Feb. 13, 1923. 1,445,306

M. E. EPSTEIN

NONGLARE HEADLAMP REFLECTOR

Filed May 12, 1922

Fig. 1.

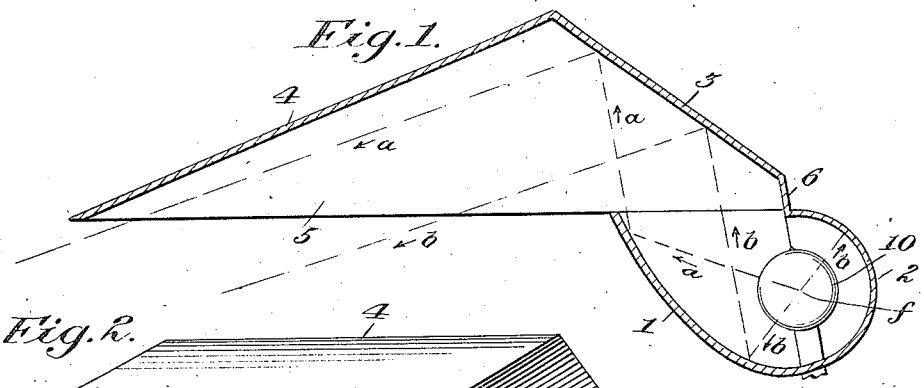


Fig. 2.

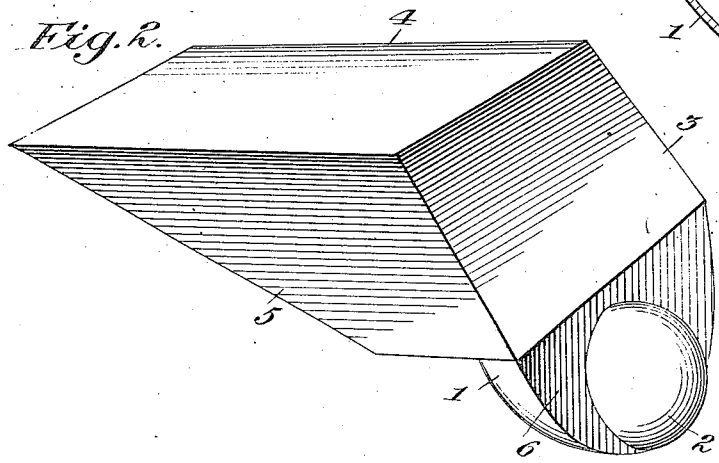


Fig. 3.

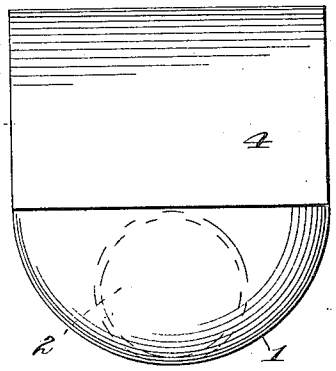


Fig. 4.

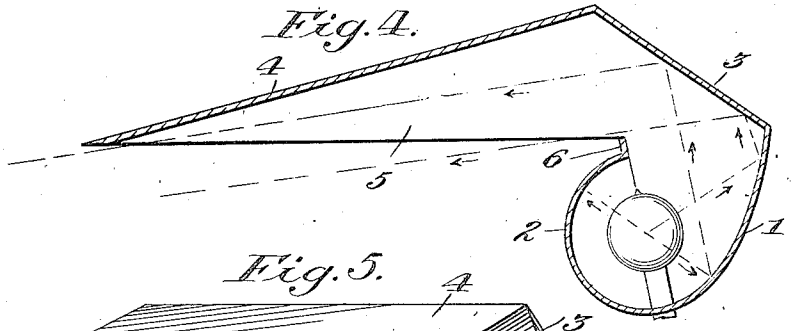
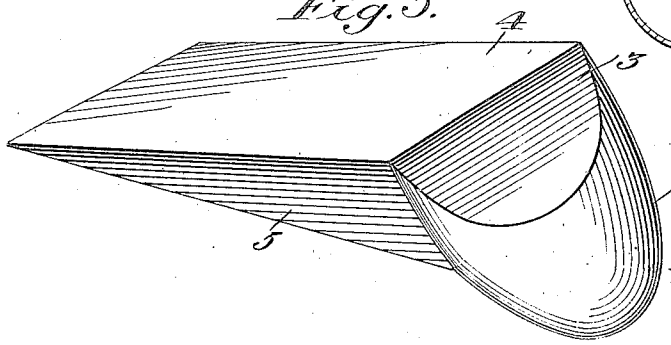


Fig. 5.



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UNITED STATES PATENT OFFICE.

MONROE E. EPSTEIN, OF ST. LOUIS, MISSOURI.

NONGLARE HEADLAMP REFLECTOR.

Application filed May 12, 1922. Serial No. 560,314.

To all whom it may concern:

Be it known that I, MONROE E. EPSTEIN, a citizen of the United States, residing at St. Louis, in the county of Saint Louis City and State of Missouri, have invented certain new and useful Improvements in Nonglare Headlamp Reflectors, of which the following is a specification.

My invention relates to headlights for automobiles or other vehicles.

The object of the invention is to furnish a head lamp reflector for vehicles which will illuminate the area in front of the vehicle in a satisfactory manner and yet will be free from the offensive glare of the head lamps now in common use.

This object I accomplish by the construction shown in the accompanying drawing, in which:

Fig. 1 is a central vertical longitudinal section through my improved head lamp.

Fig. 2 is a perspective of the same from the rear.

Fig. 3 is a front elevation.

Fig. 4 is a view similar to Fig. 1 of a modification.

