W. G. WOOD.

HEADLIGHT.

APPLICATION FILED JAN. 2, 1918.

1,324,288.

Patented Dec. 9, 1919.

3 SHEETS—SHEET 1.

Fig. 1.

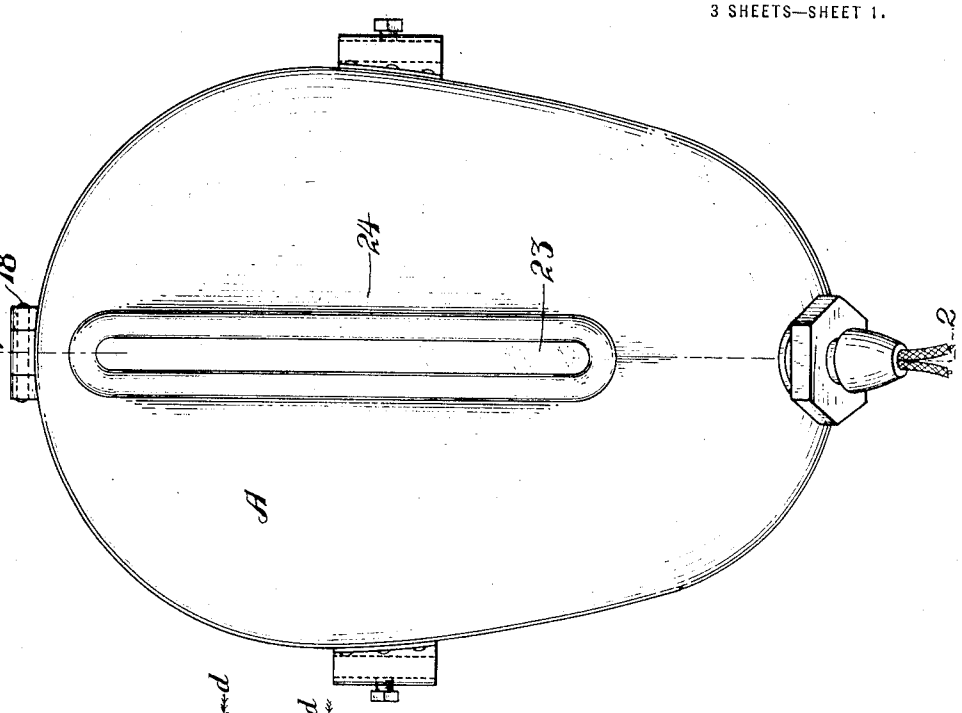
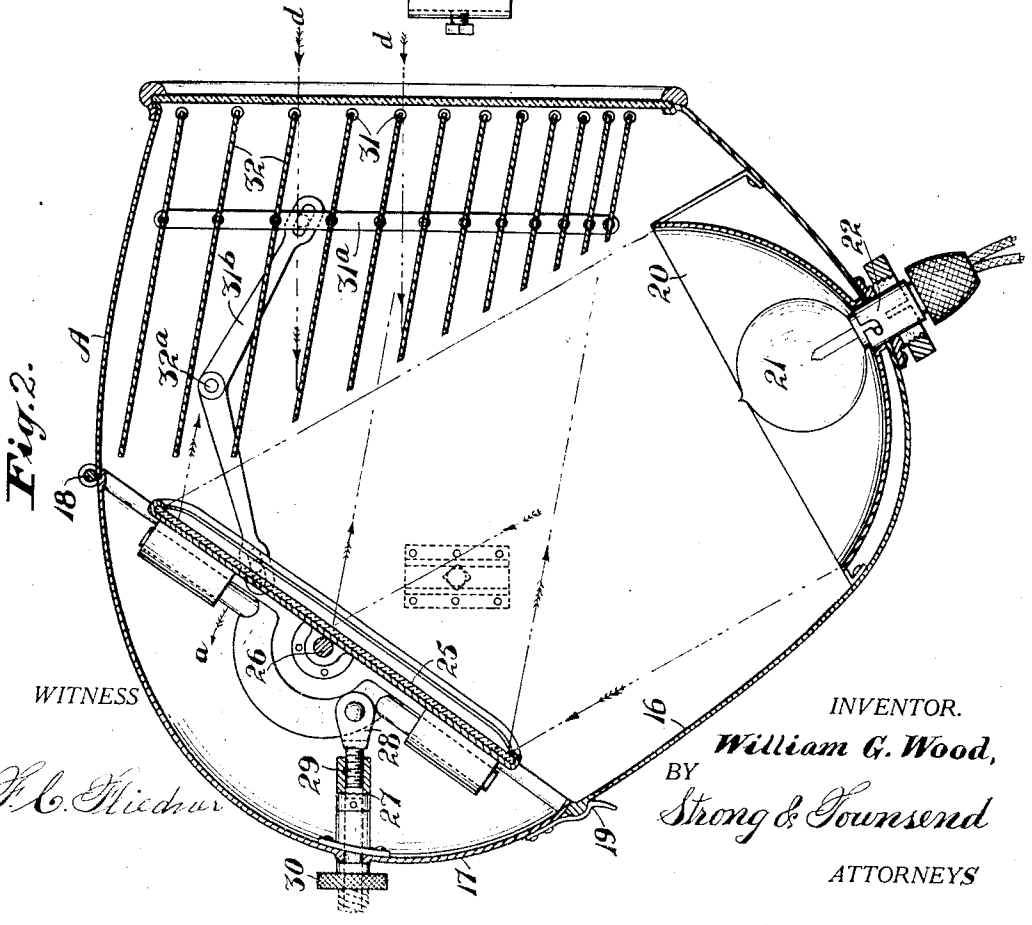


