

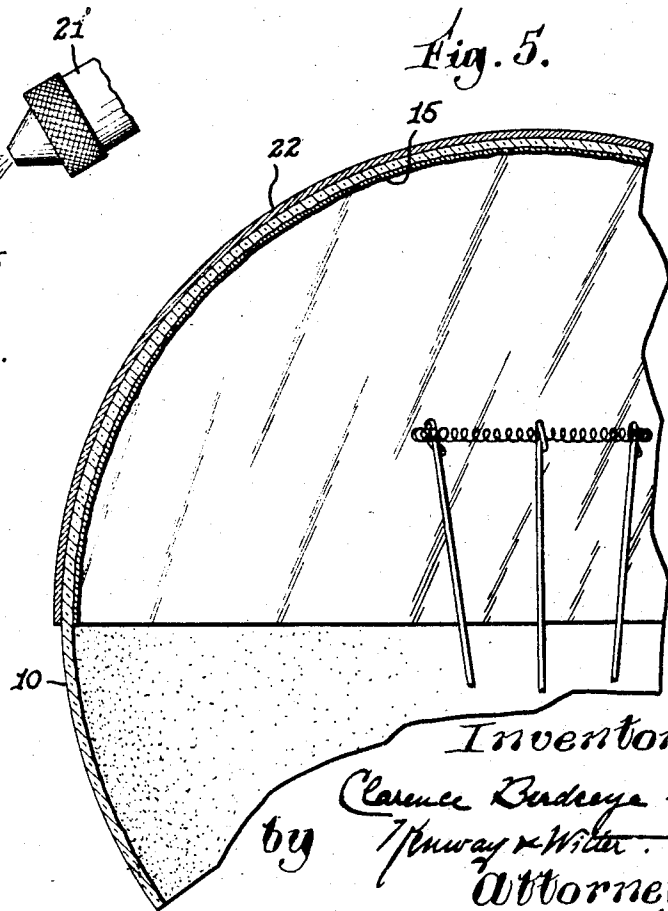
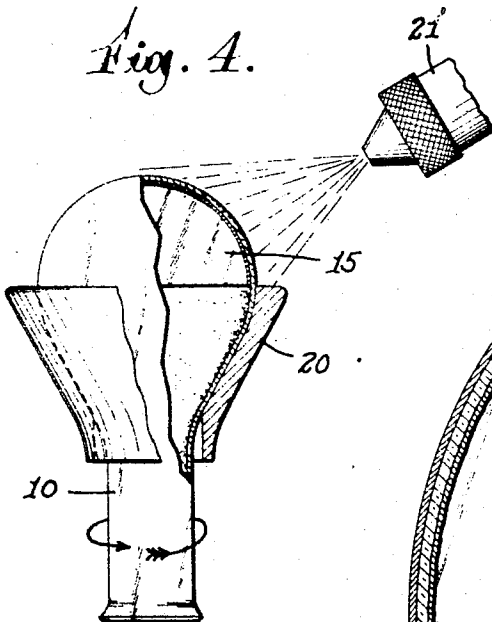
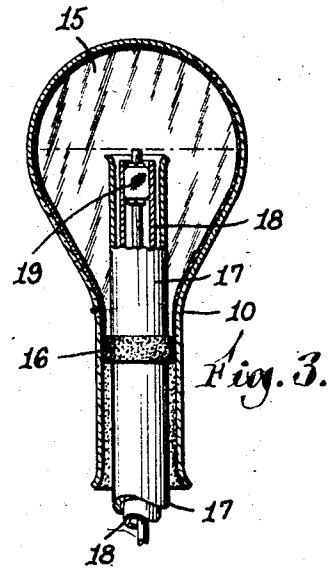
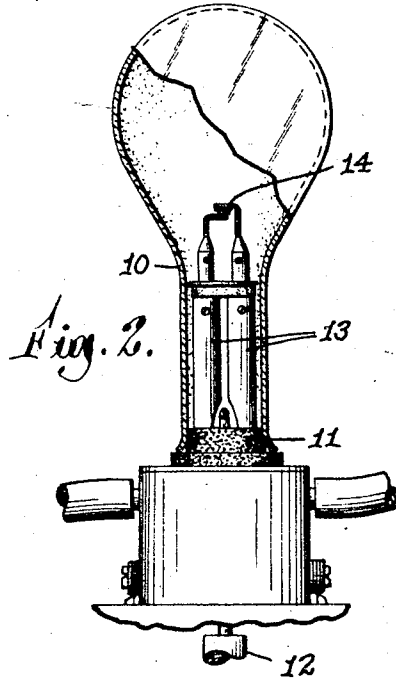
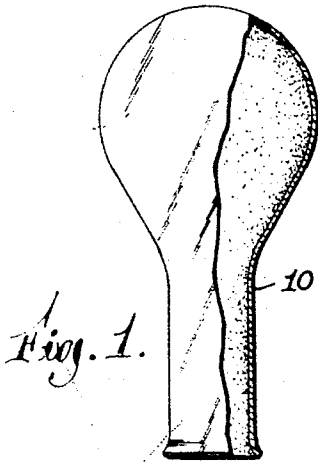
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REFLECTING ELECTRIC LAMP

