March 18, 1941. W. R. KOPP 2,235,024

FLASHLIGHT

Filed March 5, 1938

Fig. 1.

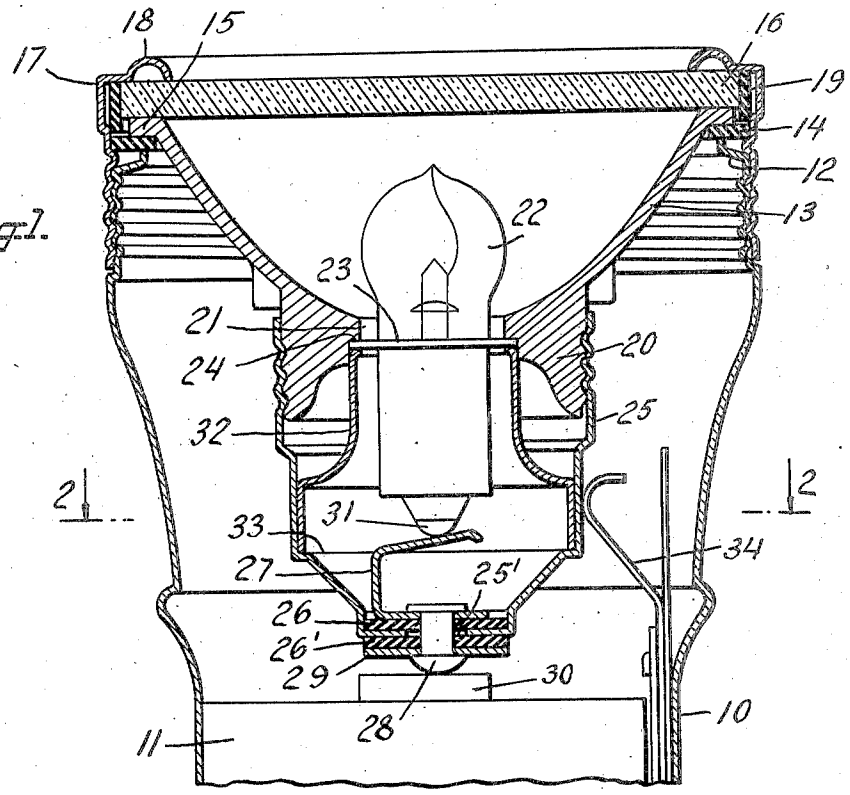



Fig. 2.

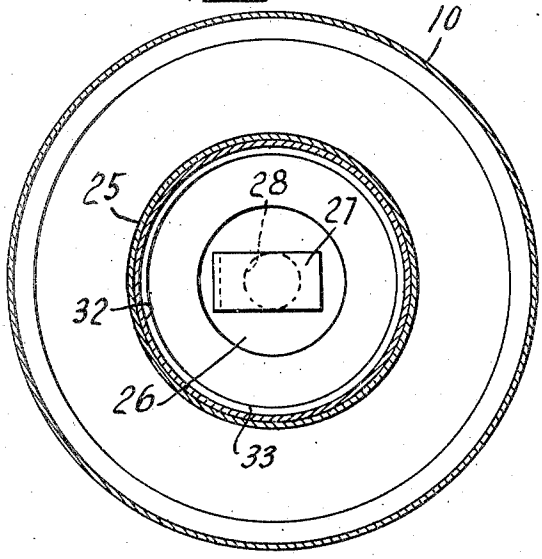
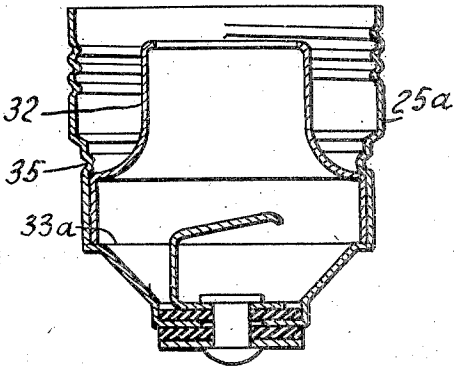



Fig. 3.




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# UNITED STATES PATENT OFFICE

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## FLASHLIGHT

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4 Claims. (Cl. 240—10.6)

This invention relates to portable lamps and has particular reference to a novel portable lamp of the fixed focus type, in which the source of light is held securely in a predetermined position with respect to a reflector at all times during operation. The new lamp is of a simple construction adapted for manufacture at low cost, may be quickly assembled and disassembled, and when assembled maintains the light source securely in a definite predetermined position relative to the reflector so that the form of the pencil or beam of light remains constant throughout the useful life of the lamp.

For the purpose of illustration, the principles of the invention will be described in connection with a flashlight, although it is to be understood that the invention may take various other embodiments.

