

W. A. DOREY.
REFLECTOR.
APPLICATION FILED MAR. 24, 1920.

1,426,280.

Patented Aug. 15, 1922.
3 SHEETS—SHEET 1.

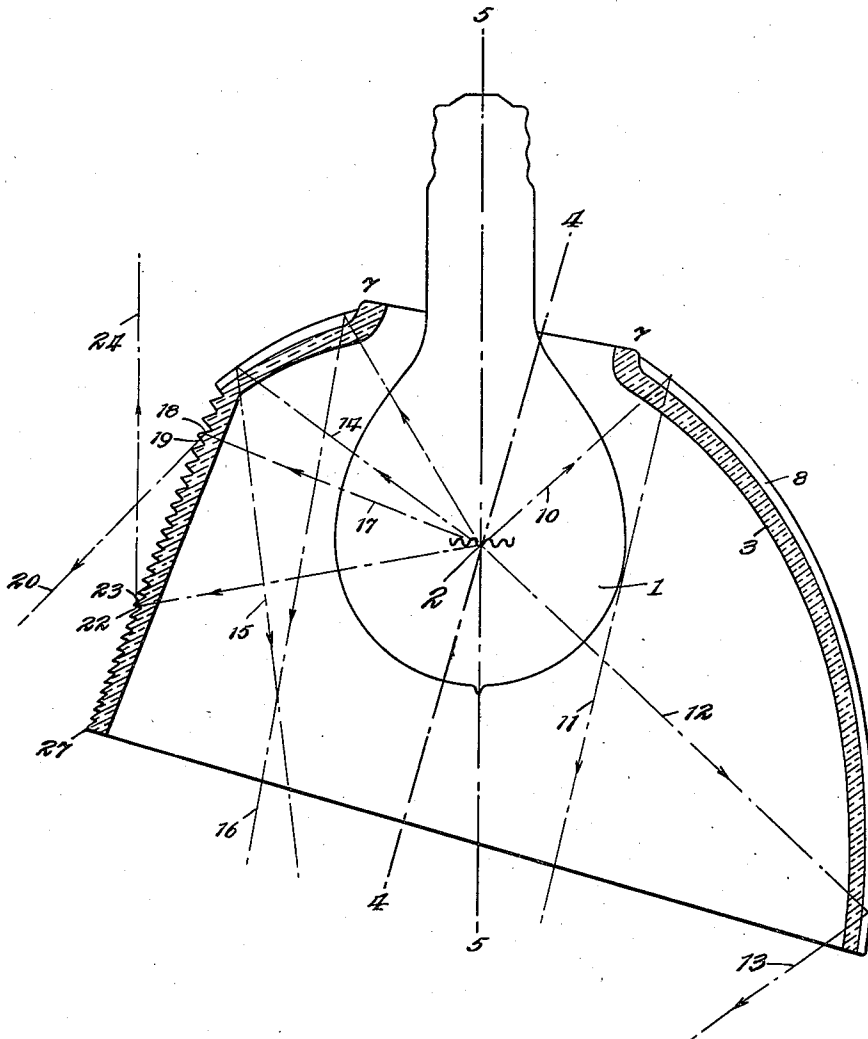


Fig. 1.

WITNESSES:

[Signature]

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JOSEPH S. LIBERMAN ^{BY}

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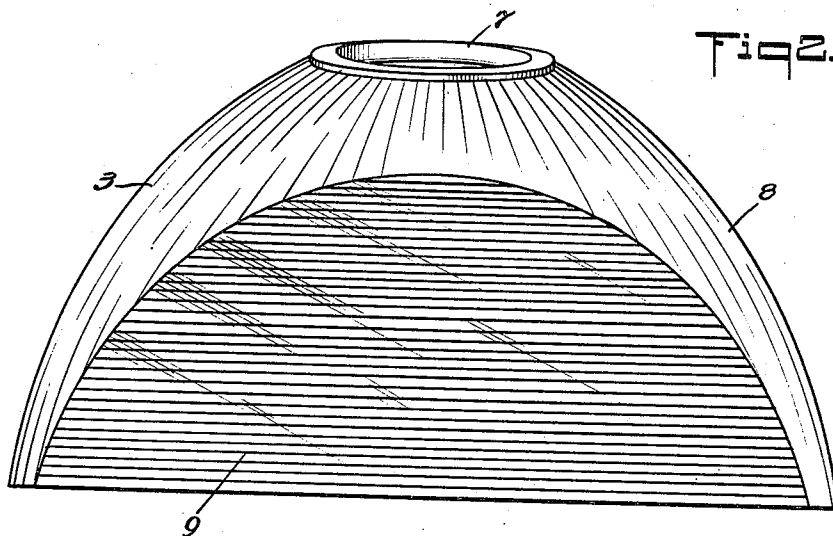


