No. 754,251. PATENTED MAR. 8, 1904.

C. P. STEINMETZ.

ELECTRIC LAMP.

APPLICATION FILED MAR. 6, 1903.

NO MODEL.

Fig. 1.

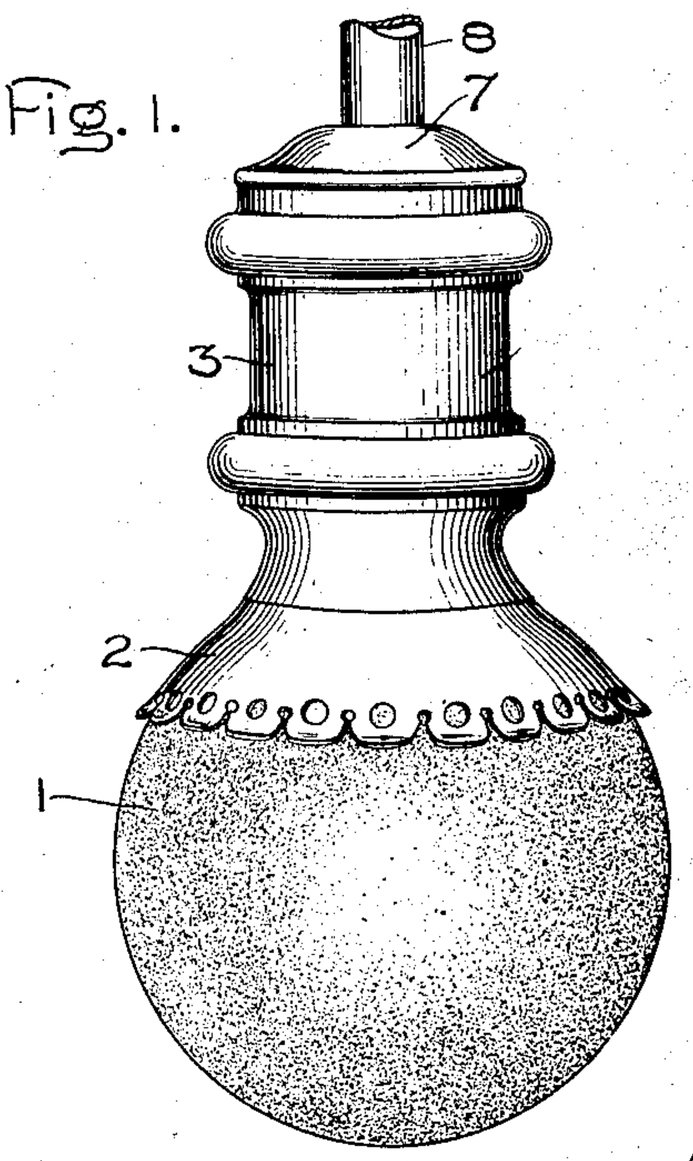


Fig. 2.

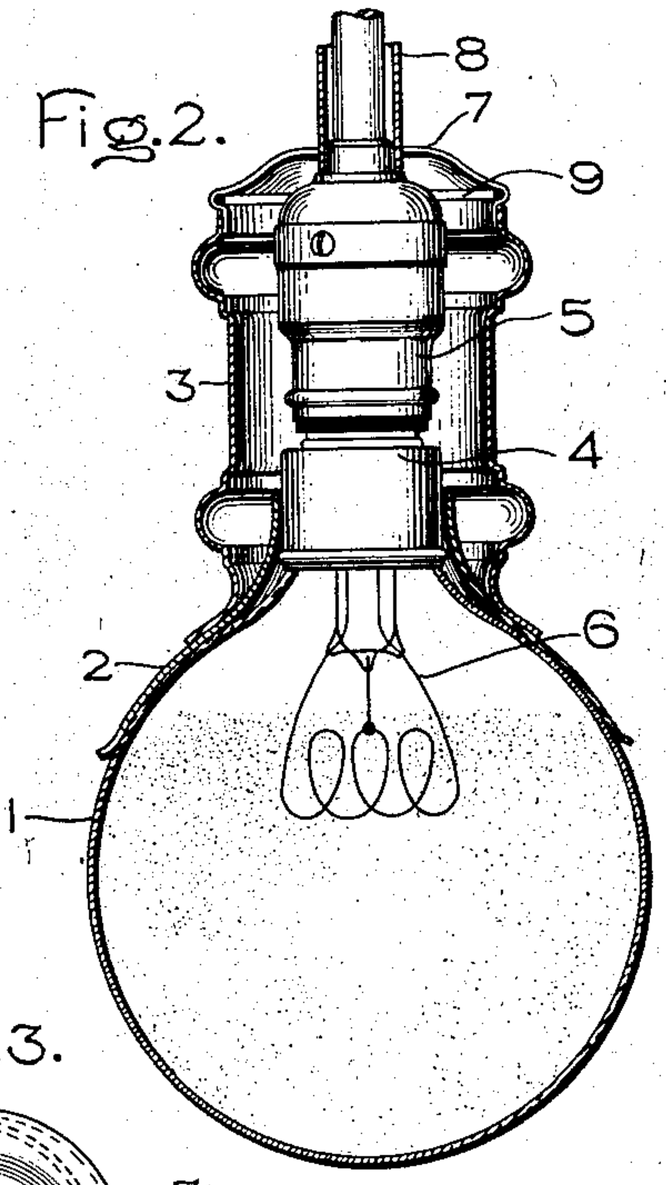


Fig. 3.

