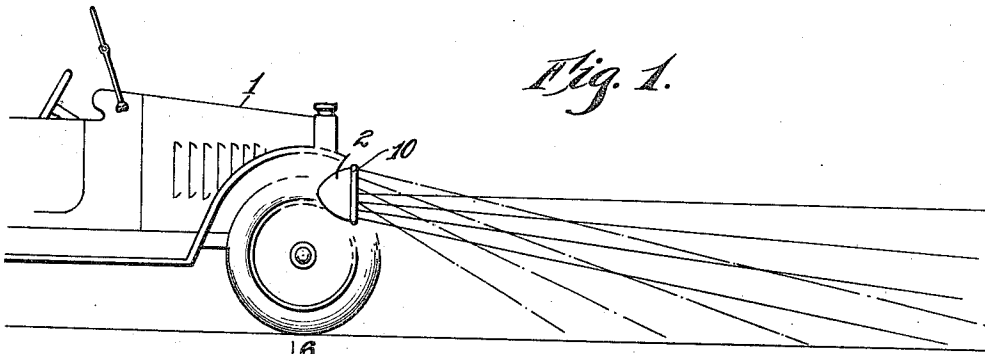
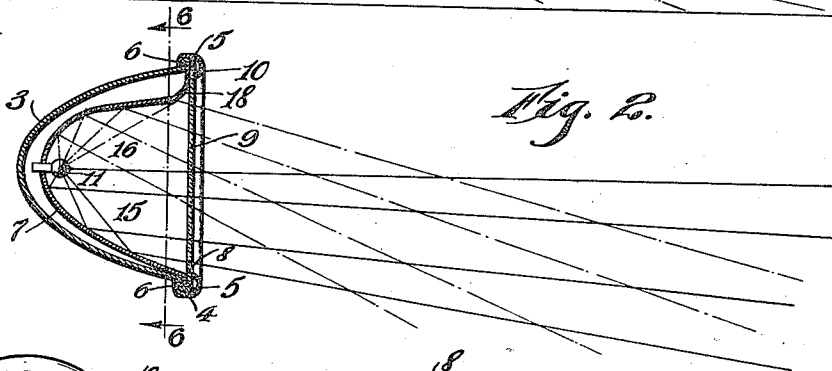
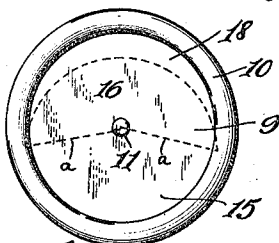
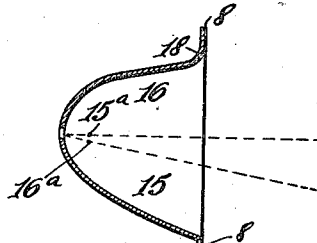
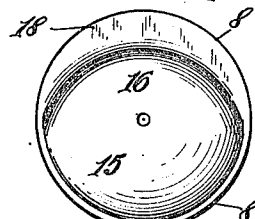
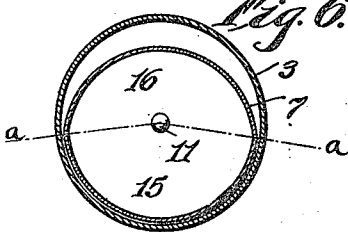
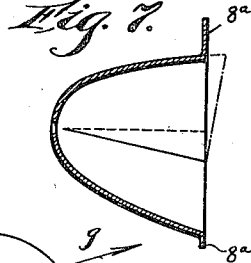
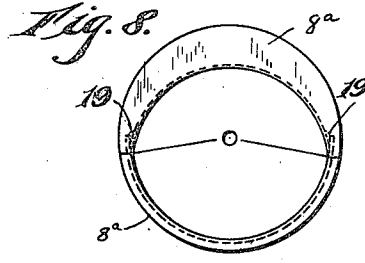
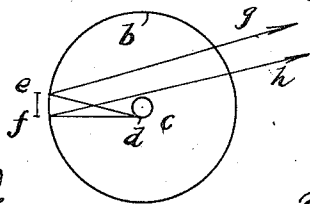


1,235,276.

