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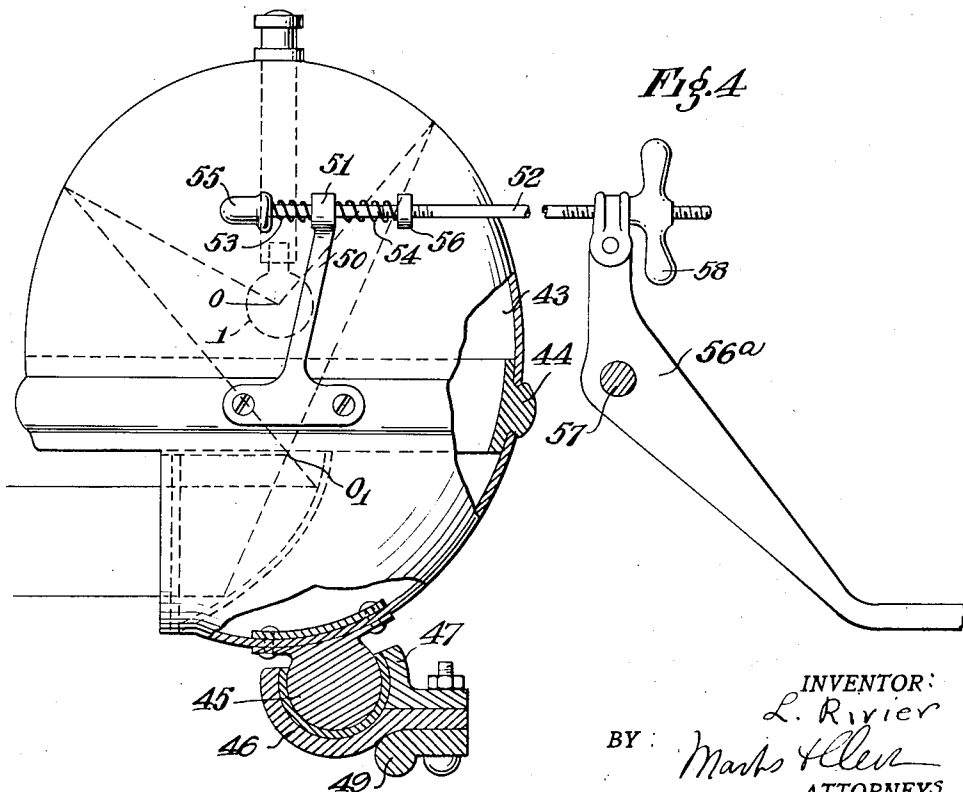
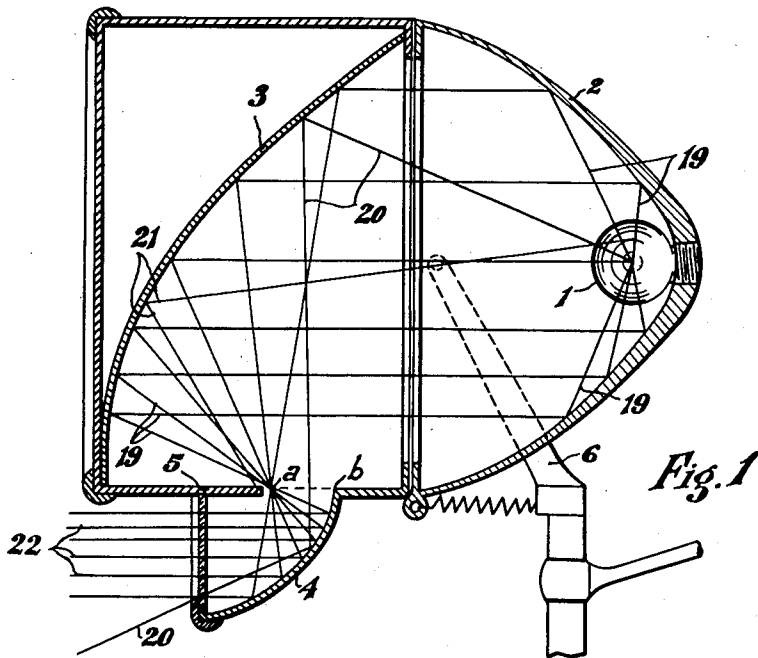
L. RIVIER

1,981,328

ILLUMINATING DEVICE

Filed Feb. 9, 1931

2 Sheets-Sheet 1



INVENTOR:
L. Rivier
BY: *Marks & Allen*
ATTORNEYS.