In flashlights as commonly made heretofore, an incandescent lamp bulb is threaded into a socket fixed to the front end of a battery casing, and a lamp head carrying a parabolic reflector is screwed on the front end of the casing until the bulb extends through a central opening in the base of the reflector. With this construction, the relative positions of the lamp bulb and reflector are dependent upon two factors, namely, the amount which the bulb is screwed in its socket and the amount which the lamp head is screwed on the casing, and since these amounts vary considerably from time to time in the use of the flashlight, due to screwing or unscrewing the members on their mating threads, wearing of the thread, etc., the concentration of the light from the bulb does not remain constant. Even after flashlights of this type are assembled in the factory, the concentration of light emitted from different units of the same kind may vary for the reason that the bulb or lamp head may be threaded more tightly on one flashlight than on another. Various expedients have been devised heretofore to overcome this objection, but these have been unsatisfactory for numerous reasons, among which are the high cost of manufacture, complexity of structure, and failure to prevent completely any variation in the relative positions of the bulb and reflector.

The present invention is accordingly directed to the provision of a novel flashlight, or the like wherein the bulb and reflector are positively held against undesired relative movement when the parts are assembled, the new flashlight being of a simple construction which may be made cheaply.

A flashlight made in accordance with the present invention comprises a casing for receiving a battery or other source of energy, and a reflector mounted on the casing near the front end and preferably removable from the casing. Extending through a central opening in the reflector is a lamp bulb which is located by a shoulder provided on the base of the bulb and held against a seat on the reflector, or on a part affixed thereto, by clamping means carried by the reflector. The clamping means may take various forms, but preferably comprises a cap threaded or otherwise secured on the back of the reflector, and a spring contact arm on the cap which engages the usual terminal at the bottom of the base of the bulb and urges the shoulder of the bulb against the reflector. The contact arm is insulated from the cap and is electrically connected to one terminal of the battery in the casing. In the improved form of the new flashlight, the shoulder on the bulb is positively held against the reflector by a collar extending forwardly from the cap and surrounding the base of the bulb with its front end in engagement with the shoulder, so that the cap when tightened on the reflector holds the collar against the shoulder with a clamping action. The circuit through the battery and bulb may be controlled by a switch on the casing adapted to make and break contact with the cap on the reflector.

With this construction, the lamp bulb is held securely in a predetermined relation to the reflector at all times while the flashlight is in use, since the mounting for the bulb is carried by the reflector. The bulb may be easily replaced by removing the reflector from the casing, detaching the cap and substituting another bulb. The parts may be readily assembled by inserting the bulb through the reflector from the back thereof, screwing the cap in place on the reflector with the collar clamping the shoulder on the base of the bulb against the reflector, and then mounting the reflector in position on the casing. When the parts are thus assembled the bulb will occupy the desired predetermined position with respect to the reflector regardless of the position of the reflector relative to the casing.

For a better understanding of the invention, reference may be had to the accompanying drawing in which

Fig. 1 is a view in longitudinal section of the front portion of one form of the new lamp:

Fig. 2 is a section on the line 2—2 in Fig. 1, and

Fig. 3 is a detailed view in section showing

a modified form of the cap for clamping the lamp bulb.

In the drawing, the numeral 10 designates the front portion of a flashlight casing which houses one or more battery units 11. The casing is provided with the usual end cap (not shown) screwed on the rear end of the casing and electrically connecting one terminal of the battery to the casing. The casing may be of any suitable form, but is preferably enlarged at its front end and provided with an inwardly extending peripheral flange 12. A parabolic reflector 13 of polished metal, or the like, is supported on the flange 12, an annulus 14 of insulating material being preferably interposed between the flange 12 and a peripheral flange 15 on the reflector. Seated against the front of flange 15 is a glass lens 16, the lens and reflector being held in position on the casing by means of a metal sleeve 17 threaded on the upper end of the casing and provided with an inwardly extending flange 18 overlying the front face of the glass disk. Preferably, a ring of insulating material 19 is interposed between the edge of the lens and the cap 17.

The base of reflector 13 is formed in back with a central boss 20, and disposed in an opening 21 in the boss is an incandescent lamp bulb 22, the filament of which is in front of the reflector base. Preferably, the metal base of the bulb 22 is formed with a smooth cylindrical surface, as distinguished from the usual threaded surface, and the bulb is located with respect to the reflector by means of a peripheral shoulder 23 arranged at the top of the base of the bulb and held against a seat 24 formed in the boss of the reflector.

The bulb 22 is held against the reflector by clamping means which comprises a metallic cap 25 threaded on the boss 20 of the reflector and provided in its end with a central opening 25'. Insulating disks 26 and 26' are disposed around the central opening 25' inside and outside the cap, respectively, and a U-shaped contact arm 27 is held against the inner insulating disk 26 by a rivet 28 which extends forwardly through a metal washer 29, the insulating disks and opening 25', and an opening in one leg of the contact arm. The head of the rivet is in contact with the central terminal 30 of battery 11, and since the opening 25' is sufficiently large to permit a clearance between the cap 25 and rivet, the latter forms an electrical connection between the central terminal 30 and the contact arm which is insulated from the cap. The other leg of contact arm 27 engages the central terminal 31 at the base of the lamp bulb and urges the bulb forwardly against the seat 24 on the reflector.