Fig. 2.



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Fig. 3.

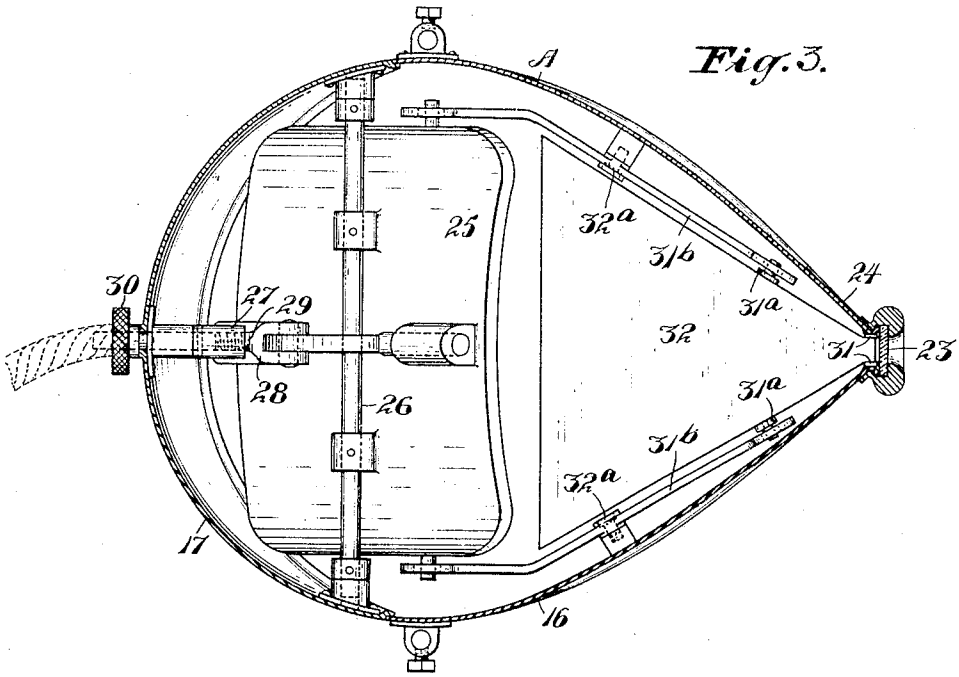


Fig. 4.

