

March 22, 1949.

V. L. FLAGGE

2,464,990

ELECTRIC LAMP MANUFACTURE

Filed Aug. 28, 1945

*Fig. 1.*

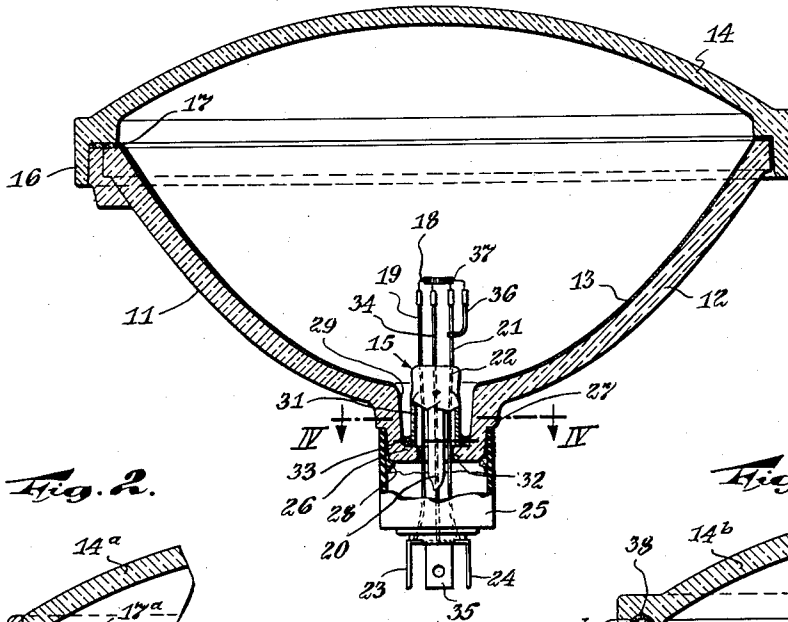


*Fig. 2.*

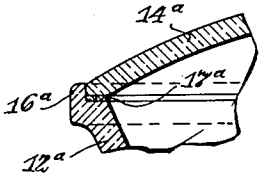


*Fig. 3.*

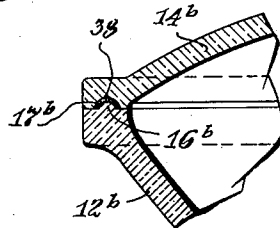


*Fig. 4.*

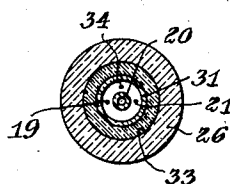


*Fig. 5.*

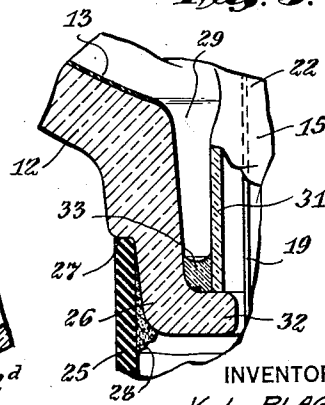


*Fig. 6.*

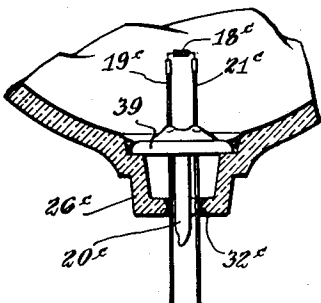
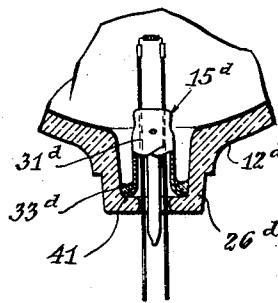


*Fig. 7.*



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## UNITED STATES PATENT OFFICE

2,464,990

## ELECTRIC LAMP MANUFACTURE

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Application August 28, 1945, Serial No. 613,107

27 Claims. (Cl. 176—34)

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This invention relates to incandescent electric lamps and, more particularly, to such adapted to function as head lamps for vehicles.

The principal object of my invention, generally considered, is to cheapen and facilitate the manufacture of lamps of the "sealed beam" type by making the reflector and lens portions of soft glass and the light-source supporting or mount with a conventional stem, all of said parts being secured together by a low-softening-point sealing glass.

Another object of my invention is to provide an incandescent electric lamp of the vehicle head lamp type, in which the light source is supported on a conventional stem of soft glass, which engages the outside or inside of the reflector portion, and is secured thereto by a low-softening-point sealing or brazing glass.