Patented July 31, 1917.



Inventor;

William H. Wood

By *Hull Smith Brock & West*
Atty's.

UNITED STATES PATENT OFFICE.

WILLIAM H. WOOD, OF CLEVELAND, OHIO.

LAMP.

1,235,276.

Specification of Letters Patent.

Patented July 31, 1917.

Application filed October 4, 1916. Serial No. 123,637.

To all whom it may concern:

Be it known that I, WILLIAM H. WOOD, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Lamps, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

10 This invention relates to headlights and especially to headlights of the kind used on automobiles and other vehicles, although equally suitable for locomotives and motor boats and the like. The objects of the invention are the operation of an improved reflector which can be cheaply constructed, which will be rigid and unchanging in shape, and which will do away with lateral glare while securing both distant lighting, 15 near lighting and lateral lighting.

20 In automobile headlights as commonly used heretofore, a reflector of more or less paraboloid form has ordinarily been employed with a small but somewhat extended light source located in the vicinity of the paraboloid focus.

25 It is this extension of the light source beyond a mathematical point which alone has heretofore rendered the parabolic search light even part way successful as applied to automobiles. It is well known that if a point source be located exactly at the focus of a paraboloid reflector, a single luminous cylindrical beam of exactly parallel rays 30 will be formed, and no illumination whatever will be created excepting within the path of that beam—which is obviously useless for automobile purposes. However a point source is merely an academic supposition, 35 and every source which can practically be employed has sufficient extent, either in length or in area to cause a wide departure from the mathematical point, and thus bring about either concentration or diversion—in 40 either case a certain amount of diffusion which is even more necessary for practical purposes than the distant beam. This diffusion is increased or modified to some extent by varying the relation between the light 45 source and the focal point, though ordinarily a part of the light source is caused to coincide rather closely with the focus so that both distant lighting and diffused lighting are secured.

50 However valuable as this diffused lighting is, it is highly objectionable in one fea-

ture, to wit, that it is thrown into the eyes of meeting travelers just as much as upon the ground, with the blinding, dazzling and confusing results which have led to many casualties and have induced some municipalities to require the use of "dimmers" which in effect is to prevent the beneficial uses of the light as well as the detrimental effects.

60 A little practical observation will verify absolutely the results of mathematical deduction, which is that the objectionable light arises almost entirely from the lateral portions of the reflecting surface; although other dazzling effects can be secured in the following modes: In case the light source be placed forward the focus the light rays will be converged instead of thrown straight ahead in a parallel beam, and this regardless 65 of the size of the light source; and if the light source be in the rear of the focal point the effect is to diverge the light, which effect in this instance is added to the effect due to the size of the source.

70 In previous devices, this diffused illumination has been thrown downwardly substantially equally in parallel directions around the paraboloid axis with the result that approaching drivers or pedestrians were seriously blinded by the lateral light reflected by the horizontal portions of the reflector. Under ordinary conditions this light is so intense and persists for so long a time that a person meeting an automobile has the constant impression that the automobile is turning in his direction and that a collision is inevitable.

75 Various expediences have been suggested for controlling and directing the light beams so as to effect the functions of distant lighting, near lighting and lateral lighting, but generally no attention has been directed toward this question of disposing of the light which falls on the horizontal portion 80 of the reflector. In my copending application filed March 3, 1916, Serial No. 81,785, I have described and claimed a reflecting fitting adapted to be inserted inside of the ordinary paraboloid reflectors and having 85 or comprising horizontal blinders adapted to shield the lateral portions of the reflector from the light source and so arranged as to reflect the rays falling thereon forwardly and downwardly through the open front of 90 the reflector; and in a second copending application filed May 5, 1916, Serial No. 95,542, 95 100 105 110

I have described and claimed one mode in which this can be effected, viz. by separating the slightly adjacent margins of two opposed semiparaboloids and introducing
 5 into the space so formed a suitable curved surface so arranged as to reflect all rays falling thereon forwardly through the front of the reflector and downwardly toward the ground.