Fig. 2.

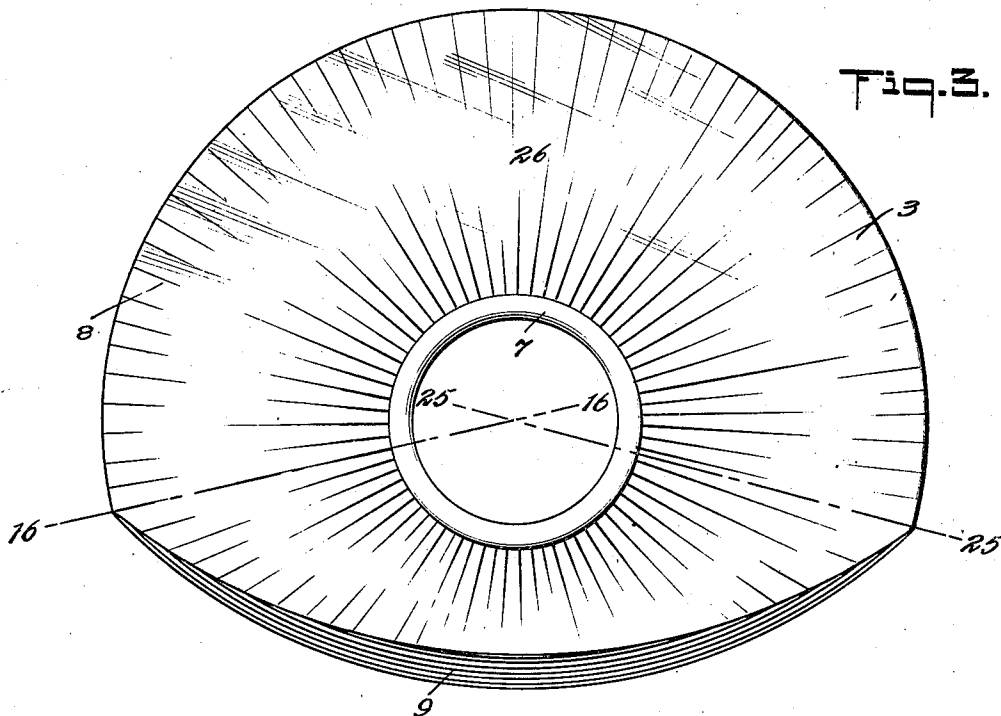


Fig. 3.

