Nov. 22, 1938. T. R. ARDEN 2,137,230

ELECTRIC FLASHLIGHT

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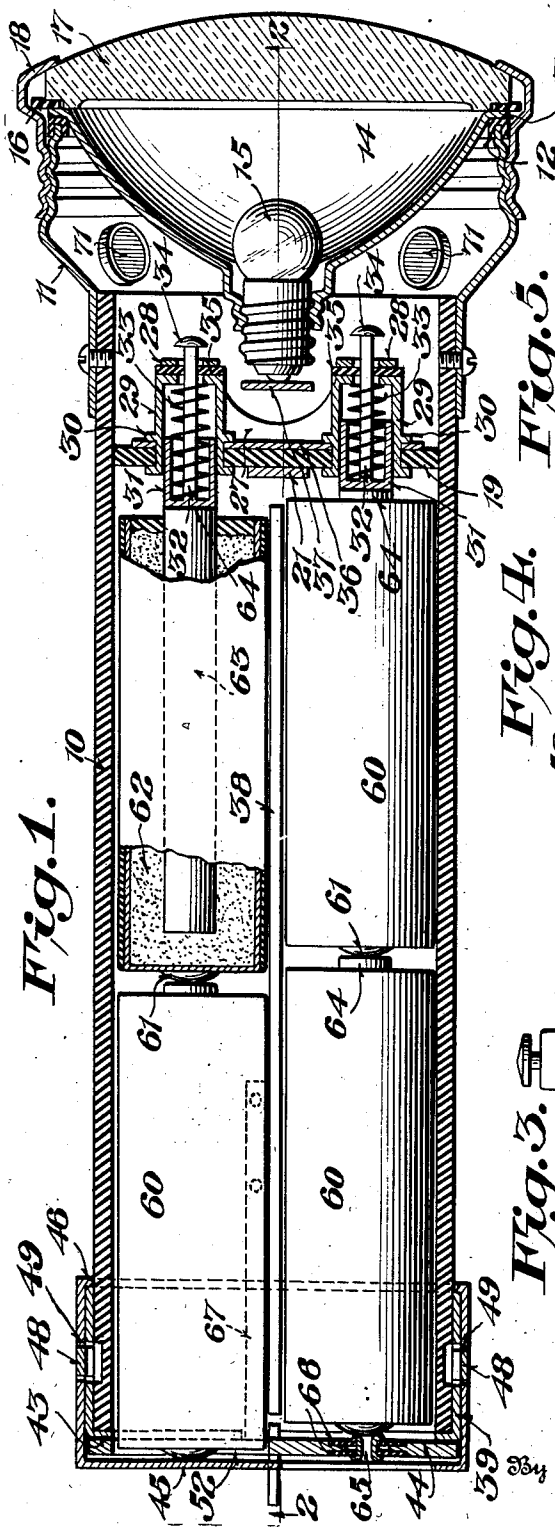

Fig. 1.

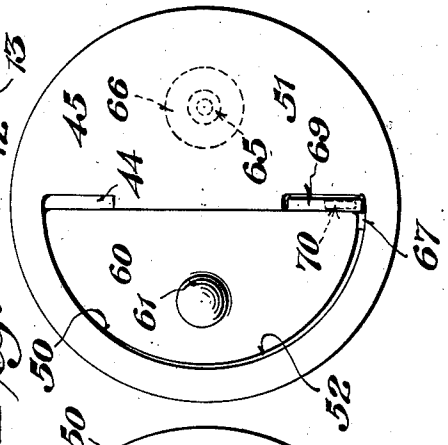

Fig. 5.

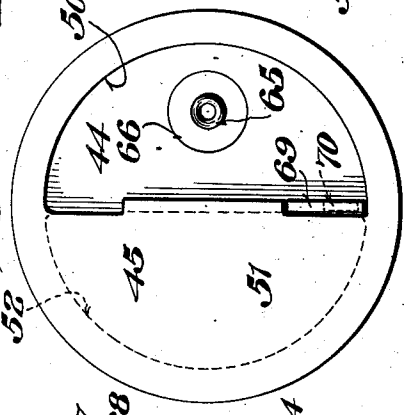

Fig. 4.

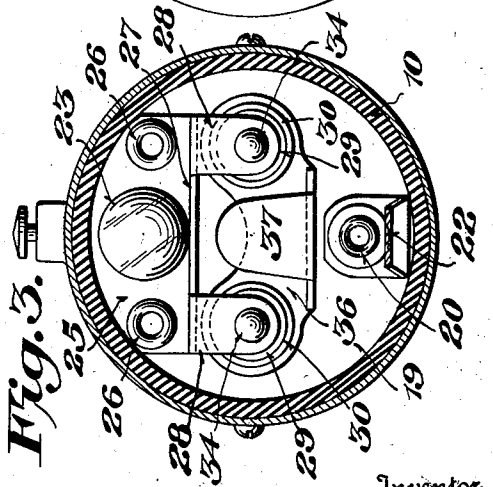

Fig. 3.