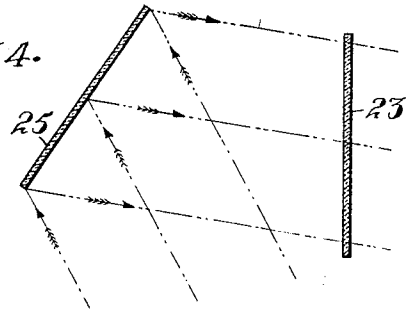


Fig. 6.

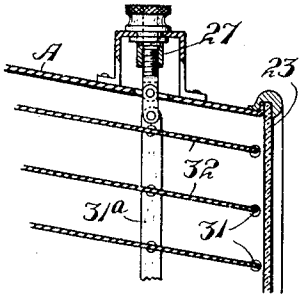
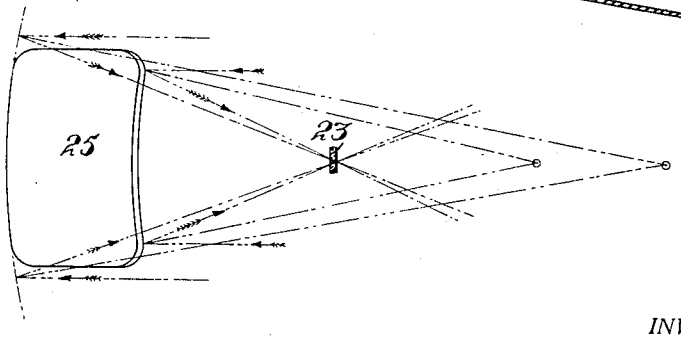


Fig. 5.



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3 SHEETS—SHEET 3.

