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[54] **COMBINATION FLASHLIGHT AND PROPELLANT DISCHARGE DEVICE**

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[51] **Int. Cl.**..... **F21v 33/00**

[58] **Field of Search**..... 222/3, 130, 173, 222/192, 325, 404, 113, 162; 273/84; 240/6.41, 6.42, 10.66, 2 FD; 42/1 G, 1 A

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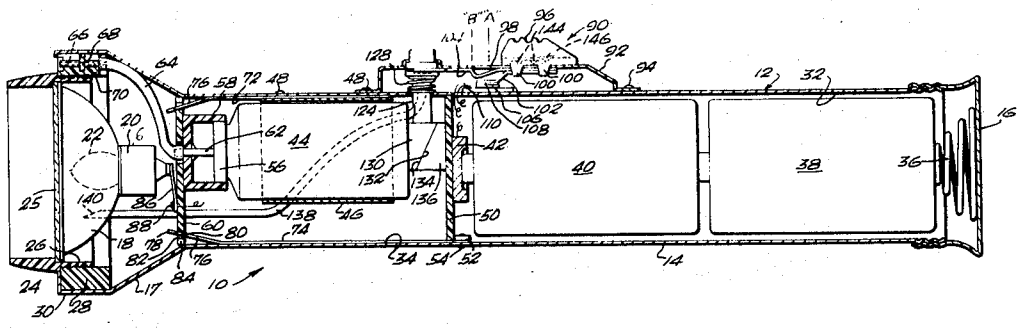
[57] **ABSTRACT**

A device, incorporating the conventional configuration, appearance, weight and handiness of a flashlight, which doubles as a flashlight and a protective means incorporating a three position switch, a first or off position for deactivating the device, a second position for completing a circuit to the flashlight bulb through a conventional battery energized circuit and a third position for discharging a propellant from a capsule, enclosed within the housing, in the general direction in which the flashlight is aimed, the circuit to the bulb being energized in said third position. Interlock means are provided to prevent discharge of the propellant at all times except when the switch is in the third position.

