

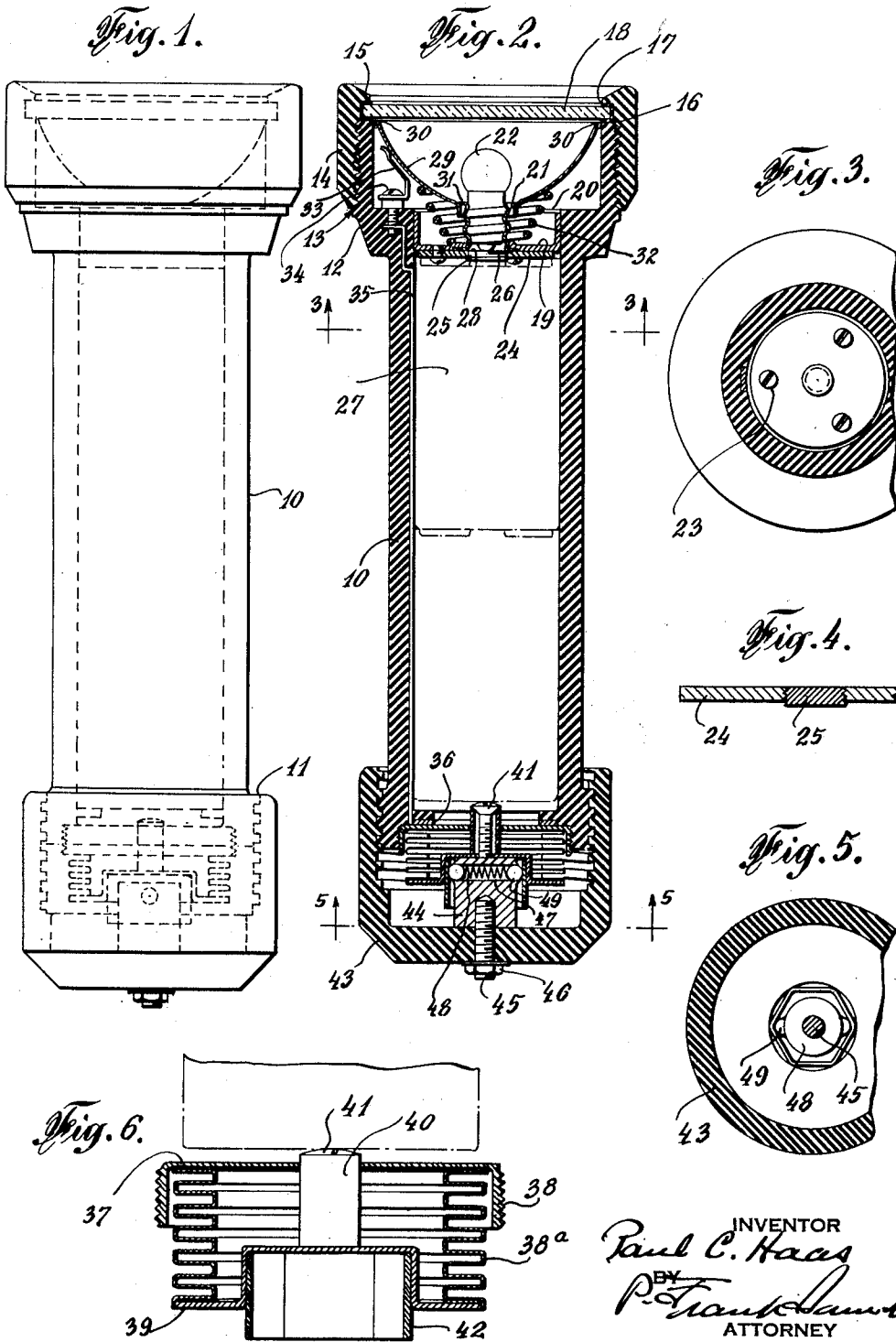
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FLASHLIGHT

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FLASHLIGHT

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4 Claims. (Cl. 240—10.66)