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ELECTRIC FLASHLIGHT

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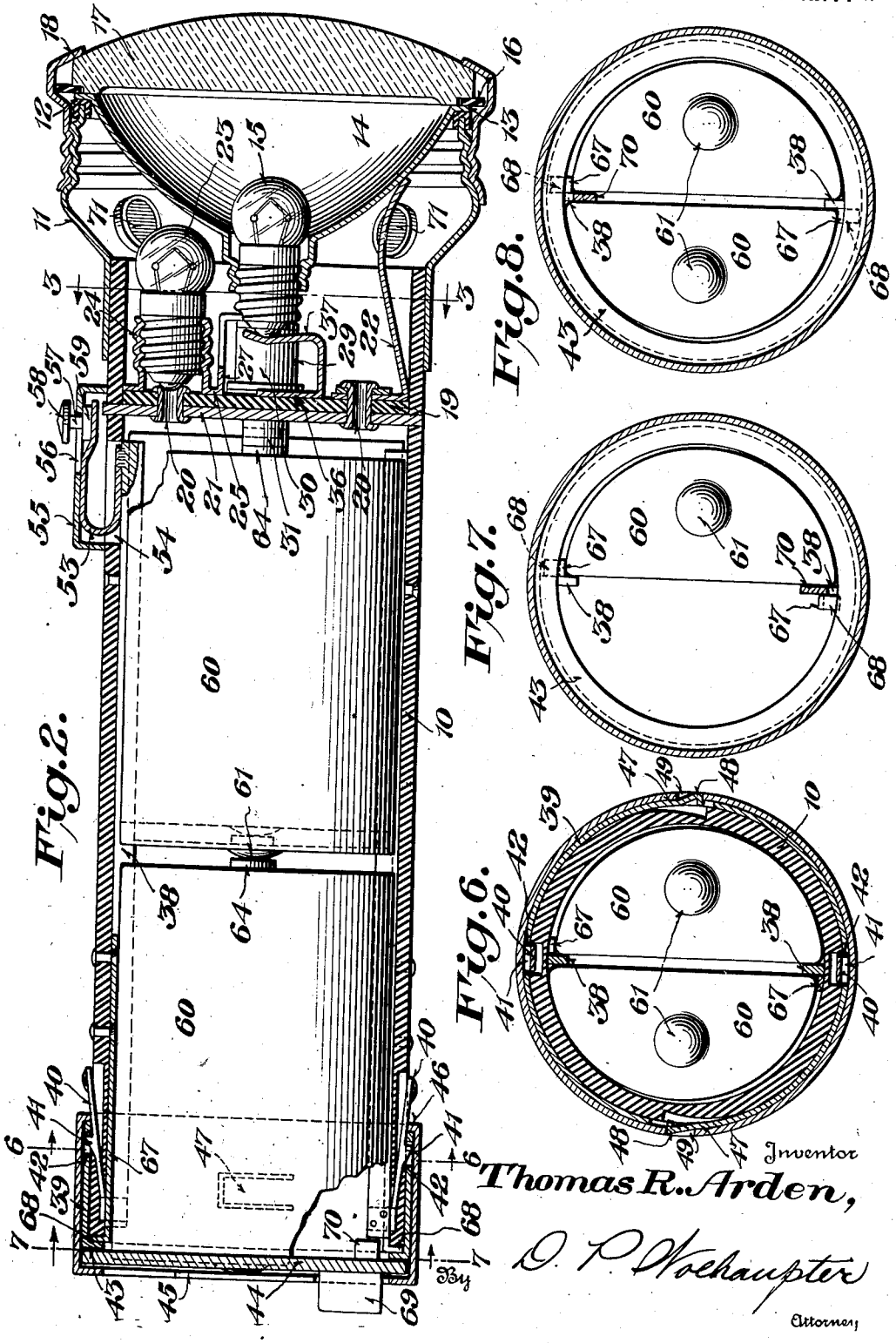

Fig. 2.

Fig. 8.

Fig. 7.

Fig. 6.

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Fig. 9.

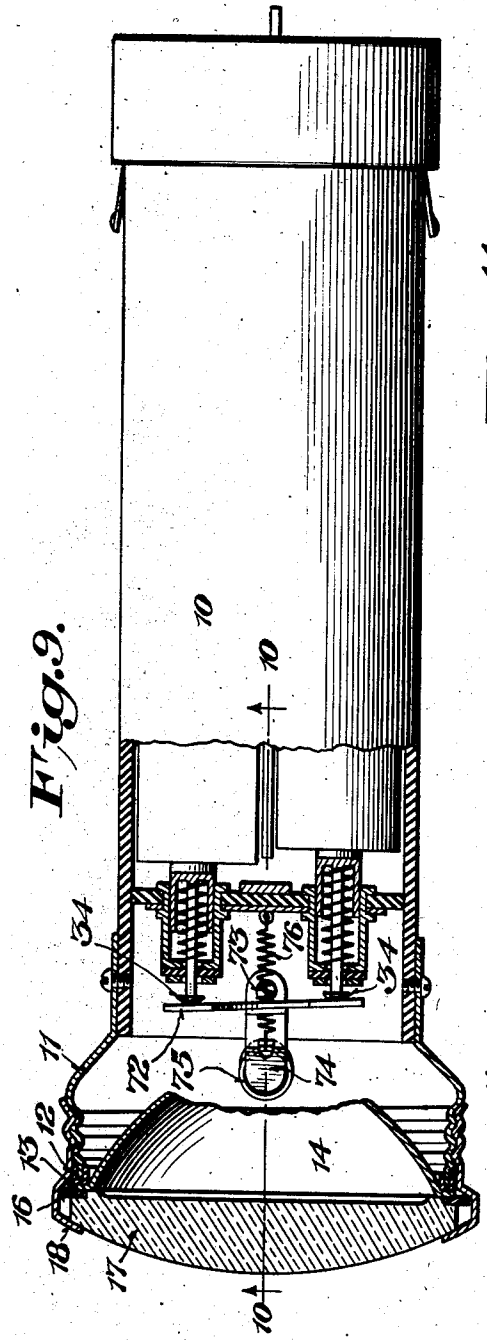


Fig. 11.

