Dec. 2, 1924. 1,517,362

J. O. HELLIWELL

REFLECTOR

Filed June 13, 1921

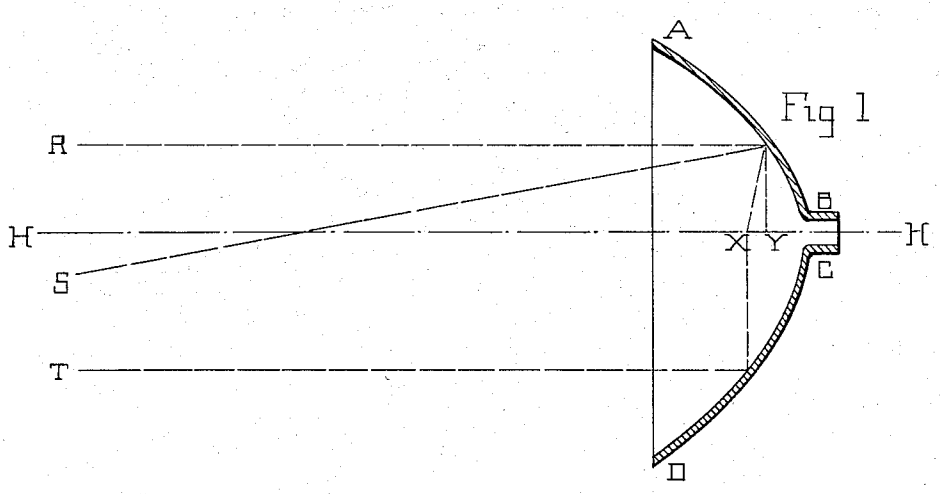


Fig 1

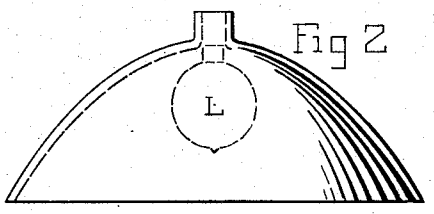


Fig 2

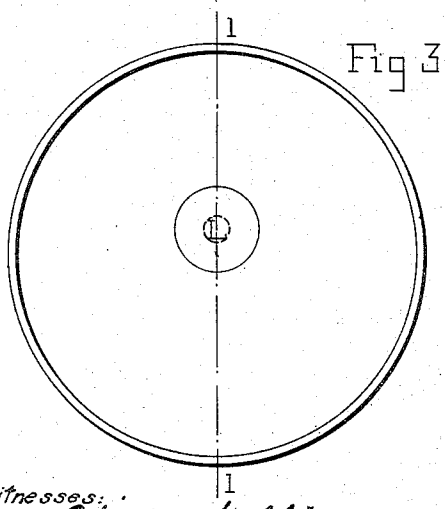


Fig 3

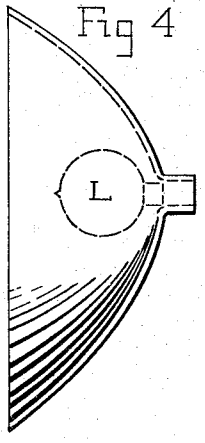


Fig 4

Witnesses:
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UNITED STATES PATENT OFFICE.

JOHN O. HELLIWELL, OF PASADENA, CALIFORNIA.

REFLECTOR.

Application filed June 13, 1921. Serial No. 477,161.

To all whom it may concern:

Be it known that I, JOHN O. HELLIWELL, a citizen of the United States, residing at Pasadena, county of Los Angeles, State of California, have invented new and useful Improvements in Reflectors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a conoidal reflector.

The object of this invention is to provide a reflector which shall render the headlamp to which it is applied so free from objectionable glare as to make it comply with the various State traffic laws and obviate the necessity of lenses or dimmers.

It is a further object of this invention to provide a reflector of such conformation that a maximum number of light rays shall be projected on the plane of travel and without sacrificing the distance at which the head light functions.

It is a further object of this invention to provide a reflector of such conformation that the maximum amount of lighting energy be projected along the path of travel rather than be reflected in an upward direction and lost.

It is a further object of this invention to provide a reflector of such conformation that the light rays from the upper part of the reflector shall cross those reflected from the lower part so as to effect a partial diffusion of the light.

It is a further object of this invention to provide a reflector which may be adapted to the standard headlamp casing and which will permit of the inclination of the light rays to eliminate objectionable glare being adjusted by adjusting the light bulb rather than by tilting the headlamp.