The ordinary flashlight has an open-ended cylindrical metallic case with a switch button slidably mounted exteriorly thereof. A removable metal cap closes the bottom end thereof and an annular member with a turned-in flange at the opposite end removably retains in position a lens behind which is mounted the miniature electric lamp with its reflector. Within the case is the battery which is electrically connected with the lamp through a circuit which includes the switch. The flashlight case is not waterproof or gas proof; fluid, either gaseous or liquid, can seep into the case at the bottom cap or through and around the annular lens securing member and around the edges of the lens and even around the switch button because the latter is slidable with respect to the case and the contact member of the switch is within the case and connected to the switch button through a slot in the case. Fluids thus seeping into the case, cause the reflector to tarnish and become dull, corrode the case interiorly, causing the parts of the flashlight to adhere to each other, and create short circuits which prevent operation of the flashlight and shorten the life of or ruin the battery, nor will the ordinary flashlight function submerged in water or other liquids.

A flashlight is often subjected to rough handling and use; the case is sometimes dented, the lens shattered or switch member broken, and the switch member will often fail from wear alone. The ordinary flashlight must generally be discarded when such breakage takes place, especially, if, for example, the switch member breaks since the latter is usually slidably riveted or eye-letted to the case and the average person is not equipped to make the repairs necessary to remove the damaged switch member and to secure the replacement switch member in place.

A flashlight, however, constructed according to the specifications more particularly hereinafter set forth will avoid all the difficulties and shortcomings of the ordinary flashlight.

The principal object of this invention is, therefore, to provide a flashlight which is impervious to fluids.

Another object of this invention is to provide a flashlight which will function even when submerged in liquids by reason of the fluid-tight case and contact member.

A unique switch member consisting of a bellows and a contact member avoids the use of the usual spring or friction switch with their attendant wear and liability to breakage. For operating the switch the bottom cap of the flashlight is threaded

internally and the case is threaded externally to provide cooperating means upon the cap and case to produce rectilinear movement of the cap with respect to the case upon rotation of the cap and this rectilinear movement of the cap is used to operate the bellows causing the contact member associated with the bellows to come into or to break contact with the battery to close the electrical circuit.

An additional advantage of this invention is to provide a flashlight which may be readily disassembled so that another part or parts may be readily substituted for defective or broken parts. The flashlight comprehended herein may be used in places where the ordinary flashlight cannot be used due to the possibility in the use of an ordinary flashlight, that a spark from the switch in lighting or hot filament if the lens and lamp are shattered may cause inflammable gases or liquids to ignite.

Other objects of this invention are to provide a flashlight having a case of a moulded substance which is substantially unbreakable, non-conducting, non-corroding; which is unaffected by water, gasoline, solvents, acids or alkalies, and one which is simple in construction and operation, and may be manufactured economically.

Numerous other objects of this invention will be readily apparent from an examination of the following specification taken in conjunction with the accompanying drawing, in which:

Fig. 1 is a longitudinal plan view showing by broken lines the outline of the lens gasket, the lamp assembly, battery compartment, and switch mechanism as it is when the circuit is open;

Fig. 2 is a longitudinal sectional view showing the switch mechanism as it is when the circuit is closed;

Fig. 3 is an enlarged fragmentary cross-sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is an enlarged fragmentary cross-sectional view showing a detail of the lamp assembly;

Fig. 5 is an enlarged fragmentary view on the line 5—5 of Fig. 2; and

Fig. 6 is an enlarged sectional view of the bellows-like switch mechanism including in broken line a fragmentary portion of an electric cell or battery.

Referring more specifically to the drawing, there is a case 10, threaded at one end 11 with an enlarged head 12 at the opposite end thereof. The enlarged head 12 is threaded externally at 13, the threads on the enlarged head 12 cooperating with the internal threads on the annu-

lar ring 14. An inwardly-extending flange 15 is integrally formed at one end of the angular ring 14 and serves to grip between the flange 15 and the end 16 of the case 10 a U-shaped annular gasket 17, which encircles the circumferential edges of the lens 18, to provide a fluid-tight closing means for the case 10 at the end thereof which has the enlarged head 12.

