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TWO-TONE REFLECTOR FLASHLIGHT

Filed July 26, 1937

Fig. 1.

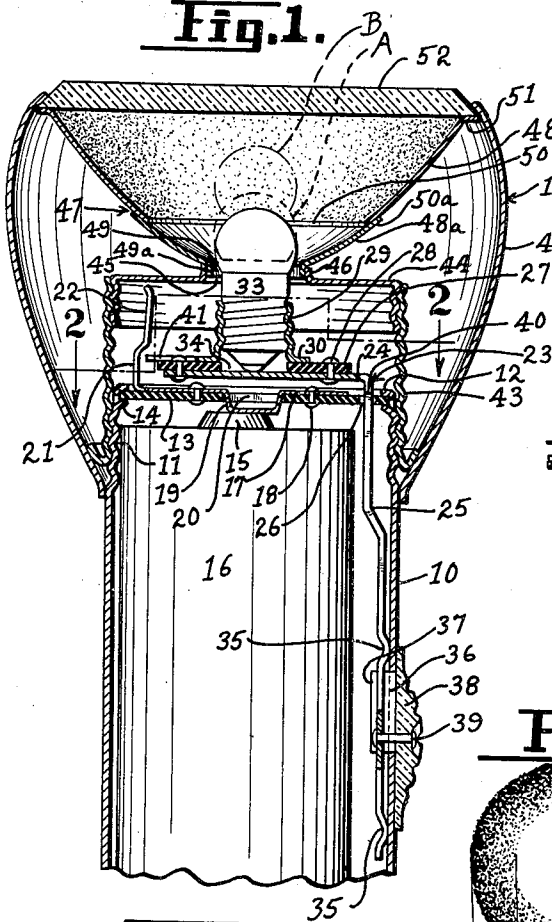


Fig. 2.

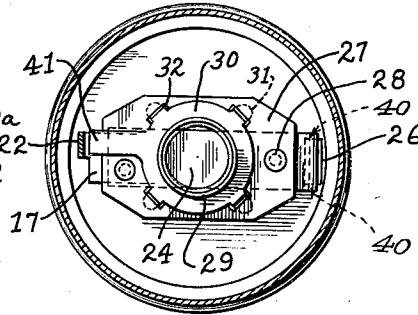


Fig. 4.

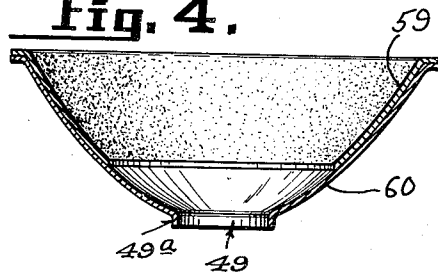


Fig. 3.

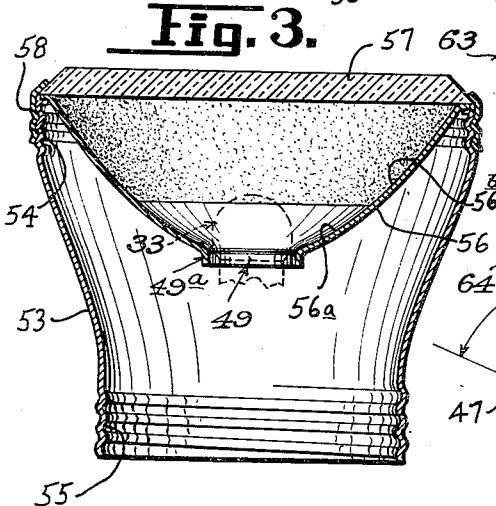


Fig. 5.

