Oct. 30, 1923. 1,472,639

W. A. DOREY

INDIRECT LIGHTING UNIT

Filed Nov. 6, 1920 2 Sheets-Sheet 1

Fig. 1.

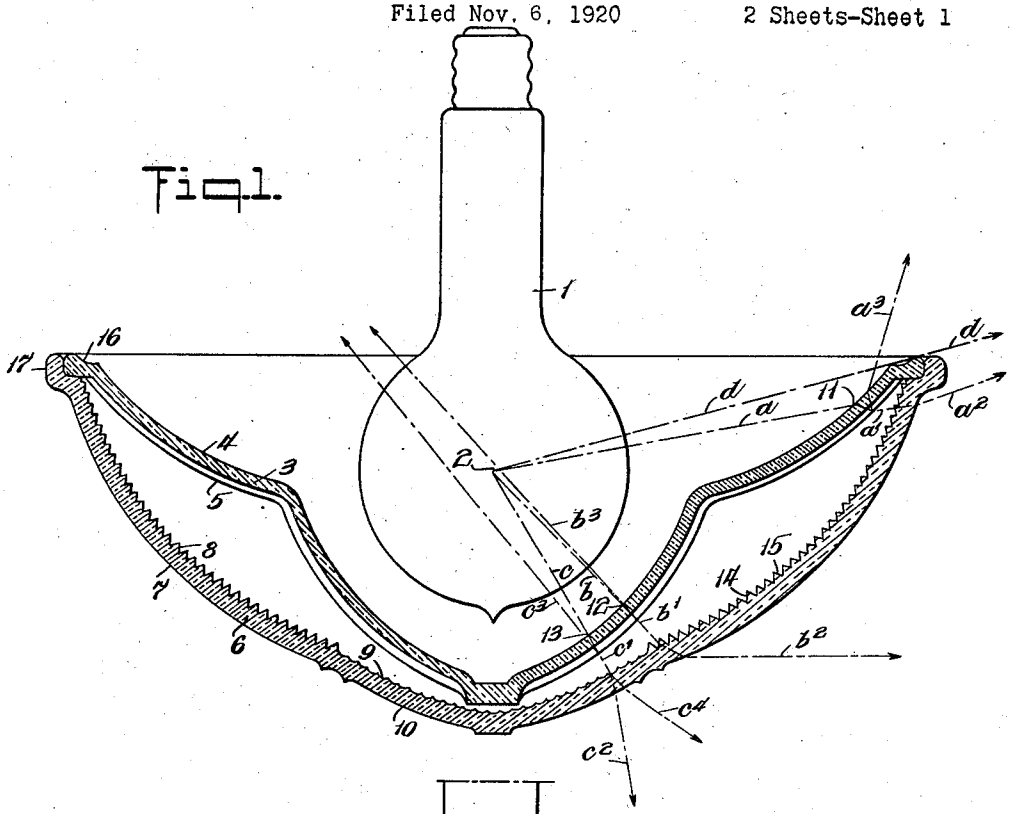
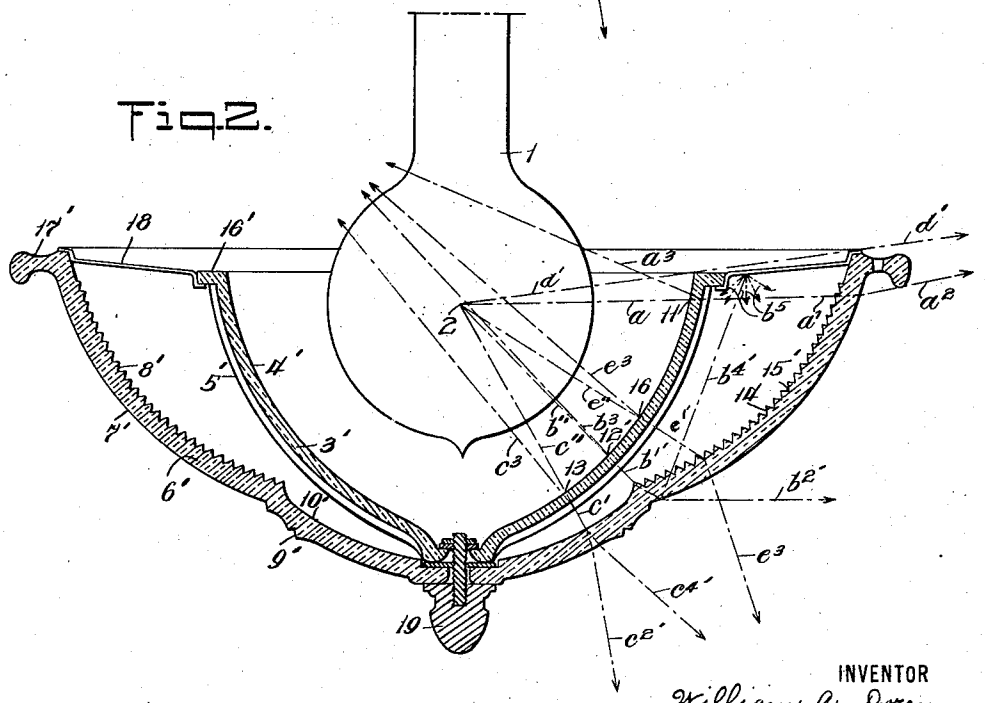


