April 21, 1936. R. H. HUMMERT 2,038,514

MEANS FOR PROJECTING LIGHT

Filed Feb. 4, 1935 2 Sheets-Sheet 1

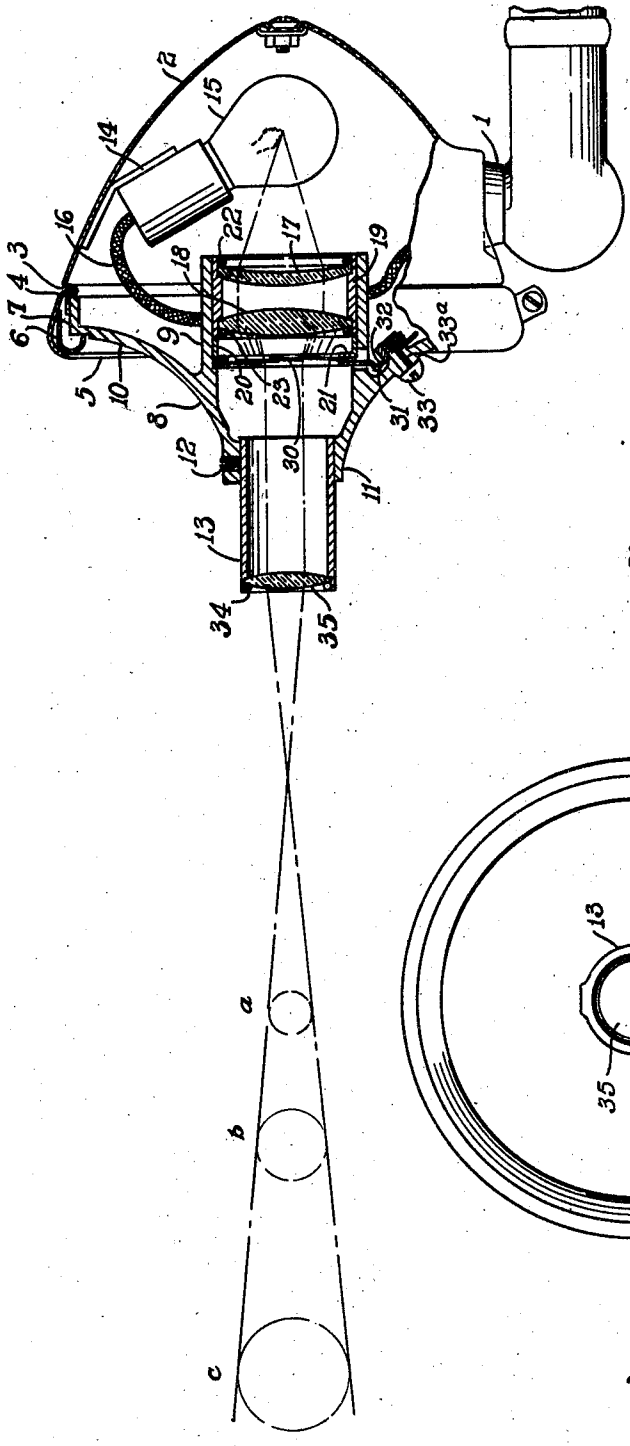


Fig. 1.

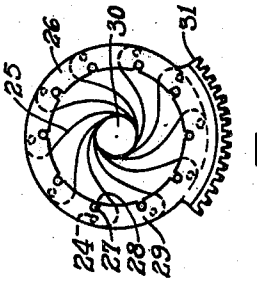


Fig. 4.

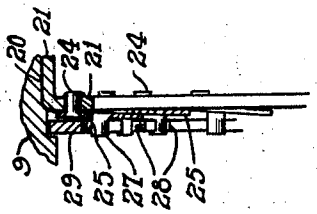


Fig. 3.

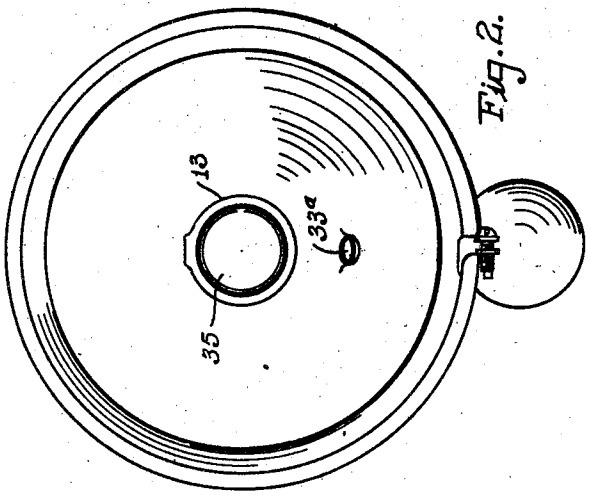


Fig. 2.