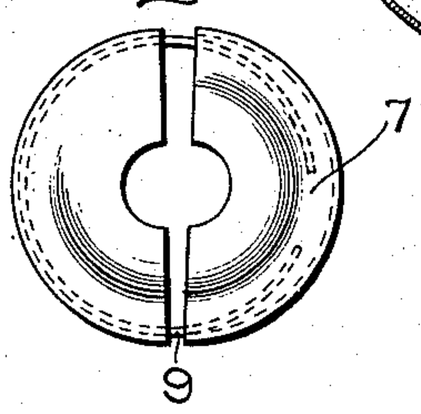


Fig. 4.

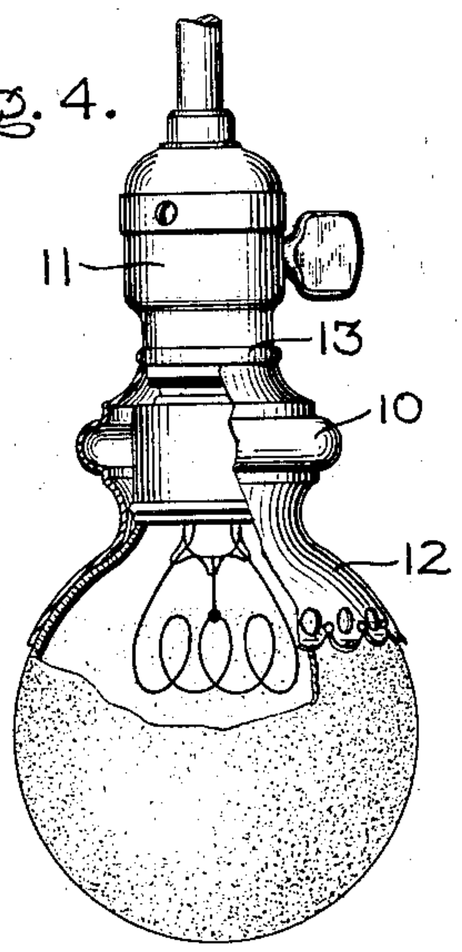
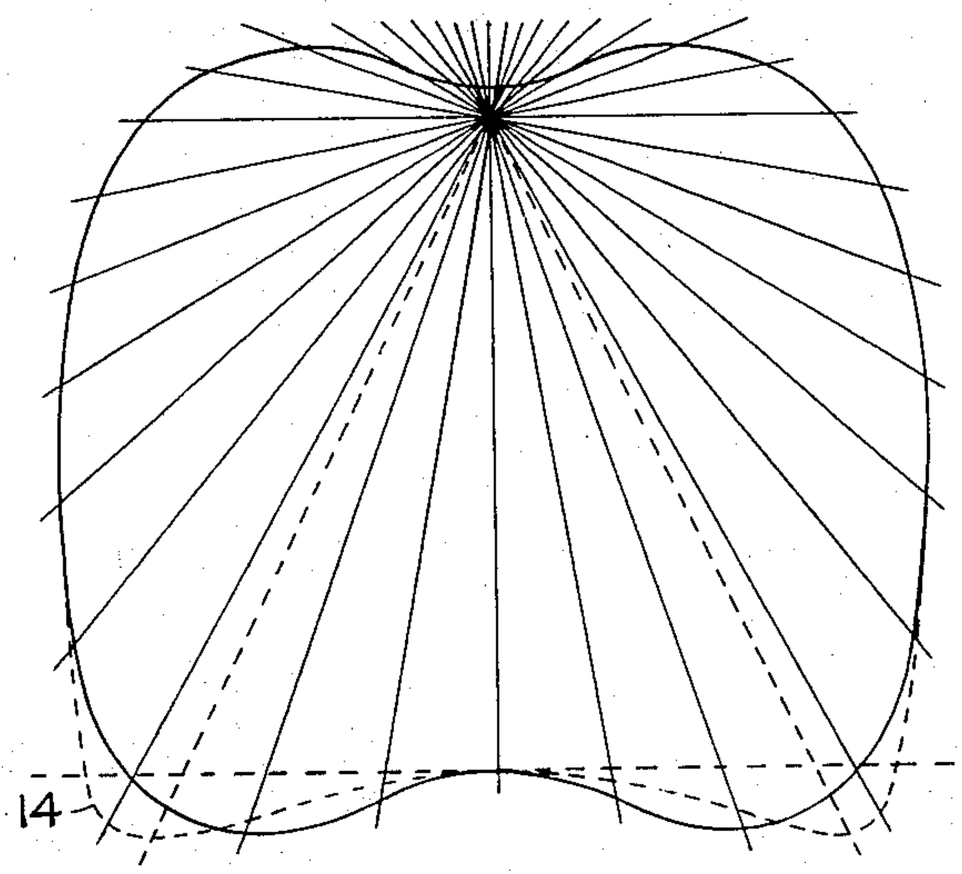


