Nov. 29, 1932. L. A. BEAN 1,889,188

REFLECTOR

Filed May 9, 1931

Fig. 1.

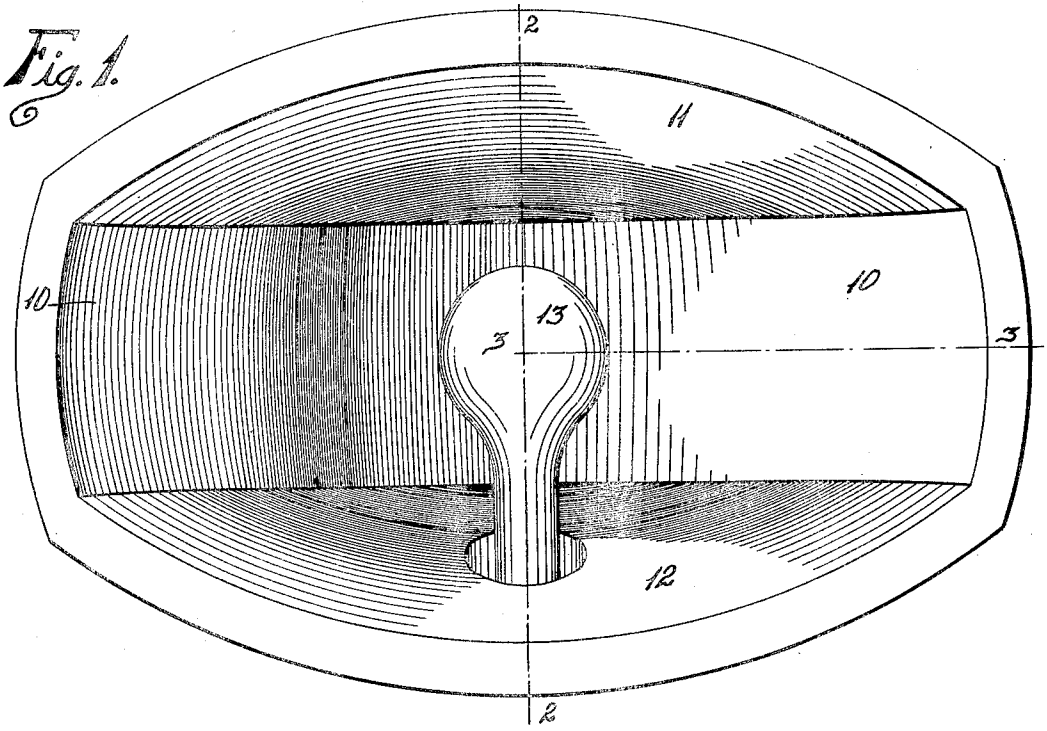


Fig. 2.

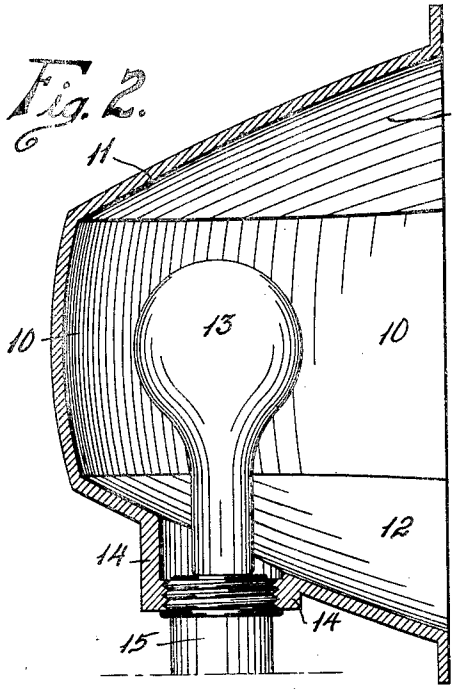
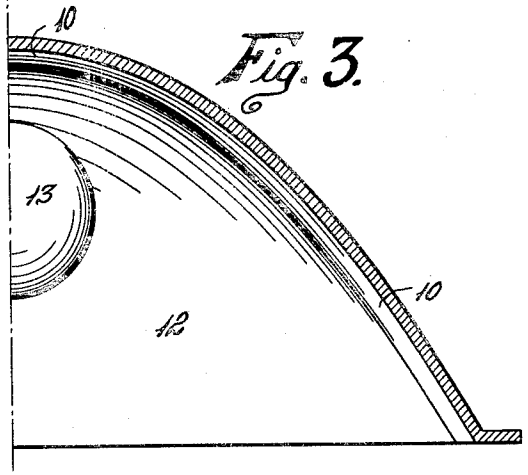


Fig. 3.