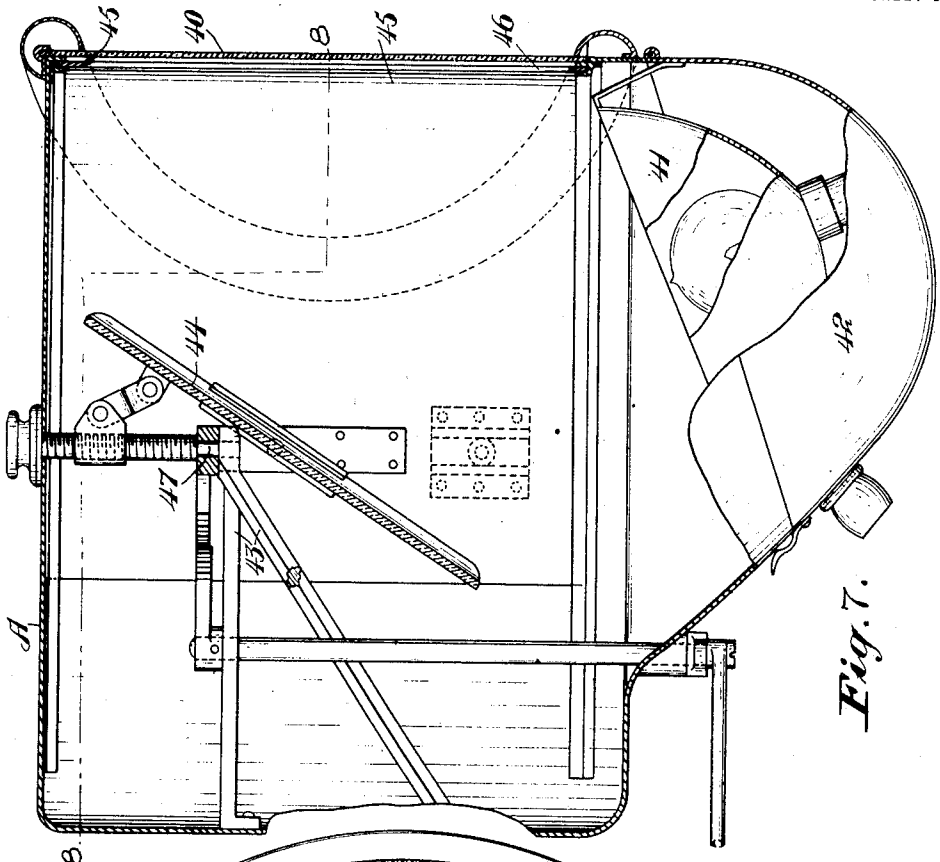


Fig. 7.

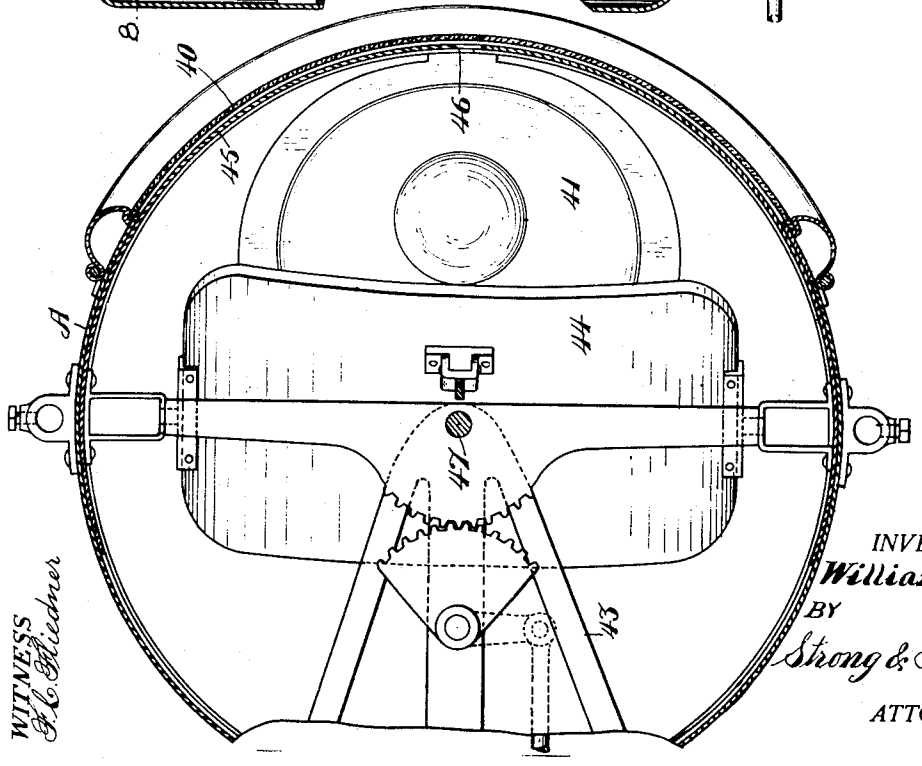


Fig. 8.

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UNITED STATES PATENT OFFICE.

WILLIAM G. WOOD, OF BERKELEY, CALIFORNIA, ASSIGNOR TO BERKELEY LIGHT CORPORATION, OF SAN FRANCISCO, CALIFORNIA, A CORPORATION OF NEVADA.

HEADLIGHT.

1,324,288. Specification of Letters Patent. Patented Dec. 9, 1919.

Application filed January 2, 1918. Serial No. 209,834.

To all whom it may concern:

Be it known that I, WILLIAM G. WOOD, a citizen of the United States, residing at Berkeley, in the county of Alameda and State of California, have invented new and useful Improvements in Headlights, of which the following is a specification.

This invention relates to improvements in light projectors and more particularly to headlights such as are adapted for use on automobiles, locomotives, street cars, and the like.

Lamps of the headlight type, such as are commonly used on automobiles and the like, are ordinarily provided with a parabolic or like reflector to concentrate the rays and to permit the projection of a single beam of intense light.