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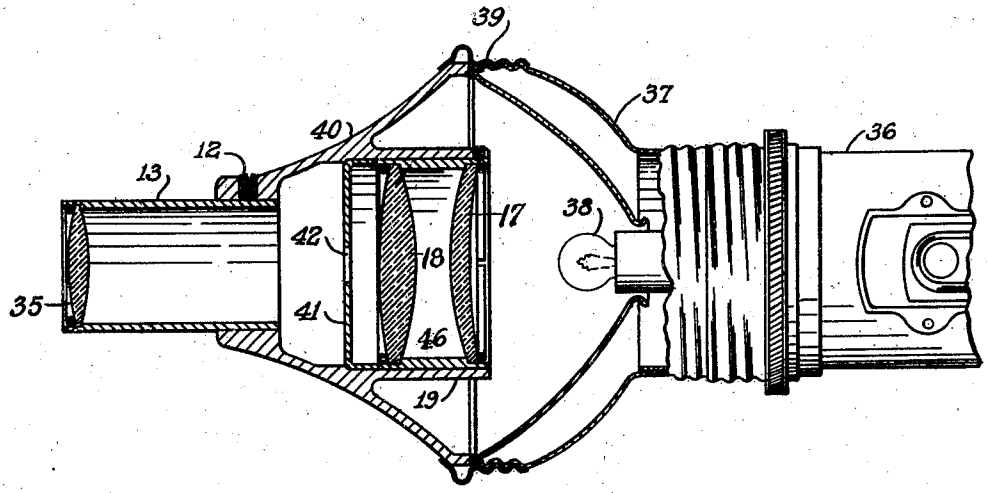


Fig. 5.

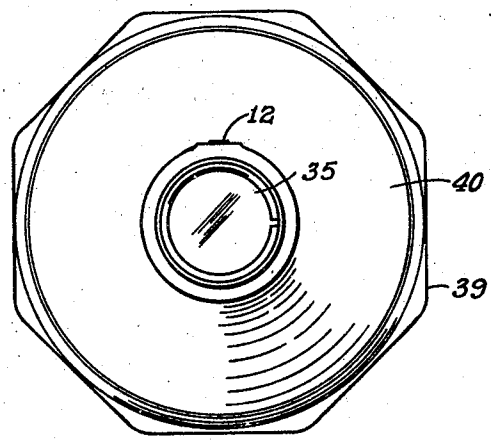


Fig. 6.

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UNITED STATES PATENT OFFICE

2,038,514

MEANS FOR PROJECTING LIGHT

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Application February 4, 1935, Serial No. 4,827

1 Claim. (Cl. 240—41.15)

This invention relates to new and useful improvements in means for projecting light.

In many instances it is eminently desirable to artificially illuminate a definite field without exposing to view the light source or, in fact, without illuminating any persons or objects outside this sharply defined area of light. For example, it is dangerous for a peace officer to appear in the field illuminated by his flash light; while in time of war it is an extreme risk for an army truck carrying a headlight, searchlight or spotlight to expose itself to aerial attack through inclusion in the illuminated area of roadway.

It is the principal object of my invention, therefore, to provide a spotlight, flash light or other similar light with simple and effective means for projecting the light beams in a concentrated and sharply defined manner upon a definite field without exposing to view the light source or any other object or persons outside the sharply illuminated area.

It is a further object of my invention to provide in the path of the concentrated light rays, a shutter or window from the variable central aperture of which the concentrated beams emanate for direction by a tube through a double convex lens which projects them upon a sharply defined field.

Other important and incidental objects will be brought out in the following specification and particularly set forth in the subjoined claim.

In the accompanying drawings illustrating various forms of embodiment of my invention, Figure 1 is a longitudinal, sectional view taken through a vehicle spotlight equipped with my light projecting means. Figure 2 is a front view of the same. Figure 3 is a sectional view taken through the upper portion of the shutter. Figure 4 is a front view of the shutter mechanism. Figure 5 is a longitudinal sectional view taken through a flash light equipped with my light projector. And Figure 6 is a front view of the same.

Referring to Figures 1, 2, 3 and 4 for a detailed description of the form of embodiment of my invention disclosed therein, the numeral 1 designates the pivotal mounting for the paraboloidal casing 2 of a well-known spotlight.