10 In the foregoing applications a suggestion has also been made that the reflecting member consist of two opposed semiparaboloid surfaces having their axes so inclined relatively to each other as to cause the rays fall-
 15 ing on one portion to be reflected in concentrated beams for distant lighting and the rays falling on the other portion to be diverged downwardly in a somewhat diffused manner for near and lateral lighting; the
 20 nature of these beams being modified to some extent by the relative size of the two semiparaboloids, the size and shape of the light source and the position of that light source with respect to the focal points of
 25 the surfaces. In the present instance the semiparaboloids are converged together forwardly, and disposed one above the other, the lowermost having its axis substantially horizontal and having the light source sub-
 30 stantially coincident with its focal point for distant lighting, the upper paraboloid being inclined downwardly so as to effect the near and lateral illumination desired. The two paraboloids are preferably formed about
 35 a common vertex, wherefore the focal points will overlap, which affords certain advantages as will be hereafter explained, although as to many of the features of my invention the relation of the focal points is
 40 immaterial; but the lower semiparaboloid is always caused to subtend less than 180° , so that it shall have no horizontal portions to give rise to the confusing rays before men-
 45 tioned and the upper semiparaboloid on account of its inclined position meets the first paraboloid without the interposition of any vertical or other transitional portion, wherefore all the rays falling upon these are pre-
 50 vented from rising above the horizontal plane.

In the drawing accompanying and forming a part of this application I have illustrated certain embodiments of my invention wherein Figure 1 illustrates a lamp of my
 55 improved type applied to an automobile; Fig. 2 is a vertical section on an enlarged scale through the headlight shown in Fig. 1; Fig. 3 is a front view of the headlight shown in Fig. 2; Fig. 4 is a longitudinal vertical
 60 section of the reflector shown in Fig. 2. Fig. 5 is an end view of the reflector looking toward its closed end; Fig. 6 is a transverse section on the line 6—6 of Fig. 2 looking in the direction of the arrows; Fig. 7 is a
 65 longitudinal cross-sectional view through a

modified form of reflector; Fig. 8 is an end view of the reflector shown in Fig. 7 looking from the right hand end; and Fig. 9 is a diagram showing the relation between
 70 a paraboloid mirror and an extended source.

Describing the parts by reference characters, 1 represents generally a vehicle of any suitable type or construction, an automobile being here chosen; and 2 a headlight carried thereby with its axis approximately
 75 horizontal. As shown in Fig. 2 this headlight comprises essentially a cup shaped casing 3 having near its open end a short enlargement 4 defining an internal ledge 5 and an external shoulder 6. Inside of this cas-
 80 ing is supported the reflector indicated generally at 7 also of general cup shape having at its front edge the outstanding continuous circular flange 8 resting upon the ledge 5. Against the face of this flange the trans-
 85 parent or lenticular member 9 is secured in any suitable manner as by the hollow band 10 overlapping the shoulder 6. The light source consists of an incandescent lamp bulb 11.

The lower portion of this reflector consists of a paraboloid segment 15 subtending less than 180° and terminating on each side sub-
 90 stantially at the lines *a—*a**. The upper portion of the reflector consists of a second paraboloid segment 16 inclined toward the first segment and having its edges brought into close relation with the margins of the first segment. The two paraboloids are shown as having a common vertex, which brings the
 95 focal point 15^a of the lower segment above the focal point 16^a of the upper segment, although the angularity of the segments is here somewhat accentuated. In Figs. 3, 4, 5 and 6 the adjacent margins of the two sections are
 100 integrally connected together as is the case where the reflector is drawn from a single sheet of metal without cutting or slitting. In Figs. 7 and 8 the reflector is made of a
 105 single piece of metal but the lateral portions are slit and the upper paraboloid folded inwardly inside the lower paraboloid so as to reduce the effective extent of the latter to less than 180° , the crevice being afterward
 110 filled with solder or the like, as shown at 19.