A further object of my invention is to employ a conventional stem holding the light source of a sealed beam lamp, which stem is unprovided with a flared end and connected to the inside of the reflector portion by sealing or brazing glass of low-softening-point.

A still further object of my invention is to provide a sealed beam lamp in which the relationship between the reflector and lens portions, prior to uniting the same, is maintained by a flange on one of said portions within which the other portion fits.

Other objects and advantages of the invention, relating to the particular arrangement and construction of the various parts, will become apparent as the description proceeds.

Referring to the drawing:

Fig. 1 is an axial sectional view, with parts in elevation, of a lamp of the sealed beam type, embodying my invention.

Fig. 2 is a fragmentary sectional view of portions of the connected reflector and lens of the lamp, but showing a modification.

Fig. 3 is a view corresponding to Fig. 2, but showing another embodiment of the invention.

Fig. 4 is a transverse sectional view on the line IV—IV of Fig. 1, in the direction of the arrows.

Fig. 5 is a fragmentary view of a portion of the lamp of Fig. 1 adjacent the base, but on a larger scale.

Fig. 6 is a fragmentary portion of a lamp, as in Fig. 1, but showing another embodiment.

Fig. 7 is a view corresponding to Fig. 6, but showing a further embodiment.

Fig. 8 shows a construction corresponding generally to Fig. 7, but slightly modified.

In the well-known sealed beam lamps for auto-

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mobile head lights, it has been customary to make the reflector and lens portions of hard glass, and secure them together by fusing adjacent surface portions. It has also been the practice to support the light sources in such lamps on leads extending from metal contact terminal devices, including skirt portions of metal of suitable coefficient of expansion for sealing into the lamp envelope, and having sharp edge portions embedded in the glass of the reflector portion. Such construction is relatively expensive because of the use of hard glass and special alloy members of proper coefficient of expansion for sealing thereto. In accordance with the present invention, such special members are avoided, hard glass is replaced by soft glass, and the parts of the lamp are held together by a sealing or brazing vitreous material or glass of low softening point, preferably considerably lower, say about 200° C. lower than the glass parts which are held together thereby. The coefficient of expansion of the sealing glass is close enough to that or those of the parts being united to avoid subsequent cracking or separation thereof.

Referring to the drawing in detail, like parts being designated by like reference characters, and first considering the embodiment illustrated in Figs. 1, 4, and 5, there is shown lamp 11 of the sealed beam type comprising a concave preferably parabolic reflector portion 12, formed of translucent vitreous material, such as soft glass, the inner surface of which has a coating 13 of specular metal, a lens or cover glass portion 14, desirably formed of transparent or translucent vitreous material such as soft glass, and a mount 15. The reflector and lens portions desirably fit together, as by having a peripheral flange 16 on one of said members nestingly or closely receiving the rim portion of the other, as illustrated, thus initially positioning them in proper relationship, independently of the sealing means later described. In this embodiment, the lens portion 14 has a flange 16 receiving the edge portion of the reflector 12.

The reverse construction is illustrated in Fig. 2, in which the reflector 12<sup>a</sup> has a flange 16<sup>a</sup> receiving the edge portion of the lens 14<sup>a</sup>. The nested reflector and lens portions are in these embodiments united by layers of sealing glass 17 and 17<sup>a</sup>, positioned between adjacent spaced surfaces of the portions which are angularly disposed with respect to the flange, 16 or 16<sup>a</sup> as the case may be. The sealing glass is desirably of special character so that it softens at a temperature considerably lower than the soft glass forming the parts being

united, and has a coefficient of expansion sufficiently close to that of said parts that it functions for the desired purpose without cracking or separating therefrom upon cooling.

The light source, as is usual in such lamps, comprises a major or "in-focus" filament 18 supported by leads 19 and 21 extending through a press 22 of the mount 15, the exterior portions of said leads continuing to exterior contact members 23 and 24 projecting from a base 25. The base is formed of "Bakelite" or other suitable insulating material and fits over the boss 26 projecting from the convex portion of the reflector 12. The boss desirably has a shoulder 27 engaged by the rim of the base 25, the base being secured to said boss by basing cement or other suitable connecting material 28.

The boss 26 is hollow and thus provides a pocket 29 sufficiently deep to receive the stem 31 carrying the exhaust tube 20 of the mount 15, the bottom of said pocket being defined by an inward-turned flange 32 on which the stem 31 rests, and which is sealed thereto by special sealing or brazing glass 33 which may correspond with the glass 17.