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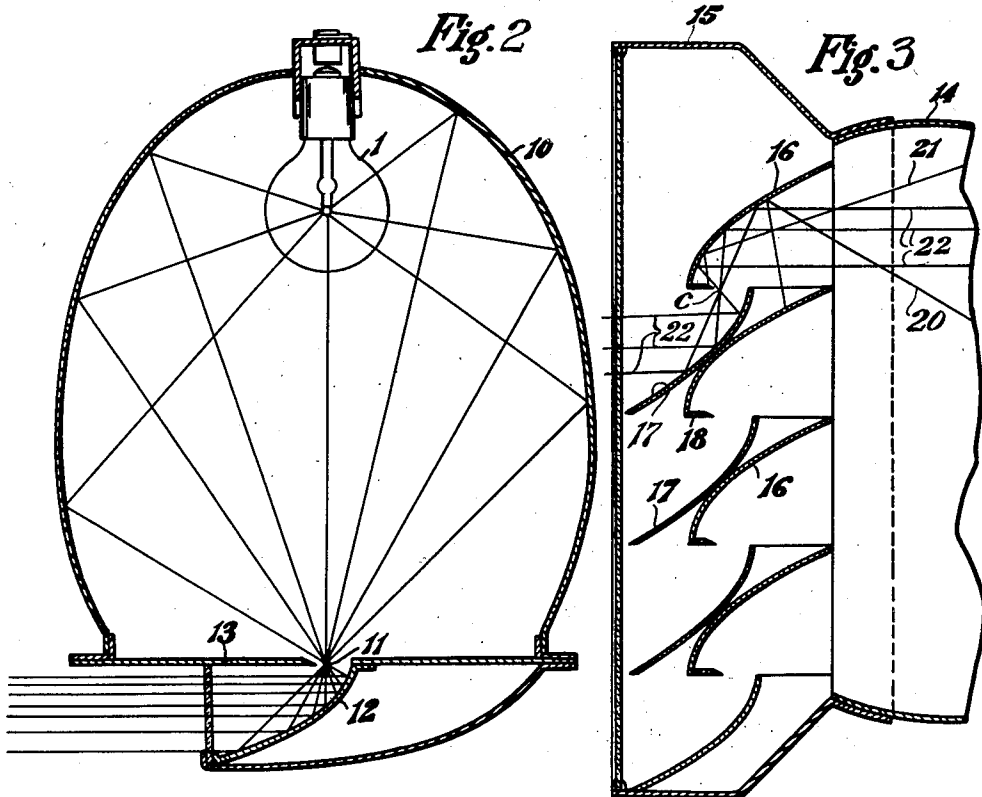
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L. Rivier
BY: *Marks & Allen*
ATTORNEYS.

UNITED STATES PATENT OFFICE

1,981,328

ILLUMINATING DEVICE

Louis Rivier, Jouxkens-Mezery, Switzerland

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In Switzerland February 18, 1930

1 Claim. (Cl. 240—41.1)

This invention relates to illuminating devices and to apparatus for concentration of light rays and for projecting said rays in a desired manner. It is known that a parabolic reflector cannot send out a truly parallel beam of light owing to the impossibility to reduce the size of the filament of the light bulb to a mathematical point placed at the focus of the reflecting surface, so that in addition to a parallel beam also divergent rays will be sent out by the parabolic reflector.

It is an object of this invention to provide an illuminating device which is particularly suitable for use as an automobile headlight and wherein two or more reflecting surfaces are combined with a light screen for preventing the projection of any light rays which would be upwardly directed relative to the horizontal plane of the headlight.

The accompanying drawings given by way of example illustrate various constructions according to the invention.

Figure 1 is a vertical axial section through an automobile headlight using parabolic reflecting surfaces.

Figure 2 is a similar section through a headlight using reflectors with elliptical and parabolic curvatures.

Figure 3 is a vertical axial section through the front portion of a modified headlight according to the invention.

Figure 4 illustrates means for suspension of a headlight according to the invention on an automobile.

In Figure 1, 1 indicates a source of light the center of which is disposed in the focus of a reflector 2 formed by a paraboloid of revolution. As it is known, the light rays 19 extending from the focus to the reflecting surface, are reflected in a parallel beam of light, while direct light rays and those rays which are emitted from points of the source of light out of focus produce divergent rays, for instance rays 20 extending upwardly, and rays 21 extending downwardly, the former being such rays which produce the dazzling effects in automobile headlights. In order to suppress these injurious rays, there is disposed in front of the reflector 2 a second reflector 3 formed by a portion of a cylinder with parabolic cross section which reflects the parallel rays towards the focal line a of this parabolic cylinder. The focal line a of the parabolic cylinder 3 is at the same time the focal line of a third reflecting surface 4 also formed of a portion of a cylinder of parabolic

cross section. This surface 4 receives the light rays passing through the focal line a and reflects them in a parallel beam 22.

The divergent rays 20, after impinging upon the parabolic surface 3, are reflected towards the region $a-b$ and impinge also upon the reflecting surface 4 from where they are reflected downwardly. The divergent rays 21 would be upwardly reflected by the reflector 4 if they could arrive at this reflector, but a screen 5 disposed at the left hand side of the focal line a prevents these rays from striking the surface 4.

