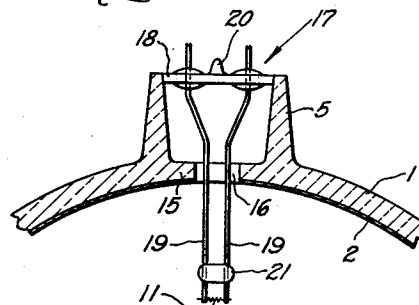


FIG. 4.



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Fig. 5.

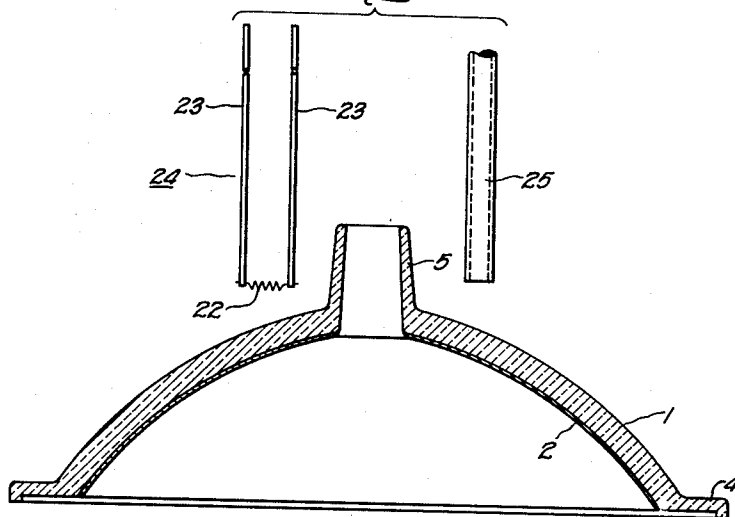


Fig. 6.

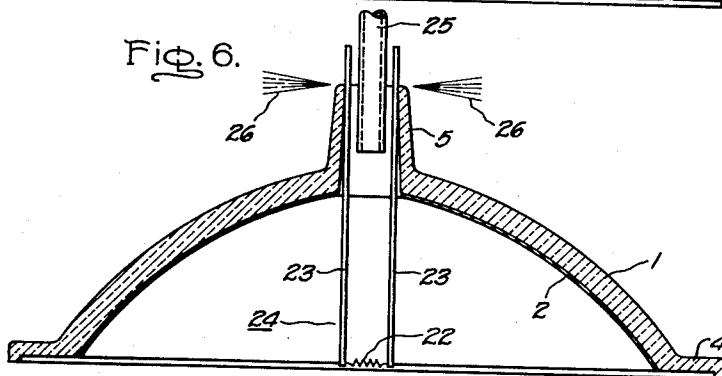
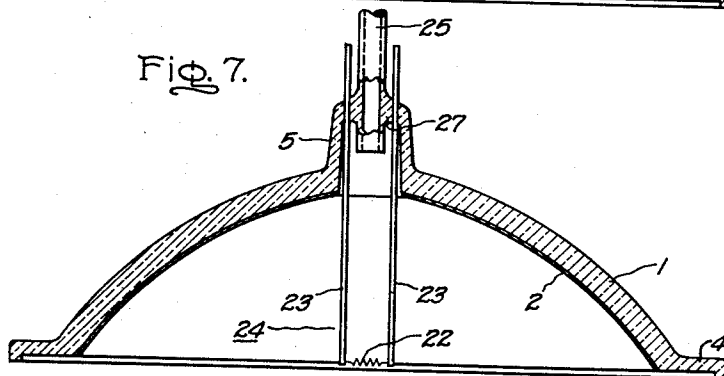


Fig. 7.