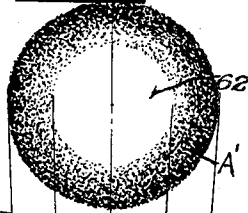
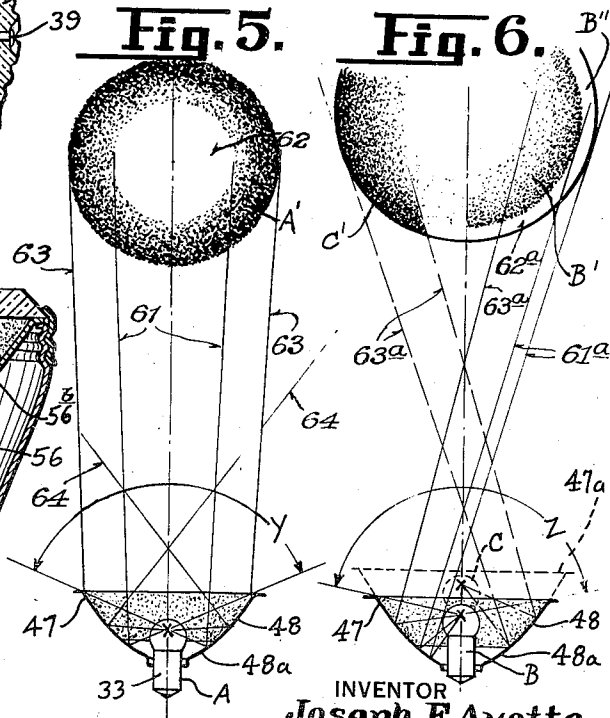


Fig. 6.



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TWO-TONE REFLECTOR FLASHLIGHT

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Application July 26, 1937, Serial No. 155,795

2 Claims. (Cl. 240—10.69)

The present invention relates to flashlights, and has for an object to provide a flashlight capable of projecting light rays to provide a defining border ring or line of light of high intensity with a highly illuminated central field within the border ring, and an outer field of diffused light of less intensity outside of or beyond the border ring.

Another object of this invention is to provide a flashlight of the focusing type capable of adjustment to produce a spot light and also a large flood area without dark spots and surrounded by an intensified defining ring of light.

Another object of the invention is to provide axially spaced reflectors with an axially adjustable source of illumination for producing, by relative adjustment, different illuminating effects.

A further object of the invention is to provide a flashlight capable of throwing a uniform intensity spot light without the usual central dark spots, both with and without a defining intensified light ring.

A further object of this invention is to provide a composite reflector for the focusing flashlight of this invention in which the reflecting surface is preferably made in two zones of separate individual parts, primarily as a manufacturing expedient for the purpose of producing a different finish on each part of the reflector. This particular type of two-part reflector is adapted to be held together in assembled position by a novel and particular type of head shell construction which lends itself effectually to that purpose.

With these and other objects in view, the advantages of this invention will be apparent, as will be better understood from the following description which, taken in connection with the accompanying drawing, discloses several embodiments thereof.

In the drawing:

Figure 1 is a longitudinal fragmentary section through the front portion of a hand flashlight embodying the invention.

Figure 2 is a transverse section taken substantially on the line 2—2 of Figure 1 through the head end of the flashlight, looking in the direction of the arrows.

Figure 3 is a detail longitudinal section taken through a conventional head shell unit, showing a modified form of two-tone reflector mounted therein.

Figure 4 is a detail longitudinal section taken through a further modified form of the reflector

which may be assembled to the conventional head shell unit of Figure 3.

Figure 5 is a diagrammatic view showing the light source at the focal point within the reflector, and showing the reflection of the light rays relatively to the different surfaces of the reflector, and

Figure 6 is a similar diagrammatic showing, but with the light source in different axially advanced positions within the reflector for producing various light effects.

Referring now in detail to the several figures of the drawing, the numeral 10 designates a metallic casing having a threaded portion 11 at its forward end for the reception of a suitable head shell and reflector unit 10^a, to be described later. The forward end of the metallic casing is provided with an integral inwardly formed flange 12 against the inner side of which is seated a disc 13 of insulation material. The disc 13 may be held in permanent assembled position by several lugs 14 struck inwardly from the wall of the casing 10 and engaging against the inner side of the disc 13.

The circuit of the flashlight includes the central terminal 15 of a battery 16 contacting a stationary conductor strip 17 secured to the upper surface of the disc 13, by rivets 18 or the like. The intermediate portion of the conductor strip 17 is formed with a rearwardly offset portion 19 extending through an opening 20 in the disc 13 and which is in direct contact with the central terminal 15 of the battery. One end of the conductor strip 17 is integrally formed with a forwardly extending arm 21 which terminates in a slightly inwardly offset circuit closing contact portion 22.