Fig. 5 is a rear perspective of the same.

The head lamp reflector shown in Figs. 1, 2 and 3 comprises four main parts as follows: a lower front semi-ellipsoidal or paraboloidal reflecting surface of revolution 1, with a focus at *f;* a hemispherical reflecting surface 2 in rear of the reflecting surface 1, and the center of which is confocal with that of the said surface 1 at *f;* a plane reflecting surface 3 extending upwardly and forwardly from the upper forward edge of the reflecting surface 2 over the reflecting surface 1 and connected at its rear lower edge to the upper forward edge of the surface 2 by vertically disposed plane surface 6, which may or may not be a reflecting surface, as it merely forms a connecting wall between reflecting surfaces 2 and 3; a plane reflecting visor or hood 4 which extends forwardly and downwardly from the upper forward edge of the reflecting member 3 and is provided with depending side reflectors 5, 5 which extend back to the rear end of the reflector 3. In viewing, therefore, the lamp from the front, only the top of 4 and lower part of the part 1 will be visible, as shown in Fig. 3. The reflecting surface and source of light are, in other words, all completely hidden in looking towards the front of the lamp. The source of light shown as an electric light bulb 10 is mounted, as shown, in the bottom of the reflector within the parts 1 and 2, where it is wholly concealed.

The principle or theory of operation is as follows: Rays of light from the bulb 10, Fig. 1, striking the ellipsoidal or paraboloidal surface 1, as indicated by the arrow *a*, will be reflected upward in a path approximately parallel to the axis of revolution and to the plane surface 3, and thence out along a path approximately at 90° to the axis of revolution, as indicated by the path of arrow *a*. Rays such as indicated by arrows *b* which strike the spherical surface 2 are reflected back through the focus *f*, onto the surface 1, axially upward to plane surface 3 and thence in a path approximately 90° from the axis of revolution as indicated by arrows *b*.

In Fig. 4 the general construction and arrangement are substantially similar to that in Figs. 1, 2 and 3, with these differences, viz: Instead of the paraboloid or ellipsoid forming the front half and the semispherical reflecting member forming the rear half, their positions are reversed and the semispherical reflecting surface 2 with its wall 6 is at the front of the light-inclosing portion, while the paraboloidal or ellipsoidal portion 1 forms the rear half. The plane reflector 3 intersects the reflecting surface 1, making a suitable angle with the axis of revolution, as in Fig. 1. The visor 4, 5 is, as before described, an extension of the plane reflecting surface 3 at such an angle that it conceals all reflecting surfaces, while the reflecting surfaces 1 and 2 inclose the source of light. The arrows clearly indicate the paths of the light rays.

With regard to a semi-ellipsoidal reflecting surface in lieu of a paraboloidal surface, would state that they are of the same kind. The parabola and ellipse are both conics; the ellipse having an eccentricity less than one, and the parabola being a special form of ellipse with an eccentricity just equal to one. There is such a slight difference between the two that, in fact, they cannot be distinguished by sight. The ellipse has the property of reflecting all rays emanating from one focus to the other. As the focal length is increased to an infinite length, the reflector is then parabolic as the rays will then be reflected to a point at infinity or will be parallel. In my reflector,

however, the difference between the two is merely that the elliptical surface if used will have a slightly greater curvature than the parabolic so that in fact it will be substantially parabolic. In practice I have used both parabolic and ellipsoidal surfaces.

In operation, all light rays, such as *a*, striking the rear half of the paraboloidal surface 1^a will be reflected axially upward to the plane surface 3 and thence out at an angle approximately 90° from the axis of revolution. All rays, such as *b*, striking the front half of the paraboloidal surface 1^a will be reflected axially upward, and will strike surface 2^a perpendicularly. They will, therefore, be reflected back upon themselves to the paraboloidal surface, back through the focus and onto the rear half of the paraboloid 1^a, axially upward to the plane surface 3, and thence out at an angle of approximately 90° from the axis of revolution.

It will be seen that in the several forms of the lamp the source of light is concealed within a hollow reflecting chamber opening upwardly, an overlying plane reflector inclined upwardly and forwardly from the rear edge of the hollow chamber and a flat reflecting visor or hood provided with side flanges and extending forwardly and downwardly from the forward edge of the said inclined plane reflector until it completely conceals the said plane reflector so that the source of light and all reflector surfaces are concealed to those approaching the vehicle on which the lamp is mounted. The above lamp will be provided with a suitable protecting casing, not shown.

In use my reflector will project the light beams a suitable distance for driving and yet neither the source of light nor any of the reflecting surfaces will be visible, as was shown by an actual test and so there is none of the glare so objectionable in the usual lamp.

What I claim is:

1. A vehicle head lamp reflector comprising a hollow cup-like reflector open at its top and concealing a source of light; one part of the cup being semispherical and the other substantially semiparaboloidal, a plane reflecting surface inclined upwardly and forwardly from the rear member of the hollow cup-like reflector, and a reflecting visor or hood extending forwardly and downwardly from the said inclined plane reflecting surface to a point which conceals all of the reflecting surfaces from the front; said visor or hood having side flanges extending back to the rear edge of the inclined plane reflecting surface.

2. A vehicle head lamp comprising a cup-like reflector open at its top with its rear half in the form of a semisphere and its front half substantially semiparaboloidal, a source of light concealed within said cup-like reflector, a plane reflector extending forwardly and upwardly from the rear end of the said cup-like reflector, and a reflecting visor or hood having depending side flanges extending back to the rear edge of the said plane reflector; the visor or hood being inclined forwardly and downwardly from the forward edge of the plane reflector to a point which conceals all of the reflecting surfaces from the front.

In testimony whereof I affix my signature.

MONROE E. EPSTEIN.