In actual practice it is found impossible to regulate the vertical height of the beam projected as imperfections in the parabolic reflector and the size of the filament produce a cone-shaped beam and not a series of parallel rays as theoretically intended. While the source of light itself may not be of great intensity the projection and concentration of its rays produces a light so intense as to be in effect blinding to the eyes of approaching drivers or pedestrians, particularly if the field of the projected beam is entered. Many attempts have been made to prevent the glaring or blinding effect thus produced and to regulate the vertical height of the rays projected.

One of the objects of the present invention is to overcome this defect and to provide a headlight which permits concentration and projection of the light rays on the road ahead of the automobile and which permits spreading of the beam laterally but confining it vertically. That is, the projector or reflector from which the light emanates may be arranged so that no light rays are permitted to project above a horizontal line drawn on a level with the lamps. Another object of the invention is to provide a reflector which projects a concentrated light beam in which the rays cross at a given focal point and then spread, and also to provide a small window or translucent aperture through which the rays are projected; this window being preferably placed at the focal point of the rays, thus permitting a great reduction in the size of the window, in some instances to less than a half inch of exposed area. Another object of the invention is to prevent the transmission or deflection of light rays outside of a given field either from the direct source of light or the reflector or apparent source. Further objects will hereinafter appear.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a front view of the headlight.

Fig. 2 is a vertical, longitudinal section on line 2—2 of Fig. 1.

Fig. 3 is a plan view, partly in section, of the lamp shown in Figs. 1 and 2.

Fig. 4 is a vertical, diagrammatic section of the reflector shown in Fig. 2.

Fig. 5 is a diagrammatic plan view of Fig. 4.

Fig. 6 shows a modified form of mechanism for adjusting the position of the reflector 25 and the shutter-like members carried thereby.

Fig. 7 is a central vertical section of a modified form of the headlight.

Fig. 8 is a cross section on line 8—8 of Fig. 7.

By referring to Figs. 1, 2 and 3, it will be seen that a novel form of lamp has been provided. The casing A is divided into two sections, as shown at 16 and 17, said sections being hingedly connected, as at 18, and adapted to be locked with relation to each other by a spring latch or other suitable means 19. The casing section 16 is in this instance provided with a stationary parabolic reflector 20, a lamp 21 and a socket 22 for its reception. The window or translucent aperture 23 is oblong, as shown, to permit the projection of what may be termed a wedge-shaped beam to permit spreading of the beam laterally across a roadway but limiting its vertical projection.

The casing section 16 may be wedge-shaped or pointed, as shown at 24, (see Figs. 1 and 3) as the narrow window 23 provided occupies comparatively small space and is so narrow that reduction or tapering of the casing is permitted. The reflector 25 is in this instance adjustably mounted; that is, it is supported upon a shaft 26 and may be swung about this shaft by means of an ad-

justing mechanism, shown at 27, comprising a link 28, the outer end of which is threaded, as shown at 29, to permit a nut 30, when turned, to move the link in or out and thereby swing the reflector about the shaft.

Positioned in front of the reflector is a series of superposed shutters or blinders 32. These are all pivotally mounted, as at 31, at their forward ends and are otherwise connected by a link 31^a, so that they may be swung about their pivots 31 in unison and always assume a parallel position and a predetermined spacing with relation to each other. The link 31^a is connected with a bell-crank 31^b which is pivotally mounted in the side of the casing, as at 32^a. Both ends of the bell-crank are slotted as shown, one end engaging a pin carried by the link 31^d and the opposite end engaging a pin in the side of the reflector 25. The bell-crank provided transmits movement from the reflector to the shutters; that is, movement of the reflector in the direction of arrow *a* causes the bell-crank to swing about its pivot 32^a, thereby depressing or swinging the shutters about their pivots 31 in a downward direction. They will, therefore, always assume a parallel position with relation to the light rays projected by the reflector and permit a free projection of the light rays without deflecting or in any way interfering or absorbing any light. These shutters in reality do not serve the function of shutters, as they are placed in a position where they will always remain parallel with the light rays projected by the reflector, but they do serve as shutters when the lamp is viewed from the front.