In order to fill the gap left by the inward inclination of the upper paraboloid, its edge is rolled outwardly as at 18, and merges with the circular flange 8, which flange is continuous around the entire reflector. In Fig.
 120 4 this flange is shown as integral with the reflector, and in Figs. 7 and 8 the corresponding flange 8^a is shown as a separate part rigidly secured thereto. This flange not only serves as a point of attachment, but main-
 125 tains the same always rigid and unyielding which within my knowledge has never before been accomplished with paraboloid reflectors whose different portions are angularly disposed.

Now if the light source be made to coincide with the focus of the lower segment, that segment will project a powerful parallel beam for distant lighting, wholly free from lateral rays since the material size of the light source is neutralized by the fact that this part of the reflector subtends less than 180° ; but the relation of the two foci brings the light source above the focus of the upper paraboloid section which causes diffusion, and the angle of inclination of the upper segment is chosen so that none of this dispersed light shall rise above the horizontal plane. In other words the angle between the paraboloids is not less than the maximum divergence of the light rays.

Of course the device may be made with a common focus for the paraboloids in which case each segment will cast an intense parallel beam, which will be rather less desirable than the arrangement just described wherein the ground all around the front of the vehicle is bathed in an even light; although the expedient of confining the lower segment to an arc of less than 180° will prevent the heretofore objectionable side-glare. It will be noted that I have illustrated no fillet along the line where the reflecting sections meet and I prefer to employ a naked joint, since a fillet or transition surface, unless carefully planned as described and claimed in my previous applications, is certain to reflect light where it is not wanted. Also I have here illustrated only those cases wherein the paraboloid sections are inclined together or (what is the same thing) wherein one or both sections subtend less than 180° ; for if either section subtend more than this angle the objectionable vertical reflecting portion will be produced, which it is my object to avoid. However I do not confine myself to the exact details here described, but only as necessary to effect the end in view and as recited in the claims and as required by the prior art.

Having thus described my invention, what I claim is:—

1. In a headlight, a light source, a reflector comprising a pair of opposed semiparaboloid surfaces arranged one above the other with their axes angularly arranged, the upper portion subtending a larger angle about the light source than the lower portion.

2. In a headlight, a light source, a reflector comprising a pair of opposed semiparaboloid surfaces arranged one above the other with their axes angularly arranged, the axis of the lower portion being substantially horizontal and that of the upper portion being inclined downwardly and forwardly at a slight angle, the lower portion subtending less than 180° of arc.

3. In a headlight, a reflector comprising a pair of opposed semiparaboloid surfaces

arranged one above the other, the axis of one being substantially horizontal and that of the other being inclined toward the roadway, and a light source located substantially at the focus of the horizontally supported section and in diffusive relation to the downwardly inclined section, the horizontal section subtending less than and the inclined section subtending more than 180° of the light sphere.

4. In a headlight, a light source, a pair of opposed paraboloid segments each comprising somewhat less than a semiparaboloid and having their adjacent margins closely adjoining, one of said segments subtending less than and the other segment more than 180° of the light sphere.

5. In a headlight, a pair of opposed paraboloid segments, one of which subtends less than 180° and is located with its axis substantially horizontal, the other of which subtends not more than 180° and is located with its axis inclined forwardly and downwardly, the margins of said segments being closely adjacent each other, and a light source located substantially at the focus of the horizontal section, whereby said horizontal section subtends less than 180° of the light sphere.

6. In a headlight, a pair of opposed paraboloid segments, having a common vertex and inclined together from about that point so that their focal points overlap, one of said segments subtending less than 180° and having its axis substantially horizontal, the other segment having its margins closely adjacent the margins of said first segment, and a light source located substantially upon the focal point of the first named segment for distant lighting and above the focal point of the second named segment for diffused lighting.