Fig. 5.



Witnesses:
George A. Thornton.
Helen Orford

Inventor:
Charles P Steinmetz.
by Albert G. Davis.
Atty.

No. 754,251. Patented March 8, 1904.

UNITED STATES PATENT OFFICE.

CHARLES P. STEINMETZ, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 754,251, dated March 8, 1904.

Application filed March 6, 1903. Serial No. 146,443. (No model.)

To all whom it may concern:

Be it known that I, CHARLES P. STEINMETZ, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Electric Lamps, of which the following is a specification.

My invention relates to electric lamps, and comprises certain improvements whereby a lamp may be produced having a superior distribution of light. In addition my invention embodies certain details in construction.

The novel features which I believe are characteristic of my invention I have pointed out with particularity in the appended claims, while the invention itself, both as to its details of construction and mode of operation, will be better understood by reference to the following description, which is to be taken in connection with the accompanying drawings, in which—

Figure 1 is an external view of a lamp constituting one embodiment of my invention. Fig. 2 is a view, partly in section, of the lamp shown in Fig. 1. Fig. 3 is a detail of a portion of the lamp shown in Figs. 1 and 2. Fig. 4 represents a modified form of lamp, and Fig. 5 shows curves of light distribution.

From an exterior view the lamp shown in Fig. 1 will be seen to consist of a globe or envelop 1, a reflector 2, and an ornamental and protecting casing 3. By referring in addition to Fig. 2 it will be noticed that the globe 1 is provided with a base 4 for attaching the globe to a socket, such as 5, of any usual and ordinary construction. In the interior of the globe and between the center of the globe and the attaching device or base 4 is a filament 6, similar in its construction to the filament of an ordinary incandescent lamp. This filament, however, is coiled in the form of a helix and is located within the globe with its axis substantially at right angles to a line between the base 4 and the center of the globe. The exact shape of the filament is, however, not of great importance so long as it is so formed that the production of light takes place within a space located at a distance from the center of the globe and close to the spherical reflector 2, which in this instance is placed outside of the globe. This reflector has a flared central opening, the lips or edges of which fit closely around the base 4, which thus serves as a centering means for the reflector. Before securing the lamp into the supporting-socket 5 the sleeve 3 is slipped over the socket. At the same time a split cap 7 (shown in detail in Fig. 3) is slipped around the supporting-shank 8 for the socket. The two halves of the split cap 7, which are held apart by a circular spring 9, are pressed together against the tension of the spring and slipped into the top of the sleeve 3, as indicated in Fig. 2. Upon relieving the tension upon the spring 9 the two halves of the cap move into spring-pressed engagement with the interior edge of the sleeve 3. The base 4 is then screwed firmly into the socket 5 in the usual manner, the parts being proportioned so that the lamp holds in place the reflector 2 and the sleeve or ornamental shell 3, with its cap 7. The globe or envelop 1 is of such construction as to produce a certain amount of diffusion of the light produced within its interior, and for this purpose it may be of opalescent or other similar glass or of ordinary glass frosted either by acid treatment or by sand blast. I prefer to use glass which has been treated by sand blast, since the greater roughness of the glass thus produced has a greater diffusing effect upon the light. That portion of the globe which is surrounded by the reflector 2 remains unfrosted, so as not to obstruct the passage of the light acting upon the concave reflecting-surface of the reflector. The line of demarcation between the frosted and the unfrosted or the diffusing and non-diffusing portions of the globe does not, however, occur exactly at the edge of the reflector 2, but at a slight distance inward therefrom, as will be clearly seen in Fig. 2. The edge of the reflector is scalloped or serrated and is provided with perforations, which may be of any fanciful design. These perforations are so near the edge of the reflector as to be located directly over a frosted portion of the globe.

In the modification shown in Fig. 4 the construction is substantially the same as in Fig.