The line of vision, indicated by the arrows *d*, cannot reach the reflector proper as the angle of the shutters 32 is such that the line of vision is intercepted. They, therefore, permit a free projection of all of the light rays from the reflector but they otherwise serve as shutters when the lamp is viewed from the front. Therefore, it is impossible for anyone to see either the direct source of light indicated by the lamp 21 or the apparent source represented by the reflector 25, whether an individual is standing in the direct path of the projected beam or outside of same; that is, unless he stoops so low that his eye comes on a parallel line with the beams projected.

The reflector 25 is absolutely straight on a vertical line, but it is curved horizontally, as shown by Figs. 5 and 7, the line of curvature being struck on a smaller radius on the top edge and gradually increased as it reaches the lower edge. This is of considerable importance as it permits the window to assume a vertical position and it also permits a crossing or concentration of all the light rays at the point where they pass through the window. This would be impossible if the radius of the reflector on the horizontal plane remained constant, as the line of crossing of the rays would assume an angle equal to the angle of the reflector. This is however, obviated in the present instance as a gradual increase in the radius permits the line of crossing to meet on a vertical line, as shown in Fig. 7.

The shaft or beam of light projected may in this manner be confined vertically but may spread on a lateral plane as large as desired. Increase or decrease in the horizontal curvature will naturally increase or decrease the spread of the beam while the depth or vertical height will remain constant. The danger of blinding approaching pedestrians or drivers of other machines is entirely eliminated not only because the vertical height of the beam is limited or may be adjusted, but also because both the original source and the apparent source of light are entirely hidden from anyone approaching, there being no evidence of light whatever except the projected beam itself and the light on the roadway; and as this does not give a blinding effect except when the eye of an observer is placed directly in the beam the most powerful light can be projected on the ground ahead of the vehicle without in any way causing danger.

While the reflector 25, shown in Figs. 2 and 3, is adjusted by means of the mechanism indicated at 27, I wish it understood that any other suitable form of mechanism may be provided. By referring to Fig. 6 it will be seen that a mechanism similar to that disclosed in Fig. 2 may be placed on top of the lamp casing and connected with the shutter-like members 32. Adjustment of the reflector and said members may in this manner be obtained whether the mechanism is directly connected with the reflector or with the members described.

By referring to Figs. 7 and 8, which show modified forms of the lamp, it will be seen that the main casing A is practically cylindrical in cross section. This lamp is also provided with a large curved window, such as shown at 40, and a stationary parabolic reflector 41 which is supported in an extension 42 formed on the lower end of the main casing. Adjustably mounted both for horizontal and vertical movement on a bracket member 43 is a reflector 44 which presents a straight face vertically but a curved face horizontally, as shown in Fig. 8. This reflector is identical to the reflector shown in Fig. 2, the only difference being that it is capable of both horizontal and vertical adjustments.

Mounted interiorly of the casing is a cylindrical shutter 45, in the center portion of which is formed an oblong slot 46 from which the wedge-shaped beam produced by

the reflector is adapted to be projected. The shutter 45 is adapted to move in unison with the reflector when this is turned horizontally about the pivot 47 and as the ends of the shutter are projected a considerable distance on each side beyond the window opening the shutter will serve as a closure for the window and no light can be projected therethrough except that which passes through the slot 46.