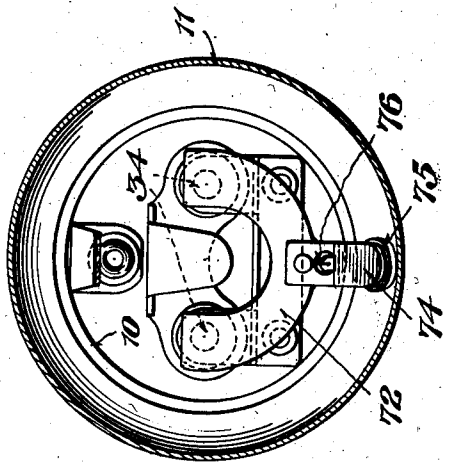
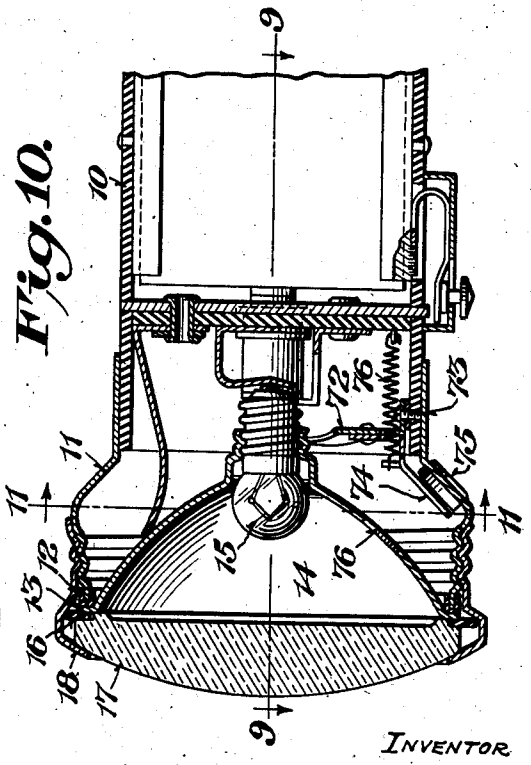


Fig. 10.



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Patented Nov. 22, 1938 2,137,230

UNITED STATES PATENT OFFICE

2,137,230

ELECTRIC FLASHLIGHT

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Application March 3, 1937, Serial No. 128,856

18 Claims. (Cl. 240—10.66)

This invention relates to electric flashlights of the type which employ dry cells as the source of current for their operation, and in which the dry cells are housed within a barrel comprising the flashlight handle.

Flashlights of the type referred to and the cells for use therein are well known and, generally speaking, have become standardized. Usually, the cells are of cylindrical shape and of a single standard diameter and length. Usually, too, the barrels are of a single standard diameter to more or less snugly receive the cells, but are of different standard lengths to accommodate different numbers of cells disposed serially in end to end relationship, the greater the number of cells the higher the voltage and the more powerful the light, as is understood.

In flashlights of the type referred to and as heretofore constructed, all of the cells are in service whenever the flashlight lamp circuit is closed. Therefore, there occurs a simultaneous depletion of the capacities of all of the cells regardless of their number, and when it becomes necessary to renew them the entire set must be removed from the barrel and an entirely new set substituted. This may not be inconvenient nor of any particular importance under ordinary conditions, if a new set of cells always is at hand ready to be substituted for a depleted, useless set. On the other hand, in an emergency, the amount of time required to effect the substitution may be of vital importance. In any event, flashlight users do not, as a rule, carry a reserve set of cells, since, for various reasons, that may be too inconvenient, or impracticable. As a rule, too, cells are not purchasable under conditions where the use of a flashlight is necessary or desirable. Moreover, it has not been considered practicable heretofore to increase the length of a flashlight barrel by an amount such as would be necessary to enable the carrying therein of a reserve set of cells; nor otherwise to construct a flashlight to provide for the carrying of a reserve set of cells as a part thereof. Consequently, flashlights as heretofore constructed frequently have not been usable, due to cell depletion, when their use has sorely been desired.

Accordingly, one important object of the present invention is to provide a flashlight structure of the general type referred to, and to provide cells of novel shape for use therein, so that, as compared with a prior flashlight of the same general type and size, there may be carried in the present flashlight barrel two separate sets of cells, one set for reserve use, and each set of which has nearly or the same electrical capacity as a set comprising an equal number of cells of prior standard design.

Another important object of the present invention is to provide a flashlight of the general type referred to embodying novel means whereby the reserve set of cells may instantly be included in the circuit of the flashlight lamp whenever this becomes necessary or desirable, without the necessity of removing either set of the cells from the flashlight barrel.

Another important object of the invention is to provide means operable, each time the flashlight is used after the reserve set of cells has been included in the circuit of the flashlight lamp, to indicate that the other or depleted set of cells requires replacement by a new set of cells.

Another important object of the invention is to provide a flashlight of the general type referred to in which cells of the prior well known cylindrical type may be used if desired in the event cells of the present type are not available.

With the foregoing and various other objects and purposes in view, which will become more fully apparent as the nature of the invention is better understood, the same consists in the novel features of construction, combination and arrangement of parts as will be hereinafter more fully described, illustrated in the accompanying drawings and defined in the appended claims.

In the drawings, wherein like characters of reference denote corresponding parts in the different views:—

Figure 1 is a central longitudinal section through a flashlight constructed in accordance with one practical embodiment of the invention.

Figure 2 is a longitudinal section on the line 2—2 of Fig. 1.

Figure 3 is a cross section on the line 3—3 of Fig. 2.

Figure 4 is an elevation of the inner end of the flashlight showing the cap structure fully closed.

Figure 5 is a view similar to Fig. 4 showing the elements of the cap structure relatively adjusted to open the end of one of the barrel compartments and to maintain the end of the other barrel compartment closed.

Figure 6 is a cross-section on the line 6—6 of Fig. 2.

Figure 7 is a section on the line 7—7 of Fig. 2 showing that a depleted set of cells has been removed from one of the cell compartments of the barrel.

Figure 8 is a view similar to Fig. 7 showing that

a new set of cells has been inserted in lieu of the depleted, removed set.

Figure 9 is a view similar to Fig. 1 showing an alternative form of signal means for indicating the absence of a set of cells from the barrel.

Figure 10 is a section on the line 10—10 of Fig. 9; and

Figure 11 is a cross-section on the line 11—11 of Fig. 10.

By reference to the drawings, it will be observed that the present flashlight is, in general design and appearance, of the well-known commercial type comprising a cell accommodating handle in the form of a barrel having, at one end thereof, a closure cap structure, and, at the other end thereof, the usual lamp, reflector and lens assembly.

The barrel of the present flashlight is designated as 10, and is illustrated as being formed from insulating material. It may, however, be formed from metal, in which event suitable insulation will, of course, be provided where required in accordance with known practice.