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UNITED STATES PATENT OFFICE

LOUIS A. BEAN, OF DENVER, COLORADO

REFLECTOR

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This invention relates to light reflectors, and more particularly to light reflectors adapted to cooperate directly with a source of light to illuminate interiors, work-rooms, piers, docks, wharves, and any and all similar places where people are employed or congregate, and has as an object the provision of a novel and improved construction and arrangement of curved reflecting surfaces whereby the light from a given source may be more efficiently distributed for purposes of general illumination.

A further object of the invention is to provide an improved construction and arrangement of curved reflecting surfaces in operative combination with a light source, whereby the light rays emanating from said source may be spread over an unusually wide area with substantially uniform intensity throughout the area.

A further object of the invention is to provide an improved reflector in combination with a light source, which reflector is composed of a plurality of curved reflecting surfaces so interrelated as to project the light from said source efficiently, the projected light being diffused rather than concentrated and hence substantially free from glare.

A further object of the invention is to provide a light reflector of the character described which readily lends itself to simple, inexpensive manufacturing operations and which is susceptible of efficient functioning in any of a wide variety of installations.

My invention consists in the construction, arrangement and combination of elements hereinafter set forth, pointed out in my claims and illustrated by the accompanying drawing, in which—

Figure 1 is a front elevation of my improved reflector as arranged for practical use. Figure 2 is a vertical section through the showing of Figure 1 taken on the indicated line 2—2 of said latter figure. Figure 3 is a half horizontal section of the showing of Figure 1 taken on the indicated line 3—3 of said latter figure.

As is clearly shown in the drawing, the improved reflector comprises three distinct curved surfaces 10, 11 and 12, the latter two of which are identical and arranged in spaced opposition, the surface 10 serving to complete the assembly and act as the connecting element between the surfaces 11 and 12. The surface 10 is a strip-like element concaved in two perpendicularly-related directions and corresponds to a radial zone taken from the surface of a solid generated by rotating a parabola about a line parallel with the directrix and perpendicular to the axis of said curve. The strip carrying the surface 10 is arranged with its length horizontally of the improved reflector so that the axis of the parabola defining said surface becomes the axis of the reflector, the concavity of said surface 10 thus being symmetrical about the reflector axis in the horizontal and vertical planes containing said axis. Thus, as is clearly shown in Figure 2, the vertical plane containing the axis of the reflector shows the curvature of the surface 10 as a circular arc, while the horizontal section containing said axis, illustrated in Figure 3, shows the curvature of said surface as the vertex and more extended adjacent portions of a parabola. The surfaces 11 and 12 are more regular in form, being identical surfaces conforming to the surface of a segment cut from a parabolic conoid by a plane parallel with the axis of the conoid, the chord of the arc at the base of said segment corresponding in length with the horizontal spread of the strip surface 10 at the forward margin of the reflector. The surface 11 closes the upper side of the strip surface 10 and joins with said surface in a line forming the apex of the angle between said surfaces, said line being not quite straight, but curving slightly upward as it is extended on either side of the vertical plane of the reflector, so that the vertical height of the strip 10 is slightly less at its midportion than at either of its ends. The relation of the surfaces 10 and 11 is determined by the relation of the axes of said surfaces, the axis of rotation of the surface 11 being positioned in the same vertical plane with, beneath and parallel with the axis of the surface 10. In like manner, the surface 12 closes the lower side of the strip surface 10 and joins with said surface in the

manner above described, the relation between the surfaces 10 and 12 being determined by positioning the axis of rotation of the surface 12 in the same vertical plane with, above and parallel with the axis of the surface 10. The front or opening of the reflector formed as above described is defined by a plane perpendicular to the axis of the surfaces 10, 11 and 12, which plane intersects the surfaces 11 and 12 in circular arcs and the surface 10 in circular arcs of wider spread, the front opening of the reflector thus presenting the form of an approximate ellipse interrupted at four points by the curvilinear angles formed by the intersections of the curved surfaces 10, 11 and 12.