11 Claims, 3 Drawing Figures



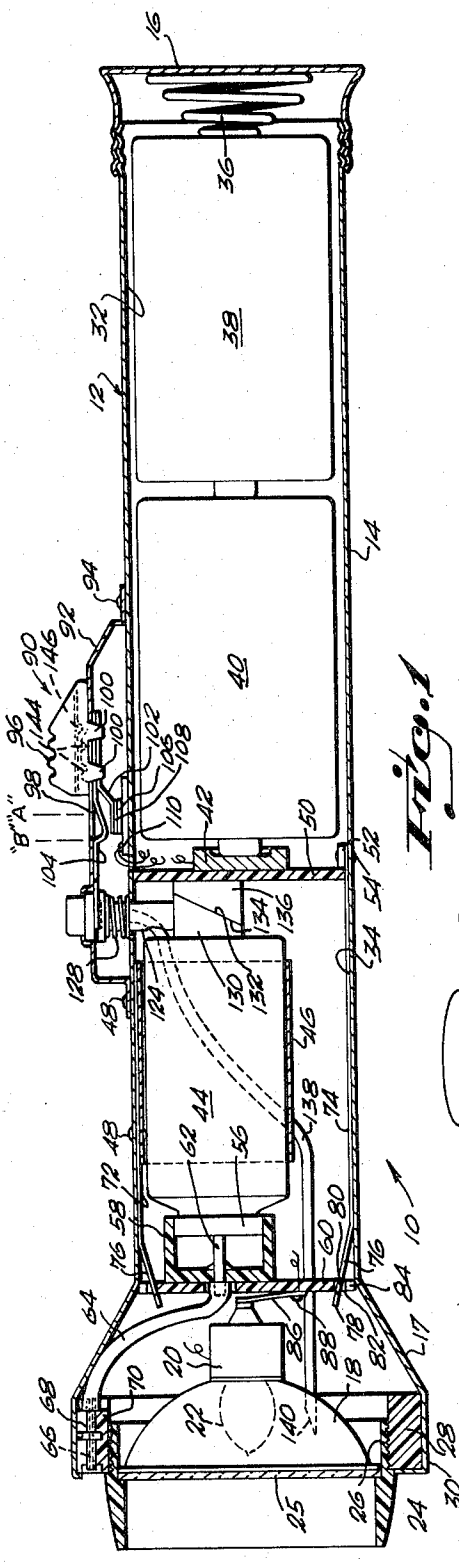


Fig. 1

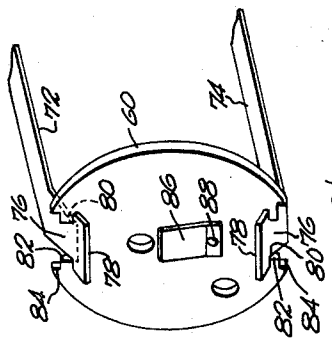


Fig. 3

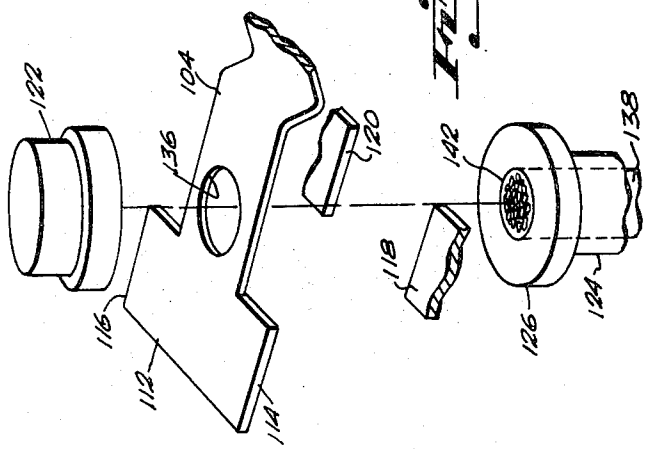


Fig. 2

COMBINATION FLASHLIGHT AND PROPELLANT DISCHARGE DEVICE

BACKGROUND OF THE PRESENT INVENTION

The present invention comprises generally a combination flashlight and a protective device with the visual appearance of an ordinary flashlight. The device provides a three position switch, a first or off position, a second position for illuminating the flashlight and a third position for discharging any one of a variety of immobilizing propellants with the flashlight illuminated.

With the continuous upswing in crime, many people have turned to either carrying or having close at hand any of a variety of protective devices including a variety of devices designed for the single purpose of discharging any one of a variety of immobilizing propellants such as mace, tear gas or other commercially available propellants.

The purpose of such devices is generally obvious to a robber or attacker with the result that the intended victim often does not have the opportunity to employ said device and may even have it turned on himself or herself.

The device of the instant invention has the appearance of a common flashlight and many persons such as law-enforcement personnel, security guards, night watchmen, night delivery men, truck drivers, railroad personnel, hunters, campers, etc., routinely have flashlights either close at hand and often in hand and the opportunity of using the propellant aspect of this device is greatly enhanced because of its deceptive appearance. This deceptive appearance also makes it a very practical device for private individuals in city streets and in their homes.

Another utility of the present invention is to provide a defense against aggressive animals especially by hunters, campers, game wardens and the like.

One of the principal objects of the present invention is, therefore, to provide a combination flashlight and protective device, having the visual appearance or an ordinary flashlight.

A further object of the instant invention is to provide a device of the above-described nature, having an automatic interlock device which prevents accidental actuation of the protective aspect of the invention.

Yet another object of the present invention is to provide the device with a capsule, containing an immobilizing propellant, which is readily interchangeable without the use of tools.

Another object of this invention is to provide the device with a three position switch means, the first position being an off position, the second position completes an electric circuit through battery means to the flashlight bulb and the third position opens the automatic interlock mechanism to permit actuation of a push button means to discharge the propellant from the cartridge.

Yet another object of the present invention is to provide a single device combining two devices currently in widespread use, carried and employed separately.

A further object of this invention is to provide a device of the nature, above described, which is extremely practical and can be manufactured at a low cost.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a longitudinal sectional view through the combination flashlight and propellant discharge device in accordance with the present invention;

FIG. 2 is an exploded perspective view of a portion of the encapsulated propellant discharge mechanism; and

FIG. 3 is a fragmentary perspective view, illustrating the mounting fingers for the front wall of the capsule compartment.

DETAILED DESCRIPTION OF THE DRAWINGS

With reference to the drawings, in which like reference numerals designate like or similar parts throughout the several views, and with particular reference to FIG. 1, the numeral **10** generally indicates the combination flashlight and protective device of the present invention which includes a housing **12**, generally conforming to that of an ordinary flashlight.

