S. L. LEBBY.

REFLECTOR AND SEARCH LIGHT.

APPLICATION FILED OCT. 9, 1909.

981,290. **Patented Jan. 10, 1911.**

Fig. 1.

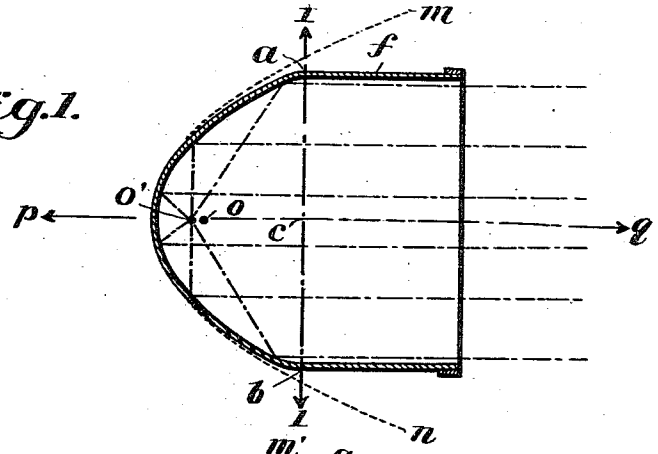


Fig. 2.

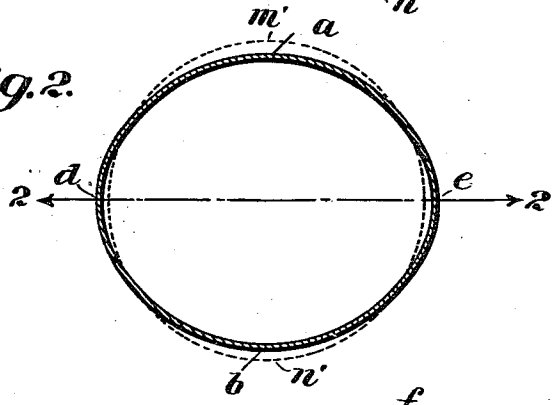
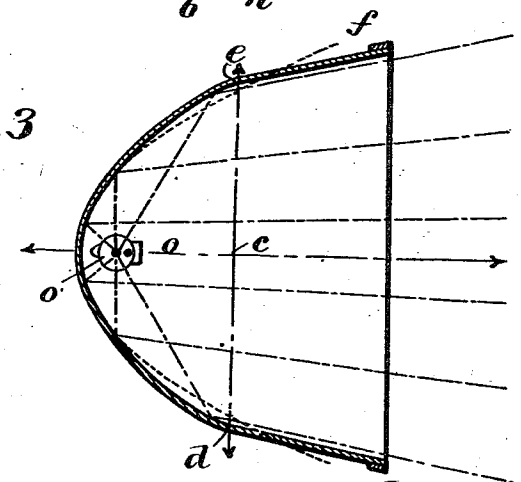


Fig. 3



Witnesses

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UNITED STATES PATENT OFFICE.

STATES LEE LEBBY, OF CHARLESTON, SOUTH CAROLINA.

REFLECTOR AND SEARCH-LIGHT.

981,290. Specification of Letters Patent. Patented Jan. 10, 1911.

Application filed October 9, 1909. Serial No. 521,943.

To all whom it may concern:

Be it known that I, STATES LEE LEBBY, a citizen of the United States, residing at Charleston, in the county of Charleston and State of South Carolina, have invented certain new and useful Improvements in Reflectors and Search-Lights, of which the following is a specification.

My invention relates to reflectors, and has for its object the design and construction of such devices which, while capable of a wide range of use, are particularly intended for use as search lights upon motor boats and motor vehicles.

The objects of the invention are to provide a reflector which will cast a beam composed of rays which are substantially parallel in a vertical plane and divergent in the horizontal plane; and which will cast an intense beam considerably wider than its height.

In carrying my invention into effect, I construct the reflecting surface in the form of a modified, or distorted, parabola. As is well known, a circular beam of parallel rays is cast by a parabolic reflector from a light placed in the parabolic focus, and hence the field of illumination is very small. I have discovered that by modifying or distorting the reflecting surface to a desired degree from the true parabolic form, and properly locating the light in relation thereto, a beam of any desired shape may be obtained. For instance, by slightly flattening, so to speak, a true parabolic reflector so that its vertical diameter is diminished and its horizontal diameter is increased, a section taken perpendicular to the axis will be a true ellipse instead of a circle. Moreover, a section taken on the axis, in any plane, will still give a true parabola. This modification or distortion will result in deflecting rays of a light, placed in the focus of the original parabola, toward the axis in the vertical plane, and in spreading them in the horizontal plane. Now, by shortening the focus, or in other words, by placing the light nearer the vertex and in the focus of the parabolic section having the shortest focus, the rays in the vertical plane are brought parallel while those in the horizontal plane are caused to diverge a little more. The result is a wide cast, or beam, with very little loss in density.