In order to hold shoulder 23 of the bulb positively against seat 24 on the reflector, a metallic collar 32 is disposed in the cap 25 with the rear end of the collar seated on a shoulder 33 of the cap. The forward portion of collar 32 is reduced and surrounds the base of bulb 22, and the front end of the collar is clamped by cap 25 against the shoulder 23 so as to exert a pressure around the periphery of the shoulder and hold the latter against its seat.

The energizing of bulb 22 may be controlled by a switch including a contact arm 34 mounted in the casing between the battery 11 and casing wall and adapted to engage the cap 25. The contact arm 34 may be moved into and out of engagement with the cap by a suitable button (not shown), and when the contact arm is in engagement with the cap the bulb is energized by a circuit traceable through terminal 30 of the battery, rivet 28, contact arm 27, terminal 31 of the bulb, the lamp filament, shoulder 23 where the current divides and passes to cap 25 by way of collar 32 and boss 20, and from cap 25 to contact arm 34 and back to the other terminal of the battery by way of the casing and end cap. Since the cap 25 and reflector 13 are insulated from the casing by annulus 14, disengagement of contact arm 34 from the cap will result in breaking of this circuit and extinguishment of the bulb.

While the collar 32 in the embodiment illustrated in Fig. 1 is removably seated in the cap 25, it will be apparent that it may be rotatably affixed thereto if desired. For example, the collar may be locked in a cap 25a of the form shown in Fig. 3 by forming the cap with an inwardly projecting rib 35 which overlies the enlarged portion of the collar and holds the collar seated against shoulder 33a of the cap. Also, if desired, the collar 32 may be made integral with cap 25. The construction shown in Fig. 1 is preferred, however, because it allows the collar 32 to adjust itself to inaccuracies in the manufacture and assembly of the reflector and cap 25. For example, if the shoulder 33, after assembly of the parts, should lie in a plane which is not normal to the bulb axis, due to inaccurate forming of the threads on the reflector, etc., the collar 32 will tilt on shoulder 33 so as to maintain contact around the shoulder 23 of the lamp and hold the lamp firmy seated.

It will be observed that the new flashlight may be readily disassembled for replacement of bulb 22, or for any other purpose, by unscrewing the cap 17, removing the reflector 13, and detaching the cap 25 from the boss 20 on the reflector. The bulb 22 may then be removed from the seat 24 and another bulb substituted. When the parts are assembled, the bulb will always assume the desired position with respect to the reflector, regardless of how tightly cap 25 is threaded on the boss, as long as the shoulder 23 of the bulb is clamped on its seat, and regardless of the position of reflector 13 with respect to the casing. Also, the contact arm 27 serves the dual function of establishing an electrical connection between the central battery terminal and the base contact of the bulb and supplementing the action of collar 32 in seating the shoulder of the bulb.

While the shoulder of the lamp bulb in the illustrated embodiment, is seated against a part of the reflector, it may, if desired, be seated against a member which is affixed to the reflector, and in the following claims the term "reflector" includes any member fixed relative to the reflecting element.

I claim:

1. In a portable lamp, a reflector having an opening therein, a lamp bulb disposed in the opening and provided on its base with a shoulder, the reflector having a seat engaging said shoulder around the lamp bulb, a cap mounted on the reflector, and a collar seated at one end in the cap and surrounding the base of the lamp bulb, the other end of the collar engaging said shoulder to hold the same against the seat and thereby secure the bulb against displacement from the seat.

2. In a portable lamp, a reflector having an

opening therein, a lamp bulb disposed in the opening and provided with a shoulder, a cap threaded on the reflector and having an internal rib, and a collar having an enlarged portion fitting closely in the cap between the end thereof and said rib, the front end of the collar surrounding the base of the lamp bulb and engaging said shoulder to hold the same against a portion of the reflector surrounding said opening.

3. A portable lamp comprising a casing, a reflector mounted on the casing and having an opening therein, a lamp bulb disposed in the opening and provided with a shoulder, a cap threaded on the reflector and having an opening in the end thereof, a collar in the cap surrounding the base of the lamp bulb, one end of the collar engaging said shoulder to hold the same against the reflector, a contact arm in the cap engaging the base terminal of the lamp bulb and normally urging said shoulder against the reflector, means extending through said opening in the cap for securing the contact arm in position and adapted to engage the one terminal of a battery inserted in the casing, said means and contact arm being insulated from the cap, and a switch element on the casing movable into and out of contact with the cap.

4. In a portable lamp, a reflector having an opening therein, a lamp bulb disposed in the opening and provided with a shoulder, a cap secured to the reflector and having an internal seat, and a collar fitted in the cap with its rear end mounted on said seat, the front end of the collar surrounding the base of the lamp bulb and engaging said shoulder to hold the same against a portion of the reflector surrounding said opening.

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