J. GRAVES
FOCUSING FLASH LIGHT
Filed April 24, 1922

Inventor:
John Graves
By Cheever & Co.
To all whom it may concern:

Be it known that I, JOHN GRAVES, a citizen of the United States, residing at Madison, Wisconsin, have invented a certain new and useful Improvement in Focusing Flash Lights, of which the following is a specification.

This invention relates to hand flashlight lights of the type now commonly carried by travelers, automobilists, and others and also in the home where regular lights are momentarily or otherwise unavailable to throw a light into dark places. The trouble with commercial devices of this kind is that they do not focus the light, and they are therefore, not nearly as efficient and satisfactory as they should be. The object of this invention is to provide a device of this kind in which the operator can at will, change the relationship of the electric light bulb with reference to the reflector which is always present adjacent to it, and thereby obtain a satisfactory adjustment or focusing of the lamp with reference to the reflector.

The invention consists in mechanism for attaining the foregoing objects which can be easily and cheaply made, which are satisfactory in use and are not readily liable to get out of order. More particularly the invention resides in a novel mechanism by which the reflector may be reciprocated longitudinally on the axis of the lamp to produce the desired result, and in other features and details of construction which will be hereafter more fully set forth in the specification and claims.

Referring to the drawings in which like numerals denote like parts throughout the several views,

Figure 1 is a sectional detail view thru a complete device of the type described, having the mechanism of this invention in its preferred form applied thereto.

Figure 2 is a perspective view of the reflector and an attached frame removed from the remainder of the device.

Figure 3 is a perspective view of an electric conductor for the outer terminal of the lamp.

Figure 4 is a perspective view of an electric conductor for the central terminal of the lamp.

Figure 5 is a bottom sectional view taken on approximately the line 6—6, Figure 1.

Figure 6 is a plan view taken on approximately the line 6—6, Figure 1.

The conventional form of flash light case shown in the drawings includes a tubular case member 10, continued at its upper end 60 in a cup 12, having inside its top an annular insulating band 14 on which the lens 16 rests, being secured in place by means of the conventional screw threads 18. The bottom of this case 10 is closed by a cap 20 adjustable longitudinally on screw threads 22 in a conventional manner. In one side of the case is a conventional form of switch housing 24 having a reciprocable switch 26 adapted to slide the length of a slot 28 into contact with an electric conductor 30, hereafter more fully described in detail, separated from the case member 10 by conventional insulating material 32 inside the case.

An insulating plate 34, more or less permanently but positively secured across an upper end of the tubular member 10 is notched at one side to allow for the passage of the member 30 up from the switch mechanism 26 and over the top of the plate 34 to the center of the plate where it is provided with contacting mechanism, in the particular case here illustrated, a screw thread tube 36 adapted to receive the outer terminal 38 of the electric lamp 40, the lamp and member 36 passing thru a suitable central perforation formed for them in the plate 34 which is also suitably perforated to receive and allow for the reciprocation of a plurality of vertically disposed posts 42 concentric with the lamp and connected together at their bottoms by a plate 44 and supporting at their upper ends a reflector 46 which envelops the lamp 40. The upper circumference 48 of the reflector is of such a diameter that it can reciprocate vertically inside of the insulating ring 14 without under ordinary circumstance touching it, but will be insulated by said ring should accidental contact occur.

Permanently secured to the underside of plate 34 as for instance by suitable screws thru holes 50 is an electric conducting member 52 preferably of spring material having at free end 54 adapted to always contact the central lamp terminal 56.

Below the member 52, always contacting it, and inside the posts 42 and above the plate 44, and always contacting it, is a com-
pression spring 58 tending to normally push the plate 44 downward away from stationary plate 54 and therefore hold the reflector 46 in its lowest possible position with reference to the lamp 40.

Inside the case below plate 44 is a conventional set of battery cells 60 placed in series with the upper terminal 62 of the upper cell in contact with the plate 44, the opposite terminal 64 of the lowest cell 60 resting upon a suitable supporting frame 66 carried by the inside of cap 20.

In operation, assuming that the cap 20 is wholly removed for the insertion of the battery cell 60, the spring 58 will move the reflector 46 into practical if not actual contact with the upper surface of insulating plate or block 34. As soon as the operator puts battery cell 60 in the case 10, applies the cap 20 and begins to screw it upward on screw threads 22, the batteries will necessarily force plate 44 and attached parts gradually upward, thus moving the reflector 46 upward with reference to the lamp 40 toward the lens 16. All the operator has to do to change this adjustment when and as he desires, in the use of the lamp, is to manipulate the screw cap 20 on screw threads 22 to force the reflector upward or to rotate the cap the other way to allow the spring 58 to move the reflector downward.