The housing **12** may be constructed of various material and generally comprises an elongated tubular portion **14**, having a rear end closure cap **16**, screw threaded onto the end of the tubular portion **14**, and an enlarged head portion **17**, housing a conventional relector **18**, receptacle and bulb **20** and **22** and a removable retainer **24** for the lens **25**, screw-threaded as at **26** into a ring member **28** contained within the front portion **30** of the head **17**.

The chamber within the elongated tubular portion **14** is divided into back and front tubular chambers **32** and **34**. The back chamber **32** may be sized to receive a pair of either C or D type flashlight batteries in the conventional manner. The end cap **16** carries a compression sring **36** which serves the dual purpose of constantly urging a pair of batteries **38** and **40** forwardly to maintain electrical contact between the batteries and a positive terminal **42** and acting as a conductor between the negative end of the battery **38** and the end cap **16**.

The front chamber **34** encloses a propellant capsule **44** which is longitudinally slidable within a sleeve **46**, fixed to the housing **14** by rivet means **48**. As illustrated in FIG. **1** the tubular chambers **32** and **34** are separated by a first wall **50** which comprises the rear wall of the front chamber **34**, the wall **50** including foot portions **52** (one illustrated) which are rivited to the housing **14** as at **54**. As illustrated, the positive terminal **42** is carried by the wall **50**.

A conventional propellant capsule of the type utilized in the present invention includes a neck **56**, slidably engaged in a cap **58**, contained against longitudinal movement against a second or forward wall **60** of the front chamber **34**. The cap **58** includes an axially inwardly extending, rigidly fixed tube **62** which is positioned to open a valve means (not shown) conventionally contained within the propellant capsule **44**.

When the capsule **44** is slidably moved forwardly, the rigid tube **62** acts to guide the cylinder against the fixed forward wall which together with the cap actuates the internal valve to open the same to discharge the propellant, contained in the capsule, through the rigid tube **62**, through a flexible tube **64** slip-fitted thereon and out through a small orifice **66** in a tube **68** which is aimed generally in the direction of the flashlight beam. The flexible tube **64** is slip-fitted onto the rear end of the discharge tube **68** which may be snap-fitted into a receptacle **70**, contained in the ring member **28**.

As illustrated in FIGS. 1 and 3, the forward wall 60 is held in place by a pair of longitudinally extending, diametrically opposed leaf spring retainers 72 and 74. The upper spring retainer 72 is fixed to the housing 14 by the rivets 48 and the lower spring retainer 74 is fixed in place by the rivet 54.

Each spring retainer 72 and 74 includes an inwardly turned portion 76, terminating in an increased width head 78. A somewhat narrowed neck 80 is adapted to fit into a notch 82 in the wall 60 to hold said wall firmly in position. The inherent spring qualities of the spring retainers 72 and 74 maintain the neck portions 80 within the notches 82, however, when it is necessary to replace the propellant capsule, the lens retainer ring 24, lens, reflector and light bulb are removed and the head portions 78 of the retainers 72 and 74 are manually sprung diametrically outwardly into registry with increased width portions 84 of the notches 82, whereupon the front wall 60, cap 58 and capsule 44 can be removed. After a new capsule 44 is inserted the cap 58 and wall 60 are replaced.

The front wall 60 is provided with a spring contact 86, riveted as at 88 thereto, to contact the positive terminal of the light bulb 22.

A three position switch means, indicated generally at 90, is adapted to control both the flashlight and propellant aspects of the present invention. The switch means includes a switch housing 92 fixed to the main housing 12 by rivet 48 and a rivet 94. A slide button 96 is slidably engaged through a pair of longitudinal slots 98 (one shown)) by means of a pair of downwardly projecting lugs 100—100 extending downwardly through each slot 98. Each lug 100, inwardly of the housing 90, is crimped about a pair of leaf spring slide member 102 and 104.

When the slide button 96 is manually pushed forwardly from the off position, illustrated in FIG. 1, to a second position, indicated by the line A, a contact plate 106, insulated from the slide member 102 as at 108, bridges a pair of contacts 110 (one shown) to complete a circuit from the batteries 38 and 40 through a plurality of leads and the housing 12 in a manner conventional to general flashlight construction.

