April 23, 1946. G. C. SINGER 2,398,969

ELECTRIC LAMP

Filed Jan. 29, 1945

Fig. 1.

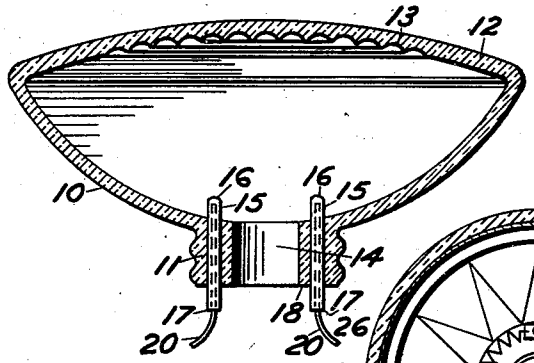


Fig. 6.

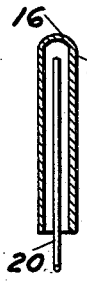


Fig. 4.

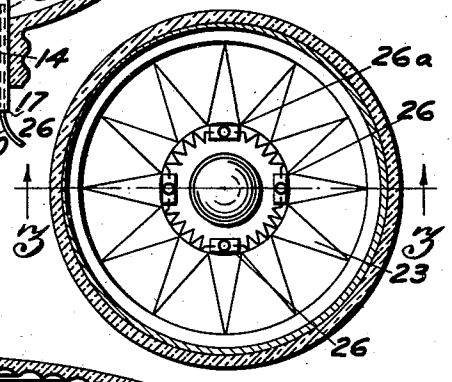


Fig. 2.

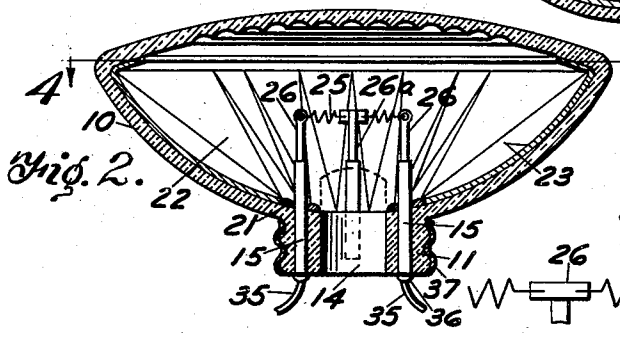


Fig. 5.

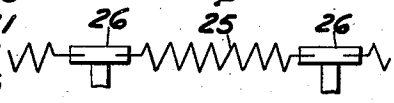


Fig. 3.

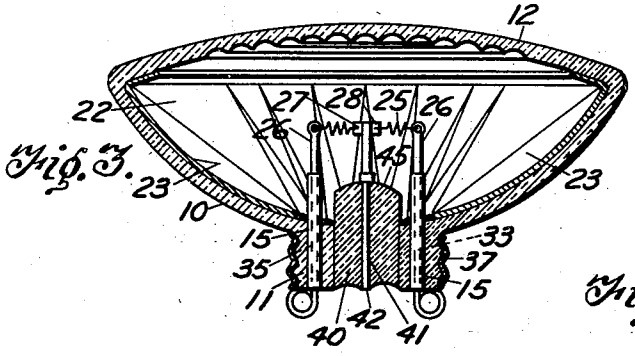
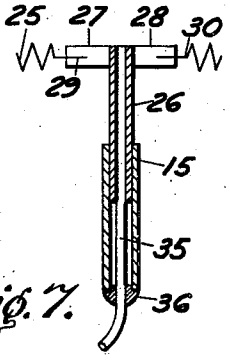


Fig. 7.



INVENTOR.

Grover C. Singer

BY

Munn, Liddy & Glascum

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ELECTRIC LAMP

Grover C. Singer, Brownsville, Tex.

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4 Claims. (Cl. 176—34)

This invention relates to electric lamps.

An object of the invention is the provision of an electric lamp in which the bulb and base are formed integrally of transparent materials, with the base having a wide passage adapted to be closed by a plug of transparent materials with the inner end of the plug curved to form a reflecting surface, supports for lead-in wires being imbedded in the base and projecting into the bulb with the inner projecting ends of the supports providing connections for the usual filaments.

Another object of the invention is the provision of an electric lamp having a bulb and base member formed integrally of transparent materials, the base member having a wide passage through which are adapted to be inserted the filaments and filament supports which are attached to metal tubes embedded in the base member, said passage being closed by a transparent plug having an axial passage through which air is exhausted, said passage being closed in the usual manner.