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REFLECTING ELECTRIC LAMP

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5 Claims. (Cl. 176-34)

This invention relates to reflecting electric lamps, that is to say, to lamps having bulbs provided with a reflecting coating for controlling the intensity or direction of their light output.

5 In one aspect my invention consists in an improved lamp having a reflecting coating upon its inner surface in an area enclosing its light source and an external opaque coating upon a substantially coextensive area. In another aspect the
10 invention consists in a novel process of manufacturing reflecting lamps of this character.

It has long been appreciated that a thin metallic coating deposited upon the surface of a lamp bulb is a more efficient reflector than a coating
15 otherwise similar but of greater thickness. This is probably due to the fact that the thicker coating presents a more irregular surface tending to cause greater diffusion of the light than a thin metallic coating which may approach a
20 mono-molecular thickness and so present an extremely smooth surface. It is difficult under commercial conditions of manufacture to apply a thin metallic coating which is continuous and free from pinholes and other imperfections that
25 detract seriously from the appearance of the lamp, particularly when illuminated. I have discovered, however, that a thin and possibly imperfect inner metallic coating may be supplemented by a thicker outer opaque coating in
30 such manner that all the advantages of a very thin and highly efficient internal coating may be retained and still the combined inner and outer coating of the lamp as a whole be free of visible holes, thin spots or other defects.

35 In accordance with the present invention the inner metallic coating may be applied to the inner surface of the bulb in any convenient manner, as by depositing from a metallic solution or by vaporizing under conditions of reduced pressure. The internal coating may then be re-
40 stricted to the desired area within the bulb, by removing the undesired portion of the coating chemically or mechanically. Subsequently an external metallic or other opaque coating may be
45 applied to the outer surface of the bulb in any desired manner, as by spraying, and may be confined to an area substantially coincident with the inner metallic coating of the bulb. The external coating may be applied at any convenient
50 stage in the manufacturing process, either before or after the mount and filament have been sealed into the bulb. One very satisfactory way of applying the external coating is to protect appropriate portions of the bulb by an enveloping
55 shield and spray a metallic laquer upon the

exposed portions of the bulb up to the line of the shield. An advantage of carrying out this step in the manner suggested is that the external coating may thus be applied to otherwise completed lamps. The process is, therefore, available
5 for after-treating lamps which tests have shown to have defective internal coatings or for correcting or increasing the area of the composite reflecting coating of lamps already otherwise
10 completed.

These and other features of the invention will be best understood and appreciated from the following description of a preferred manner of carrying out the novel process thereof in producing a reflecting lamp of a type selected for
15 purposes of illustration. In the drawing—

Fig. 1 is a view in elevation with parts broken away of a lamp bulb,

Fig. 2 is a view in elevation of the bulb inverted and in process of having an internal coating applied to it,

Fig. 3 is a view in elevation of the bulb internally coated, suggesting the step of removing the internal coating up to the line of maximum
25 bulb diameter,

Fig. 4 is a view in elevation of the bulb suggesting the step of applying the external coating, and

Fig. 5 is a fragmentary view in cross section of part of the completed lamp.

This invention is herein illustrated in the treatment of a pear-shaped bulb of conventional design but it is, of course, not limited in its application to this or to any particular type of bulb or lamp. The bulb 10, after being first
35 properly cleaned, is inverted and mounted in apparatus in which is included a sealing disk 11, an exhaust stem 12 and leads 13 carrying a receptacle 14 for a pellet of silver or aluminum. The bulb thus mounted is exhausted and heated
40 and then a heavy current is caused to flow in the leads 13 heating the receptacle 14 and causing the metal therein to be vaporized and to be deposited as a thin metallic film or coating upon the inner surface of the bulb. The coating thus
45 deposited may be distributed generally over the entire inner surface of the bulb, although by properly locating the receptacle 14 the coating may be more or less localized. For example, as shown in Fig. 1, a smaller amount of metal will
50 be deposited in the neck portions of the bulb than in its bowl end. The internal coating 15 may be made very thin by limiting the amount of metal supplied in the receptacle and controlling the conditions under which it is flashed or
55

vaporized. However the internal coating 15 may be applied it will be understood that it is deposited upon the surface of the bulb as a very thin film of high lustre and, while it is desirable that the film should be continuous, the occurrence of pinholes or thin spots, if any, is taken care of and covered up by the external coating subsequently applied.