The electric circuit thru the lamp is maintained under all positions of adjustment in the following manner:

Assuming that the current starts from battery 62, it moves upward thru plate 44, spring 58, conductor 52—54 to the center of the lamp 40, thence thru the outer terminal of the lamp via member 30 which is insulated from the rest of the case into switch housing 24 whereby on moving switch 26 upward in contact with member 30 the current passes to member 26, thence to the cap 20 and up supports 66 to the lower battery terminal. In other words the operator can by closing switch 26 maintain the lamp 40 in a lighted condition while adjusting the focus by rotating cap 20 on screw threads 22 as may be required for this purpose.

The mechanism for reciprocating the reflector, thereby focusing the lamp, is by no means limited to an all metal case flashlight. Such a case is merely one type of device to which the broad invention may be applied.

Having thus described my invention what I claim as new and desire to secure by Letters Patent, is:

1. In a flashlight, the combination of, an incandescent lamp, a battery, for providing current to light said lamp, positioned for reciprocation toward and from the lamp, a spring cushioned reflector reciprocable with the battery with reference to the lamp, manually controllable means for moving the battery toward and from the lamp, and means maintaining electric current from the battery thru the lamp in all positions of adjustment of the battery and reflector.

2. In mechanism of the class described, a case terminating in a lens, an electric lamp mounted in the case behind the lens, a reflector about the lamp and inside the case, means mounting the reflector for reciprocation to and from the lamp, an electric battery in the case, means for conducting current from said battery thru the lamp, in all positions of movement of the reflector, and means engageable at the rear end of the case, operating through the battery for moving the reflector with reference to the lamp as desired by an operator outside the case.

3. In a device of the class described, a case, a battery inside the case, means for reciprocating the battery in one direction, spring mechanism moving the battery in the other direction, an electric lamp in the case, means conveying current from the battery thru the lamp and back to the battery, under all conditions of movement of the battery, and a lamp focusing reflector selectively reciprocable by reciprocating the battery.

4. In a device of the class described, a case, a battery inside the case, means for reciprocating the battery in one direction, spring mechanism moving the battery in the other direction, an electric lamp in the case, means conveying current from the battery thru the lamp and back to the battery under all conditions of movement of the battery, and switch mechanism operable from outside the case controlling the passage of current from the battery thru the lamp, and a lamp focusing reflector selectively reciprocable by reciprocating the battery.

5. In a device of the class described, a case, a battery inside the case, means for reciprocating the battery in one direction, spring mechanism moving the battery in the other direction, an electric lamp in the case, means conveying current from the battery thru the lamp and back to the battery under all conditions of movement of the battery, and a reflector mechanism inside the case cushioned by the spring mechanism controlling the battery reciprocable in unison with the battery.

6. In a device of the class described, a case, a battery inside the case, means for reciprocating the battery in one direction, spring mechanism moving the battery in the other direction, an electric lamp in the case, means conveying current from the battery thru the lamp and back to the battery, under all conditions of movement of the battery, switch mechanism operable from outside the case controlling the passage of current from the battery thru the lamp, and a reflector mechanism inside the case cushioned by the spring mechanism controlling.
the battery reciprocable in unison with the battery.

7. In mechanism of the class described, in combination with a case, an insulating plate across the case, perforated to receive the terminals of an electric lamp passing thru it and suitably perforated to receive posts outside of but concentric with the lamp adapted to reciprocate thru the plate, a reflector on one end of said posts, a conducting plate on the other end of said posts, and an electric conductor for the central terminal of the lamp on the side of said insulating plate which is adjacent to the conducting plate, a spring between said conducting plate and said electric conductor, and an electric conductor on the other side of the insulating plate engaging the outer terminal of the lamp, for the purposes set forth.

8. In mechanism of the class described, a metallic case, an insulated plate across the case perforated in its center to receive an electric lamp, an electric conductor adapted for connection on one side of the plate to the outer terminal of an electric lamp inserted in said perforation, and leading from said side of the plate to the opposite side of said plate and hence in insulated relation with the case to a switch controllable from outside the case, another conductor member on the second side of the plate adapted for engagement with the central terminal of the same lamp thru the plate, a spring in engagement with the last conductor, batteries in electrical contact with said spring, and means for electrically connecting the opposite terminal of the battery to the case and for adjusting the battery in the case against action of said spring.

In witness whereof, I have hereunto subscribed my name.

JOHN GRAVES.