A further object of the invention is the provision of an electric lamp having a bulb and base member formed integrally of transparent materials, said base member having a wide passage through which are adapted to be inserted filaments and their supports which are connected to metal tubes projecting into the bulb and embedded in the base, said tubes being applied to the base when the lamp is molded, the inner ends of said tubes being initially closed with pipes being inserted in the metal tubes for suppling a cooling fluid during the molding operation to prevent the heat from melting the inner ends of the tubes, the closed ends of the tubes when sufficiently cool, being sheared off to receive supports and filaments, the said tubes receiving lead-in wires which are soldered to the outer ends of the tubes with the solder forming a seal to close the said outer ends, the wide passage being closed by a plug which is sealed to the walls of the passage, the inner end of the plug which is formed of transparent materials being polished or provided with a reflecting surface which cooperates with uniformly arranged triangularly shaped sections of reflecting material on the inner face of the bulb for directing the light along a predetermined path.

This invention will be best understood from a consideration of the following detailed description, in view of the accompanying drawing forming a part of the specification; nevertheless, it is to be understood that the invention is not confined to the disclosure, being susceptible of such changes and modifications as define no material departure from the salient features of the invention as expressed in the appended claims.

In the drawing:

Fig. 1 is a vertical section of a bulb and integrally formed base member with metal tubes embedded in the base member and pipes for cooling the tubes when the bulb and base member are molded.

Fig. 2 shows a vertical section of a lamp in the second stage of completion with the filaments and reflecting materials in position within the bulb.

Fig. 3 is a vertical section showing a complete bulb ready for use.

Fig. 4 is a horizontal section taken along the line 4—4 of Fig. 2.

Fig. 5 is an enlarged fragmentary side view of a filament and its support.

Fig. 6 is an enlarged vertical section of a metal tube which is embedded in the molten glass when the lamp is cast, and showing a pipe for supplying cooling fluid to the tube.

Fig. 7 is an enlarged vertical section of a tube with the supports and filaments in position in the tube.

Referring more particularly to the drawing, 10 designates a bulb which is formed of transparent material, while 11 indicates a base formed integrally with the bulb 10. The outer end of the bulb may have any configuration suitable for the purpose, but in this case said outer or closed end 12 is provided with corrugations 13 at its inner face for the purpose of diffusing the light rays to eliminate the usual glare of a head lamp. The base 11 is provided with a relatively wide passage 14 for a purpose which will be presently explained.

Metal tubes 15 are embedded in the base member and have their inner ends closed as shown at 16, and these inner ends project into the bulb 10. The outer ends 17 of said tubes are open and project beyond the outer end 18 of the base member.

These tubes are incorporated in the base 11 when the bulb and base member are cast from the molten glass. However, due to the intense heat of the molten glass the metal tubes would melt. In order to prevent this, pipes 20 as shown more particularly in Figs. 1 and 6 are inserted through the open ends 17 of said tubes and a cooling fluid is forced into the interior of the tubes. Such fluid may be an inert gas, such as nitrogen or carbon dioxide. However, the temperature of the cooling fluid must be such that the materials of the base 11 will not be chilled.

After the lamp has been completed to the stage shown in Fig. 1 and has been cooled sufficiently the inner closed ends 16 of the tubes 15 are punctured or drilled so that both ends of the tubes will be open. The next step in the manufacture of the lamp will be the application of beeswax or molasses, or any other suitable material, shown at 21 to the inner surface of the base member 11 surrounding the tubes 15. The object of applying beeswax is for the purpose of preventing an area around each tube from receiving reflecting materials in order to prevent short circuiting of

the filaments. Beeswax or other suitable material is applied to sections indicated by the numeral 22, leaving blank spaces which are covered by reflecting materials as indicated at 23. In other words, the application of beeswax or other suitable material to the section 22 of the inner face of the bulb 10 provides radiating triangularly shaped sections of reflecting material as shown in Figs. 2, 3 and 4. The inner surface of the base 11 is likewise covered with reflecting materials except those portions which are covered by beeswax as indicated at 21 adjacent the tubes 15.

After the reflecting materials have been applied as described to the inner surface of the bulb 10 a suitable solvent is poured into the bulb through the passage 14 and the beeswax or other materials are removed, leaving a pattern of reflecting materials as illustrated in Fig. 4.

As previously explained the passage 14 is relatively wide so that an instrument may be inserted through the passage 14 for applying the beeswax, for injecting the reflecting materials and for injecting the solvent to remove the beeswax after the reflecting materials have been fixed in position.