Fig. 2.



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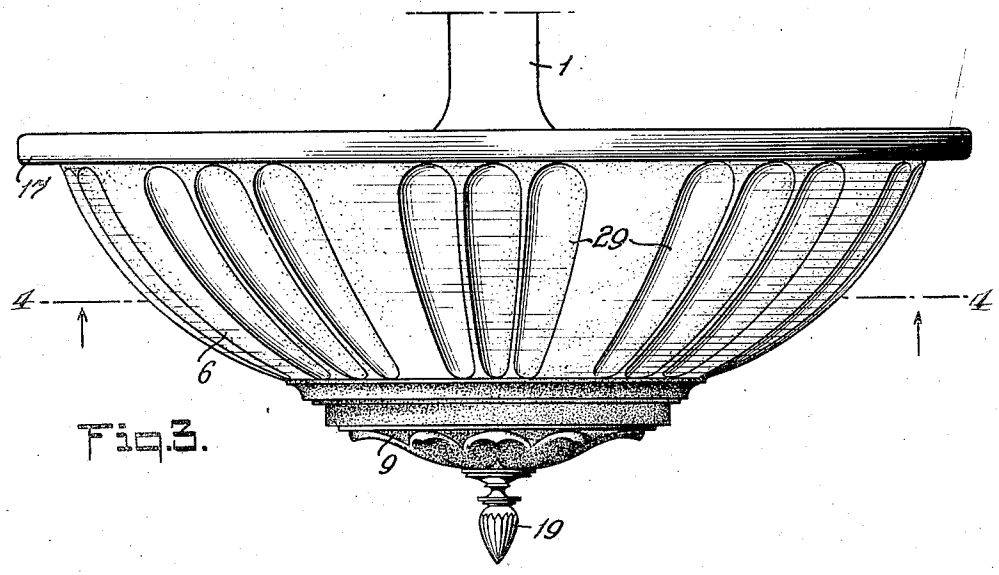


Fig. 3.