The switch means and lamp focusing means of this invention are combined as a unit which comprises an L-shaped movable conductor strip 23 having a horizontal leg 24 and a vertical leg 25, the latter slidably engaging through an opening 26 provided in the insulation disc 13. Surmounted upon the horizontal leg 24 is an insulation plate 27 held rigid thereto, as by means of rivets 28. Resting upon the plate 27 and insulated from the conductor strip 23 is a threaded lamp socket 29. The lower end of the socket 29 has an integral flange 30 with peripheral lugs 31 which engage through corresponding slots 32 in the insulation plate 27 beyond the lateral edges on the strip 23 and extend outwardly beneath the plate 27 for holding the lamp socket 29 thereto.

The usual form of electrical lamp bulb 33 is

provided, and is threaded in the socket 29. The bulb 33 has access, through a suitable opening 34 in the insulation plate 27, to the horizontal leg 24 of the conductor strip 23 to admit the central terminal of the lamp 33 to electrically engage with the conductor strip.

The vertical leg 25 of the movable conductor strip 23 extends downwardly along the inside of the casing 10, and is provided with a pair of transverse ribs 35 struck outwardly therefrom for frictional and electrical contact with said casing 10. It is to be here understood that the casing 10 is grounded to the base terminal of the end battery in the usual manner.

To permit manual manipulation of the conductor strip 23, a slot 36 is provided in the side wall of the casing 10. A pair of opposed overturned guides 37 are struck inwardly from opposite sides of the slot 36 to provide suitable retention means for said conductor strip 23. The conductor strip 23 is given motion through a thumb piece 38 positioned outside of the casing 10 over the slot 36 and is suitably connected to said strip 23, as by means of a rivet 39. In order to limit the downward movement of the conductor strip 23, a shoulder 40 is provided which, as shown in Figure 1, is adapted to engage against the top surface of the disc 13 beyond the ends of the slot 26 (see Figure 2). This construction obviously will prevent the horizontal leg 24 of the strip 23 and fastening rivets thereof coming into contact with the stationary conductor strip 17 directly underneath.

The circuit is opened and closed by means of a contactor tongue 41 extending outwardly from the flange 30 of the socket 29, as best shown in Figure 2. The tongue 41 extends a short distance beyond the edge of the insulation plate 27 into line with the fixed contact 22 offset inwardly from a yieldable contact strip 21 extending upwardly from the adjacent end of the stationary conductor strip 17, when the thumb piece 38 is moved forwardly.

The construction and arrangement of the parts is such that, as soon as the tongue 41 makes contact with the lower end of the fixed contact 22, the light source, or bulb, 33 will be at its principal focal position with respect to the composite reflector in the head shell unit 10^a and, by reason of the extended length of the portion 22, the lighted bulb 33 may be moved forwardly to assume various other positions within the reflector to produce different illuminating effects as will be fully disclosed later.

The head shell unit 10^a may be of any suitable construction, and in the present illustration comprises a bulbous shaped hollow shell 42 having an interior threaded sleeve 43 secured within the shell 42 adjacent its smaller end. The threaded sleeve 43 permits the head shell unit 10^a to be adjustably attached to the threaded end 11 of the casing 10. A cup shaped threaded member 44 is threadedly and adjustably engaged within the forward end of the sleeve 43 and is provided in its crowned end with a concentric opening 45, the marginal edge carrying an upstanding cuff 46. This particular construction of head shell unit is fully disclosed and claimed in an application of Almanzo Schaff filed December 1, 1936, Serial No. 113,652, now Patent No. 2,092,590, both this and the present application having a common assignee.

For the purpose of manufacturing a reflector with a composite reflecting surface the reflector 47, in its preferred form, is made in two annular

complemental parabolic parts. The outer part is the larger part of the reflector and is designated by the numeral 48 while the inner smaller part of the reflector is shown at 48^a. Each part 48 and 48^a is a complete annular reflector but the parts are formed on different longitudinal sections of the parabola. The smaller reflector 48^a has the usual highly polished reflecting surface and is provided at its apex or inner end with a concentric opening 49 sufficiently large to receive therethrough the glass bulb of the electric lamp 33. The smaller inner reflector 48^a has at the marginal edge of the opening 49 a depending ring 49^a which telescopically interfits into the upstanding cuff 46 on the cup shaped member 44 for holding and centering the reflector parts 48 and 48^a in the head shell 10^a, and also in coaxial alignment with the axis of the flashlight in any position of adjustment of the head shell 10^a on the casing 10. As best shown in Fig. 1, the diameter of the outer end of the smaller reflector 48^a is made larger than the smaller open end 50 of the larger reflector 48, providing an annular overlapping supporting portion 50^a for supporting the outer reflector 48. The outer end of the larger reflector 48 has an out-turned flange 51 which bears against and supports a lens 52 in the outer open end of the head shell 42.

