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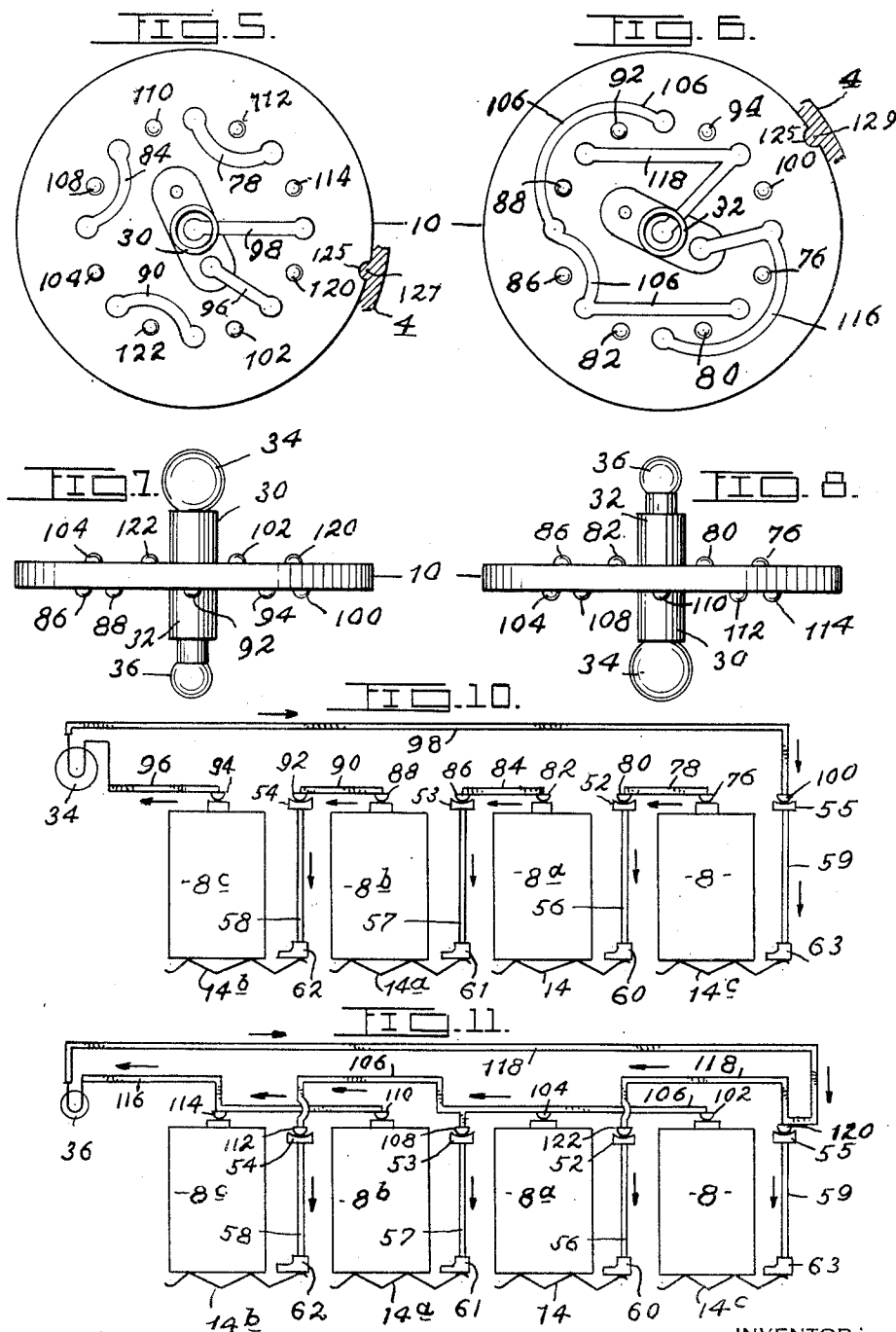
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FLASHLIGHT HAVING A REVERSIBLE CONTACT PLATE FOR ESTABLISHING
EITHER SERIES OR SERIES-PARALLEL CONNECTIONS

