Jan. 1, 1935. J. S. ZOOK 1,986,242

HAND LAMP

Filed Sept. 30, 1932

Fig. 1.

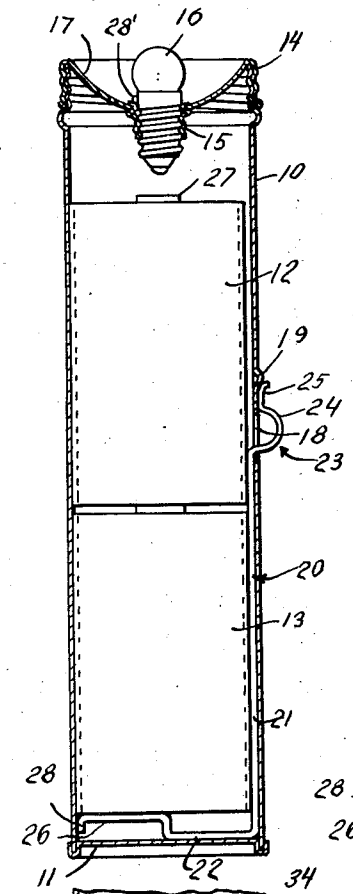


Fig. 2.

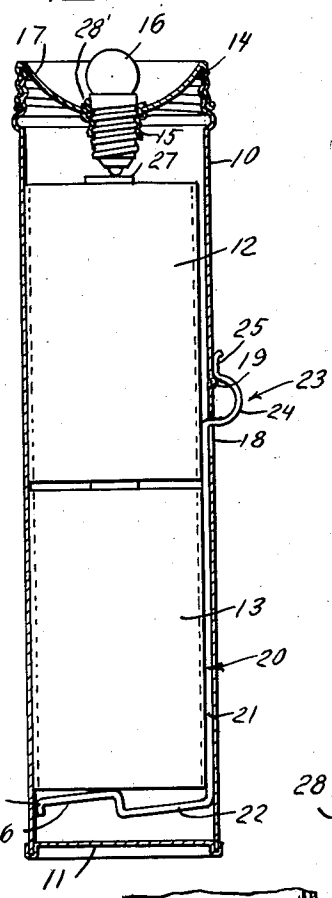


Fig. 3.

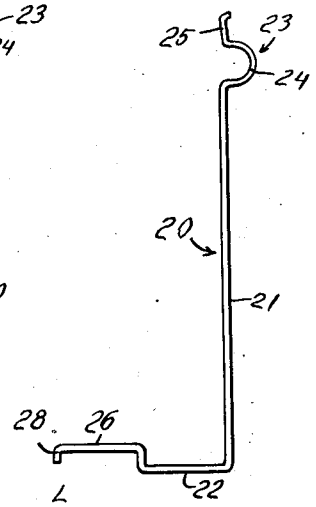


Fig. 4.

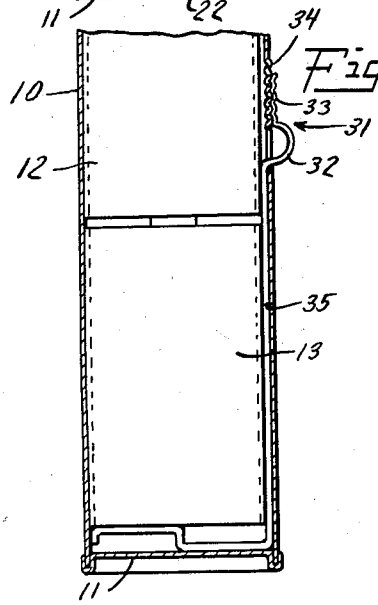
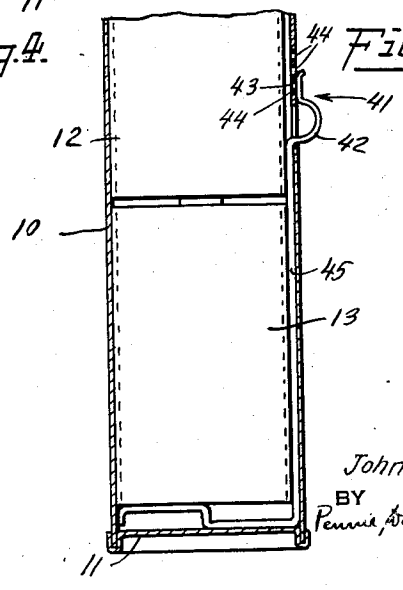


Fig. 5.