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## UNITED STATES PATENT OFFICE

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## ELECTRIC INCANDESCENT LAMP

Wilhelm Honing, Herman Bernard Siebelink, and Simon Wijnberg, Eindhoven, Netherlands, assignors to Hartford National Bank and Trust Company, Hartford, Conn., as trustee; patent dedicated to the Public insofar as it relates to lamps and lamp parts to the extent stated in document recorded in the United States Patent Office April 13, 1954

Application January 25, 1951, Serial No. 207,744

Claims priority, application Netherlands  
January 28, 1950

2 Claims. (Cl. 313-113)

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Our invention relates in general to electric incandescent lamps, and more particularly to electric incandescent lamps of the type in which the envelope is composed at least in part of a pressed glass section.

Electric incandescent lamps of the so-called "sealed beam" type are in general use at present and comprise an envelope or bulb composed of two parts at least one of which is made of pressed glass and usually constitutes a reflecting section. The lead-in conductors for the lamp filament are generally sealed through this pressed glass reflector section by means of small metal caps or thimble-like ferrules which cover openings in the wall of the reflector section and are fusion-sealed at their thin rim edges to the glass bordering the said openings. Secured to the inner sides of the ferrules, as by soldering for instance, are the inner lead-in conductors which are connected to and support the lamp filament, while at their outer sides the said ferrules are provided with terminals, binding screws, or the like, for connecting the current supply wires thereto. The sealing of the lead-in conductors to the glass lamp envelope is thus effected at the rims or edges of the metal ferrules. Usually, an exhaust tube is also provided as an integral part of the pressed glass reflector section for evacuation of the lamp envelope.

In order to assure an effective seal between the glass and the metal ferrules in such type lamps, it is necessary that the ferrules be made of a material having a coefficient of expansion more or less matching that of the glass to which it is sealed and that it have the ability to readily "wet" and adhere to the glass. For this reason, therefore, it has been heretofore necessary to make the metal ferrules of a special relatively expensive chrome-iron alloy.

It is an object of our invention, therefore, to provide an electric incandescent lamp of the above general character having an envelope constituted in part by a pressed glass reflector section, which is of simple and relatively inexpensive construction and which is characterized by a minimum loss of reflected light from the reflector section due to lead-in conductor openings therein.

According to the invention, the pressed glass reflector section of the lamp envelope is provided with an integral external tubular projection, also of pressed glass, in which are sealed the supports or lead-in conductors for the filament or filaments as well as the exhaust tube for the lamp. The tubular projection may form an

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enclosure which communicates with the interior of the envelope through an opening in the wall of the reflector section, and according to one form of the invention the outer edge of the tubular projection is sealed to a glass stem carrying filament support wires which extend through the said wall opening into the interior of the envelope. To minimize loss of reflected light from the reflector wall, the diameter of the wall opening is preferably made as small as possible, preferably no greater than one-half or so the internal diameter of the tubular projection. In such case, the lead-in conductors for the filament may be mounted in a separate part, for instance, a lamp base or a pressed glass base or bottom support. Such a lamp base may be of the general form employed on conventional type incandescent lamps employing blown glass bulbs, while the pressed glass base support may be of the general form employed in radio tubes. However, if desired, the lead-in conductors of the exhaust tube may be sealed directly in the glass of the tubular projection itself.

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

In the drawings, Fig. 1 is an exploded sectional view of the pressed glass reflector section and the glass stem or mount of an electric incandescent lamp comprising our invention, the said parts being shown in position prior to the sealing together thereof; Fig. 2 is a sectional view of a completed lamp according to Fig. 1; Figs. 3 and 4 are fragmentary sectional views of two different modifications according to the invention; Fig. 5 is a view illustrating separately the component parts of the reflector section assembly of another modification according to the invention; Fig. 6 is a sectional view showing the component parts of Fig. 5 in assembled position ready for sealing together; and Fig. 7 is a sectional view of the completed reflector section assembly after sealing.