The stem 31 also carries an additional lead 36 passing through the press 22 and with its outer end connected to a third contact 35, its inner end, together with an auxiliary lead 36 branching from the lead 21, serving to support the minor or "meeting" filament 37 which is slightly out of focus with respect to the reflector 12.

Fig. 3 shows a construction similar to Figs. 1 and 2, except that the sealing glass 17<sup>b</sup> is mainly received in a pocket 38 in one of the connected members, in this instance the lens 14<sup>b</sup>, and a bead, boss or flange 16<sup>b</sup> on the other member embedded therein, but said pocket, if desired, could be formed in the reflector 12<sup>b</sup>.

Fig. 6 shows a modification in which the mount 15<sup>c</sup> comprises a soft glass disk 39 through which leads 19<sup>c</sup> and 21<sup>c</sup> extend to support the filament forming the light source 18<sup>c</sup>, said mount as in the preceding embodiment including an exhaust tube 20<sup>c</sup> which, with the outer portions of the leads 19<sup>c</sup> and 21<sup>c</sup>, project through an aperture provided by the inwardly extending flange 32<sup>c</sup> on the base supporting boss 26<sup>c</sup>. Although only one filament has been shown in the present embodiment, it will be understood that two filaments, as in the first embodiment, are desirably employed when used for a vehicle head lamp.

Fig. 7 shows a construction similar to that of Fig. 1 except that the stem 31<sup>d</sup> has an outwardly projecting flange 41 over which the sealing glass 33<sup>d</sup> is placed for securing the mount 15<sup>d</sup> to the boss 26<sup>d</sup> of the reflector portion 12<sup>d</sup>. Fig. 8 shows an embodiment similar to that of Fig. 7, except that the flange 41<sup>e</sup> on the stem 15<sup>e</sup> engages the outer surface, rather than the inner surface, of the boss 26<sup>e</sup> projecting from the reflector 12<sup>e</sup>, and the sealing glass 33<sup>e</sup> is applied over the outer or lower surface of said flange and confined by a peripheral flange 32<sup>e</sup> on said boss.

From the foregoing, it will be seen that I have improved on the construction of "sealed-beam" lamps by not only substituting soft glass for hard glass and eliminating special members formed of expensive alloy, but I have facilitated the process of uniting the parts by using readily-fusible sealing glass for that purpose, rather than making it necessary to fuse the abutting surfaces of the parts.

In accordance with previous practice, it was necessary to use hard glass because glass of low

expansion was necessary when the parts were connected by fusion at abutting surfaces. If such mode of connection were attempted with soft glass, cracks would result due to the greater expansion. However, if it is desired to still use parts of hard glass, but otherwise connect them in accordance with my invention, I may use as a sealing glass such manufactured by the Corning Glass Works as No. 775, and employ it for brazing or sealing together hard glass parts made of such glass as Corning No. 172.

However, a preferred embodiment of my invention comprises using a soft glass, such as Corning No. 008 lime glass, for the lens and reflector portions. In fact, any soft glass composition with a softening point of not lower than 695° C., and with an expansion coefficient between 0° and 300° C. of from 38 to 94×10<sup>-7</sup>, is suitable for the purpose.

As for the vitreous material or glass used as the sealing or brazing medium, I have employed a special glass with essentially the same expansivity as the glass parts being secured together, and with a softening point at least 200° C. lower than that of said glass parts. Such a glass may be that manufactured by Corning as No. X750 PD or its equivalent. In other words, a suitable glass may be manufactured by using a large proportion of lead oxide, PbO, relatively small proportions of silica and alumina, and still smaller proportions of alkali and boric oxide.

The method of assembly for a lamp as illustrated in Figs. 1, 4 and 5, is to place the mount 15 in position in the pocket 29 of the reflector portion and, while the same is held in place as by a suitable jig, pour a small quantity of molten sealing glass 33 in said pocket so that it unites the lower edge portion of said stem 31 to the boss 26. As an alternative, the reflector portion may be made by the manufacturer with a coating of sealing glass 33 at the place illustrated, as well as a coating of sealing glass 17, and the parts may be assembled and merely heated until a sealing glass, but not the glass forming the parts to be united, softens or melts to cause union of said parts. After cooling, the bulb so formed is evacuated through the exhaust tube, and filled with inert gas in accordance with customary practice.

Although preferred embodiments of my invention have been disclosed, it will be understood that modifications may be made within the spirit and scope of the appended claims.