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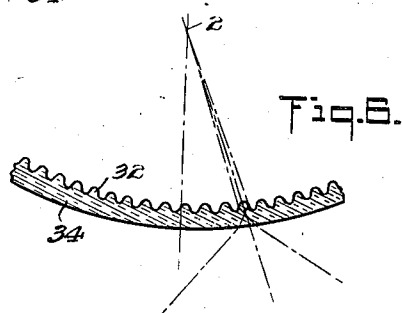
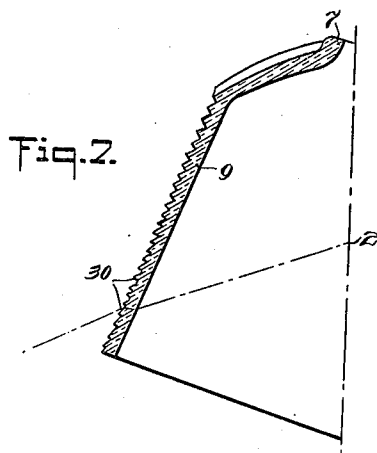
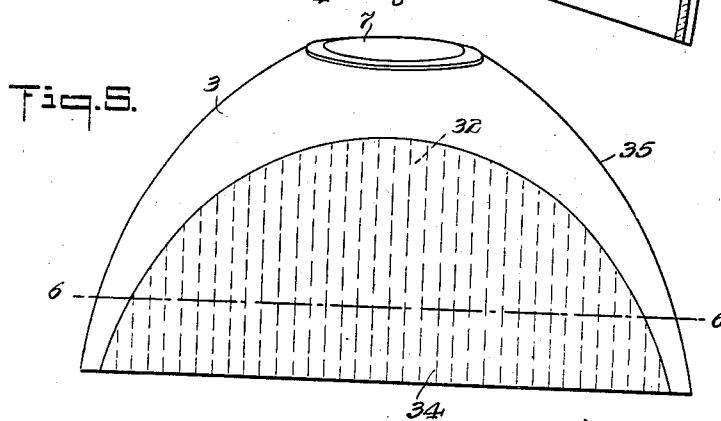
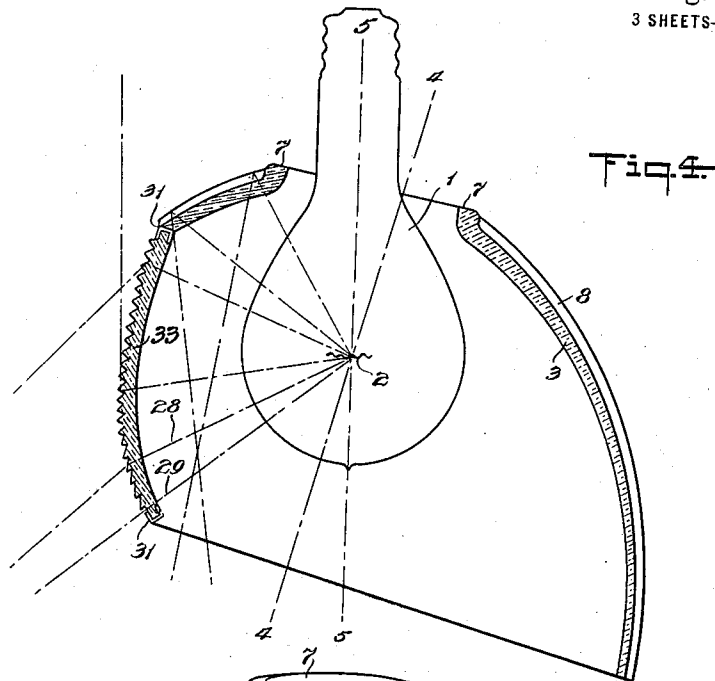
James R. Liberman

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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

WILLIAM A. DOREY, OF NEWARK, OHIO, ASSIGNOR TO HOLOPHANE GLASS COMPANY, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

REFLECTOR.

1,426,280.

Specification of Letters Patent. Patented Aug. 15, 1922.

Application filed March 24, 1920. Serial No. 368,360.

To all whom it may concern:

Be it known that I, WILLIAM A. DOREY, a citizen of the United States, and resident of Newark, in the county of Licking and State of Ohio, have invented certain new and useful Improvements in Reflectors, of which the following is a specification.

The object of the invention is to secure a prismatic glass reflector which will cast the maximum intensity of the beam to one side of the lamp axis and having a portion of the reflector wall displaced by a transmitting screen on the side towards the beam such screen having a conformation adapted to deflect the light rays from the source out of an extended field of view.

Fig. 1 is a vertical cross section of a reflector embodying my invention through the axis of the lamp and the center of the screen.

Fig. 2 is an elevation of the screen side of the reflector.

Fig. 3 is a plan view of the reflector.

Fig. 4 is a vertical cross section of a modification of my device in which the screen is separate and of curved formation.

Fig. 5 is an elevation of the screen side of the reflector showing a modification in which vertical flutes are on the interior of the screen.

Fig. 6 is a horizontal cross section of a fragment of the screen on line 6—6 of Fig. 5 showing such inner flutes.