A suitable light source, indicated at 13 as an electric light bulb, is mounted in the reflector in any suitable or convenient manner and so positioned relative to the reflector as to locate the light-producing element of the source as nearly as possible on the axis of the reflector and closely adjacent the focal point of the horizontally-disposed parabola of the surface 10. A convenient means of mounting the light source 13 in the reflector is illustrated in Figure 2 as comprising an apertured boss 14 beneath and opening through the surface 12, a bulb socket member 15 engaged in the aperture of said boss and a light bulb 13 seated in and extending within the reflector from said socket member.

With the reflector and light source arranged as illustrated and above described, light from said source will be projected through the opening of the reflector throughout an unusually wide spread, substantially free from glare. A very few of the light rays from the source will be projected in parallel relation from the reflector, in fact, owing to the difficulty of confining the source to a single point, practically no beam with parallel or converging rays will be projected, the only possible source of such a beam being the reflection from the parabola of the surface 10 lying in the horizontal plane, and that beam is destroyed by the multiplicity of points comprising the light source and the infinite number of other rays from the reflector intersecting the rays of said beam at various angles. Since the light source is positioned behind the focal point of the parabola of the surface 10 lying in the vertical plane, rays from the light source impinging on said parabola will be reflected in diverging relation through the reflector opening or against the surfaces 11 and 12, from which latter surfaces the rays are again reflected outwardly of the reflector at still different angles. Rays from the light source impinging directly on the surfaces 11 and 12 are reflected outwardly of the reflector at various angles, most if not all of said rays being in diverging relation, and some of said rays will intersect the frontal plane of the reflector at a very small angle, thus giving unusually efficient lighting effect on all sides of the reflector throughout a wide spread.

The improved reflector may be constructed in any suitable manner as a unit, or may be assembled by suitably joining together the separately formed surfaces of which it is composed, and the reflecting surfaces may be polished, silvered, or otherwise treated as may appear expedient for the function to which the reflector is to be adapted. The reflector is designed for operation with no frontal lens other than a protective plane covering of suitably transparent material, any curved lens which would refract or otherwise change the direction of the projected light rays being destructive of the efficiency and particular advantages of the reflector. Suitable brackets may be secured to the reflector for mounting thereof, or the reflector may be enclosed save for its frontal area in a housing or cabinet, and the mounting may be fixed or adjustable, all of which details are matters of specific installation and use of the reflector and in no wise related to the construction, function and successful operation thereof.

Since changes and modifications in the proportions of the reflector shown and described, and in the mathematical constants of the curves employed in said reflector, may be made and may indeed be required for certain specific adaptations thereof, all without departing from the spirit of the invention, I wish to be understood as being limited solely by the scope of the appended claims rather than by any details of the illustrative showing and foregoing description.

I claim as my invention—

1. A light reflector comprising three concaved, rearwardly-converging reflecting surfaces in angular interrelation, two of said surfaces being identical and arranged in spaced opposition on opposite sides of and intersecting relation with said third surface, the concavity of each of said surfaces presenting different curves in perpendicularly-related planes intersecting said surface.

2. A light reflector comprising three concaved, rearwardly-converging reflecting surfaces in angular interrelation, two of said surfaces being identical segments of the surface of a parabolic conoid arranged in spaced opposition on opposite sides of and intersecting relation with said third surface.

3. A light reflector comprising three concaved, rearwardly-converging reflecting surfaces in angular interrelation, two of said surfaces being identical segments of the surface of a parabolic conoid arranged in spaced opposition and the third of said surfaces being a doubly parabolic strip between, intersecting and connecting said conoidal surfaces.

4. A light reflector comprising three concaved, rearwardly-converging reflecting sur-

faces in angular interrelation, two of said surfaces being identical segments of the surface of a parabolic conoid arranged in spaced opposition and the third of said surfaces being a doubly parabolic strip between, intersecting and connecting said conoidal surfaces, the axes of rotation of said conoidal surfaces lying in the same plane with, and in spaced parallel relation on opposite sides of the axis of said doubly parabolic surface.

Signed at Houston, in the county of Harris and State of Texas, this 27 day of April, 1931.

LOUIS A. BEAN.