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HAND LAMP

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Application September 30, 1932, Serial No. 635,549

3 Claims. (Cl. 240—10.68)

This invention relates to battery hand lamps, particularly of the tubular type.

It is an object of the invention to provide a hand lamp which is simple, comprises a minimum number of parts and is inexpensive to manufacture. It is a further object of the invention to provide a hand lamp which, though inexpensive, possesses desirable operating features. Among its advantages are the following. The switch moves into the operative and inoperative positions with a snap and is retained in such positions until moved positively therefrom by hand. The switch is constructed to compensate automatically for differences which may occur in the overall length of individual batteries. The battery is protected against short circuits and accidental lighting at inopportune or undesired times.

In the drawing:

Fig. 1 is a vertical sectional view of the hand lamp of the present invention showing the device in the inoperative position;

Fig. 2 is a similar view showing the device in the operative position;

Fig. 3 is a view of the switch member which is used in the device;

Fig. 4 is a fragmental, sectional view of a modified form of the hand lamps; and

Fig. 5 is a similar view of another modification.

The hand lamp comprises a metal conductive tubular case 10, which may be provided with an integral bottom closure 11. Within the case is a battery comprising several cells. While any desired number of cells may be used, a convenient and common form comprises two cells, an upper cell 12 and a lower cell 13. The cells are laterally encased in insulating material to insulate them from case 10. A cap 14 is in threaded engagement with and closes the top end of case 10. A threaded socket 15 is mounted centrally in cap 14 and an incandescent bulb 16 is mounted in the socket. Cap 14 is concave and its exterior surface 17 is polished to form a reflector.

In the side of case 10 there is an opening 18 and above the opening is an outwardly projecting ridge 19. An angular switch member 20 (see Fig. 3) formed of a strip of spring metal, preferably spring brass, is subdivided into a longitudinal section 21 extending between the side of case 10 and the sides of cells 12 and 13, an angular section 22 between the bottom of lower cell 13 and the bottom of case 10, and an operating section 23 extending through opening 18 to the outside of the case. The bottoms of the cells are exposed so that angular section 22 makes electrical contact with one pole of the battery. The operating section 23 is preferably S-shaped, and it comprises two convexities 24 and 25, reversed with respect to each other. Convexity 24 serves as a thumb piece and convexity 25 is adapted to cooperate with ridge 19 to cause the switch to move into the operative and inoperative positions with a snap and to be held more or less positively in such positions to insure against accidental movement from one to the other.

Angular section 22 extends diametrically across the inside of case 10. The end portion 26 of angular section 22 is offset upwardly and makes contact with the bottom of cell 13. The extreme end 28 is curved downwardly substantially parallel with the side of case 10 with which it makes contact.

The assembly of the hand lamp is very simple. Angular section 22 of switch member 20 is inserted into opening 18 and by means of operating section 23 the switch member may be pushed down into position in case 10. Cells 12 and 13 are then inserted into case 10 and cap 14 is screwed in place. Bulb 16 may be screwed into socket 15 at any time either before or after cap 14 is in place upon case 10.

In the inoperative position (Fig. 1) angular section 22 rests upon the bottom of case 10 and cell 13 rests upon end portion 26. The bottom of cell 12 rests upon the carbon pole of cell 13 and the carbon pole 27 of cell 12, which is the positive terminal of the battery, rests in spaced opposed relation to the end terminal of bulb 16. Convexity 25 rests just below ridge 19.

Convexity 25 is offset inwardly from the plane of longitudinal section 21 as shown in Fig. 3 and with the free end 28 of angular section 22 resting against the side of case 10 and holding longitudinal section 21 against the opposite side, a lever action is effected upon switch member 20 whereby outward pressure is exerted by it at the lower edge of opening 18 and inward pressure at the point of contact between convexity 25 and the outside of case 10. The lever effect upon the top end of switch member 20 may cause longitudinal section 21 to bow inwardly somewhat and press against the sides of cells 12 and 13, tending to prevent rattling of the cells and also increasing the pressure of convexity 25 against case 10. The lever effect of switch member 20 upon case 10 would be obtained if angular section 22 did not extend entirely across the inside of the case, because cells 12 and 13 would nevertheless hold longitudinal section 21 in the positions shown in Figs. 1 and 2. It is preferable that angular section 22 extend across the inside of case 10 in order

to prevent switch member 20 from falling out of the case when there is no battery in it.