To one end of the barrel 10 is secured in any suitable manner a flared casing 11 which extends beyond the end of the barrel and has engaged over its outer edge a ring 12 of insulation. Seated against this insulating ring 12 is the outer flanged end 13 of a reflector 14 which extends within the casing 11 and at its center has threaded therein an electric lamp 15. Against the outer face of the flanged end 13 of the reflector 14 is disposed a ring of insulation 16, and against this insulating ring is seated the marginal portion of a lens 17 which is retained in assembly with the casing 11, exerting inward holding pressure against the reflector flange, by a flanged cap ring 18 threaded on said casing. The lens and reflector thus are removably mounted on the casing 11 with the reflector insulated from said casing.

Rigidly mounted in any suitable manner within the barrel 10, near the end thereof which carries the lamp, reflector and lens assembly, is a transverse partition 19, preferably of insulating material. In the present instance this partition is fastened by rivets 20 to a transverse metal bar 21 the ends of which are mounted in openings in opposite sides of the barrel 10. The riveting is effected after insertion of the partition and said bar, and in this way the partition is very firmly secured within the barrel.

One of the rivets 20 serves to fasten to the partition 19 a resilient contact arm 22 which extends outwardly from said partition into contact with the reflector 14. The other of said rivets 20 comprises a contact engaged by the center contact of a signal lamp 23 which is threaded in a metal socket 24 carried by a metal plate 25 secured by rivets 26 against the outer face of the partition 19, the said lamp 23 being disposed in the space between the casing 11 and the reflector 14.

The plate 25 is disposed near one side of the barrel 10 and is bent to provide an outwardly extending flange 27 from which two contact arms 28, 28 are bent to extend laterally in spaced relationship to the partition 19, parallel thereto, and to be disposed at opposite sides of the center of the barrel 10.

Mounted in the partition 19 are two small metal barrels 29, 29, which are alined, respectively, with the contact arms 28, 28 and are disposed between said partition and said contact arms. Each barrel has an external shoulder 30 near its inner end disposed outwardly of the partition 19 and has its inner end portion extending through an opening in said partition and spun over against the inner face of the latter, whereby it is secured rigidly thereto.

Slidable in each barrel 29 is a contact element 31 having a stem 32 which extends outwardly therefrom through the outer end wall of the barrel and through a larger opening in the related contact arm 28, whereby it does not have electrical contact with said contact arm. A coil spring 33 between each contact element 31 and the outer end wall of the related barrel 29 urges the contact element constantly inward, and on the outer end of each stem 32 is a head 34 which serves the dual purpose of limiting inward movement of the contact element 31 under the influence of the spring 33 and of making electrical contact with the releated contact arm 28 when the contact element 31 is free to be moved inwardly by the spring 33. Between the outer end of each barrel 29 and the related contact arm 28 is a disk 35 of insulation.

The barrels 29, 29 serve to secure to the partition 19 a metal plate 36 which is confined between the outer face of said partition and the shoulders 30 of said barrels. This plate 36 is provided with a spring tongue 37 which constitutes the center contact for the lamp 15 and is electrically connected with the contact elements 31 through the barrels 29, 29.

Suitably secured to the barrel 10, interiorly thereof, are two metal strips 38, 38 which are disposed at diametrically opposite sides of said barrel in a plane passing between the contact elements 31, 31, preferably at right angles to a plane including said contact elements, and which project short distances into said barrel and together provide, in effect, a partition dividing the barrel into two separate cell accommodating compartments. These strips 38, 38 extend longitudinally relative to the barrel 10 from points near the partition 19 to points near the inner end of said barrel where at least one of them is in electrical contact with a metal cap band 39 which snugly embraces the inner end portion of said barrel, and is detachably fastened thereon.

The band 39 may be detachably fastened on the barrel 10 in any suitable manner. Preferably, however, it is detachably fastened on said barrel as, for example, by means of a pair of spring latches 40 fastened, respectively, to the adjacent ends of the strips 38, 38. These spring latches are disposed outside of the barrel 10 and their constant tendency is to spring outwardly. They are, however, depressible into recesses in the barrel 10 so that the band 39 may be slipped over them onto the barrel. Each spring latch is provided at its outer side with a lug 41 and the band 39 is provided with openings 42 into which said lugs snap when, by the act of engaging the band on the barrel 10, said openings become alined with said lugs, the lugs being wedge-shaped and being disposed to permit the band 39 to be moved freely onto the barrel, but to prevent removal of the band from the barrel when the lugs snap into the recesses 42. However, by depressing the spring latches to disengage the lugs 41 from the recesses 42, which may be done by exerting finger pressure against the free ends of the spring latches, which are disposed beyond the inner edge of the band when the same is operatively mounted on the barrel, the band may readily be released for removal from the barrel whenever desired.

At its outer end the band 39 preferably is flanged inwardly, as indicated at 43, to overlie

the inner end of the barrel 10, and seated against said flange 43 is a disk 44 which is held seated against said flange by a cap 45 which rotatably embraces the band 39 and is retained thereon by having its inner edge spun over the inner edge of said band, as indicated at 46. Thus, not only is the cap 45 mounted on the band 39 for rotation with respect thereto, but the disk 44 is held in assembly with said cap and said band for rotation with respect to both the cap and the band.

The band 39 either is slit to provide two or more spring tongues 47, or equivalent spring tongues are secured thereto in any suitable manner. In either case, the constant tendency of said tongues is to spring outwardly to project lugs 48 carried at their outer sides into openings 49 formed in the cap 45 when, by rotation of said cap relative to said band, said openings 49 become alined with the lugs 48. Preferably the lugs 48 are of wedge-shape so that the cap 46 can be rotated only in a single direction.