Within and adjacent the enlarged head 12 is a lamp assembly which includes a metal disc 19, with a turned-up flange 20 which may be integrally formed with the disc. Disc 19 has a socket 21 in electrical contact therewith for threadedly receiving a miniature lamp 22. Secured by suitable means, such, for example, as the screws 23, to the bottom of the disc 19, (that is, on the side of the disc opposite the lamp socket 21), is a disc 24 of non-conducting material. A metal contact member 25 passes through a centrally spaced aperture in the disc 24 and is suitably secured therein by means of threads as shown or some other suitable fastening means. This contact member 25 serves as the contact member for the positive post 26 of the electric cells or batteries 27, which are intended to be inserted within the case and are shown by broken lines. This same metal contact member 25 serves as one of the contact members for the lamp 22, the center contact of which, when the lamp is in the socket, projects through an aperture 28 in disc 19 and contacts against the contact member 25, which is electrically insulated from the metal disc 19 by reason of the aperture 28 and the non-conducting disc 24.

A substantially parabolic reflector 29 is also within the enlarged head 12 and has the edges 30 thereof contacting against the inner side of the lens 18. An aperture 31 is provided in this reflector through which the lamp 22 projects. For normally urging and retaining said reflector 29 in contact at the edges 30 with the lens 18, and for normally retaining the lamp assembly in position and for urging the contact member 25 into contact with the positive post of the electric cell or battery 27, there is provided a spiral expansible coil spring 32, which at one end thereof rests upon the metal disc 19 and at the other end this spring engages the reflector. A metal spring contact member 33 is secured to the case 10 within the enlarged head 12 by means of a screw or other similar suitable fastening means 34. There is thereby provided an electrical conducting circuit from the threaded portion lamp 22, through the socket 21, the metal disc 19, the expansible coil spring 32, the metal reflector 29, and the metal spring contact member 33, to the screw or other fastening means 34.

Extending from the screw 34 is an electrical conductor 35, which passes through the wall of the case 10. It may be well to point out here that this invention comprehends the use of a mouldable substance, including a canvas base, which is unbreakable, non-conducting, non-corrosive, and is unaffected by water, gasoline, solvents or alkalies, but which product per se does not form part of this invention. Since the case 10 is intended to be of non-conducting material, the electrical conductor 35 will thus be insulated from the electric cells or batteries 27. The conductor 35 terminates near the end of the casing opposite the enlarged head. The terminal of the electrical conductor 35 is electrically connected to an annular ring 36, with which annular ring the switch mechanism, hereinafter described, is in electrical contact.

The switch mechanism referred to above consists of a metal disc 37 with an externally threaded flange 38, which engages with cooperating threads on the interior of the casing 10. Secured to the metal disc 37 is a series of metal convolutions 38^a, which serve as a bellows in conjunction with the flanged metal cap 39. Secured to the metal cap 39, within the bellows, is a tube 40, through which a bolt 41 is passed with its head resting upon one end of the tube 40 and its end engaged in the cap 39. The tube 40 is of such length that when the bellows 38^a is compressed, the tube 40, which passes through an aperture in the disc 37, through which it is freely movable, will press upon the bottom of the electric cells or batteries 27, so as to close a circuit through the miniature lamp, as shown in Fig. 2, as follows: The current passes through the metallic casing of the electric cells or batteries 27, through the positive post 26, the contact member 25, the contact point of the miniature lamp 22, through the filament of the lamp, through the threaded portion thereof, and then through the socket 21 to the screw 34, as described above, by way of the conductor 35, the annular ring 36, to the metal disc 37, and the tube 40 and screw 41, which are in electrical contact therewith, thus completing the circuit to the metallic casing of the batteries. Within the depression of the flanged cap 39 and rigidly secured thereto and partially projecting therefrom is a hexagonally shaped tube 42, the purpose of which will be more fully hereinafter explained. The bellows is so constructed and arranged as to be fluid-tight and the entire switch mechanism thus renders the case 10 fluid-tight at the end opposite the enlarged head 12. The bellows is intended to be normally expanded when the circuit is open but is compressible to close the circuit, returning again to its expanded state when the pressure of the post 44 is released from the end of the bellows.

For closing the case 10 at the threaded end 11, there is provided an internally threaded cap 43, the threads of which cooperate with the external threads on the case 10 at 11. In addition to covering the switch mechanism hereinbefore described and closing the end of the case 10, the cap 43 is the means for operating the switch, being used for compressing the bellows so as to close the circuit as hereinbefore described. Within the cap 43 is a post-like member 44, rigidly secured to the cap by suitable means, such as, for example, the bolt 45 and the nut 46. A bore 47 passes diametrically through the upper end of the post 44 and contains therein an expansible coil spring 48, which presses upon two spherical bodies 49, which project partially from the aperture diametrically opposite each other with respect to the post, but whose outward movement is limited by the fact that the external diameters of the bore 47 are of less diameter than that of the spherical bodies 49.