To move switch member 20 into the operative position, operating section 23 is moved upwardly by the thumb or finger until convexity 25 rests just above ridge 19, as shown in Fig. 2. The end 28 slides upwardly upon the side of case 10. The fact that the end portion 28 is substantially parallel with the side of the case facilitates this sliding action. The pressure of convexity 25 upon case 10 results in this action taking place with a snap. The translational movement of switch member 20 is arranged to exceed that of the battery so that pole 27 comes into contact with the end terminal of bulb 16 before switch 20 reaches its final operative position. To make such action possible switch 20 is made of spring metal, as stated heretofore. When the battery reaches its uppermost position, further movement of switch member 20 causes it to flex at the junction of sections 21 and 22 from the normal shape shown in Figs. 1 and 3 to that shown in Fig. 2. This results in firm spring compressional contact between section 26 and cell 13, between the carbon pole of cell 13 and the bottom of cell 12 and between terminal 27 and the end terminal of bulb 16. Flexure of switch member 20 results in a slight sidewise relative motion between section 26 and the bottom of cell 13 with the result that a wiping contact is had at this point. The flexure of switch member 20 causes the lower end of longitudinal section 21 to be pressed quite firmly against the side of case 10 with the result that the lever action at the upper end of switch member 20 is again obtained with resulting increased pressure between switch member 20 and the lower edge of opening 18 and between convexity 25 and the outer surface of case 10. The pressure of end section 26 upon the bottom of cell 13 holds the battery firmly and prevents rattling within the case.

With switch 20 in the operative position, the electrical circuit 10 is maintained from the bottom of cell 13 through switch member 20, case 10, cap 14 and socket 15 to the threaded terminal of bulb 16.

The curvature of convexity 25 is designed so that as it passes over ridge 19 it moves to the opposite side thereof with a snap. This is accomplished by having its mid portion substantially flat and its length substantially equal to the distance of travel of switch member 20 as shown in Figs. 1, 2 and 3. In moving to the inoperative position, the switch, of course, comes to an abrupt and positive stop when angular section 22 reaches the bottom of case 10. Likewise, when moving into the operative position, member 20 comes to an abrupt and practically positive stop when the portion of angular section 22 adjacent the junction with longitudinal section 21 reaches the bottom of cell 13 or, if the overall length of the battery is too little for this, when the flexure of member 20 reaches the point beyond which it can not be flexed further without considerable effort. This is the case when flexure is substantially that shown in Fig. 2. Further upward pressure results in an increasing upward pull at the point of contact between section 26 and cell 13 and increased resistance of member 20 against further flexure. The point at which further flexure becomes difficult is reached rather abruptly so that the switch action is of the preferred character, namely, of such character that it moves to its respective positions with a snap and comes to a positive stop after reaching such positions. It is apparent that in operation, case 10 must withstand considerable stress at the location of operating section 23 and for this reason ridge 19 may be extended some distance circumferentially to provide needed stiffness at this point, since, for purposes of economy, it may be desired to make the case as thin as good construction permits.

The mentioned flexure of switch 20 makes it possible for the hand lamp to cooperate properly with batteries of different overall length. In some instances the bulb extends into the case further than in others. Each bulb has a drop of solder 28' above its threaded portion which acts as a stop and the location of the drop of solder, which is not always the same, determines how far the bulb will extend into the case. There is also a slight non-uniformity in the length of cells. The hand lamp is designed so that under conditions where the bottom of cell 13 extends the maximum distance into the case encountered in actual practice, convexity 25 can still move to its position above ridge 19 before further upward movement becomes impossible. Under the condition where the bottom of cell 13 extends a minimum distance into the case, the spring of switch member 20 is sufficient to maintain firm contact at the necessary points in the circuit. With proper spring metal, such as spring brass, only a small degree of flexure is necessary to produce firm pressure contact. In this case the usual user moves the switch only until it snaps over ridge 19 but in case pressure is continued until the switch reaches its upper limit, when pressure is removed the switch merely moves downwardly again until convexity 25 reaches ridge 19.

The mentioned lever action of switch member 20 is an advantage since it insures firm electrical contact between it and case 10 at all times. It is usual practice to coat the interior of metal flashlight cases with an insulating varnish or shellac to prevent corrosion and to provide insulation against possible electrical contact between it and the battery and it may be that there are no other points of electrical contact between switch 20 and case 10.