With these and other objects in view, the invention consists in the unique conformation and construction referred to as a conoidal reflector hereinafter described, illustrated in the accompanying drawing and pointed out in the claims hereto appended; it being understood that various changes in the form, proportion, conformation, size and minor details of construction, within the proper scope of the claims, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

It is also to be understood that while in the following specification the word "parabola" is used that this is merely for illustration and that with proper modification any conic sections may be used without departing from the basic principle of this application.

In the drawing:

Figure 1 is a vertical section of Fig. 3 showing the general shape and conformation of a conoidal reflector constructed in accordance with this invention and the general direction of the reflected light rays, but with light bulb omitted in order to show the position of foci.

Fig. 2 is the top view of the reflector.

Fig. 3 is a front elevation.

Fig. 4 is a side elevation.

Like letters of reference designate corresponding parts in the several figures of the drawing.

This reflector, a preferred embodiment of which is illustrated in the accompanying drawing, comprises a concave body of suitable material, and so treated on its inner surface as to afford a suitable reflecting surface. The introduction of a light bulb connection is provided for by the opening (B—C). This reflector is designed to perform the usual functions of a reflector as well as achieve the objects above mentioned.

These objects are attained because of the fact that the inner surface of this conoidal reflector is the composite of an infinite number of conic sections of varying focal lengths. Hereinafter parabolic conic sections will be referred to, both in the specifications and drawing, but as stated above, this is merely by way of concrete example.

For example in the illustration accompanying these specifications (Fig. 1) the foci of the parabolas fall between (Y), which is the focal point of (A—B), and (X), which is the focal point of (C—D). While in Fig. 1 of the drawing the parabolas, (A—B) and (C—D) are respectively the upper and lower parabolas it is only necessary that they be substantially so to give the desired result.

Because of the fact that if the source of light of a parabolic reflector be a point placed at the focal point the resultant reflected beam will be projected parallel to the axis of the parabola—if the source of light be placed at (Y) the resultant beam will be light ray (R) parallel to (H—H). On the other hand, should the source of light

be placed at point (X) the resultant beam (T) reflected from (C—D) will be parallel to (H—H). Furthermore, when the source of light is placed in this position at (X) the resultant beam (S) reflected from (A—B) will converge towards (H—H). This last position of the source of light at (X) is substantially the one to obtain the desired results, giving downwardly reflected rays from the greater part of the surface of such reflector and substantially horizontal beams from the lowest and remaining portion of the surface.

Because of the fact that in practice the source of light is not a point as in theory but an area the size of the bulb filament it may be deemed advisable to place the bulb filament slightly to the rear of (X) so that the secondary rays from the outer periphery of the bulb filament will be reflected from (C—D) in a horizontal direction. The relative position of the light bulb between (X—Y) will control the downward inclination of all the reflected rays, thus affording an easy method of regulating the angle of projection onto the surface of the road.

While it is to be noted that in Fig. 1 of the drawing all the parabolas have a common axis coinciding with (H—H), it is only necessary that the several axes of the parabolas approximately coincide so long as their apexes fall substantially between (B) and (C).

With a reflector as described and illustrated and with proper adjustment of the light bulb filament no light rays will be projected upwardly from its surface.

What I claim is:

1. A conoidal reflector the inner surface of which is the composite of an infinite number of conic sections of which the substantially uppermost conic section is shortest in focal length and the substantially lowermost conic section is longest in focal length and all the other conic sections in focal length fall in between such minimum and maximum focal lengths, said conic sections having a common apex.

2. A conoidal reflector the inner surface of which is the composite of an infinite number of conic sections having a multiplicity of foci having a general axial disposition and of which the substantially uppermost conic section is shortest in focal length and the substantially lowermost conic section is longest in focal length and all the other conic sections in focal length fall in between such minimum and maximum focal lengths.

3. A conoidal reflector, being substantially circular in vertical transverse section, the inner surface of which is the composite of an infinite number of conic sections having a multiplicity of foci with a general axial disposition, of which the substantially uppermost conic section is shortest in focal length and the substantially lowermost is longest in focal length and all the other conic sections in focal length fall in between such minimum and maximum focal lengths.

4. A conoidal reflector the inner surface of which is the composite of an infinite number of conic sections having a multiplicity of foci with a general axial disposition, of which the substantially uppermost conic section is shortest in focal length and the substantially lowermost conic section is longest in focal length and of which all other conic sections are of such intermediate focal length that the lateral distribution of light shall be greater than the vertical distribution in area.

5. A conoidal reflector being substantially circular in vertical transverse section and having a common axis, the inner surface of which is the composite of an infinite number of conic sections having a multiplicity of foci with a general axial disposition, of which the substantially uppermost conic section is shortest in focal length and the substantially lowermost conic section is longest in focal length and all the other conic sections in focal length fall in between such minimum and maximum focal lengths.

JOHN O. HELLIWELL.