I claim:

1. An electric lamp comprising a vitreous reflector portion having a concave surface with a reflecting coating, a translucent vitreous cover hermetically sealed to the rim of said reflector portion and forming an enclosure therewith, a vitreous stem sealed to said reflector portion by vitreous material having a softening point about 200° C. lower than that of the parts sealed together, leads extending from said stem, and a light source supported on said leads and positioned in said enclosure in definite optical relationship to said reflecting surface.

2. An electric lamp comprising a soft glass reflector portion having a concave surface with a reflecting coating, a soft glass cover hermetically sealed to the rim of said reflector portion and forming an enclosure therewith, a soft glass stem sealed to said reflector portion by glass of considerably lower softening point, leads projecting from said stem, and a light source supported on said leads and positioned in said enclosure in

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definite optical relationship to said reflecting surface.

3. An electric lamp comprising a vitreous reflector portion having a concave surface with a reflecting coating, a hollow boss projecting from the convex side of said reflector portion and formed with an inturned flange, a translucent vitreous cover hermetically sealed to the rim of said reflector portion and forming an enclosure therewith, a vitreous stem engaging the inturned flange on said boss and sealed thereto by vitreous material having a softening point considerably lower than that of the parts sealed together, leads extending from said stem, and a light source supported on said leads and positioned in said enclosure in definite optical relationship to said reflecting surface.

4. An electric lamp comprising a vitreous reflector portion having a concave surface with a reflecting coating, a hollow boss projecting from the convex side of said reflector portion and formed with an inturned flange, a translucent vitreous cover hermetically sealed to the rim of said reflector portion and forming an enclosure therewith, a vitreous stem having a flared portion resting on and sealed to the inner surface of said inturned flange by vitreous material having a softening point considerably lower than that of the connected parts, leads extending from said stem, and a light source supported on said leads and positioned in said enclosure in definite optical relationship to said reflecting surface.

5. An electric lamp comprising a vitreous reflector portion having a concave surface with a reflecting coating, a hollow boss projecting from the convex side of said reflector portion and formed with a central aperture, a translucent vitreous cover hermetically sealed to the rim of said reflector portion and forming an enclosure therewith, a vitreous stem passing into said aperture, engaging said boss and sealed thereto by vitreous material having a softening point considerably lower than that of the connected parts, leads extending from said stem, and a light source supported on said leads and positioned in said enclosure in definite optical relationship to said reflecting surface.

6. An electric lamp comprising a vitreous reflector portion having a concave surface with a reflecting coating, a hollow boss projecting from the convex side of said reflector portion and formed with an inturned flange leaving a central aperture, a translucent vitreous cover hermetically sealed to the rim of said reflector portion and forming an enclosure therewith, a vitreous stem engaging said inturned flange and sealed thereto by a vitreous material having a softening point considerably lower than that of the connected parts, leads extending from said stem, a light source supported on said leads and mounted in said enclosure in definite optical relationship to said reflecting surface, a base telescoping with a portion of and secured to said boss, contact elements carried on the outside of said base, and means respectively connecting said leads to said contact elements.

7. An electric lamp comprising a vitreous reflector portion having a concave surface with a reflecting coating, a translucent vitreous cover portion, one of said portions having a flange nestingly encircling a peripheral part of the other portion to initially accurately position the portions in proper relationship, said nested portions having adjacent spaced surfaces angularly disposed with respect to said flange, and vitreous

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material having a softening point considerably lower than that of said nested portions, positioned between said spaced surfaces, and forming an enclosure by hermetically sealing said cover portion to the rim of said reflector portion.

8. An electric lamp comprising a vitreous reflector portion having a concave surface with a reflecting coating, a translucent vitreous cover portion hermetically sealed, by material having a softening point considerably lower than that of the connected portions, to the rim of said reflecting portion and forming an enclosure therewith, said cover portion having a flange closely encircling a peripheral part of the other portion to initially accurately position the portions in proper relationship independently of the sealing means.

9. An electric lamp comprising a vitreous reflector portion having a concave surface with a reflecting coating, a translucent vitreous cover portion hermetically sealed, by material having a softening point considerably lower than that of the connected portions, to the rim of said reflecting portion and forming an enclosure therewith, said reflector portion having a flange closely encircling a peripheral part of the other portion to initially accurately position the portions in proper relationship independently of the sealing means.