The purpose of the hexagonal tube 40, which is associated with the bellows and the spring-urged spherical bodies 49, is as follows: In turning the cap 43, with respect to the case 10, the spherical bodies 49 are caused to alternately press against the flat internal surfaces of the hexagonal tube and to press into the apexes of the angles of the hexagon, thus causing a certain stop in the rotary motion of the cap and requiring slightly additional pressure in order to rotate the cap 43 with respect to the case 10, each time that the spherical bodies 49 come to

rest in a pair of apexes of the angles of the hexagon. There is thus provided means for limiting the free rotation of the cap 43 with respect to the case 10. This is advantageous since it is possible to so adjust the cap 43 that the circuit is open and yet have the cap so adjusted that by a mere one-sixth turn the circuit may be closed where it will remain until it is desired to open the circuit again. This precludes accidental lighting of the flashlight when not in use and consequent burning out of the battery and prevents the flashlight from going out when in use.

A flashlight constructed as shown and described herein may be focused by rotating the annular ring 14 in one direction so as to cause the lens 18, with its gasket 17, to move away from contact with the end 16 of the case 10, and thereupon the expansible coil spring 32 causes the reflector 29 to continue at its edges 30 in contact with the lens 18, while the lamp assembly remains stationary and rotation in the opposite direction will return the flashlight to its previous focus.

While, of course, as previously stated, this device will preferably be made of a moulded canvas base material, it is within the scope of this invention to provide a flashlight of any other suitable material, and the case may be made of hard rubber or any other similar material, and the annular ring 14 and the cap 43 may be made of the same material as the case or of a different material. The lens will be preferably made of so-called shatter-proof glass, that is, a number of layers of glass secured together by means of a transparent cellulose layer or somewhat similar material to provide the additional advantages previously pointed out.

While the structure of the flashlight has been shown in the drawing and the same specifically described, it will be understood that this invention is not confined to the specific details shown and described as numerous other changes and modifications and the full use of equivalents may be resorted to without departing from the spirit or scope of the appended claims.

What I claim is:

1. In a flashlight, a casing, a bellows connected to said casing to form a fluid-tight seal therefor, the protruding end wall of the bellows being movable in response to the flexing of the side wall thereof, a contact element carried by said end wall, a fixed contact element electrically con-

necting said bellows to said flashlight within the sealed casing and means for closing and opening a circuit through said contact elements in response to alternative movements of the bellows, the circuit being closed and opened within the sealed casing.

2. A flashlight having a casing, a lens mounted at one end thereof, a reflector and cooperating lamp assembly associated with said lens, means for moving said lamp assembly for focusing said flashlight, a bellows embodying a movable end wall, a contact element carried thereby, means for connecting said bellows to the other end of said casing to form a fluid-tight seal therefor, a fixed contact element electrically connecting said bellows to the lamp assembly within the casing, and means exterior of said casing for closing and opening a circuit through said contacts in response to the compression and expansion of said bellows.

3. A flashlight having a casing, a lens at one end thereof, a reflector and cooperating lamp assembly associated with said lens, means for moving said lamp assembly for varying the focus of said flashlight, a bellows embodying a movable end wall, a contact element carried by said wall, means for connecting said bellows to the other end of said casing to form a fluid-tight seal therefor, a fixed contact element electrically connecting said bellows to the lamp assembly within the casing, a closure connected externally of said casing for relative movement in reverse directions in engagement with said bellows, for effecting the closing and opening of a circuit through said contacts, by a responsive movement of said bellows and means for controlling the movement of said closure.

4. A flashlight having an open-ended case, a lens, reflector and lamp assembly at one end, means associated with said lens and one end of said case to render the latter fluid-tight, circuit closing means including a compressible and self-expanding chambered element for sealing the other end of the case fluid-tight, a fixed contact member electrically connecting the lamp assembly to said element within the case and a contact member carried by a movable portion of said element for projecting therefrom into the sealed case in response to the compression of said element, to close the circuit through said two contacts and said lamp assembly.

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