Jan. 16, 1940. A. BERGSTRÖM 2,186,951

HEADLIGHT FOR VEHICLES

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Fig. 1.

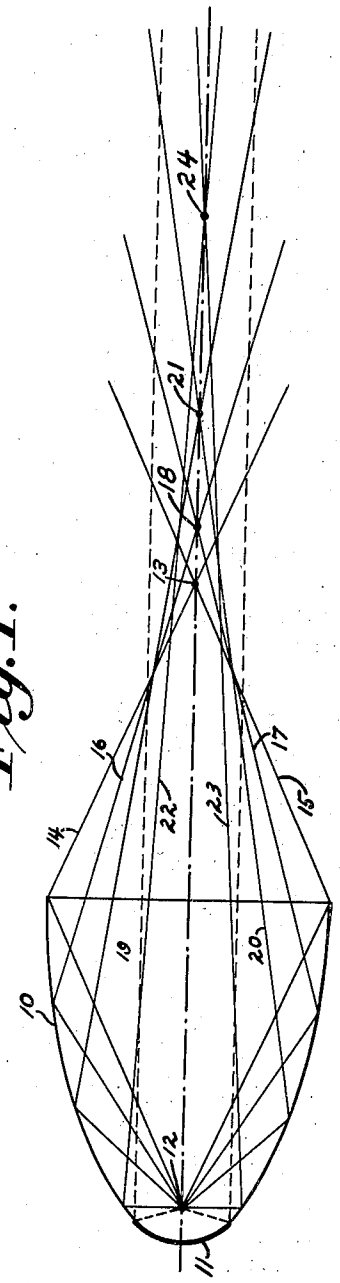
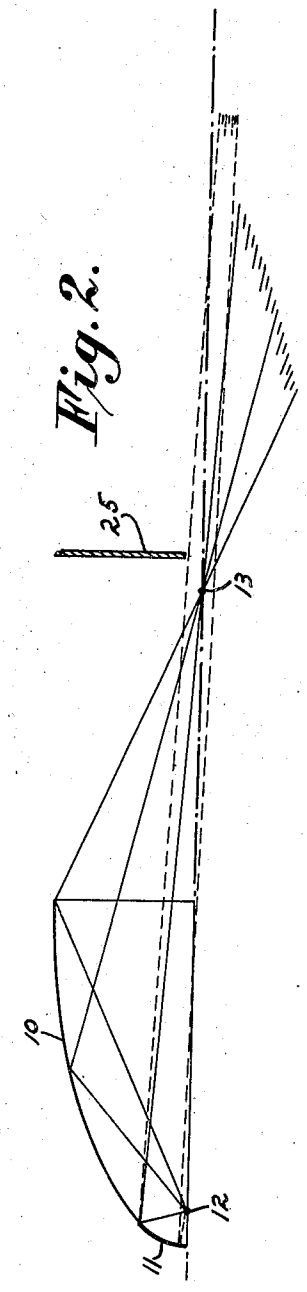


Fig. 2.



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HEADLIGHT FOR VEHICLES

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2 Claims. (Cl. 240—41.35)

It is well known that headlights for motor-cars and other rapidly moving vehicles are subjected to rather severe demands with reference to the scope of the lighting. The greater the speed of the motor-car, the farther the light must reach on the road-way in front of the car. The speed being great, however, the lighting of the road-way immediately in front of the car is of less importance. But the speed being decreased, for instance when meeting other vehicles, good lighting of the road-way in the near vicinity becomes increasingly necessary. When meeting other vehicles great demands are also made on the anti-dazzle quality of the lighting. On the other hand when the speed is great and no other vehicles are met the light beams of the headlights should disperse the light slightly above the horizontal plane on a level with the headlights to make it possible more clearly to discern objects extending vertically beside the road-way, such as trees, telegraph-poles, etc., these objects giving a good idea of any curves made by the road, but the light falling above the horizontal plane mentioned should, when meeting other vehicles, be entirely screened in order not to dazzle the approaching drivers.

The present invention is a headlight with the aid of which, judging by experiments made, fully satisfactory lighting of the road-way is obtained both at short and long distances from the motor-car. The invention first of all concerns the reflector which according to the invention is constructed in such a manner that at least its foremost part is made in the shape of an ellipsoid or a similar solid with mainly elliptical sections in a vertical plane through the optical axis of the headlight, and that at least its rear part is of such a shape that the light rays from a source of light placed in or in the vicinity of the rear focus of the elliptical section of the foremost part of the reflector are substantially parallel after being reflected against the rear part.