When the described headlight is used on automobiles the parallel beam 22 will be situated at about three feet above the ground and a divergent beam 20 will be directed towards the ground. There will be no divergent rays directed upwardly so that this headlight will have no dazzling effect on persons using the street. The parallel beam 22 will be highly luminous as the reflector 4 is of smaller dimensions than the reflector 2 which produces a concentration of light.

The headlight itself is rotatably mounted on a support 6, so that it can turn about a horizontal axis in order to be brought into an inclined position, which can be useful when the automobile is descending a slope. By turning the headlights slightly upwards, a succeeding horizontal or rising stretch of road can be illuminated.

According to Figure 2 the source of light 1 is disposed in one of the focuses of a reflecting surface 10 having the shape of an ellipsoid of revolution. The rays emitted by a luminous point situated in the focus are reflected towards the second focus 11 of the ellipsoid which point is at the same time the focus of a second reflecting surface 12 constituted by a portion of a paraboloid of revolution obtained by a section along the axis of the paraboloid. A screen 13 is placed in front of the focus 11 having the same purpose as the screen 5 according to Figure 1, that means that it prevents such rays from striking the reflecting surface 12 which this surface would reflect in an upwardly inclined direction.

According to Figure 3, 14 indicates the reflector of an ordinary automobile headlight, the reflecting surface being constituted by a paraboloid of revolution, having the source of light, which is not shown, situated in its focus.

On the front part of the head light, there is mounted a casing 15 in which are enclosed four pairs of reflectors 16 and 17, each reflector being

constituted by a portion of a cylinder with parabolic cross section, which is obtained by displacing a parabola at right angles to the plane in which it is situated. Each pair of cylindrical, parabolic reflectors 16 and 17 has a common focal line *c*, in front of which line there is situated a screen 18. Each pair of reflectors operates substantially as the device according to Figure 1, and sends out a primary, parallel beam of light 22 and downwardly directed diverging rays 20, while the rays 21, which, could they reach the reflector 17, would be upwardly reflected, are destroyed by the screen 18. This construction has the advantage that with a reflector 14 of relatively large dimensions, a plurality of small reflectors 16 and 17 can be used which can be more accurately constructed than large reflecting surfaces. A controlling device may be provided in order to exactly determine the position of the reflectors 16 and 17.

Figure 4 shows a suspension device adapted for use with the described headlights. The headlight shown in Fig. 4 comprises an ellipsoidal reflector 43 and an assembly frame 44 on which is mounted an arm 50. A cylindrical rod 45 is secured to the bottom of the headlight and journaled in bearings 46, 47 mounted on a bracket 49 of the automobile. The two focuses of the reflecting surface 43 are indicated at *o* and *o'*, the source of light 1 being situated in the focus *o*.

A rod 52 having its two ends provided with screw thread freely traverses a ring 51 on the arm 50. Two springs 53 and 54 are disposed on the rod 52 on either side of the ring 51 and are compressed by means of nuts 55 and 56. The rod 52 extends rearwardly from the headlight and is connected to a foot pedal 56a near the driver's place by means of an adjusting screw 58. The pedal is rotatable around a transverse pin 57 which can be secured to the protecting sleeve of the steering wheel shaft. The headlight is disposed in such a way that the center of gravity of the combination headlight and rod 52 is situated forwards of the bearing 45.

The operation of the device is as follows: The nut 58 is adjusted so that the parallel beam of light emitted by the headlight is horizontal when the automobile is immobile and horizontal.

When the car is moving the headlight will be subjected to a movement of oscillation around the bearing 45 owing to the action of the shocks transmitted to the springs 53 and 54 by the intermediary of the arm 50, the period of this movement of oscillation being capable of adjustment by means of the nuts 55 and 56.

It will be understood that the compression of the springs 53 and 54 or other shock absorbing means can be adjusted so that the movements of the car will have very little influence on the headlights and that the light beams will deviate a little only from a direction which is substantially parallel to the road on which the car is advancing. When passing another automobile coming from the opposite direction, the speed of the car is usually decreased. With the described method of suspension a decrease of speed has the effect, owing to the inertia of the headlight, to forwardly incline the latter, so that the beam of light will be slightly downwardly inclined to still further render impossible any dazzling effect. The pedal 56a serves to turn the headlight slightly upwards in order to have the possibility to illuminate an upward slope in front of the car on a horizontal stretch of road, or a horizontal stretch of road in front of the car running on a downward slope.

I claim:—

A light projector comprising a first reflector having a reflecting surface formed by a paraboloid of revolution, a light source mounted in said first reflector, a second reflector having a parabolic cylindrical reflecting surface, the focal line of said second reflector being disposed at right angles to the axis of the first reflector, the axis of the generating parabola of the second reflector being parallel to and spaced from the axis of the first reflector, said second reflector being disposed so that light rays reflected by the first reflector impinge on the concave reflecting surface of the second reflector, a third reflector having a parabolic cylindrical reflecting surface, the focal line of said third reflector coinciding with the focal line of the second reflector, and a light screen having a straight line edge positioned parallel with and adjacent to the common focal line of said second and third reflectors.

LOUIS RIVIER.