The method of applying the reflecting materials and the beeswax, molasses or other masking materials is described in my Patent No. 2,365,224 granted Dec. 19, 1944.

Referring more particularly to Figs. 6 and 7 it will be seen that filaments 25 are mounted within the bulb 10 in a particular manner, and the tubes 15 are employed as an element of the support. As has been previously stated the closed inner end 16 of each tube has been removed and a second tube 26 is inserted through the passage 14 and forced into the open ended tube 15 from the interior of the bulb 10. This tube is provided with diametrically disposed clamping members 27 and 28. These clamps are formed by splitting the ends of the lateral projections as shown at 29. The straight end 30 of the filament is then inserted within the split and the split ends are then clamped down on the filament by a suitable tool which has been inserted through the passage 14.

A lead-in wire 35 is inserted through the outer open end of each tube 15 and this wire is extended downwardly into the auxiliary tube 26 so that the tubes 26, 15 and the wire 35 are in conductive relationship. The lead-in wire may extend to the top of the tube 26 or it may terminate short of the top.

The outer end of each wire 35 as shown at 36 is soldered to the outer end of the tube 15 and sufficient solder is applied to seal the outer ends of said tubes.

One of the tubes 26 and likewise the lead-in wire 35 may form the positive electrode while a diametrically disposed tube 26a (Fig. 4) may form the negative electrode. On the other hand, two of the tubes 15 may form the positive so that the outer ends 36 of said tubes will engage the usual contact in a socket while the other two tubes will be in contact with a metal sleeve 37 which is mounted on the threaded base member 11.

A plug 40 which is formed of glass is adapted to close the passage 14 and it is sealed in place in the usual manner. This plug is provided with an axial passage 41 through which the air is exhausted from the bulb 10 after which it is sealed at 42 in any suitable manner. In other words, the glass may be fused to close the outer end of the passage 41. The inner end of the plug as shown at 45 is curved to form a reflector and reflecting materials may be either applied to the inner end of the plug or it may be highly polished. Furthermore the plug may be formed of different colored glass if desired.

As shown more particularly in Fig. 3 the completed lamp is illustrated with the filaments and plug 40 in position. The filaments are supported by the tubes 26 applied to the tubes 15.

While the filaments are shown as concentrated within the confines of the base member 11, it will be appreciated that the auxiliary tubes 26 may be bent at an angle outwardly from the center so that the filaments may be spread outwardly and in a greater circumference within the bulb for increasing the illumination of the lamp.

I claim:

1. An electric lamp comprising a base, a bulb formed integrally with the base, said base having an axial passage leading from the interior of the bulb to the outside, a glass plug neatly fitting said passage and sealed to the walls thereof, the inner end of the plug having a curved surface which forms a reflector inwardly of the inner end of the base, the inner wall of the bulb being provided with reflecting material, a filament in the bulb, metal tubes extending through the base and supporting the filament.

2. An electric lamp comprising a base, a bulb formed integrally with the base, said base having an axial passage leading from the interior of the bulb to the outside, a glass plug neatly fitting said passage and sealed to the walls thereof, the inner end of the plug having a curved surface which forms a reflector inwardly of the inner end of the base, the inner wall of the bulb being provided with reflecting material, a filament in the bulb, metal tubes extending through the base and having one end projecting into the bulb, the other end of said tube terminating at the outer end of the base, a lead-in wire extending through each tube, one end of each wire having connections with a filament, the outer end of each tube being closed and having secured therein the filament wire ends.

3. An electric lamp comprising a base, a bulb formed integrally with the base, said base having an axial passage leading from the interior of the bulb to the outside, a glass plug neatly fitting said passage and sealed to the walls thereof, the inner end of the plug having a curved surface which forms a reflector inwardly of the inner end of the base, the inner wall of the bulb being provided with reflecting material, a filament in the bulb, metal tubes extending through the base into the bulb, metal supports mounted in the inner ends of the tube and provided with oppositely disposed lateral clamps, each clamp receiving the end of a filament, lead-in wires received by the tubes and solder sealing the outer ends of the tubes and the wires to said tubes.

4. In an electric lamp having a base and an integrally formed bulb composed of transparent materials, the inner surface of the bulb being provided with triangularly shaped sections of reflecting materials extending from the base to points adjacent the top surface, said base having an axial passage, a plug closing said passage, the inner end of the plug projecting into the bulb and provided with a reflector, a series of filaments arranged around the inner end of said plug and conductive means embedded in the base and supporting the filaments.

GROVER C. SINGER.