Upon moving switch 20 back to the inoperative position, the battery may not return with it but may remain in the upper position as shown in Fig. 2 because of the pressure exerted upon it by section 21. The circuit is nevertheless broken because end section 26 moves downwardly out of contact with the bottom of cell 13. For the same reason, when the switch is in the inoperative position the hand lamp may be reversed and jarred or the battery may be otherwise inadvertently caused to move into contact with bulb 16 without danger of lighting the latter.

With the battery in the upper position, movement of the switch to the operative position merely establishes contact between section 26 and cell 13 with the result that the bulb is again lighted.

Fig. 4 illustrates a switch member having a modified form of operating section. Operating section 31 comprises a thumb-piece 32, and above the thumb-piece corrugations 33 are provided. These corrugations are adapted to cooperate with similar corrugations 34 upon the side of case 10. Operating section 31 is arranged with respect to longitudinal section 35 so as to exert pressure against the side of case 10 whereby corrugations 33 and 34 cooperate to maintain the switch member in the positions to which it may be manipulated.

As a further modification (see Fig. 5), it is also

possible to provide an inward projection 43 upon the operating section 41 of the switch member and a pair of depressions or openings 44 in the side of the case which are adapted to cooperate to maintain the switch member in its operative or inoperative position. In the same way the openings or depressions may be upon the switch member and the projection upon the case.

Various additional modifications in structure and arrangement may be made from that described and illustrated. The battery may be reversed in case 10; that is, the carbon poles of the cells may be arranged toward the bottom of case 10 instead of toward the top. Cap 14 may be attached to case 10 by the well known bayonet type of joint instead of the threaded joint shown. Ridge 19 or corrugations 33 and 34 may be omitted if the snap action and the safety feature of retaining the switch in its positions are not considered important. The conventional threaded bottom end cap, without the usual spiral spring, may be substituted for integral bottom 11 and the conventional lens and reflector structure may be substituted for cap 14. Conventional focusing features may also be employed. Limited focusing may be obtained with the device illustrated by screwing bulb 16 out of its socket as far as possible without disconnecting the circuit. This results in narrowing or concentrating somewhat the beam of light. The invention is adapted for use with the ordinary flat or oval type of flashlight and with battery operated hand lanterns, candle sticks, battery operated toys and battery holders for such toys, etc.

I claim:

1. In combination, a tubular metal case having an integral bottom, a cap engaging the top of said case, said cap comprising a reflector and having a socket therein, a bulb threadedly engaged in said socket and having its end terminal exposed in said case, a battery in said case, insulated therefrom, adapted for longitudinal movement therein and having a terminal opposed to said end terminal of said bulb, a longitudinally movable resilient switch member within said case and engaging the end of said battery removed from said bulb, said case having an opening therein, said switch member projecting through said opening, operating means on said exposed portion of said switch member for moving said member longitudinally and thereby connecting and disconnecting said opposed terminal of said bulb and battery, and means comprising a flexed portion of said switch member for exerting lateral pressure upon said battery to prevent rattling of said battery in said case.

2. In a device of the class described, a case having an opening in the side thereof, a battery movable longitudinally within said case, a terminal mounted in one end of said case in opposed relation to a pole of said battery, and a longitudinally movable resilient switch member within said case having an angular portion adapted to engage the end of said battery removed from said terminal, a longitudinal portion between the adjacent sides of said battery and said case, and an operating portion projecting through said opening and engaging the exterior of said case, said operating portion being the terminus of said switch member, the portions of said case upon opposite sides of said opening pressing in opposite directions upon said operating portion and said longitudinal portion respectively to cause said longitudinal portion to exert lateral resilient pressure against said battery.

3. In a device of the class described, a case having an opening in the side thereof, a battery movable longitudinally within said case, a terminal mounted in one end of said case in opposed relation to a pole of said battery, and a longitudinally movable resilient switch member within said case having an angular portion adapted to engage the end of said battery removed from said terminal, a longitudinal portion between the adjacent sides of said battery and said case, and an operating portion projecting through said opening and engaging the exterior of said case, said operating portion being the terminus of said switch member, the portions of said case upon opposite sides of said opening pressing in opposite directions upon said operating portion and said longitudinal portion respectively to cause said longitudinal portion to exert lateral resilient pressure against said battery, said operating portion normally being off-set toward said case from the plane of said longitudinal section to increase said pressure.

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