Filed Sept. 12, 1947

2 SHEETS—SHEET 1



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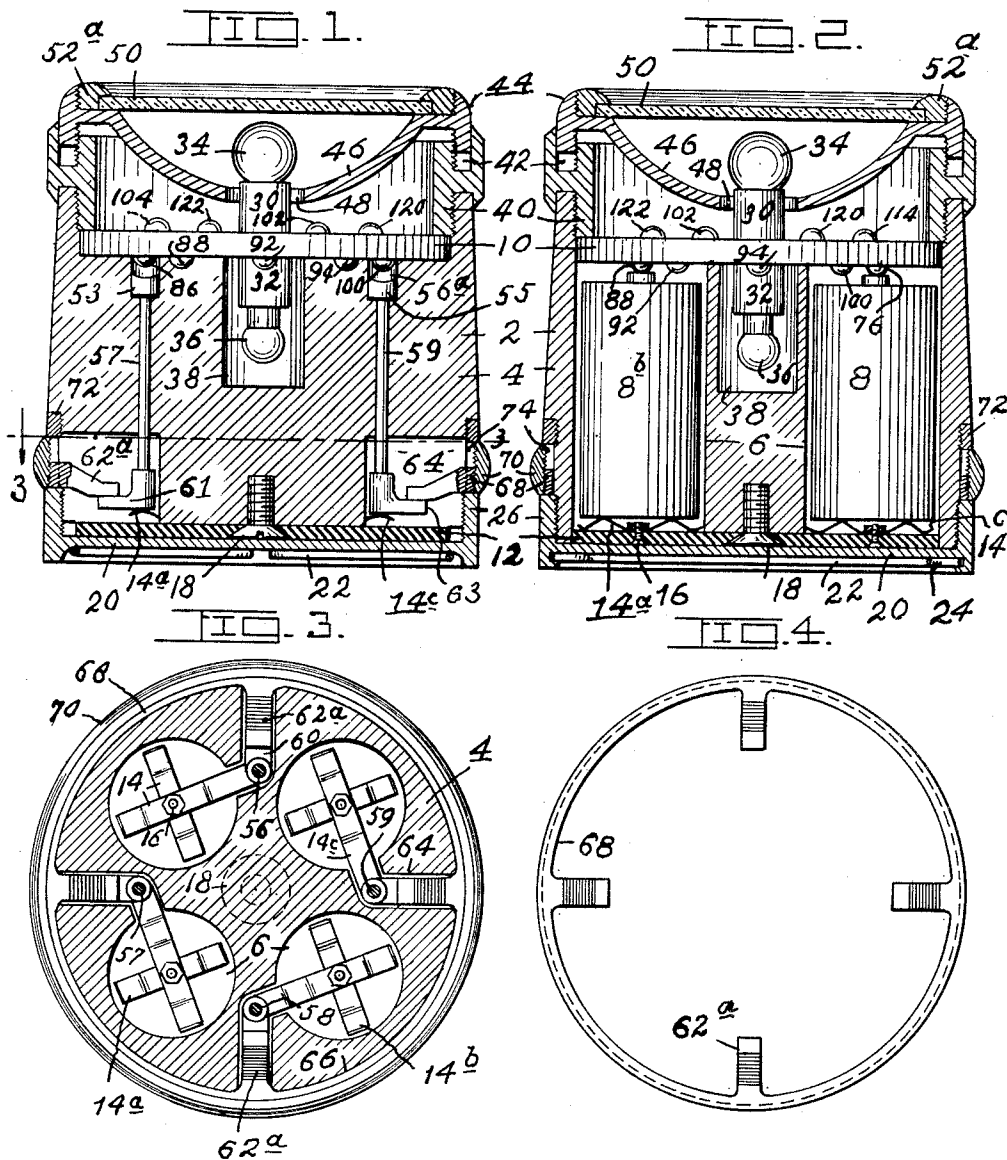
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FLASHLIGHT HAVING A REVERSIBLE CONTACT PLATE FOR ESTABLISHING EITHER SERIES OR SERIES-PARALLEL CONNECTIONS

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My invention relates to a plural voltage flashlight and an important feature of the invention resides in the provision of a single flashlight which can be adjusted to different voltages and thus avoid the necessity of providing a separate flashlight for each voltage.