With particular reference to FIG. 2, when the slide button is moved to the position A, the slide member 104 is moved forwardly a like amount. However, the forward or leading end of the slide member 104 is provided with an increased width portion 112 and when the slide button 96 is in either the off or A position, the oppositely extended wings 114 and 116 overlie a pair of opposed, inwardly projecting flanges 118 and 120 which are either fixed to or struck inwardly from the opposed side walls of the switch housing 92.

A push button 122 is vertically disposed in the housing 92, above the forward extended end of the slide member 104 and when inward pressure in applied to the push button 122, with the slide button 96 in either the off or A position, inward movement thereof is arrested by the flanges 118 and 120 which lie underneath and in contact with the extended wings 114 and 116.

Referring to FIG. 2, the leaf spring slide member 104 is illustrated in its forward position as determined by advancing the slide button 96 to the B position of FIG. 1. When the push button 122 is depressed, with the slide member 104 thusly positioned, a narrow portion of the spring leaf slide member is flexed downwardly between the flanges 118 and 120. The push button is also sized to pass therebetween. The increased width head portion 112 provides a safety interlock by, in effect, locking out the push button 122 when the slide button is in the "off" and A positions, however, in the B position, the wide portion 112 is positioned forwardly of the flanges 114 and 116 and the push button is operable to cause a discharge of the popellant in the capsule 44 in the following manner.

A somewhat flexible tubular plunger 124 is vertically disposed through the housing 14 and has an enlarged head portion 126, spring urged by the compression spring 128 against the underside of the spring leaf slide member 104 in general axial alignment with the push button 122. The bottom distal end of the plunger 124 has fixed thereto a slide block 130 having an angular cam surface 132 in sliding engagement with a complementarily angled cam surface 134 on a block 136 fixed to the wall 50.

When the push button 122 is depressed, with the slide button 96 in the B position, the spring leaf slide member 104 is flexed as above described, moving the plunger and slide block 130 downwardly, imparting a forward movement to the capsule 44, in the sleeve 46 by the action of the cam surfaces 132 and 134. Forward movement of the capsule results in the discharge of the propellant in the manner previously described.

As best illustrated in FIG. 2, the slide member 104 is provided with a through hole 136 which is axially aligned with the push button 122 when the slide button 96 is in the B position. The push button 122 is preferably formed of a red plastic material and an optic rod 138 reflects light from the light bulb 22, through the hole 136, to illuminate the red push button 122. This provides an added safety feature and serves to inform the user that the slide button is in the B position. Optic rods of this type are commercially available. As illustrated in FIG. 1, the first end 140 of the optic rod 138 extends through the reflector 18 into close proximity to the light bulb 22. The second end 142, FIG. 2, extends upwardly through the plunger 124.

Two detent notches 144, provided in the top of the switch housing 92, cooperate with a leaf spring follower 146, carried by the slide button 96, to accurately define the A and B slide button positions.

What is claimed is:

1. A combination flashlight and propellant discharge device comprising,

A. a main, generally cylindrical housing providing,

1. a rear chamber, having a removable rear end closure cap, for the reception of conventional flashlight battery means in contact with positive and negative terminal means,

2. a forward chamber having,

a. a longitudinally disposed sleeve fixed therein for the sliding reception of a conventional type of valved capsule containing a propellant,

b. a cap means slidably receiving a neck portion of the capsule,

3. an enlarged head portion containing,

a. a removable lens, reflector, light bulb and socket assembly,

b. electric terminal means to said light bulb,

c. connection means between said discharge means and said head portion to open the valve means in the capsule to discharge the propellant when the capsule is slid forwardly in said sleeve;

B. a switch means providing,
1. a three position slide button having,
a. a first, off, position,
b. a second position wherein contact means are provided to complete an electric circuit between said battery and light bulb terminals, and
c. a third position wherein said electric circuit is maintained,
2. means, including a manually operable push button, to slide the capsule forwardly in said sleeve,
3. interlock means to prevent operation of said push button in said first and second positions and to permit operation thereof in said third position,
said rear chamber being defined between said closure cap and a first wall fixed within said housing intermediate its length,
said positive terminal for the battery means being fixed to said first wall and said negative terminal being in the form of a compression spring fixed within said end cap;
said forward chamber being defined between said first wall and a second wall, spaced forwardly therefrom, having means to maintain it firmly in place to permit manual removal threof.