The lamp thus constructed is not only capable of presenting a small slot through which a horizontally spreading beam may be projected, but it is also capable of a service similar to that of a dirigible headlight; that is, the reflector and the beam projected may be swung horizontally about the pivot 37 and serve the same function as headlights of the dirigible type.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. A headlight comprising a casing, a source of light in said casing, a reflector adapted to project a beam of light through a transparent aperture formed in the casing, said reflector presenting a straight surface on a vertical plane and a curved surface on a horizontal plane to permit the projection of a beam having a focal or crossing point for the rays to permit spreading of the rays on a horizontal plane and to limit spreading of the rays on a vertical plane, the said transparent aperture being just sufficiently wide to permit the crossing rays to pass therethrough and having a height slightly in excess of the vertical height of the reflector, and a series of interspaced superposed plate-like members positioned in front of the reflector, said plate-like members being positioned on a horizontal plane parallel with the light rays projected from the reflector.

2. A headlight comprising a casing having a transparent aperture formed therein, a lamp in the casing, a reflector adapted to project the rays of light from the lamp through the transparent aperture, a plurality of interspaced, superposed, plate-like members pivotally mounted in front of the reflector, a horizontal pivot about which the reflector is adapted to swing, and means for transmitting movement from the reflector to swing the plate-like members about their pivots.

3. A headlight comprising a casing having a transparent aperture formed therein, a lamp in the casing, a reflector adapted to project the rays of light from the lamp through the transparent aperture, a plurality of interspaced, superposed, plate-like members pivotally mounted in front of the reflector, means for maintaining the plate-like members on parallel lines with the light rays projected by the reflector, a pivot member supporting the reflector, and means for swinging the reflector and the plate-like members in unison about their pivot members.

4. A headlight comprising a casing having a transparent aperture formed therein, a lamp in the casing, a reflector adapted to project the rays of light from the lamp through the transparent aperture, a plurality of interspaced, superposed, plate-like members pivotally mounted in front of the reflector, means for adjusting the position of the reflector vertically, and means for maintaining a predetermined position between the reflector and the plate-like members.

5. A headlight comprising a casing having a transparent aperture formed therein, a source of light in the casing, a parabolic reflector coöperating with said light, a second reflector in the casing adapted to receive the rays projected by the parabolic reflector and the light, said second reflector adapted to project said rays in the form of a beam having a vertical focal line or crossing point for the rays, a vertical pivot member about which the second reflector is adapted to turn, and a shutter forming a closure for the transparent opening adapted to swing in unison with the reflector about the vertical pivot, said shutter having a narrow elongated vertical opening formed therein positioned adjacent the vertical focal line of the rays to permit the crossing rays to be projected through the opening in the shutter and the transparent opening.

6. A headlight comprising a casing having a transparent aperture formed therein, a source of light in the casing, a parabolic reflector coöperating with said light, a second reflector in the casing adapted to receive the rays projected by the parabolic reflector and the light, said second reflector adapted to project said rays in the form of a beam having a vertical focal line or crossing point for the rays, a vertical pivot member about which the second reflector is adapted to turn, a cylindrical-shaped shutter adapted to form a closure for the transparent opening, said cylindrical shutter having a slit-like vertically disposed opening formed therein positioned adjacent the vertical focal line of the light rays projected by the second reflector to permit said rays to be projected through the transparent opening, and means for swinging the shutter and the reflector in unison about the vertical pivot member.

7. A headlight comprising a casing having a transparent aperture formed therein, a source of light in the casing, a parabolic reflector coöperating with said light, a second reflector in the casing adapted to receive the rays projected by the parabolic reflector and the light, said second reflector adapted to project said rays in the form of a beam having a vertical focal line or cross-

ing point for the rays, a vertical pivot member about which the second reflector is adapted to turn, a cylindrical-shaped shutter adapted to form a closure for the transparent opening, said cylindrical shutter having a slit-like vertically disposed opening formed therein positioned adjacent the vertical focal line of the light rays projected by the second reflector to permit said rays to be projected through the transparent opening, means for swinging the shutter and the reflector in unison about the vertical pivot member, a horizontal pivot member for the reflector, and means for swinging said reflector about the horizontal pivot.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WILLIAM G. WOOD.

Witnesses:
W. W. HEALEY,
M. E. EWING.