C. H. ALLEN.

HEADLIGHT.

APPLICATION FILED JULY 29, 1920.

1,393,877. **Patented Oct. 18, 1921.**

Fig. 1

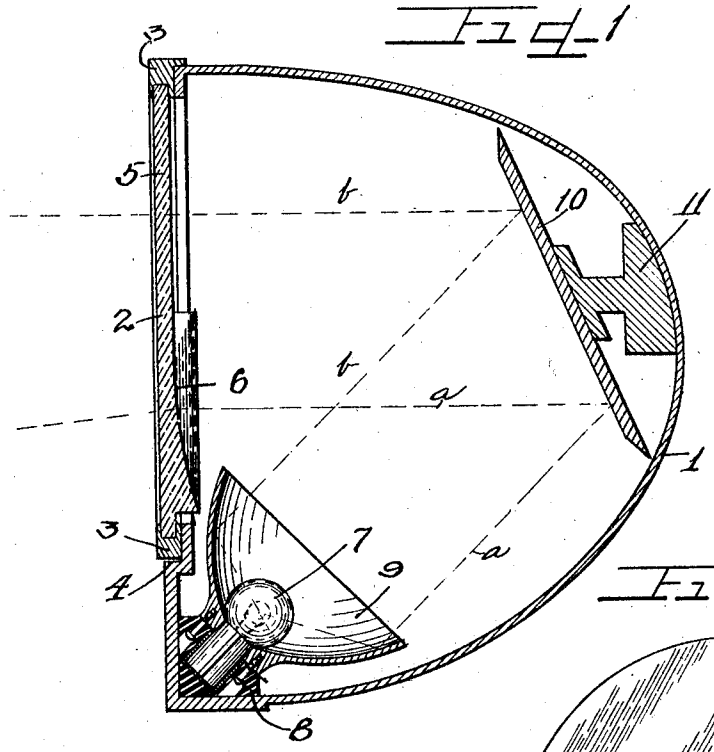


Fig. 3

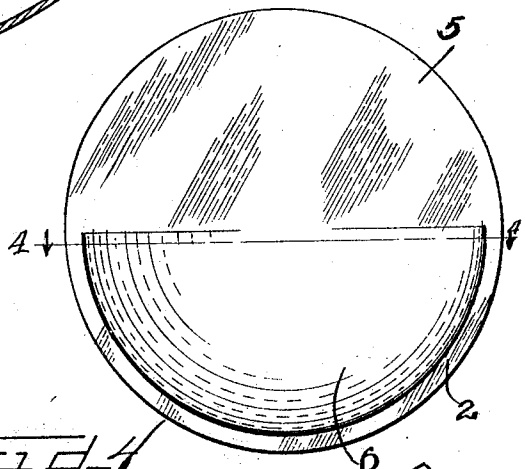


Fig. 2

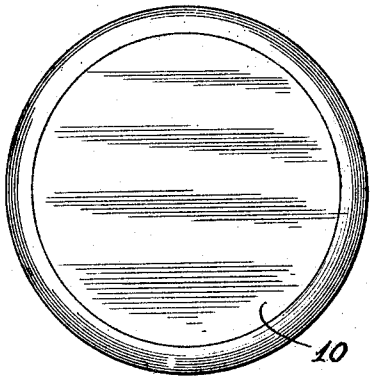
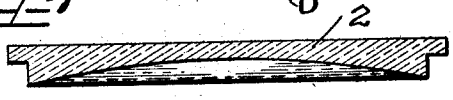


Fig. 4



Witnesses
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UNITED STATES PATENT OFFICE.

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HEADLIGHT.

1,393,877. Specification of Letters Patent. Patented Oct. 18, 1921.

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To all whom it may concern:

Be it known that I, CHARLES H. ALLEN, a citizen of the United States, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Headlights; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form a part of this specification.

My invention relates more particularly to a headlight for vehicles, boats or the like, in which highly polished reflecting surfaces and a lens may be utilized to direct the rays of light so that most of them may be projected horizontally below a certain horizontal plane and some of which may be directed divergently downward.

It is therefore an object of my invention to utilize a lens having a portion with parallel faces and a plano-concave portion.

It is a further object of my invention to provide reflecting surfaces whereby the rays of light are largely directed in horizontal planes to the lens.

It is broadly an object of my invention to construct a headlight in which the rays of light are confined below a certain horizontal plane.

It is also broadly an object of my invention to divide the rays into a horizontal portion and a downwardly divergent portion.

The structure and relation of parts whereby I attain these objects are within the scope of my invention.

My invention in a preferred form is illustrated in the accompanying drawings and hereinafter more specifically described and claimed.

On the drawings:

Figure 1 is a central sectional view of a headlight embodying the principles of my invention.

Fig. 2 is a front face view of one of the reflecting surfaces.