As illustrated, the inner reflector part 48^a is axially shorter than the outer reflector part 48, the relative proportions being, in the present embodiment, approximately one to two, wherein the inner shorter reflector part is about one third of the axial length of the whole reflector 47 and the outer larger reflector part is approximately two thirds of the total axial length. While the inner shorter reflector part 48^a has a highly polished reflecting inner surface, the outer longer reflector part 48 has a light diffusing inner surface provided by a more or less roughened finish effected in any suitable manner, for instance: by scratch-brushing the reflector surface, by a matte-dip finish, a coating of aluminum paint, or in any other desired manner.

In the modification shown in Figure 3, the head shell 53 has threaded outer and inner ends 54 and 55, the latter for adjustable screw threaded engagement upon the threaded outer end 11 of the casing 10. A reflector 56, of one piece parabolic construction, has its out-turned flange bearing against the lens 57 and is seated upon the outer end of the head shell 53 and held thereto by a threaded clamping ring 58 in the usual manner. The inner end of the reflector 56 has the central opening 49 and the marginal ring or flange 49^a for receiving the bulb 33 and for interchangeable mounting in the head structure of Figure 1.

This one piece reflector 56 has a highly polished inner light reflecting surface part 56^a and an outer light diffusing surface part 56^b of preferably the proportions and relations of the composite reflector 47, the reflector 56 of Figure 3 being two-tone or composite relative to the reflecting and diffusing parts 56^a and 56^b. In use the lighting and focusing effects are the same for both reflectors 47 and 56.

The modification illustrated in Figure 4 discloses another form of two-tone or composite reflector. The body part 60 is of the full size of the reflector similar to the reflector 56 in Figure 3, but is provided with a separate outer light diffusing part 59 proportioned to the size of the outer part 56^b of the reflector shown in Figure 3, and of the outer part 48 of the reflector shown in

Figure 1. In Figure 4, the part 60 comprises the inner part of the reflector and the exposed inner surface portion only thereof need be highly polished, while the inner surface of the outer part 59 is roughened in any suitable manner to provide the larger light diffusing outer part of the reflector.

The constructions, proportions and relations of the reflectors with their inner and outer reflecting and diffusing parts as above specifically defined may be changed and modified within the scope of this invention to accommodate the flashlight to various conditions of manufacture and use.

The shiftable mounting of the bulb 33 may be substituted by a fixed bulb and a shiftable reflector or head shell so as to obtain relative movement between the bulb and the reflector where an adjustable focusing flashlight is desired. The flashlight may also have a fixed bulb and a fixed reflector where the relation is established to produce a definite fixed lighting effect of the flashlight.

In the use and operation of the above described flashlight, when the lamp 33 is extinguished it is retracted by drawing back the thumb piece 38 so as to move the contact 41 inwardly beyond the fixed contact 22, thus breaking the circuit.

When it is desired to produce a spot light and a surrounding field of illumination, the thumb piece 38 at the side of the casing is slid outwardly to an extent sufficient to bring the movable contact 41 into engagement with the fixed yieldable contact 22. This completes the light circuit through the lamp 33, and at the same time advances the lamp 33 axially outwardly into substantially the dotted line position shown at A in Figure 1, and also in the diagrammatic view shown in Figure 5. This is the first position of adjustment of the lamp and it moves the light source into position substantially at the focal point of the composite reflector 47. In this position the highly polished reflecting surface portion 48^a of the reflector lies inwardly of the transverse plane of the light source so that the high intensity light rays projected from the flashlight are reflected in slightly divergent beams or rays from the inner section 48^a of the reflector. From Figure 5 it will be noted that the reflecting inner surface 48^a provides an annular highly polished surface of an effective width defined substantially by the light ray lines 61, shown in Figure 5, and which impose on a lighted surface a bright central spot light 62 of highly intensified light.