10. An electric lamp comprising a vitreous reflector portion having a concave surface with a reflecting coating, a translucent vitreous cover portion, means to initially accurately position the portions in proper relationship independently of the sealing means, said positioned portions having adjacent spaced surfaces angularly disposed with respect to said positioning means, and vitreous material having a softening point considerably lower than that of the positioned portions, disposed between said spaced surfaces, and forming an enclosure by hermetically sealing said cover portion to the rim of said reflector portion.

11. An electric lamp comprising a vitreous reflector portion having a concave surface with a reflecting coating, a translucent vitreous cover portion hermetically sealed to the rim of said reflector portion, by vitreous material having a softening point considerably lower than that of the connected parts, and forming an enclosure therewith, said cover portion having a flange closely encircling a peripheral part of the reflector portion to initially accurately position the portions in proper relationship independently of the sealing means.

12. An electric lamp comprising a vitreous reflector portion having a concave surface with a reflecting coating, a translucent vitreous cover portion hermetically sealed to the rim of said reflecting portion, by vitreous material having a softening point considerably lower than that of the connected parts, and forming an enclosure therewith, said reflector portion having a flange closely encircling a peripheral part of the cover portion to initially accurately position the portions in proper relationship independently of the sealing means.

13. An electric lamp comprising a concave vitreous reflector portion having an inner surface with a reflecting coating, a translucent vitreous cover portion hermetically sealed to the rim of said reflector portion and forming an enclosure therewith, one of said portions having a groove receiving vitreous material having a softening point considerably lower than that of the parts

sealed together, the other having a boss received in said groove and embedded in said vitreous material of considerably lower softening point.

14. An electric lamp comprising a vitreous reflector portion having a concave surface with a reflecting coating, a hollow boss projecting from the convex side of said reflector portion and formed with an inturned flange defining a central aperture, a translucent vitreous cover hermetically sealed to the rim of said reflector portion, and a mount comprising a stem carrying an exhaust tube passing through said aperture, and stem-carried lead-in conductors, the inner portions of which serve to support a light source and the outer portions of which pass through said aperture with said exhaust tube, said stem being sealed to said reflector portion by vitreous material having a softening point considerably lower than that of the connected parts.

15. An electric lamp comprising a vitreous reflector portion having a concave surface with a reflecting coating, a hollow boss projecting from the convex side of said reflector portion and formed with an inturned flange defining a central aperture and an annular depression at the base of said boss, a translucent vitreous cover hermetically sealed to the rim of said reflector portion, and a mount comprising a stem sealed in said depression and carrying an exhaust tube passing through said aperture, and stem-carried lead-in conductors, the inner portions of which serve to support a light source and the outer portions of which pass through said aperture on opposite sides of said exhaust tube, the peripheral portion of said stem being sealed to said reflector portion by vitreous material having a softening point considerably lower than that of the connected parts.

16. The method of making an electric lamp comprising forming a reflector portion with a hollow boss projecting from a convex surface and a reflecting coating on a concave surface thereof, fitting a vitreous stem in said boss, and pouring molten vitreous material which has a softening point considerably lower than that of the associated parts sealed together around said stem to secure it to said boss.

17. The method of making an electric lamp comprising forming a reflector portion with a hollow boss projecting from a convex surface and a reflecting coating on a concave surface thereof, placing a coating of vitreous material which has a softening point considerably lower than that of said reflector portion on the inside of said boss, fitting a vitreous stem in said boss, so that it engages said low softening point material, and heating without softening the assembled parts until said low softening point material effects sealing therebetween.

18. The method of making an electric lamp comprising forming a reflector portion with a reflecting coating on a concave surface thereof, forming a cover portion with an outer peripheral surface shaped to seat on the outer peripheral surface of said reflector portion, one of said portions having a peripheral flange of a size to closely encircle a peripheral part of the other portion, coating at least one of said peripheral surfaces with vitreous material which has a softening point considerably lower than that of the parts to be united, assembling so that the peripheral flange receives said peripheral part and effects accurate positioning of the cover portion with respect to said reflector portion independently of

said low softening point material, and heating without softening the assembled parts until said low softening point material effects sealing therebetween.

19. The method of making an electric lamp comprising forming a reflector portion with a hollow boss projecting from a convex surface and a reflecting coating on a concave surface thereof, placing a coating of vitreous material, which has a softening point considerably lower than that of said reflecting portion, on the inside of said boss, fitting a vitreous stem in said boss, so that it engages said low softening point material, forming a cover portion with an outer peripheral surface shaped to seat on the outer peripheral surface of said reflector portion, placing a coating of said low softening point material on one of said surfaces, assembling, and heating without softening the assembled parts until said low softening point material effects sealing therebetween.