The casing or shell 2 is formed at its front edge with a grooved bead 3 adapted to receive the inner hook edge 4 of a split ring 5. The latter, through the medium of an inner L-shaped clamp ring 6, holds the flanged peripheral portion 7 of a lens support 8 firmly against the bead 3. The lens support 8 comprises an axial tube 9 integral at its front portion with a concave web 10 on which the peripheral flange 7 is formed. The axial tube 9 tapers slightly inwardly at its front end to provide a boss portion 11 in which there is secured by a screw 12, the inner end of a projecting lens tube 13.

Secured to a bracket plate 14 attached to the upper inner surface of the shell 2, is a light source such as an incandescent lamp 15 supplied with electric current by a suitable conductor 16.

Mounted in the axial tube 9 immediately in front of the lamp 15, so as to be in the direct path of the light rays emitted thereby, is a suitable condenser. This condenser comprises an inner concavo-convex lens 17 and an outer double convex lens 18 mounted in a spacer ring 19 fitted within the tube 9 behind the flanged rim 20 of a shutter-supporting ring 21. Retaining rings 22 and 23 hold the lens 17 and 18 respectively against shoulders formed on the spacer ring 19.

Attached by pivots 24 to the fixed ring 21 are the segmental vanes 25 of a conventional shutter 26. These vanes carry pins 27 which enter slots 28 in a flat actuating band 29 that is free to be rotated within a recessed portion of the tube 9. (See Figures 3 and 4).

One means of moving the band 29 either clockwise or counterclockwise to vary the size of the shutter aperture or opening 30, is to provide it with a toothed sector 31 that is adapted to be engaged by a pinion 32 on the inner end of an adjusting screw 33 fitted in a hole 33a within the web 10 of the lens support.

Mounted in a recessed portion of the outer end of the projecting tube 13, and held in place by a retaining ring 34, is a double convex lens 35.

The light rays emanating from the lamp 15 are first condensed by their passage through the spaced lenses 17 and 18 of the condenser. The concentrated light beams then pass through the adjusted aperture 30 of the shutter 26 into the tube 13.

By the double convex lens 35 in the outer end of this tube the concentrated light beams are projected onto a sharply illuminated field such as is represented by any one of the circles *a*, *b*, or *c* in Figure 1. When any one of these fields is illuminated, all persons and objects including the light source outside it will not be visible. Hence, if the spotlight is carried by a vehicle such as an army truck, the latter will not be exposed to aerial or other attack, since the field illuminated by the light does not embrace the truck or any other objects or persons outside it.

While my light projecting means may be ap-

plied to any type of spot light, headlight, or search light carried by vehicles or mounted on a fixed base, the invention is equally applicable to flash lights or other lights that are carried by the hand for the purpose of exploring dark places without subjecting the persons carrying the light to the field illuminated by its rays.

In Figure 5 I have illustrated my light projector applied to a flashlight of a well-known make. This flashlight comprises a handle **36** which carries a light casing or shell **37**. A light source, such as the incandescent light **38**, is supported in a conventional manner at the center of the shell. The outer rim portion of the shell is corrugated as shown in Figure 5 to receive a crimped ring **39** which is employed to firmly connect to the shell the lens support **40**. The latter is in all respects similar to the lens support **8** in Figure 1, save that it does not employ a shutter. Although a shutter may be used in this lens support, I have fitted in the tube **9** a metal disc **41** having a central aperture or window **42** through which the concentrated beams pass from the condenser **46** into the double convex lens tube **13**.

The light beams emitted by the incandescent lamp **38** pass through the lenses **17** and **18** of the condenser **46** for concentration before entering the window **42** in the disc **41**. From this window the concentrated beams of light enter the tube **13** for passage through the double convex lens **35** by which they are projected upon a definitely illuminated field such as those represented by the circles *a*, *b* and *c* in Figure 1.

These sharply defined fields or areas are brilliantly illuminated by the light beams projected from the flash light without exposing to view the holder of the same. The element of risk and danger to a detective, police or other persons exploring a dark space is reduced to the minimum when my projecting flash light is used, since it is difficult for a burglar or other unauthorized person within that space to see the holder of the light.

Having described my invention, I claim:

A light projecting attachment for a flashlight including a casing and a light source, comprising a lens support having an axial tubular portion, a concave web projecting from the latter for contact with the rim of said casing, a ring for securing said web to the casing rim, a condenser in the tubular portion of said support in the path of the light beams emitted by the light source, a disc in said tubular portion, having a window through which the concentrated light beams pass, a lens tube secured to said support beyond said disc, and a double convex lens in the outer end of said tube through which the concentrated light beams pass and by which they are projected to form a sharply defined field of light.

ROBERT H. HUMMERT.