Referring to Figs. 1 and 2, the incandescent lamp according to the invention comprises an envelope or bulb B formed in part of a relatively thick-walled section 1 made of pressed glass. This section 1 is of more or less dished form, with its inner surface shaped as an optical surface of revolution such as a paraboloid for instance, and provided with a suitable reflecting coating 2 such as aluminium, for example, to thereby constitute it a reflector. The lamp envelope or bulb B is completed by a second or cover glass

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section 3, likewise of pressed glass, which is sealed to the reflector section 1 around the edge or rim 4 thereof. The reflector section 1 is provided with an external tubular projection 5 which is formed integral with the reflector section at the time of pressing thereof and which projects outward from the apex of the reflector section concentrically of the axis R thereof.

Sealed to the reflector section 1 is a stem assembly or mount 6 comprising a glass stem tube 7 terminating at one end in an out-turned flange 8 and at its other end in a pressed portion 9 in which are sealed a pair of lead-in conductors or wires 10. A light source or filament 11, such as a coiled or coiled-coil tungsten wire, is connected across the inner ends of the lead-in conductors 10 and is supported thereby. An exhaust tube 12 extends into the glass stem tube 7 and is sealed thereto at the region of the pressed portion 9 thereof, the said pressed portion being provided with an orifice or aperture 12' which communicates with the interior of the exhaust tube to thereby provide a through passageway for enabling the evacuation of the lamp envelope therethrough.

In fabricating the reflector section assembly of the lamp, the mount 6 is introduced into the opening of the tubular projection 5 into proper sealing position therein, with the flange 8 of the glass stem tube 7 disposed opposite the outer edge of the tubular projection 5. The outer edges of the projection 5 and the stem tube flange 8 are then heated to softening temperature, and interfused and sealed together, by suitable heating means such as gas fires 13, for instance. During the sealing operation, while the glass is still soft, the mount 6 may be shifted slightly so as to locate the filament 11 in the desired optical position with respect to the reflecting surface 2 of the reflector section. This feature constitutes a distinct and important advantage over other constructions wherein the glass parts are sealed to each other by means of preformed inter-fitting surfaces and a sealing glass or enamel.

After completion of the reflector section assembly, the cover glass 3 is fusion-sealed to the reflector section 1 to complete the envelope B. The envelope B is then evacuated and, if desired, filled with a suitable gas through the exhaust tube 12 which is thereafter tipped off, as indicated at 12'', to thereby hermetically seal the envelope.

The construction shown in Figs. 1 and 2 is less expensive than the present conventional type construction wherein the lead-in conductors are carried by metal ferrules fusion-sealed to the reflector section. However, because of its relatively large size, the reflector wall opening 14, which in Figs. 1 and 2 is shown as having a diameter "a" equal to the full inside diameter of the tubular projection 5, nevertheless causes a rather considerable loss of reflected light. The construction illustrated in Fig. 3 eliminates this shortcoming. In this form of the invention the reflector wall is continued or extended inwardly beyond, and across the inner end of the tubular projection 5, as indicated at 15, to a point closely adjacent the lead-in conductors 10 which at this point extend approximately parallel to and closely adjacent one another. In this way an opening 16 is formed in the reflector wall of a diameter "b" which is much smaller than preferably no greater than one-half the internal diameter "c" of the tubular projection 5. As a result, the loss in reflected light from the reflector section

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1 of Fig. 3 is very slight, even though sufficient space remains for the introduction of the mount 6 into the tubular projection 5 and into the interior of the envelope proper.

Fig. 4 illustrates a construction similar to Fig. 3 employing a modified form of mount structure 17 comprising a disc-shaped pressed glass base or bottom support 18 in which are sealed the filament lead-in conductors 19 and an exhaust tube 20. The glass base support 18 may be of the general form employed in radio tubes and is fusion-sealed at its periphery to the outer edge of the tubular projection 5. In this embodiment of the invention, as well as that shown in Fig. 3, the short space between the filament lead-in conductors 19 or 20 may necessitate the reinforcement of these conductors by means of a glass bead 21 fused therearound, as shown.