Fig. 7 is a vertical cross section of the screen half of a modification of a reflector in which refracting surfaces are used on the prisms.

In the figures similar numbers are used for identical parts: 1 is the lamp with light source at 2, here shown of the concentrated type for purposes of illustration. 3 is the reflector which is substantially of an elliptical, parabolic or hyperbolic contour, symmetrical with reference to axis 4—4 making an angle with the lamp axis 5—5. 9 is a screen of steep conical form displacing a portion of the reflecting surface on the side where the reflector is tilted upward and this screen portion is brought in closer to the lamp axis than the general reflector surface so as to increase the angle through which it operates. The neck opening 7—7 is so placed and of such dimensions as are required for securing sufficient lamp clearance and a proper method of support for the reflector. I prefer to cover the reflector ex-

cept on the screen with radial double reflecting prisms 8, although it may be of any good specular reflecting material such as mirrored glass, polished metal or the like as shown at 35 in Fig. 5. The screen 9, has upon its outer surface lateral corrugations transmitting, deflecting and diffusing the light rays. I prefer to use a prism form, each side of which will reflect the light rays first incident upon it in such directions as will permit their transmission by the opposite prism face, although refracting surfaces as shown in prisms 30 on Fig. 7 may be used where sufficient deflection may be obtained, more and more of the reflecting prisms at the bottom edge of the screen being cut away by refracting surfaces. The light is then refracted downward to be parallel with or lower than the highest ray coming direct from the lamp. Diffusing flutes 32 as shown in the screen 34 of Figs. 5 and 6 may also be employed. The course of light rays in such case is shown in Fig. 6, where the intensity of the primary light source is low enough to warrant it.

The operation of the device is as follows: Light rays 10 proceeding from the light source striking the reflector near the top opening will be reflected in the downward direction 11. Light rays emitted at lower angles and striking reflector at lower points will be reflected back at greater angles with the reflector axis 4—4 until light ray 12 striking the extreme lower edge of the reflector is emitted in direction 13 making a great angle with the reflector axis 4—4. Since the reflector is symmetrical with reference to axis 4—4, these rays are typical of the action of reflected rays in any plane through said axis, but in the plane shown at the left of Fig. 1, the reflector surface is displaced to a high angle by the screening surface and therefore ray 14 emitted from the light source and reflected in direction 15, which is at a moderate inclination with the axis 4—4, represents the extreme inclination of reflected light rays toward the right in this plane. It is evident from the form of the screen as shown in Figs. 2 and 3, that in other planes through the reflector axis 4—4 the amount of reflector surface will gradually increase as the inclination of these other planes increases with reference to the center plane, until in the plane 16—16, of Fig. 3, the full extent of the reflector surface is available

and reflections will be secured through a range corresponding to that shown by the typical rays 10, 11, 12 and 13.

If a portion of the reflector wall were not displaced by the screen the resultant illuminated field produced on a horizontal plane would be approximately circular with its center displaced toward the left to a degree depending on the tilt of the reflector. Since the transmitting screen displaces that portion of the reflector toward the left which would contribute to the illuminated field at the right, a portion of the illuminated field at the right will be eliminated so that the illuminated field will extend very little beyond the vertical axis of the lamp on the right hand side. The screen which displaces this portion of the reflector wall operates as follows: Light ray 17, emitted by the source and striking upper surface 18 of a prism on the screen will be reflected across to lower surface 19 of said prism and be emitted in downward direction 20. Light ray 21 emitted by the lamp and striking lower prism surface 22, will be reflected across to upper prism surface 23 and emitted in upper direction 24. The angle between emitted rays 20 and 24 is an approximate measure of the vertical angle through which the screen acts in suppressing glare from the source. Referring to the plan view, the angle between the planes 16—16 and 25—25 is an approximate measure of the lateral angle through which the screen operates in suppressing the glare from the source. The reflector shown is of sufficient depth to give a proper average screening of the light source, but owing to the tilt an unmodified reflector would expose the direct light to too high an angle at the left, Fig. 1.