Other features reside in novel means for connecting the dry cells of the flashlight in series for maximum voltage output and means for connecting the dry cells in series-parallel for reduced voltage output.

Another object is to provide a compact flashlight in which the conventional dry cells are arranged so as to be axially coextensive, instead of being extended in axial alinement in the customary long handle now in general use, which occupies too much room to be carried in a compact space, such for example, as one of the small storage compartments of a boat or motor vehicle.

A further object is to provide a flashlight having a lens and reflector of substantially greater circumference than like parts of the conventional flashlight to project a much larger volume of light without an expenditure of greater electric power.

Another object is to provide a flashlight in which the working parts may be readily assembled, are of substantial construction and not likely to get out of order.

Other objects will hereinafter appear, and in order that the invention may be fully understood reference will now be had to the accompanying drawings, in which—

Fig. 1 is a vertical section of the flashlight.

Fig. 2 is a vertical section of the flashlight turned approximately one-eighth of a revolution from the position disclosed by Fig. 1.

Fig. 3 is a cross section on line 3—3 of Fig. 1.

Fig. 4 is a detail of an annulus adapted to contact with other parts in controlling the electrical circuits of the flashlight.

Fig. 5 is a plan view disclosing one side of a contact plate with contacts forming part of the series-parallel circuit and electrical conductors forming parts of the series circuit.

Fig. 6 shows the reverse side of the contact plate with contacts forming part of the series circuit and electrical conductors forming parts of the series-parallel circuit.

Figs. 7 and 8 disclose side elevations of the contact plate when in the positions shown by Figs. 5 and 6, with the addition of high and low voltage lamps, respectively.

Fig. 9 is a detail showing parts of a manually controlled switch for opening and closing the flashlight circuits.

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Fig. 10 is a diagrammatic view of a circuit in which the dry cells are arranged in series for maximum output of voltage.

Fig. 11 is a diagrammatic view of a circuit in which the dry cells are connected in series-parallel for reduced output of voltage.

In carrying out the invention I provide a case 2, preferably of circular form, having a body portion 4, with a plurality of cavities 6 for the reception of a like number of dry cells 8, 8a, 8b and 8c. Preferably, the cavities 6 are equally spaced from each other and the axis of the body portion 4, as shown by Fig. 3. The dry cells may be of any preferred or conventional type. The cavities 6 are normally closed at their front and rear ends by movable insulated plates 10 and 12, respectively, the former of which has independent sets of positive and negative contacts with conductors, on opposite sides of the plate.

The plate 12 has a plurality of springs 14, 14a, 14b and 14c, preferably arranged in pairs disposed in crossed relation to each other, as disclosed by Fig. 3, and secured to the inner side of the plate 12 by suitable means such as small bolts 16, the plate 12 in turn being secured to the rear central part of the body 4 by suitable means such as a threaded element 18. The springs press against the negative ends of the respective dry cells to yieldably hold their positive poles in engagement with a certain number of the contacts carried by the plate 10, as will hereinafter appear. The plate 12 is arranged in juxtaposition with the rear wall 20 of the case 2, which latter is provided at its rear side with suitable carrying means such as a pair of handles 22, each of which may consist of a wire bent into semicircular or other suitable form and pivotally connected at its opposite ends 24 to the wall 20 which has a forwardly extending annular flange 26 removably threaded upon the rear portion of the case. New dry cells may be readily installed in the cavities 6 or removed when exhausted by unscrewing the rear wall 20 from the case 2 and the screw 18 from the plate 12.