The cap 45 is not completely closed at its outer end, but has cut therein a semi-circularly-shaped opening 50 substantially corresponding in size to the cross sectional size of each of the cell accommodating chambers of the barrel 10, the remaining semi-circular portion 51 serving as an end closure for one or the other of the two cell compartments of the barrel 10, depending upon the rotated position of the cap relative to the barrel as will be hereinafter more fully explained. Similarly, the disk 44 is cut away to provide a semi-circularly-shaped opening 52 of the same size as the opening 50 in the cap. It is apparent, therefore, that by relatively rotating the cap and the disk, the outer end of the barrel 10 may be either completely closed, one-half by the cap and the other half by the disk, or may be half-opened, by alining the openings 50 and 52 in the cap and the disk. In this connection it is pointed out that the band 39 is held against rotation relative to the barrel 10 by the spring latches 40 and that the openings 49 in the cap 45 with which the lugs 48 on the spring tongues 47 carried by said band 39 cooperate, are so disposed that the cap is rotatable through an angle of 180° from one to the next latched position; also, that when said cap is in a latched position, the semi-circularly-shaped opening 50 therein is alined with one or the other of the two semi-circularly-shaped cell compartments within the barrel 10.

One of the strips 38 has fastened thereto one arm of a U-shaped spring switch element 53, the other arm of which is free and normally is spaced from one end of the aforementioned bar 21. This switch element 53 extends from the strip 38 through an opening 54 in the barrel 10 to the exterior of the latter and is housed by a casing 55 which is riveted or otherwise suitably secured to said barrel. In the outer wall of the casing 55 is a slot 56 which extends longitudinally relative to the second mentioned arm of the switch element 53 and has slidable therein a pin 57 carrying at its outer end a button 58 and at its inner end a head 59. The head 59 is confined between the second mentioned arm of the switch element and the outer wall of the casing 55, and the said second mentioned arm of said switch element is shaped so that by sliding the pin 57 along the slot 56 in one direction the head 59 serves to effect depression of said switch arm into engagement with the adjacent end of the bar 21, the said switch arm being released to spring away from said bar when the head 59 is slid in the opposite direction. Also, the pin 57 is of sufficient length to permit the switch arm to be moved into engagement with the bar 21 by depression of the button 58 when the pin and head are in a position permitting the switch arm to spring away from said bar.

Now, in accordance with the present invention, standard cells of circular shape in cross section may be used in the barrel 10 in the same manner as such cells commonly are used in flashlights of the present general type. In other words, the distance between the inner edges of the strips 38, 38 approximately is equal to the diameter of a standard cell, and the spring latches 40 provide for removal of the entire cap assembly at the inner end of the barrel 10 to permit the insertion and removal of standard cells into and from said barrel. If standard cells are used they will be inserted with their zinc casing closed ends toward the outer end of the flashlight so that electrical contact will be made with one or the other or both of the contacts 31. However, the present flashlight is especially designed to advantageously use cells of semi-circular shape in cross section.

The area of the zinc shell or casing comprising the negative electrode of a dry cell primarily determines the electrical capacity of the cell. It follows, therefore that two cells of semi-circular shape in cross section and together corresponding in size to a cell of circular shape in cross section, have far greater electrical capacity than a single cell of circular shape in cross section. In fact, the electrical capacity of each of the cells of semi-circular shape in cross section is nearly equal to the electrical capacity of a corresponding cell of circular shape in cross section, since the area of the flat side of a cell of semi-circular shape in cross section is not appreciably less than the area of one-half the curved shell of a cell of circular shape in cross section.

Two sets of cells of semi-circular shape in cross section may obviously be accommodated in the same space which is required to accommodate a single set of cells of circular shape in cross section. Moreover, according to the present invention, the compartments in the present barrel for the accommodation of two sets of cells of semi-circular shape in cross section are of greater combined sectional area than the sectional area of a standard cell of circular shape in cross section by an amount approximately such that the present cells of semi-circular shape in cross section may be made of a size to have substantially the same electrical capacity as a standard cell of circular shape in cross section. In other words, the present barrel 10 is of greater diameter than the diameter of the barrel of a standard flashlight. The difference in diameter is, however, slight and not noticeable. The present invention thus provides for carrying an active and a reserve set of cells, each set of which has an electrical capacity approximately equal to a set of standard cells, in a flashlight handle of no greater length and no appreciably greater diameter than the handle of a standard flashlight designed to use only a single set of standard cells.

The present cells are designated as 60 and are, or may be, of the same construction as standard cells except as to shape. In other words, the present cells are of semi-circular shape in cross section and each cell comprises a negative electrode zinc casing including one end wall having a con-

tact 61; an electrolyte filling 62; a positive electrode 63 embedded in said filling, and a contact 64 on the end of the electrode 63 at the end of the cell opposite the end having the contact 61.

By rotating the disk 44 and the cap 45 to aline the openings 52, 50 therein with each other and with one of the cell compartments in the barrel 10, a set of the cells 60 may be inserted through said openings 52, 50 into said cell compartment. By then rotating the disk and the cap to aline the openings therein with the other cell compartment of the barrel 10, a second set of cells may be inserted into the latter cell compartment. By then rotating the disk through an angle of 180° relative to the cap, the cap opening 50 will be closed by said disk and thus both sets of the cells will be retained in the barrel, one set by the cap and the other set by the disk.

The disk 44 is provided with an insulated contact 65 which is positioned relative to said disk to aline with and to engage the contact 61 or 64, as the case may be, at the adjacent end of the cell 60 lastly inserted in one of the barrel compartments, when the disk is positioned as aforementioned closing the opening 52 in the cap 45. This means, of course, that if the disk 44 is rotated through an angle of 180° to aline its opening 50 with the cap opening 52, the contact 65 then will aline with and engage the contact 61 or 64, as the case may be, at the outer end of the cell 60 lastly inserted in the other of the barrel compartments.

The contact 65 may comprise a metal eyelet extending through an opening of larger diameter in the disk 44 and serving to secure in recesses in opposite faces of said disk a pair of insulating disks 66, 66. The contact 65 thus is insulated from said disk 44 and, at the same time, its inner end is exposed for engagement with the contact 61 or 64 at the outer end of the outermost cell of either set. Also, its outer end is exposed for engagement with the inner face of the segmental end wall 51 of the cap 45 when the disk 44 is rotated to aline its segmental portion with the cap segmental portion.