The bulb 10 may initially have a clear, untreated inner surface or it may be frosted as suggested in Figs. 1 and 2. If the bulb is frosted it should be done very lightly and under these circumstances the internal reflecting coating will have a slight diffusing effect instead of being entirely specular in its action as is the case when an unfrosted bulb is used.

In Fig. 2 a frosted bulb 10 is shown in position for evacuation and deposition of an internal coating by the process of evaporation. The internal coating 15 which is applied in this manner is indicated in the bulb as shown in Fig. 3 and this figure also indicates the step of removing the coating 15 up to the line of maximum bulb diameter.

The inverted bulb is sealed by a stopper 16 through which passes an outer vertical conduit 17 and an inner tube 18 having a filter 19 at its upper end. A solvent solution is introduced into the bulb through the tube 18 up to the desired level which in this case is the line of maximum bulb diameter. The solvent solution is introduced slowly and is prevented from splashing by the filter 19 so that the coating above the liquid level of the solution is guarded from damage during the removing step. In any case the solvent solution is supplied to a liquid level determined by the overflow outlet supplied by the outer tube 17. Fig. 4 indicates that the internal coating 15 has been removed up to the specified line and is now limited to the bowl portion of the bulb above the line of maximum bulb diameter.

The next step of the process consists in applying an external reflecting coating to the bowl portion of the bulb. For this purpose the inverted bulb may be provided with a protecting shield 20 as shown in Fig. 4 which, in the illustrated process, covers the skirt portion of the bulb and protects it up to the line of maximum bulb diameter. The shield 20 may be of rubber, clay or any other suitable material. The shielded bulb 10 is now rotated within range of a spray nozzle 21 by which metallic liquid, such as silver or aluminum lacquer, may be delivered to the exposed bowl portion of the bulb to form an external metallic coating 22 in an area coextensive or substantially coextensive with the thinner internal coating 15. The relation of the two coatings 15 and 22 is indicated in the fragmentary view of Fig. 5 which shows a portion of a lamp and its coatings on an enlarged and somewhat exaggerated scale. It will be noted that the external metallic coating 22 is substantially thicker than the internal metallic coating

15 and in practice there would be a greater difference between the thickness of these coatings than is indicated in Fig. 5. In any case however all pinholes or defects which may have occurred in the internal coating 15 are backed up and covered by the external coating 22 so that a continuous and uninterrupted composite reflecting surface is insured in the lamp.

While a metallic external coating has been referred to specifically in the foregoing description, I contemplate employing any suitable material for providing a continuous opaque or semi-opaque surface such as waterglass paint including any desired pigment. Under some circumstances the external coating may be black in color so as better to radiate heat transmitted to it through the lamp bulb from the inner reflecting surface.

Having thus disclosed my invention and described specific embodiments thereof for purposes of illustration but not by way of limitation I claim as new and desire to secure by Letters Patent:

1. A reflecting electric lamp comprising a pear-shaped bulb containing a light source and having a thin metallic reflecting coating upon its inner surface in an area enclosing the light source and extending approximately to the line of maximum bulb diameter, and an external metallic coating upon a substantially coextensive area on its outer surface, the two coatings supplementing each other in providing a portion of the bulb with an inwardly directed and uninterrupted reflecting surface.

2. A reflecting electric lamp comprising a bulb containing a light source and having a thin metallic coating of high luster upon a definite area of its inner wall, and a thicker supplementary metallic coating upon its outer wall in a substantially coincident area and presenting an inwardly directed reflecting coating.

3. A reflecting electric lamp comprising a bulb containing a light source and having a thin discontinuous metallic film upon a portion of its inner surface, and an external metallic coating substantially coextensive with said film and forming in combination therewith a continuous reflecting surface.

4. A reflecting electric lamp comprising a bulb containing a light source and having a thin reflecting coating upon its inner surface which is not free from pin holes, and a substantially opaque external coating upon a coextensive area of its outer surface presenting an inwardly directed reflecting surface outside the pin holes of said inner reflecting surface.

5. A reflecting lamp comprising a bulb containing a light source and having an internal reflecting coating of silver approaching mono-molecular thinness upon a definite area of its inner wall, and a supplementary metallic coating upon its outer wall in a substantially coextensive area.

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