20. An electric lamp comprising a vitreous reflector portion having a concave surface with a reflecting coating, a hollow boss projecting from the convex side of said reflector portion and formed with an inturned flange, a vitreous cover hermetically sealed to the rim of said reflector portion and forming an enclosure therewith, a vitreous stem formed with an outturned flange engaging the inturned flange on said boss and sealed thereto by vitreous material having a softening point considerably lower than that of the connected parts, leads extending from said stem, and a light source supported on said leads and positioned in said enclosure.

21. An electric lamp comprising a vitreous reflector portion having a concave surface, a hollow boss projecting from the convex side of said reflector portion and formed with a central aperture, a groove in the outer end of said boss around said aperture, a vitreous cover hermetically sealed to the rim of said reflector portion and forming an enclosure therewith, a vitreous stem passing through said aperture and with an outstanding flange lying in said groove, vitreous material having a softening point considerably lower than that of said reflector portion and stem sealing said flange in said groove, leads extending from said stem, and a light source supported on said leads and positioned in said enclosure.

22. The method of making an electric lamp comprising forming a reflector portion with a hollow boss projecting from a convex surface, fitting a vitreous stem portion in said boss, placing vitreous material, which has a softening point considerably lower than that of said reflector portion, on said boss adjacent said stem and heating said low softening point material so that it effects sealing between said portions without softening the latter.

23. The method of making an electric lamp comprising forming a reflector portion with a hollow boss projecting from a convex surface, placing a vitreous stem portion in said boss, placing vitreous material adjacent said boss and stem portion, said vitreous material having a softening point considerably lower than that of said reflecting and stem portions, forming a cover portion with an outer peripheral surface shaped to seat on the outer peripheral surface of said reflector portion, placing some of said low-softening-point material between said peripheral surfaces, and heating to soften said placed material and unite, without softening, said cover, reflector

and stem portions, by said low-softening-point material.

24. An electric lamp comprising a vitreous reflector portion having a concave surface with a reflecting coating, a hollow boss projecting from the convex side of said reflector portion, a vitreous stem received in and engaging said boss and sealed thereto by vitreous material having a softening point considerably lower than that of the parts sealed together, leads extending from said stem, and a light source supported on said leads in definite optical relationship to said reflecting surface.

25. An electric lamp comprising a vitreous reflector portion having a concave surface with a reflecting coating, a hollow boss projecting from the convex side of said reflector portion, a vitreous stem having a flared portion and received in said boss, said flared portion being sealed to said boss by vitreous material having a softening point considerably lower than that of the connected parts, leads extending from said stem, and a light source supported on said leads in definite optical relationship to said reflecting surface.

26. An electric lamp comprising a soft glass reflector portion having a concave surface with a reflecting coating, a soft glass stem sealed to said reflector portion by glass having a softening point of about 200° C. lower than that of the parts

sealed together, leads projecting from said stem, and a light source supported on said leads in definite optical relationship to said reflecting surface.

27. An electric lamp comprising a vitreous reflector portion having a concave surface with a reflecting coating, a hollow boss projecting from the convex side of said reflector portion and formed with a central aperture, a vitreous stem passing into said aperture and sealed to said boss by vitreous material having a softening point considerably lower than that of the connected parts, leads extending from said stem, and a light source supported on said leads in definite optical relationship to said reflecting surface.

VERNON L. PLAGGE.

#### REFERENCES CITED

The following references are of record in the file of this patent:

#### UNITED STATES PATENTS

| Number    | Name     | Date          |
|-----------|----------|---------------|
| 488,635   | Prentiss | Dec. 27, 1892 |
| 1,861,167 | Vello    | May 31, 1932  |
| 2,148,314 | Wright   | Feb. 21, 1939 |
| 2,148,315 | Wright   | Feb. 21, 1939 |
| 2,362,171 | Swanson  | Nov. 7, 1944  |
| 2,398,968 | Singer   | Apr. 23, 1946 |

#### Disclaimer

2,464,980.—*Vernon L. Plagge*, East Orange, N. J. ELECTRIC LAMP MANUFACTURE. Patent dated Mar. 22, 1949. Disclaimer filed Mar. 5, 1952, by the assignee, *Westinghouse Electric Corporation*.

Hereby enters this disclaimer to claim 13 of said patent.  
[*Official Gazette April 8, 1952.*]