1, except that the ornamental protecting-casing 10 instead of surrounding the entire socket 11 of the lamp, as in Fig. 4, is arranged so as to extend only from the lower edge of the socket, around which it closely fits, as indicated. The casing 10 may be made in one piece with the reflector 12 or in several pieces, as may be found most convenient in manufacture. In any case the lamp when screwed into place presses the reflector, along with the casing 10, against a ridge 13 or some similar abutment, thereby holding all of the parts in place.

In order to obtain a light distribution in which the illumination produced by a lamp placed, for example, directly over the floor of a room or other surface to be lighted shall be uniform or of substantially equal intensity over a circular area having some approximation in diameter to the distance from the lamp to the floor or surface, it is theoretically necessary that the lamp give a light-distribution curve of substantially the same character as the dotted curve 14 in Fig. 5. By reference to the dotted curve it will be noted that as the distance from a point directly under the lamp increases the intensity of light given out from the lamp must increase in order to maintain a uniform illumination. This increased intensity of course compensates for the increased distance between the lamp and the surface at points removed from that directly under the lamp. The law of variation of intensity necessary to secure the result mentioned is represented by the dotted line, while the result actually secured by the lamp described above is indicated in full lines. As the angle from the normal to the surface increases the intensity of the light becomes greater because of the action of the reflector, the sidewise distribution of light, so to speak, being effected by the location of the light-giving body between the reflector and its center of curvature. By making the reflector of somewhat less diameter than the frosted globe the diffusive action of the globe operates to throw a certain amount of light upward, a result which is furthered to a considerable extent by the perforations in the edge of the reflector. These perforations, as well as the scalloped edge of the reflector, also assist in preventing too great contrasts in the light distribution above and below the lamp. When the lamp is placed in a room, the ceiling therefore receives a certain amount of illumination, as well as the other portions of the room.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an incandescent lamp, the combination of an incandescent filament, and means for simultaneously diffusing and reflecting light emanating therefrom so as to produce an illumination of substantially equal intensity over a circular field whose diameter approximates its distance from the lamp.

2. In an electric lamp, the combination of a light-diffusing globe, a reflector therefor, of less diameter than the maximum diameter of the globe and having its edge perforated and of uneven contour, and a light-giving body located eccentrically in said globe.

3. In an electric lamp, a combination of a globe of light-diffusing material, a reflector located in close proximity to the globe and of less diameter than the globe, and a light-giving body located eccentrically in said globe.

4. In an electric lamp, the combination of a substantially spherical globe of light-diffusing material, a spherical reflector of substantially the same radius of curvature as the globe, located in close proximity to the globe and having a diameter less than the diameter of the globe, said reflector having its edge of uneven outline, and a light-giving body located eccentrically in said globe.

5. In an electric lamp, a combination of a spherical globe of light-diffusing material, a spherical reflector of substantially the same radius of curvature as the globe, located in close proximity to the globe and having a diameter less than the diameter of the globe, and an incandescing filament or light-giving body located eccentrically in said globe.

6. In an electric lamp, the combination of a spherical globe having the major portion of its surface frosted, a spherical reflector placed so as to cover the unfrosted portion of the globe as well as the dividing-line between the frosted and unfrosted portions, and an incandescing filament or body located symmetrically with respect to said reflector and between said reflector and the center of the globe.

7. The combination of a socket, an incandescent lamp having a substantially spherical globe or envelop of light-diffusing material, a light-generating body located eccentrically in said globe, means for detachably securing said globe to said socket, a spherical reflector of less diameter than the globe located close to the outer surface of said globe and arranged symmetrically with respect to said socket, and a casing surrounding the joint between said socket and the attaching means for the globe.

8. In an incandescent lamp, the combination of an incandescent filament, and means for simultaneously diffusing and reflecting light emanating therefrom so as to produce an illumination of equal intensity over a circular field of considerable diameter.

9. In an electric lamp, the combination of a globe one part of which is frosted and another part unfrosted, a reflector provided with an edge of uneven contour and mounted in close proximity to the unfrosted portion of the globe and so that its uneven edge laps over the frosted portion of the globe, and a light-giving body located eccentrically in said globe.

10. In an electric lamp, the combination of a globe one part of which is frosted and another part unfrosted, a reflector having a perforated

edge of uneven contour and mounted in close proximity to the unfrosted portion of the globe and so that its uneven edge laps over the frosted portion of the globe, and a light-giving body located eccentrically in said globe.

11. In an electric lamp, the combination of a light-giving body, a light-transmitting envelop therefor having transparent and translucent portions, the translucent portion including that part of the envelop of maximum diameter and the transparent portion a part of the envelop the maximum diameter of which is less than the maximum diameter of the translucent portion, and a reflector covering the transparent portion of the envelop and having an edge of uneven contour lapping over the dividing-line between transparent and translucent portions of the envelop.

In witness whereof I have hereunto set my hand this 4th day of March, 1903.

CHARLES P. STEINMETZ.

Witnesses:

BENJAMIN B. HULL,

HELEN ORFORD.