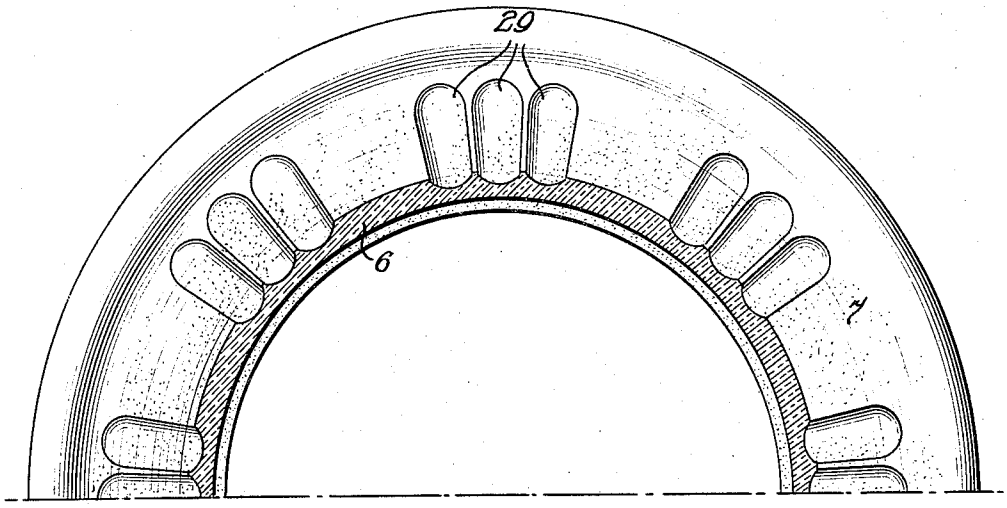


Fig. 4.

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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.

INDIRECT-LIGHTING UNIT.

Application filed November 6, 1920. Serial No. 422,269.

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 Indirect-Lighting Units, of which the following is a specification.

The object of the invention is to construct a prismatic indirect appliance which will give effective control of the light rays transmitted through the reflecting member by means of prismatic glass and at the same time reduce the glare to a minimum. Figure 1 is a vertical cross section of the device, Figure 2 is a vertical cross section of a modication of the device. Fig. 3 is an elevation of a modification and Fig. 4 is a section through line 4—4 of Fig. 3, looking upward. In Figure 1, 1 is the lamp. 2 is the light source considered in this case as a point. 3 is the interior reflector having a smooth interior surface 4 and upon its outer surface so called double reflecting prisms 5, so constructed that a ray of light from the light source within will be reflected back to the ceiling or upper walls. A certain amount of light is not reflected by the prismatic reflector but is transmitted through the prisms and is acted upon by the outer cover 6. This cover has a smooth outer surface 7 and a prismatic interior 8 on its upper portion, the action of which is explained by following the various light rays in their course through the inner reflector 3. The lower portion of cover 6 has a decorative outer surface 10 and a fluted interior surface 9. The reflector 3 is provided with a flange 16 which rests upon the flange 17 of the cover 6 so that the two flanges can be held together by a metal band or other suitable means. Typical beam a incident on the upper part 11 of the reflector has a component a^3 which is doubly refracted to the ceiling or walls in the manner set forth. The other component is transmitted through the apex or sides of the prisms in the direction of a^1 and is emitted in direction a^2 after deviation by the combined action of the interior prism 8 and the outer surface 7 of envelope 6. A portion of typical beam b incident on point 12 is doubly reflected in direction of b^3 a second component passing through the glass in the direction b^1 and emerging in direction b^2. A portion of typical beam c incident on point 13 is doubly refracted in the direction c^3. A second component passing through the glass in direction c^1 is spread by the flutings on surface 10 into the emerging beam c^2 to c^4. Typical beam d proceeding from source 2 passes above the top edge of the device without obstruction toward the ceiling or upper walls. It will be observed that the transmitted components from b^2 to a^3 pass out above the horizontal and therefore cannot contribute to a condition of glare at any ordinary view point. It will also be observed that the component a^2 converges toward the limiting direct beam d so that it will tend to light up any possible shadow from the upper edge of the device. The transmitted components such as c^2, c^4 are spread and thus partially diffused and emitted at angles lower than ordinary view points. In this particular example the prisms on the inner surface 8 of envelope 6 have faces 14 which are substantially vertical and act with the outer surface to refract light upward and upper faces 15 placed substantially parallel with the adjacent light rays within the outer envelope. A very small portion of the light will be incident on faces 15 and such light as does strike them will in the main be refracted at very low angles or reflected upward in the general direction of transmitted components a^2 and b^2.

Figure 2 is a modification of the device in which a small reflector part is used. The two members are fastened together by screw and nut 19 and the opening between the two members at the upper edge is filled by a metal diaphragm 18, the inner edge of which is held beneath the flange 16′ of reflector 3′ and above the flange 17′ of the envelope 6′. The interior reflector 3′ has a smooth interior 4′ and a prismatic exterior 5′ adapted to reflect the majority of light rays back across the axis of the device and toward the ceiling. In the envelope 6′ the lower inner surface 10′ and the lower outer surface 9′ are etched to give the requisite spread to the transmitted components such as $c^{2'}$, $c^{4'}$ from typical beam C''. Typical beam b'' incident at point 12′ has a transmitted component $b^{1'}$ which, after passing into the envelope strikes the outer surface 7′ at such a great angle that a considerable portion of it will not be transmitted in direc-