In its simplest construction a reflector embodying the invention consists of a rear, mainly parabolic part, and a foremost, mainly elliptical part. The parabolic shape of the reflector should as far as possible continuously change to the elliptical-shape, and the whole reflector should be pressed, stamped or in any other known manner made in one single coherent part. The axes of the paraboloid and the ellipsoid may coincide or form a certain angle against each other, the axis of the ellipsoid then advantageously being made horizontal whereas the axis of the paraboloid may advantageously be made to slant slightly downwards in the direction of the rays. The focus of the paraboloid should in most instances coincide with the rear focus of the ellipsoid but it may in certain cases be advantageous to place it somewhat below and/or somewhat behind the rear focus of the ellipsoid. The focus of the paraboloid being made to coincide with the rear focus of the ellipsoid, the incandescent body of the source of light should be placed in the joint focus, the light rays reflected against the paraboloid-shaped part of the reflector then forming a beam of substantially parallel rays. When the focus of the paraboloid is somewhat below and behind the posterior focus of the ellipsoid, the incandescent body of the source of light should be placed in the last mentioned focus. The rays reflected by the paraboloid-shaped part of the reflector will then converge slanting slightly downwards, also when the optical axis has been made substantially horizontal.

According to the invention the reflector, in a similar manner to the previously known reflectors intended for the same purpose, should be made in the shape of a cap, that is should be cut off along a substantially horizontal plane through its optical axis or along a line substantially parallel to that axis. In order to obtain a better luminous intensity it is possible, however, to keep also part of, or possibly the whole of, the lower half of the rear, for instance paraboloid-shaped part of the reflector. In most constructions, however, a fully satisfactory luminous intensity is obtained with the upper half of the reflector alone on condition that a concave mirror be arranged under the source of light. This mirror may in any known manner be made as a reflecting facing on the glass-bulb of the incandescent lamp used as a source of light.

The above, as well as further objects and advantages of my invention will be apparent from the following description, considered in connection with the accompanying drawing which forms a part of this specification and of which;

Fig. 1 shows more or less diagrammatically a horizontal section through a reflector in accordance wtih my invention; and

Fig. 2 is a vertical section through the reflector shown in Fig. 1.

Figs. 1 and 2 show horizontal and vertical sections respectively, of a reflector in accordance with the invention. In this construction the front part 10 of the reflector is elliptical with foci 12 and 13. Light rays emanating from a source of light placed in the rear focus 12 are reflected against the elliptical part of the reflec-

tor and thus converged towards the front focus 13, thence to emanate in the shape of a diverging beam of rays. The edge-rays of this beam outermost in the horizontal plane are denoted 14 and 15. The rear part 11 of the reflector is parabolic and, in horizontal section, the elliptical part 10 of the reflector gradually changes to a parabolic shape in such a manner that light rays reflected on its two side-edges, which have been bent down, are converged farther and farther away from the front focus the nearer the rear, substantially parabolic part of the reflector they are reflected. The light rays denoted with 16 and 17 art thus converged at the point 18, while the rays 19 and 20 converge at the point 21 and the rays 22 and 23 converge at the point 24. In other words, the section of the forward part 10 of the reflector cut by a horizontal plane passing through the optical axis of the reflector is a curve made up of a plurality of elliptical segments each having a rear focus at 12 and having forward foci located progressively forward as the segments are progressively nearer the parabolic part 11. The light rays reflected against the rear, substantially parabolic part 11 of the reflector converge at infinity. These rays are in other words practically parallel.

It should be observed that the whole section 10 in front of the parabolic part 11 of the reflector cut by a vertical plane as shown in Fig. 2 should in the main be a single ellipse having foci 12 and 13. This has the advantage that the lower edge of a shading device 25 placed in front of the reflector may be placed very near the optical axis of the reflector without too great a part of the beam of rays being obstructed.

It will thus be seen that I have provided a reflector which, while using a single source of light, gives illumination both at a distance and close to the reflector, which at the same time is not dazzling above the optical axis of the reflector. While I have described but a single embodiment of my invention, it is to be understood that this has been done for purposes of illustration only and that the scope of my invention is not to be limited thereby, but is to be determined by the appended claims.

What I claim is:

1. In a light projector, a reflector, the rear portion of said reflector above the optical axis being a parabolic body and the remaining forward portion being substantially of elliptical form, said forward portion having the shape of a single ellipse in vertical section through the optical axis of the reflector and having a contour in a horizontal section through the optical axis made up of a plurality of elliptical segments, the inner focus of said single vertical ellipse and the inner foci of said elliptical segments coinciding with the focus of said parabolic body, and the outer foci of said elliptical segments being located beyond the outer focus of said single ellipse, the last mentioned foci being located on said optical axis progressively forward as said segments are progressively approaching the parabolic body.

2. In a light projector, a reflector, the rear portion of said reflector being a parabolic body and the remaining forward portion being substantially of elliptical form, said forward portion having the shape of a single ellipse in vertical section through the optical axis of the reflector and having a contour in a horizontal section through the optical axis made up of a plurality of elliptical segments, the inner focus of said single vertical ellipse and the inner foci of said elliptical segments coinciding with the focus of said parabolic body, and the outer foci of said elliptical segments being located beyond the outer focus of said single ellipse, the last mentioned foci being located on said optical axis progressively forward as said segments are progressively approaching the parabolic body, said reflector extending entirely above a horizontal plane through said optical axis.

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