Referring again to the contact plate 10 it will be noted that the same is provided at one side with a high voltage lamp socket 30 and at its opposite side with a low voltage lamp socket 32 for the reception of high and low voltage lamps 34 and 36, respectively, either of which, when not in use may be entered in a cavity 38, located axially in the forward portion of the body 4, as shown by Figs. 1 and 2. By installing the lamps in alined sockets neither lamp need be removed from the plate 10 and will therefore be available for use when needed and either lamp is safe from

breakage when placed in the cavity 38. The plate 10 is removably clamped in the forward portion of the body 4 by an annulus 40 threaded in the internally threaded forward part of the case 2 and provided at its forward portion with an annular groove 42 to receive the threaded peripheral flange 44 of a reflector 46 provided with an axial opening 48 through which either lamp 34 or 36 may project, ready for use. A lens 50 is clamped against the forward portion of the reflector by means of a ring 52a threaded in the flange 44 of the reflector. Light from either lamp 34 or 36, may be focused as desired by rotating the flange 44 to advance or retract the reflector 46, which latter is much greater circumferentially than the average flashlight reflector and accordingly will cast a wider beam.

Contacts 52, 53, 54 and 55, equal in number to the dry cells, are spaced uniformly from each other and the axis of the body 4 and adapted to be moved forward and backward in recesses 56a formed in the body. Said contacts are mounted upon the forward ends of conductors 56, 57, 58 and 59, mounted for forward and backward movement in the body 4, said conductors being provided respectively at their ends with contacts 60, 61, 62 and 63 rigidly attached to said conductors, and being held against the respective springs by a like number of arms 62a, said arms being formed of an insulating material.

The arms 62a, are equally spaced on the inner wall of an annulus 60, Fig. 4. Said annulus 60 is threaded in a manually operable ring 70, rotatably mounted upon the body 4 between the bottom wall flange 26 and a ring 72 threaded upon the body. Contacts 60, 61, 62 and 63, and the arms 62a, are slidable forward and backward in recesses 64 and the annulus 60 is free for forward and backward movement by the ring 70, in an annular slot 74 extending around the body 4 between the flange 26 and the ring 72. The slot 74 communicates with the slots 64, the opposite sides of which prevent sidewise movement of the contacts 60, 61, 62 and 63, and the arms 62a and prevent the annulus 60 from rotating with the ring 70. From the foregoing it will be understood that when the ring 70 is rotated in one direction the contacts 52, 53, 54 and 55 are advanced through the intermediary of the intervening parts against the adjacent contacts on the plate 10, and close the circuit, which may be either of those disclosed by Figs. 10 and 11, and when the ring 70 is rotated in a reverse direction the circuit will be opened. It is also to be understood that the springs 14, 14a, 14b and 14c are in constant engagement with the negative ends of the dry cells 8, 8a, 8b and 8c and the contacts 60, 61, 62 and 63, respectively, which latter are held constantly against the arms 62a, by the respective springs.

Having described the mechanical construction and operation of the flashlight, I will now proceed to describe the two circuits shown diagrammatically by Figs. 10 and 11, respectively. Referring first to Fig. 10, in which the circuit is arranged in series for maximum output of voltage, the circuit may be traced as follows: Beginning with dry cell 8, current flows through contact 76, conductor 78, contact 80, contact 52, conductor 56, contact 60, spring 14, dry cell 8a, contact 82, conductor 84, contact 86, contact 53, conductor 57, contact 61, spring 14a, dry cell 8b, contact 88, conductor 90, contact 92, contact 54, conductor 58, contact 62, spring 14b, dry cell 8c, contact 94, conductor 96, lamp 34, conductor 98, con-

tact 100, contact 55, conductor 59, contact 63, and spring 14c.

Referring now to the diagrammatic view disclosed by Fig. 11, which shows the batteries connected in series-parallel for delivering reduced voltage, the circuit may be traced as follows: Current flows from dry cells 8 and 8a through contacts 102 and 104, conductor 106, contacts 108 and 112, contacts 53, and 54, conductors 57 and 58, contacts 61 and 62, springs 14a and 14b, dry cells 8b and 8c, contacts 110 and 114, conductor 116, lamp 36, conductor 118, contacts 120 and 122, contacts 55 and 52, conductors 59 and 56, contacts 63 and 60, springs 14c and 14, and dry cells 8 and 8a.