tion $b^{2'}$ but will be reflected in direction $b^{4'}$ up to the lower surface of the diaphragm 18. The lower surface of diaphragm 19 is finished with a white diffusing coat which will reflect component $b^{4'}$ diffusely in direction b^5, b^5. This diffused light will in part pass through the envelope 6' in downward directions. In this design the upper faces such as 15' of the prisms on surface 8' are reduced in a slope as the lower edge of surface 8' is approached, so that they will catch increased proportions of the rays transmitted through the reflector. Typical beam e'' has transmission component $e^{1'}$ which is incident on one of these upper surfaces by which it is refracted downward in the direction e^3. Typical beam d' is similar to beam d in Figure 1.

While the art shows a reflector member facing upward, the present device differs from such prior art in redirecting the light which would otherwise cause glare so as to reduce the shadow at the edge of the cone of light passing direct from the lamp in upward directions and to increase the relative proportion of direct light below an angle of 60° with the nadir as compared with the quantity of light at high angles below the horizontal.

It is possible to vary the proportion of light transmitted in downward directions by varying the inclination of the upright surfaces 15 or by decreasing or increasing the relative area of the lower diffusing portion of the enevelope.

The outer cover has been shown as smooth on the exterior and the inner reflector as smooth on the interior, but this is not absolutely essential to the practice of my invention as these may have corrugations or colors thereon, as long as they do not interfere with the reflective and directional value of the device. Fig. 3 shows an elevation and Fig. 4 a section through line 4—4 of Fig. 3, looking upward, of a modification in which the outer cover has radial flutings 29 on its exterior surface or a design the elements of which are preferably but not necessarily radial. The inner surface of the outer cover is here also lightly etched or colored as long as it does not interfere with the directional effect of the prismatic construction, and heavy etching, sand-blasting or coloring may be applied inside or out in the lower non-prismatic portion of the outer envelope.

I claim:—

1. A device for indirect lighting consisting of a light source, an interior upwardly facing reflector having reflecting prisms on its outer surface and a separate shade surrounding the same, the reflector being adapted to reflect the major portion of light rays incident thereon upwardly in a zone about the axis of the fixture limited in angles by interference of the fixture and the body of the reflector, and the shade having on its inner surface horizontal light directing prisms adapted to receive and direct light rays transmitted through the reflector at angles to obliterate the shadow formed by the edge of the reflector.

2. A device for indirect lighting consisting of a light source, an interior upwardly facing reflector having reflecting prisms on its outer surface and a separate shade surrounding the same, the reflector being adapted to reflect the major portion of light rays incident thereon upwardly in a zone about the axis of the fixture limited in angles by interference of the fixture and the body of the reflector, and the shade having on its inner surface a zone of light directing prisms and a zone of light diffusing surface adapted to receive and direct light rays transmitted through the reflector, at angles to obliterate the shadow formed by the edge of the reflector.

3. A device for indirect lighting consisting of a light source, an interior upwardly facing translucent reflector, a separate shade surrounding the same, and a flat ring spaced between the upper edges of the reflector and shade having an interior surface reflective of light, the reflector being adapted to reflect a portion of the light rays upwardly in a zone about the axis of the fixture limited in angle by interference of the fixture support and the body of the reflector and the shade having on its inner surface horizontal light directing prisms constructed to receive and direct light rays transmitted to it through the reflector at angles to obliterate the shadow formed by the edge of the reflector.

4. A device for indirect lighting consisting of a light source, an interior upwardly flaring reflector and a separate shade surrounding the same, the reflector having radial double reflecting prisms on its outer surface adapted to reflect a major portion of the light rays incident thereon upwardly in a zone about the axis of the fixture limited in angle by interference of the fixture and the body of the reflector, and the shade having on its inner surface horizontal light refracting prisms adapted to receive and direct light rays transmitted through the reflector at angles to obliterate the shadow formed by the edge of the reflector.

Signed at Newark, in the county of Licking and State of Ohio, this 25th day of October, A. D. 1920.

WILLIAM A. DOREY.