2. The combination as defined in claim **1** wherein said means to maintain comprises a pair of elongated, longitudinally extending spring strips, fixed at their rear ends to said main housing in a diametrically opposed relation, each of said spring strips having a generally inwardly turned forward end portion with a widened head and a narrowed neck therebehind sized to fit snugly in the inner portion of an inwardly extending edge notch in said second wall, said notch having a widened outer portion to permit passage therethrough of said widened head when said inwardly turned end portion is manually flexed outwardly.

3. The combination as defined in claim **2** wherein said cap means comprises a longitudinally disposed cap having its closed end disposed against said second wall and its open end slidably receiving said capsule neck, a rigid tube being axially disposed, through said cap and having a forward end extending through sand rigidly fixed to said closed end, and a rearward end positioned to engage and open the capsule valve means, when the capsule is slid forwardly, to discharge the propellant through said rigid tube.

4. The combination as defined in claim **3** wherein said propellant discharge means comprises a short length of tubing, having a small diameter through orifice, mounted adjacent to the outer periphery of the forward end of said enlarged head portion.

5. The combination as defined in claim **3** wherein said connection means comprises said rigid tube and a flexible tubular connection between said rigid tube and short length of tubing.

6. A combination flashlight and propellant discharge device comprising,
A. a main, generally cylindrical housing providing,
1. a rear chamber, having a removable rear end closure cap, for the reception of conventional flashlight battery means in contact with positive and negative terminal means,
2. a forward chamber having,
a. a longitudinally disposed sleeve fixed therein for the sliding reception of a conventional type of valved capsule containing a propellant,
b. a cap means slidably receiving a neck portion of the capsule,
3. an enlarged head portion containing,
a. a removable lens, reflector, light bulb and socket assembly,
b. electric terminal means to said light bulb,
c. connection means between said discharge means and said head portion to open the valve means in the capsule to discharge the propellant when the capsule is slid forwardly in said sleeve;
B. a switch means providing,
1. a three position slide button having,
a. a first, off, position,
b. a second position wherein contact means are provided to complete an electric circuit between said battery and light bulb terminals, and
c. a third position wherein said electric circuit is maintained,
2. means, including a manually operable push button, to slide the capsule forwardly in said sleeve,
3. interlock means to prevent operation of said push button in said first and second positions and to permit operation thereof in said third position,
said three position slide being slidably mounted along said longitudinally disposed switch housing, fixed against the outer surface of said main housing, intermediate the length thereof,
detent and follower means to selectively position said slide button in any of said three positions;
first and second leaf spring slide members fixed to said slide button for longitudinal movement within said switch housing;
said first slide member carrying said contact means which bridges a pair of contacts to complete said flashlight circuit when said slide button is in said second and third positions;
said interlock means being comprised of said second leaf spring slide member and abutment means positioned immediately therebelow, preventing downward movement of said push button at all times except when said slide button is in said third position.

7. The combination as defined in claim **6** wherein a portion of said second leaf spring slide member is at all times positioned directly beneath said push button, said second slide member having a main length of a predetermined width and an increased width forward end portion, said abutment means comprises a pair of opposed, fixed inwardly extending flanges which are spaced apart a distance to permit downward movement of said push button to flex said second slide member inbetween said flanges in said third position, said downward movement being arrested in said first and second positions by contact of said increased width forward end portion with said flanges.

8. The combination as defined in claim **7** including cam means operable to impart forward sliding movement to the capsule and a vertically extending plunger, operably connected to said cam means, having an enlarged head portion urged at all times by a compression spring against the bottom surface of said second leaf spring slide member whereby downward movement of said push button is transmitted to said plunger and cam means when said slide button is in said third position.

9. The combination as defined in claim **8** wherein said cam means is comprised of a movable slide block, fixed to the bottom end of said plunger, in sliding en-

gagement with a block fixed to said first wall, said blocks having complementarily abutting, angled cam surfaces whereby said movable block, which is in contact with the rear end of the capsule, is moved forwardly, during its downward movement, to move the capsule forwardly.

10. The combination as defined in claim **8**, wherein said push button is fabricated from a suitable plastic material having a color such as red, including a light reflecting optic rod having a first end positioned closely adjacent to said light bulb and a second end positioned to reflect light from said light bulb onto said push button to illuminate same when said slide button is in said third position.

11. The combination as defined in claim **10** wherein said second leaf spring slide member includes a through hole, positioned to permit the reflected light to pass therethrough in said third position.

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