The contacts 76, 80, 82, 86, 88, 92, 94 and 100 and the conductors 106, 116, and 118, are fixed to one side of the plate 10, while the contacts 102, 104, 108, 110, 112, 114 and conductors 78, 84, 90, 96 and 98, are fixed to the opposite side of the plate, as shown by Figs. 5 and 6, respectively. The contacts on one side of the plate 10 are independent of those on the opposite side of the plate. The conductors on one side of the plate are also independent of those on the opposite side of the plate. The foregoing, of course, also applies to the lamps 34 and 36, respectively. Insulation is employed where necessary.

In order that the contact plate 10 may be quickly and accurately placed in the positions disclosed by Figs. 5 and 6, the plate 10 is provided with a peripheral notch 125 adapted to receive lugs 127 and 129, respectively, formed on the upper inner part of the body portion 4 of the flashlight.

From the foregoing description taken in connection with the accompanying drawings, it is apparent that I have provided a flashlight embodying the features of advantage above pointed out, and while I have shown but one form of the invention, I reserve the right to such other forms and modifications thereof as properly fall within the scope of the invention as claimed.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is:

1. In a flashlight, a case, a plurality of battery cells contained in said case, a set of contacts carried by said case for engaging the negative poles of said cells, a member carried reversibly by said case adjacent the positive poles of said cells and said negative pole contacts, a set of contacts carried on each side of said reversible member, either set of which is adapted, by reversing said member, to be positioned to engage the positive poles of said cells and said negative pole contacts, conductors carried by said member and connecting one of said sets of contacts to connect said battery cells in a series circuit, a high voltage lamp in said series circuit, a second set of conductors carried by said member and connecting the other of said sets of contacts to connect said cells in a series-parallel circuit, and a low voltage lamp connected in said series-parallel circuit.

2. In a flashlight, in combination, a case, elements forming an electric circuit in the case comprising a plurality of dry cells spaced about the axis of the case, a reversible member adjacent the dry cells, a set of contacts carried by each side of said member, the contacts on either side of the member being adapted to engage the positive poles of the dry cells, a lamp carried by each side of the member, one of said lamps being of higher voltage than the other, means adapted to connect the dry cells, the contacts on one side of the member and the high voltage lamp in

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series, and means including parts of the last-mentioned means adapted to connect the dry cells, the other set of contacts and the low voltage lamp in series-parallel when the member is reversed.

3. A flashlight comprising a circular case having forward and rearward ends, a plurality of electric dry cells carried by and spaced about the axis of said case, said dry cells being longitudinally coextensive and extending longitudinally of said case, a plurality of conductors carried by said case for forward and rearward movement, a member carried by said case forwardly of said dry cells, a lamp carried by said member, elements carried by said member forming in combination with said dry cells and conductors an electric circuit including said lamp, said circuit including contacts on said member against which said conductors may be moved forwardly to complete said circuit, resilient means carried by said case and urging said conductors forwardly, an annulus carried for forward and rearward movement by said case but secured against rotation thereon, arms carried by and extending inwardly from said annulus, and engaging said conductors to move them rearwardly against said resilient means as said annulus is moved rearwardly and a ring carried for manual rotation on said case but secured against longitudinal movement thereon, said ring threadably engaging said annulus whereby the latter will be moved forwardly or rearwardly as said ring is rotated.

4. In a flashlight, a case, a plurality of battery cells carried by said case with their positive poles in a common plane, a member carried movably in said case adjacent the positive poles of said cells and adjustable to either of two positions,

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first and second sets of contacts carried by said member, said first set contacting said positive cell poles when said member is in its first position and said second set contacting said positive poles when said member is in its second position, third and fourth sets of contacts carried by said member, means carried by said case whereby said third set is connected to the negative poles of said cells when said member is in its first position, and whereby said fourth set is connected to said negative poles when said member is in its second position, conductors carried by said member and joining said first and third sets of contacts to connect said cells in series, a high voltage lamp carried by said member and connected in said series circuit, a second set of conductors carried by said member and joining said second and fourth sets of contacts to connect said cells in series-parallel and a low voltage lamp carried by said member in said series-parallel circuit.

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