From the foregoing it is obvious that when the disk 44 and the cap 45 are in relatively rotated positions completely closing the inner end of the barrel 10, the two sets of cells 60 are retained in said barrel and one set of said cells is inoperative to furnish current to the lamp 15 due to the lack of a circuit because of the insulation of the contact 65 from the disk 44 and, therefore, from the cap structure. It is equally obvious that a circuit is established between the other set of cells and the lamp 15, under the control of the switch element 53 because of the engagement of the contact 61 or 64 at the outer end of the outermost cell of said other set with the segmental portion of the cap 45 which is electrically connected with the switch element 53 through one of the strips 38. In this connection it is pointed out that the contact elements 31 are positioned to be respectively engaged by the contacts 61 or 64, as the case may be, at the inner ends of the innermost cells of the two sets when the two sets of cells are operatively positioned in the barrel 10. It is also pointed out that the lamp 15 is of the single contact type having its filament connected at one end with a screw threaded shell on its base and at its other end with a central base contact insulated from said shell. It follows, therefore, that when a circuit is established between either set of the cells 60 and either of the contact elements 31, the lamp circuit is completed due to the resilient contact arm 22 being connected with the bar 21 at one end and engaging the reflector 14 at its other end; to the metal base shell of the lamp engaging the reflector; to the center base contact of the lamp engaging the spring tongue 37 of the plate 36, and to the engagement of said plate 36 with the metal barrels 29, 29 with which the metal contact elements 31, 31 are engaged. Thus, when the barrel 10 contains two sets of the cells 60 and the disk 44 and the cap 45 are in relatively rotated positions closing the inner end of the barrel and retaining the cells therein, that set of cells the outermost cell of which has its outer end contact in engagement with the segmental portion of the cap 45, is effective to furnish current to the lamp 15 under the control of the manually operable switch element 53. On the other hand, the other set of cells is ineffective to furnish current to the lamp 15 because of the contact 65, which engages the outer end contact of the outermost cell of said set, being insulated from the disk 44 and therefore, from the strip 38 with which the switch element 53 is connected. If, now, it is assumed that the first mentioned set of cells has become depleted and it is desired to use the reserve set of cells comprised by the set last mentioned, all that is necessary to be done is to rotate the cap 45 through an angle of 180° to bring its segmental portion into overlying relationship to the segmental portion of the disk 44. This results in engagement of the segmental portion of the cap with the outer end of the contact 65 carried by the disk 44 and thus an electrical connection is effected between the contact at the outer end of the outermost cell of the reserve set and the manually operable switch element 53 through the cap structure and the strip 38 with which the switch element 53 is connected.

When the cap 45 is rotated to render the reserve set of cells effective to furnish current to the lamp 15, the openings 52, 50 in the disk 44 and the cap 45 obviously become alined with each other and with the barrel compartment containing the other or depleted set of cells. These cells therefore no longer are retained in the barrel by the cap structure, but are free to be removed through said alined openings 52, 50. Moreover, the fact that the compartment containing the depleted set of cells is opened at its inner end by rotation of the cap to render the reserve set of cells effective to furnish current to the lamp 15, affords an unmistakable indication that the depleted set of cells requires replacement, which should be attended to before depletion of the reserve set of cells. If, now, a new set of cells is inserted in lieu of the depleted set, the cap 45 is not rotated, but the disk 44 is rotated through an angle of 180° relative to the cap so that the segmental portion of the disk closes the inner end of the barrel compartment containing the new set of cells. The new set thus becomes the reserve set and the circuit between what was formerly the reserve set and the lamp remains established due to the contact at the outer end of the outermost cell of the last mentioned set engaging with the segmental portion of the cap 45, it being pointed out in this connection that the cells of both sets are constantly urged outwardly by the springs 33. When, now, the effective set of cells becomes depleted, the operation just recounted is repeated to render the reserve set of cells effective and to release the depleted set for removal from the barrel.

Means are provided whereby, upon rotation of the cap 45 to render the reserve set of cells effective to supply current for operation of the lamp

15, and upon removal of the released, depleted set of cells, the disk 44 and the cap 45 are locked against rotation in position retaining the reserve set of cells in the barrel, until the depleted set of cells is replaced by a new set. At the far side of each of the strips 38, 38, as regards the permissible direction of rotation of the cap 45, is a leaf spring 67, which is fastened either to the barrel 10 or to the related strip 38 and which tends constantly to spring inwardly into the related cell accommodating compartment in the barrel. One edge of each of said leaf springs is disposed against or closely adjacent to the adjacent face of the related strip 38, and at its free end each spring has a laterally and outwardly extending terminal portion 68 engaged in a recess in the barrel 10 whereby the spring is effectively resistant to sidewise pressure. Moreover, the said terminal portion of each spring extends beyond the end of the related strip 38, (see Fig. 2). On the disk 44 is an outwardly directed tongue 69 for finger engagement to effect its rotation. Also on said disk is an inwardly directed lug 70 which is positioned at one end of the straight edge of the segmental portion of said disk for cooperation with the free end portions of the leaf springs 67. In other words, when the disk 44 and the cap 45 are in relatively rotated positions such that their segmental portions are in overlying relationship to each other, and the barrel compartment with which the disk and cap openings 52, 50 are alined is devoid of cells, the leaf spring 67 in said compartment is in an inwardly sprung position lying in front of the lug 70, (see Fig. 7). Therefore, it is not possible to rotate the disk in either direction, since it is held against rotation in one direction by the leaf spring 67 in the vacant cell compartment of the barrel and in the other direction by the tongue 69 engaging the adjacent edge of the segmental portion of the cap 45, (see Fig. 5), which is held against rotation in the last mentioned direction by the spring tongues 47 and their lugs 48. Since the disk is held against rotation in one direction by the leaf spring 67, the cap is held against rotation in that direction by the tongue 69 carried by said disk. Thus, both the cap and the disk are held against rotation in either direction when the cap and disk openings 50, 52 are alined with each other and with either of the cell compartments in the barrel and when said cell compartment is devoid of cells. When, however, cells are inserted into the void cell compartment, they serve to displace the leaf spring 67 outwardly and to hold it displaced outwardly (see Figs. 6 and 8). The spring 67 thus is removed from in front of the lug 70 and the disk 44 is free to be rotated to bring its segmental portion into covering relationship to the inner end of the compartment containing the newly inserted set of cells. When such rotation of the disk is effected, the lug 70 rides over the outer end of the outermost cell of the newly inserted set and finally beyond the straight side of said cell, whereupon the cells spring outwardly under the influence of the related spring 31 and the disk thus is locked against reverse rotation, (see Fig. 8). Therefore, the disk and the cap must always be rotated in the same direction and there is no possibility of the inner end of either of the cell compartments being accidentally opened and consequently there is no possibility of accidental loss of the cells from the barrel.