Surrounding the ring 62 of light is an outer light field A' which is of less intensity than the inner field 62 and which is produced by the light rays 63 reflected from the outer diffusing surface portion 48 of the reflector, and beyond the outer rays 63 the field is illuminated with further decreasing intensity by the reflected light rays 64 and the direct rays from the light source or lamp 33 within the light ray projecting limit indicated by the arc Y. The shadows or dark spots upon the inner field of light, which usually occur, are eliminated by the reflected light rays 64 from the diffusing section 48 of the reflector and which intersect along the axis of the light source and reflector so as to illuminate from the opposite sides of the axis the center field within the center field 62.

If it is desired to enlarge the center light field, the lamp 33 may be further advanced forwardly or outwardly into the position shown at B in

Figures 1 and 6, to move the light source forwardly of the focal point of the reflector and to cause the reflected light rays from both sections 48 and 48^a of the reflector to cross or intersect at the axis of the reflector. As shown in Figure 6, the light rays 61^a define the width of a light ring 62^a reflected from the smooth inner portion 48^a of the reflector and which intersect at the axis of the latter. The light ring 62^a increases in diameter proportionately to the distance between the flashlight and the surface upon which the light is projected. Within the defining ring 62^a the inner field B' is provided by the crossed light rays 63^a which project a highly illuminated inner or central field brighter at its central portion and slightly shaded off toward the defining ring 62^a and without dark spots, and which is supplemented by the direct rays from the light source 33. It is apparent that the field of projection of direct rays from the light source is wider than when the light source is at the focal point of Figure 5, as indicated by the arc Z in Figure 6.

With reference to Figure 1 it will be noted that the fixed contact 22 is of sufficient length to admit of the various axial adjustments of the lamp 33 without breaking the light circuit as the movable contact 41 may slide in electrical contact over the inner face of the fixed contact 22.

If it should be desirable to entirely eliminate reflection from the highly polished inner part 48 of the reflector, the latter may be elongated as shown in dotted lines in Figure 6 so that the end of the reflector is at 47^a. The light source may be advanced axially into the forward position C. While in this position the base of the bulb 33 intercepts light rays directed backwardly at an angle sufficient to strike the inner portion 48^a of the reflector so that only the rays of diffused light may emanate from the flashlight. In this instance the field C' is uniformly lighted at the center and gradually shades off without the defining or centering ring 62^a, as shown at the left side of Figure 6. This elongated type of reflector 47^a could be substituted in the structure of Figure 1 simply by turning down the plug 44 within the sleeve 43 of the head shell. It will be noted that the lamp socket 29 together with the lamp 33 are of a diameter less than that of the opening 49 in the inner end of the reflector so that reflectors of different lengths, or depths, may be readily interchanged within the head shell.

What is claimed is:

1. In a flashlight, a composite parabolic reflector having an inner portion with a highly polished surface and an outer portion with a mat light diffusing surface, a source of light, shiftable supporting means for supporting the source of light for movement along the longitudinal axis of the reflector into and out of focus therewith, and circuit closing means carried by the shiftable supporting means, said supporting means adapted to be shifted to dispose the source of light at the focal center of the composite reflector and to close the circuit through the source of light to produce a spotlight reflected from the inner highly polished surface portion of the reflector and a surrounding limited illuminated field reflected from the outer mat light diffusing surface portion of the reflector, said supporting means also adapted to be shifted to dispose the source of light outwardly of the focal center of the reflector to produce an enlarged central light field reflected from the mat outer surface

portion of the reflector and a narrow illuminated light field reflected in axially intersecting light rays from a portion of the inner highly polished portion of the reflector.

- 5 2. In a flashlight of the type having a battery casing with a head shell and a shiftable circuit closing lamp holder movable outwardly from the casing in the head shell for closing a lamp circuit and advancing the lamp axially in the head
10 shell, a two tone reflector, and means for supporting the reflector axially in the head shell about the lamp independently of the latter, the reflector having an inner highly polished section and an outer mat surfaced section, the outer section
15 having an axial length substantially twice

that of the inner section and the two sections being complementary to a composite parabolic reflector with a common axis and a common focal point, the inner section being disposed inwardly of the transverse plane of the focal center of the reflector for reflecting a spotlight from the lamp when in its initial outwardly advanced circuit closing and focused position and the outer section being disposed outwardly of the transverse plane of the focal center of the reflector for reflecting a diffused light field with axially intersecting light rays for eliminating shadow spots at the central portion of the light field.

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