I therefore prefer to build the screen with a greater radius on the bottom edge than that of the reflector and with the center offset to the right at 26 of Fig. 3, so that the lower edge of the screen 27 of Fig. 2, is brought down to a proper screening angle. The slope of the screen is made as steep as practicable and the position of the axis 26 and the radius of the surface are so adjusted that the screen will run out to nothing at points such as 16 and 25, where average screening is obtained by the reflector wall itself.

These reflectors have a wide field of usefulness but are especially adapted for certain types of window lighting, where the observer must necessarily face the light source in looking at the window trim. Under such conditions this construction will brilliantly illuminate the goods displayed and at the same time the screen will operate to keep all glaring light out of the eyes of the observer.

The relative proportions and shape of the reflector and screen may be varied to meet the illuminating requirements and the

screening requirements: The type illustrated in Figs. 1, 2 and 3 is designed so that it may be made of an integral piece or glass without refinishing. In Fig. 4 I have shown a modification of the device where it is desired to increase the screen zone. The screen 33 is reheated and bent inward at its lower edge and it may be made in a separate piece as shown in Fig. 4 and attached by means of clamps 31. The screening angle is then lowered from rays 28 to 29, but the screen does not intersect the refracted light. Refracting prisms are here used at 28. Where it is found desirable to increase the screened zone, the screen may be reheated and bent inward at its lower edge or it may be made in a separate piece of desired form.

In the specification and claims I have mentioned a displacement of the reflector wall in the construction of the unit; in the practical application of my invention it is not necessary, of course, that this displacement of the required portion of the reflector by the transmitting screen be made during the manufacture of the reflector. Whenever it is possible, as in the case of prismatic pressed glass to make the article integral in one operation I prefer to provide for this displacement in designing and making the molds. In working out the design of such a reflector I determine the reflector form and inclination which will give the general results desired. Then I determine what portion of the reflector must be cut away in order to do away with reflection in undesirable directions and design my transmitting screen to take the place of this reflector portion, or displace it. The complete design may then be shown in the form of working drawings from which a mold can be made to produce the reflector.

I claim:

1. A reflector for artificial light sources casting the maximum intensity of the beam to one side of the lamp axis and having a portion of the reflector wall displaced by a transmitting screen on the side towards the beam such screen acting through a greater angle than the reflector wall displaced and having a conformation adapted to deflect the light rays from the source out of an extended field of view.

2. A specular reflector for artificial light sources casting the maximum intensity of the beam to one side of the lamp axis and having a portion of the reflector wall displaced by a comparatively flat transmitting screen on the side towards the beam, such screen acting through a greater angle than the reflector wall displaced and having a conformation adapted to deflect the light rays from the source out of an extended field of view.

3. A specular reflector for artificial light sources casting the maximum intensity of

- the beam to one side of the lamp axis and having a portion of the reflector wall displaced by a comparatively flat glass light transmitting screen on the side toward the beam, such screen acting through a greater angle than the reflector wall displaced and having a conformation adapted to deflect the light rays from the source out of an extended field of view.
- 10 4. A specular reflector for artificial light sources casting the maximum intensity of the beam to one side of the lamp axis and having a portion of the reflector wall displaced by a glass light transmitting screen
- 15 on the side toward the beam, such screen acting through a greater angle than the reflector wall displaced and having a series of light transmitting prisms on its surface adapted to deflect the light rays from the
- 20 source out of an extended field of view.
5. An open mouthed reflector for artificial light sources having on its surface, radial double reflecting prisms, casting the maximum intensity of the beam to one side of the lamp axis and having a portion of the reflector wall displaced by a transmitting screen on the side toward the beam, such screen running closer to the reflector axis than the reflector walls, and having on its surface a series of light transmitting prisms adapted to deflect the light rays from the screen out of an extended field of view.
6. An open-mouthed reflector for artificial light sources having on its surface, radial double-reflecting prisms casting the maximum intensity of the beam to one side of the lamp axis and having a portion of the reflector wall displaced by a comparatively flat light transmitting screen on the side towards the beam, such screen having on its surface a series of light transmitting prisms adapted to deflect the light rays from the screen out of an extended field of view.

Signed at Newark, in the county of Licking and State of Ohio, this 20th day of March, A. D. 1920.

WILLIAM A. DOREY.