In the wall of the casing 11 is provided one or more light emitting openings which is, or are, closed by windows 71 of glass, Celluloid or the like of preferably red color. When a set of cells is contained in each of the cell compartments of the barrel 10, both of the contact elements 31 are held pressed into their guide barrels 29 and the heads 34 on the stems 32 of said contact elements thereby are held spaced from the contact arms 28. Therefore, the lamp 23 is not included in circuit with the lamp 15 at any time when the circuit of the lamp 15 is closed, as long as a set of cells is contained in each of the cell compartments of the barrel. If, however, either of the cell compartments of the barrel is devoid of cells, the related contact element 31 is moved inwardly by its spring 33 and the head 34 on the stem 32 of said contact element is engaged with the related contact arm 28. Thus, under such conditions, whenever, the circuit of the lamp 15 is closed, a circuit also is completed through the lamp 23 via the plate 25, the socket 24, the threaded shell of the lamp, the lamp filament, the center base contact of the lamp, the related rivet contact 20, the bar 21, the switch element 53, the strip 38, the cap structure, the cells, the other contact element 31 and the plate 36. The space between the reflector 14 and the casing 11 thus is illuminated and serves to illuminate the window, or windows 71, thereby affording an unmistakable visual indication each time the circuit of the lamp 15 is closed that one of the cell compartments of the barrel is devoid of cells and that a set of cells should be supplied to said compartment.

In lieu of the signal means just described, a mechanical signal means may be provided if desired. In other words, the lamp 23 may be dispensed with and may be replaced by a shutter mechanism as illustrated in Figs. 9 to 11. This shutter mechanism may comprise a plate 72 pivoted intermediate its ends, as at 73, to the casing 11 and spanning the space between the heads 34 and having its ends overlying said heads; a shutter 74 extending outwardly from the medial portion of said plate 72; a single window 75 in the casing 11 into alinement with and across which said shutter is swingable; an opening 76 in the reflector adjacent to said window to permit light from the lamp 15 to reach said window; and a light coil spring 76 to maintain an unstable condition of the plate 72. By this arrangement, when each of the cell compartments of the barrel contains a set of cells, both of the heads 34 are maintained projected and serve to hold the plate 72 against any rocking movement on its pivot 73. When the plate 72 thus is held, the shutter 74 overlies the window 75 and shades the latter when the lamp 15 is illuminated. If, on the other hand, either of the cell compartments is devoid of cells, the corresponding head 34 is retracted and the related end of the plate 72 is free to swing inwardly, which it does under the influence of the spring 76. The shutter 74 thus is swung from its position in alinement with and shading the window 75 to a position to one side of the window, and when, under such conditions, the lamp 15 is illuminated, the window also is illuminated, thereby affording a signal indicating that a set of cells is needed.

Without further description it is thought that the features and advantages of the invention will be readily apparent to those skilled in the art, and it will of course be understood that changes in the form, proportion and minor details of construction may be resorted to, without departing from the spirit of the invention and scope of the appended claims.

I claim:—

1. In a flashlight, a handle in the form of a barrel, a lamp and reflector assembly at one end of said barrel, a rotatable closure cap structure at the other end of said barrel, two sets of cells of semi-circular shape in cross section within said barrel, one set in switch controlled circuit with said lamp and the other set in reserve, and means whereby rotation of said closure cap structure is effective to remove the cells of the first set from the lamp circuit and to place the cells of the reserve set in circuit with said lamp.

2. In a flashlight, a lamp, a holder for two sets of cells, one set of which is to be carried in reserve, a signal, and means whereby said signal is rendered inoperative when the holder contains two sets of cells and is rendered operable upon lighting of the lamp in the absence of a reserve set of cells from the holder.

3. In a flashlight, a handle in the form of a barrel, strips extending into said barrel from opposite sides thereof dividing the barrel into two compartments each to receive a set of cells of semi-circular shape in cross section, said strips being narrow to permit the use in the barrel of cells of circular shape in cross section, a lamp, and means for establishing a switch controlled electric circuit between said lamp and a set of cells of circular section disposed in said handle and between said lamp and either of two sets of cells of semi-circular shape in cross section disposed in said barrel.

4. In a flashlight, a handle in the form of a barrel, means dividing said barrel into two compartments, of semi-circular shape in cross section, each to receive a separate set of cells of semi-circular shape in cross section, a lamp mounted at one end of said barrel, a closure cap structure mounted at the other end of said barrel and comprising a pair of elements rotatable relative to each other and relative to the barrel to close the end of either or both of the cell compartments and to open the end of either cell compartment, and means including said closure cap structure for establishing an electric circuit between said lamp and one set of cells contained in said barrel.