In the modification shown in Figs. 5-7, the use of a preformed mount structure employing a glass support in which the lead-in conductors and exhaust tube are sealed is dispensed with and the lead-in conductors and exhaust tube instead sealed directly into the glass of the tubular projection 5. A filament 22 is connected across two parallel-extending lead-in conductors 23 to form a filament mount assembly 24. The mount assembly 24, together with a glass exhaust tube 25, are then introduced into the opening of the tubular projection 5 and located in proper sealing position therein as shown in Fig. 6, with the lead-in conductors 23 extending completely through the tubular projection 5 and the exhaust tube 25 projecting part way into the tubular projection, i. e., about half way of the length thereof. The positioning of the parts in such sealing relation with respect to each other may be effected, for instance, by means of suitable holder means (not shown) in which the parts are supported and held in place during the sealing operation. The outer end of the tubular projection 5 is then heated to softening temperature and fused down onto and sealed around the lead-in conductors 23 and the exhaust tube 25, which latter is also heated to softening temperature at the region hereof to be sealed to the tubular projection 5. The heating of the glass parts may be effected, for example, by gas fires directed thereagainst, as shown at 26 in Fig. 6. During the sealing operation a metal mandrel (not shown) may be inserted in the exhaust tube 25 for the purpose of preventing the collapsing and closing-off thereof. This mandrel must be kept in motion back and forth within the exhaust tube during the sealing operation since otherwise the glass of the exhaust tube, on cooling, might adhere to the mandrel and prevent its subsequent removal from the tube.

The completed seal between the parts is as shown in Fig. 7, the glass at the outer edge of the tubular projection 5 being fused down onto and around the lead-in conductors 23 and exhaust tube 25 to form an in-turned flange 27 which joins the exhaust tube to the tubular projection and through which the lead-in conductors extend and are sealed. Immediately after the sealing together of the parts has been completed, and while the glass is still soft, the operator may, if desired, shift the filament mount assembly 24 so as to locate the filament 22 in the desired optical position relative to the reflecting surface 2 of the reflector section 1. The filament mount assembly 24 may be rigidified, if desired, by means of a glass bead similar to that shown at 21 in Figs. 3 and 4.

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While the examples which have been shown and described embody only a single filament and two lead-in conductors therefor, it will be understood that two or more filaments may be provided and, if desired, combined with light intercepting or modifying screens or shields so as to obtain a particular light distribution from the lamp such as provided, for example, by the well-known "Duplo" type vehicle headlamps in common use in certain foreign countries. Also, it is not necessary to fix the filament and the screens, if any, to the lead-in conductors prior to the sealing-in of the latter into the reflector section 1. Such fastening may be performed, instead, after the said sealing-in operation.

Although preferred embodiments of our invention have 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 our invention as defined by the appended claims.

What we claim is:

1. An electric incandescent lamp comprising an envelope including a relatively thick-walled pressed glass reflector section coated with a reflecting layer and provided with a tubular projection extending outward from the wall of said reflector section at the apex thereof, a disc-shaped glass support extending in a plane transverse to the longitudinal axis of said tubular projection and fusion-sealed to the outer end of said tubular projection and having an exhaust tube fused thereto and a plurality of lead-in conductors

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sealed therethrough and having closely spaced parallel portions inwardly of said support, and a filament connected to and supported by said conductors within the envelope, said wall of the reflector section extending across the inner end of said tubular projection and provided with a relatively small diameter opening closely surrounding and through which the said closely spaced conductor portions extend into the interior of the envelope.

2. An electric incandescent lamp comprising an envelope including a relatively thick-walled pressed glass reflector section coated with a reflecting layer and provided with an external tubular projection surrounding an opening in the wall of said reflector section, a filament mounted within said envelope, lead-in conductors extending through said tubular projection and said opening into the interior of said envelope and connected to the said filament therein, and an exhaust tube connected to and communicating with the interior of said envelope for evacuation thereof, the outer end of said tubular projection being fused down on the said conductors and exhaust tube thereby sealing the said conductors and exhaust tube in the glass of said tubular projection.

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