7. In a headlight, a pair of opposed semiparaboloid segments arranged one above the other, and a light source approximately upon the common center of said segments, one at least of said segments subtending an angle sufficiently less than 180° to prevent reflecting lateral glare from the margins of the light source.

8. In a headlight, the combination with a light source, of a pair of opposed semiparaboloid segments located one above the other with the lower one substantially horizontal, the focal points of said segments being so related to each other and to the light source that the rays reflected from the lower segment will be substantially parallel and horizontal and those reflected from the upper segment will be diverged, and said upper segment being inclined toward the lower segment by an angle not less than the angle of maximum divergence.

9. A reflector having a pair of opposed semiparaboloid segments arranged about a

substantially common axis, one at least of said segments being limited angularly to an extent which is less than 180° by an amount proportional to the linear size of the light source to be used therewith.

10. A reflector having a pair of opposed semiparaboloid segments set at an angle relatively to each other, the mouths of said segments being surrounded by an exteriorly circular flange whose width varies according to the shape of the reflector from point to point.

11. A reflector having a pair of opposed semiparaboloid segments which converge together toward their larger ends, one of said segments being provided with a flaring portion at its outer end forming, with the outer end of the other portion, a circular rim adapted to fit within the circular mouth portion of a headlight case.

12. A one piece reflector having paraboloidal upper and lower portions integrally connected through a common vertex and axes diverging therefrom, the relative directions of said axes being such that when the reflector is fixed in its operative position the axis of the upper portion is inclined downwardly and the axis of the lower portion is substantially horizontal, in combination with a light source located on the axis of the horizontal portion and at one side of the axis of the other portion.

13. A reflector having a substantially elliptical cross section the major axis of which is substantially horizontal when the reflector is in its operative position, said reflector being provided with paraboloidal upper and lower portions having a common vertex, and axes diverging therefrom, the axis of the upper portion being inclined downwardly and the axis of the lower portion being substantially horizontal.

14. A reflector having a substantially elliptical cross section the major axis of which is substantially horizontal when the reflector is in its operative position, said reflector being provided with a paraboloidal upper portion having a downwardly inclined axis, and a paraboloidal lower portion the axis of which is substantially horizontal, said portions having a common vertex, and the mouths of

said portions being provided with a circular flange adapted to bear on the circular mouth portion of a headlight case.

15. A head light comprising a case having a substantially horizontal axis, a reflector confined in a predetermined position by said case and provided with paraboloidal upper and lower portions having a common vertex and axes diverging therefrom, the axis of the upper portion being inclined downwardly relatively to the axis of the case, and the axis of the lower portion being substantially horizontal, and a source of illumination located substantially at the focal point of one of said portions.

16. A headlight comprising a fixed case having a substantially horizontal axis, a reflector confined in said case and having a substantially elliptical cross section, the major axis of which is substantially horizontal, said reflector being provided with paraboloidal upper and lower portions having a common vertex and axes diverging therefrom, the axis of the upper portion being inclined downwardly and the axis of the lower portion being substantially horizontal, and a source of illumination located substantially at the focal point of at least one of said portions.

17. A headlight comprising a fixed case having a substantially horizontal axis, a circular mouth, and a lens covering said mouth, a reflector confined in said case and having a substantially elliptical cross section, the major axis of which is substantially horizontal, said reflector being provided with a paraboloidal upper portion having a downwardly inclined axis, and a paraboloidal lower portion having a substantially horizontal axis, said portions having a common vertex, and the said upper portion being provided with a flange at its outer end, forming, with the outer end of the lower portion, a circular rim fitting the mouth portion, and a source of illumination located substantially at the focal point of one of said portions.

In testimony whereof, I hereunto affix my signature.

WILLIAM H. WOOD.