Fig. 3 is a plan view of the lens showing the plain surface and plano-concave surface.

Fig. 4 is a section on the line 4—4 of Fig. 3.

As shown on the drawings:

In the drawings, in which similar reference numerals refer to similar features in the different views, I have illustrated a headlight in which I employ means to direct the rays of light so that the major portion thereof will be confined below such an elevation as may be consistent with a city ordinance or other laws, and while I have illustrated the said means in certain relations, it is to be understood that the same may be varied or adjusted to suit the exigencies of a particular case. Accordingly, I have shown a headlight structure comprising the circular and parabolic shaped hood or container 1 having a frontal opening in which the lens 2 may be secured in any approved manner. In the present instance, I employ a frame 3 resting upon a shoulder 4 provided in the front face of the hood 1. The frame 3 is preferably provided with a groove in which the outer circumferential part of the lens 2 is designed to fit. The upper half of the lens 2 is provided with a plain portion 5 having parallel sides, while the other half consists of a plano-concave portion 6 with the concave portion faced inwardly. The rays of light which are horizontal or are normal to the plain portion 5 are not refracted, but pass on in horizontal planes, while practically all the luminous rays passing through the plano-concave portion are refracted in divergent directions, mostly downwardly, since the plano-concave portion represents the lower half of a concave disk, as shown in Fig. 3.

The light or luminous ray producing device preferably consists of an incandescent lamp 7 supported by a block 8 arranged in the lower corner of the hood or housing 1. A reflector 9 of substantially parabolic contour is secured to this block so as to encompass the lamp 8, the reflector 9 consisting of some material having a highly polished interior surface, like a mirror, which it may constitute. The lamp 7 is so placed in the reflector 9 that most of the rays striking the parabolic walls of the reflector 9 are reflected in lines which are parallel to the major or longitudinal axis of the reflector. In the rear end of the hood, I mount a second reflector 10 upon a bracket 11 secured to the wall of the hood 1 by any well-known method. The reflector 10 is of such a size and shape as to receive practically all the rays reflected from the reflector 9, and preferably consists of a plain mirror or similar substance having a highly polished reflecting surface. This reflector 10 is arranged obliquely at an angle to a horizontal

plane, which angle is equal to the angle made with said reflector 10 by a luminous ray parallel to the longitudinal axis of the reflector 9. Therefore, the reflected rays from the parabolic reflector which are parallel to its axis are reflected from the reflector 10 in a horizontal line. The most or at least a dominating portion of the luminous rays are reflected horizontally from the reflector 10 and pass through the lens 2; those striking the plain portion 5 continue in horizontal lines, while those striking the concave portion 6 are refracted and diverge, principally downwardly, whereby the road and contour thereof may be seen and watched.

In Fig. 1 I have diagrammatically illustrated a pair of luminous rays *a* and *b*, which are parallel with the axis of the reflector 9. These rays are reflected in horizontal lines from the reflector 10 since the angle of incidence is equal to the angle of reflection, ray *b* passing unrefracted through the plain medium 5, and ray *a* passing through the concave portion 6 and being refracted downwardly and emerging in a downwardly divergent direction. The luminous rays passing through the plain portion 5 are designed to light the way straight ahead, and their highest point should be within the elevation demanded by the city ordinance, if such there be. It should be particularly noted that by having the upper half of the lens composed of plain parallel surfaces, I avoid the upward divergence so common in lamp lenses now in use and which produce an objectionable height in the pencil of light emerging from the lens; the slight fringe which may be produced by upwardly inclined rays emerging from the lens portion 5 can be disregarded since the same must be negligibly small and insignificant, if apparent at all, since most of the rays are reflected from the reflector 10 in horizontal lines, or lines normal to the front face, and of the remaining rays the larger percentage are inclined downwardly.

It will accordingly be observed that I have devised a novel headlight in which the upper divergence of luminous rays is eliminated in which reflectors have been utilized to the greatest possible advantage, in which the pencil of rays has a lower divergent and downwardly directed portion and a horizontal directed portion creating such a distribution of light which does not require the constant tipping or shifting of the headlight.

I am aware that numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted otherwise than necessitated by the prior art.

I claim as my invention:

A headlight comprising a casing a luminous ray producing device secured in the forward part of said casing and including rearwardly, a parabolic reflector surrounding said device, an inclined reflector secured to the rear wall of said casing for receiving the rays from said parabolic reflector and reflecting them forward in horizontal planes, and a lens secured in the forward end of said casing, said lens comprising an upper plain portion and a lower plano-concave portion whereby the upper pencil of light is directed in horizontal planes and the lower pencils of light are directed downwardly and laterally.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

CHARLES H. ALLEN.

Witnesses:

CARLTON HILL,

SPENCER W. GIBBS.