While I have spoken of vertical and horizontal planes, it will be understood that these terms are only relative and that the resulting distorted beam may be cast in any plane with respect to the horizontal.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section taken centrally through my reflector; Fig. 2 is a transverse section taken on line 1—1 of Fig. 1; and Fig. 3 is a horizontal section taken on line 2—2, of Fig. 2.

Referring to the drawings, m, n, represents in vertical section a parabolic reflector having its focus at o. The dotted circle m^1, n^1, Fig. 2, showing the cross section of the same. The axis of this parabola is represented by the line p—q, Fig. 1.

For the purpose of illustration I have shown a reflector designed to give an elliptical cast, the greatest diameter of the ellipse being in the horizontal plane. In this instance, the diameter of the reflector in the vertical plane is diminished, and the diameter in the horizontal plane is increased, so that a section taken through the reflector perpendicular to the axis at any point forward of the focus will give an ellipse. In other words, the parameter a—c of the parabolic section in the vertical plane is less than, preferably as much less than, the parameter of the parabola m n as the parameter d—c is greater than that of parabola m n. The rate of change of the parameter is preferably such as to give rise to a true ellipse a e b d.

The light, o^1, which may be an incandescent electric lamp, or any other suitable source of illumination, is preferably placed in the focus of the parabolic section having the shortest focus, thus giving parallel rays in that plane, and all planes parallel thereto. In this instance, it is placed in the focus of the parabola of the vertical section, so that the rays reflected in the vertical planes are parallel, as shown in Fig. 1. The light being back of the focal points of all other parabolic sections taken on the axis, the reflected rays in these sections will therefore be divergent to a greater or less degree, resulting in an elliptical cast or beam.

While I have spoken of distorting a true parabolic reflector, I do not wish to be understood as meaning necessarily that I actually bend a metal reflector of that form. My reflector may be produced either in that

manner, or made originally in the desired shape by casting, molding, or otherwise forming the material used.

In order to prevent or limit the dispersion of light beyond the parabolic portion of my reflector, I provide in some cases a hood or extension *f* which has reflecting walls parallel with the reflected parallel rays, and divergent with the reflected divergent rays, as shown in Figs. 1 and 3. The exact form of this extension may be varied within wide limits.

Many changes may be made in the details of construction and arrangement of parts of the apparatus herein shown and described without departing from my invention, and these I wish it understood fall strictly within the scope of the invention. For instance, the light may be located at the mean focal distance of the reflector, or at any point between the shortest and longest focal point, to vary the form of the cast. The degree of distortion of the reflector also is optional.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is—

1. A reflector having a reflecting surface in the form of a distorted paraboloid.

2. A reflector having a reflecting surface in the form of an elliptic paraboloid.

3. A reflector having a reflecting surface in the form of a paraboloid slightly flattened forward of the parameters.

4. A reflector having a reflecting surface in the form of an elliptic paraboloid forward of the parameters.

5. A distorted parabolic reflector axial sections of which present parabolas of different parameter.

6. A distorted parabolic reflector an axial section of which in the horizontal plane presents a parabola of greater parameter than that of an axial section in the vertical plane.

7. A reflector having a parabolic section in any plane lying in its axis and an elliptical section in any plane perpendicular to said axis.

8. A reflector comprising a distorted parabolic portion having a different parameter in different axial planes, and having an extension the walls of which are substantially parallel to the reflected rays.

9. A search light comprising a reflector having a reflecting surface in the form of a distorted paraboloid, and a source of light located at the focus of shortest focal distance.

10. A search light comprising a distorted parabolic reflector axial sections of which present parabolas of different parameter, and a section perpendicular to the axis presents an ellipse, and a source of light located at the focus of the parabola of shortest focal distance.

11. A search light comprising a distorted parabolic reflector axial sections of which present parabolas of different parameter, and a section perpendicular to the axis presents an ellipse, and a source of light axially located back of the focus of the parabola of longest focal distance.

12. A search light comprising a reflector having a reflecting surface in the form of an elliptic paraboloid forward of the parameters, and a source of light located at the focus of shortest focal distance.

In testimony whereof I have affixed my signature, in presence of two witnesses.

STATES LEE LEBBY.

Witnesses:
WALTER D. SLADE,
HARRY KIEFER.