5. In a flashlight, a handle in the form of a barrel, means dividing said barrel into two compartments of semi-circular shape in cross section, each to receive a separate set of cells of semi-circular shape in cross section, a lamp mounted at one end of the barrel, a closure cap structure at the other end of the barrel, said closure cap structure comprising a band engaged over the end of the barrel, a pair of elements assembled with said band for rotation relative thereto and relative to each other to close the end of either or both of the cell compartments and to open the end of either cell compartment, latch means releasably holding said band on said barrel so that the cap assembly may be removed from the barrel as a unit to open the entire end of the barrel for the insertion therein of a set of cells of circular shape in cross section, and means including said cap structure for establishing an electric circuit between said lamp and either a set of cells of circular shape in cross section or either of two sets of cells of semi-circular shape in cross section disposed within said barrel.

6. In a flashlight, a handle in the form of a barrel, means dividing said barrel into two compartments of semi-circular shape in cross section, each to receive a separate set of cells of semi-circular shape in cross section, a lamp mounted at one end of the barrel, a closure cap structure at the other end of the barrel, said closure cap structure comprising a band mounted on the barrel, a cap rotatably mounted on said band, and a disk rotatably mounted between the outer ends of said band and said cap, said cap and disk each having a semi-circularly shaped opening and a semi-circularly shaped barrel end closing portion, said cap and disk being rotatable relative to each other and relative to the barrel to completely close the end of the barrel or to close the end of one of the cell compartments and open the end of the other cell compartment, and means including said cap structure for establishing an electric circuit between the lamp and a set of cells disposed in either of the cell compartments of the barrel.

7. In a flashlight, a holder having two compartments each to contain a separate set of cells, a lamp, and closure means for said holder operable to open either cell compartment for insertion or removal of a set of cells into or from the same and to maintain the other cell compartment closed and to simultaneously deny an electric circuit between the lamp and a set of cells disposed in the first mentioned compartment and to establish an electric circuit between the lamp and a set of cells disposed in the second mentioned compartment.

8. In a flashlight, a holder having two cell compartments, a reserve set of cells in one of said compartments, a set of cells in the other compartment, a lamp, means including a closure cap structure for said holder establishing an electrical circuit between the second mentioned set of cells and said lamp, and means whereby said closure cap structure is operable to open the compartment containing the second mentioned set of cells for removal of the cells therefrom while maintaining the compartment containing the reserve set of cells closed and to simultaneously establish an electric circuit between the lamp and the reserve set of cells.

9. A flashlight as set forth in claim 8 including means whereby the closure cap structure is operable, following opening of the compartment containing the second mentioned set of cells, to close said compartment without establishing an electric circuit between the lamp and a set of cells contained in said compartment, and to maintain the circuit between the lamp and the reserve set of cells.

10. In a flashlight, a cell holder, a lamp, two sets of cells in said holder, one set in switch controlled electrical circuit with said lamp and the other set in reserve, a signal, and means whereby said signal is maintained inoperative when the holder contains a reserve set of cells and is rendered operable upon closing of the lamp circuit in the absence of a reserve set of cells from the holder.

11. In a flashlight, a holder having two cell compartments, a closure cap structure for said holder, a lamp, a set of cells in one of said compartments electrically connected through said closure cap structure with said lamp, a reserve set of cells in the other compartment, said closure cap structure comprising a pair of elements movable relative to each other and relative to the holder to close both cell compartments and to open one cell compartment while maintaining the other cell compartment closed, and means whereby movement of said elements to open the compartment containing the first mentioned set of cells establishes an electric circuit between the reserve set of cells and the lamp.

12. A flashlight as set forth in claim 11 including means whereby, upon opening of the compartment containing the first mentioned set of cells and removal of the cells from said compartment, the closure cap structure is locked in closing relationship to the compartment containing the reserve set of cells until a set of cells is inserted into the first mentioned compartment.

13. A flashlight as set forth in claim 2 in which the signal comprises a second lamp, and wherein the means for rendering said signal operative and inoperative comprises a pair of switches controlling said signal lamp, each switch being constructed and arranged to be maintained open by the presence of a related set of cells in the holder and to be automatically closed in the absence of a related set of cells from the holder.

14. A flashlight as set forth in claim 2 in which the signal comprises a window and a cooperating shutter, and wherein the means for rendering said signal operative and inoperative includes means whereby the shutter is maintained in covering relationship to said window by two sets of cells contained within the holder, and other means for moving said shutter from covering relationship to said window in the absence of one set of cells from the holder.

15. In a flashlight, a cell holder, a lamp, means dividing said holder into two cell compartments, a separate set of cells in each compartment, and a closure cap structure for said holder operable to close both compartments and to open one compartment while maintaining the other compartment closed, said closure cap structure constituting a switch controlling the establishment of electric circuits between the lamp and cells contained in said compartments.

16. In combination with a flashlight having a cell holder in the form of a hollow handle of circular internal cross section, means dividing said holder into two cell compartments of semi-circular cross section, a lamp and a lamp reflector and lens assembly at one end of said holder, separate sets of cells of semi-circular shape in cross section disposed in flat face to flat face relationship and said holder, and a closure cap structure at the other end of said holder controlling opening and closing of said cell compartments and the establishment of electric circuits between the lamp and the respective sets of cells.

17. In a flashlight, a casing having two cell compartments each having an open portion for the insertion and the removal of a cell into and from the same, a lamp, a pair of closure elements, one for the open portion of each cell compartment, movable to close and open its related open portion, and switch means controlled by movement of said closure elements and constructed and arranged so that when each compartment contains a cell and both closure elements are closed a circuit is completed between the lamp and the cell in only one of said compartments, and when the closure element related to the compartment containing the active cell is opened a circuit is completed between the lamp and the cell in the other compartment.

18. In a flashlight, a casing having two cell compartments each having an open portion for the insertion and the removal of a cell into and from the same, a lamp, a pair of closure elements each movable to close and open the open portion of each cell compartment, and switch means carried by said closure elements and constructed and arranged so that when one of said closure elements is in closing relationship to the open portion of one of said compartments and the other is in closing relationship to the other of said compartments a circuit is completed between the lamp and the cell in one of said compartments and a circuit between the lamp and the cell in the other compartment is denied, and when the closure element related to the compartment containing the active cell is opened the circuit between said active cell and the lamp is interrupted and a circuit is established between the lamp and the other cell.

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