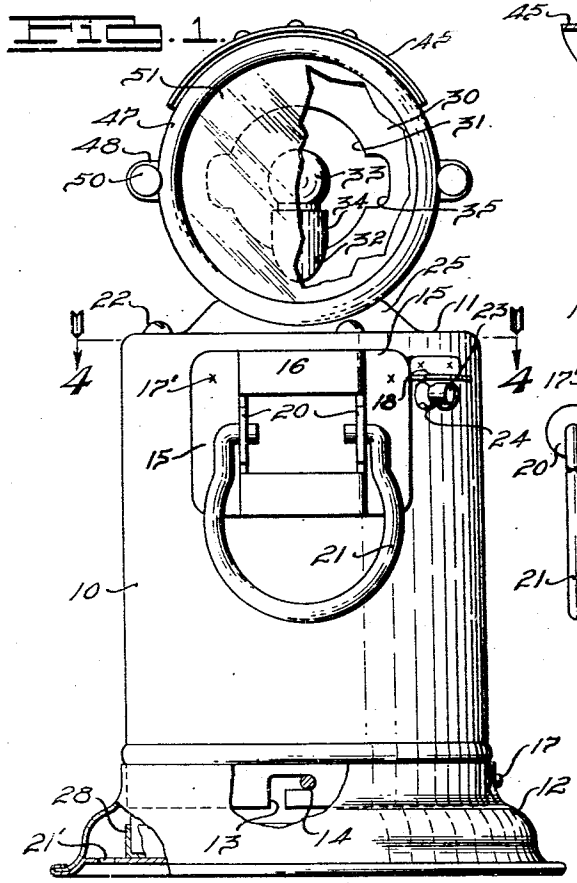
Aug. 29, 1939. L. M. WILEY 2,171,349

ELECTRIC LANTERN

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Fig. 1.



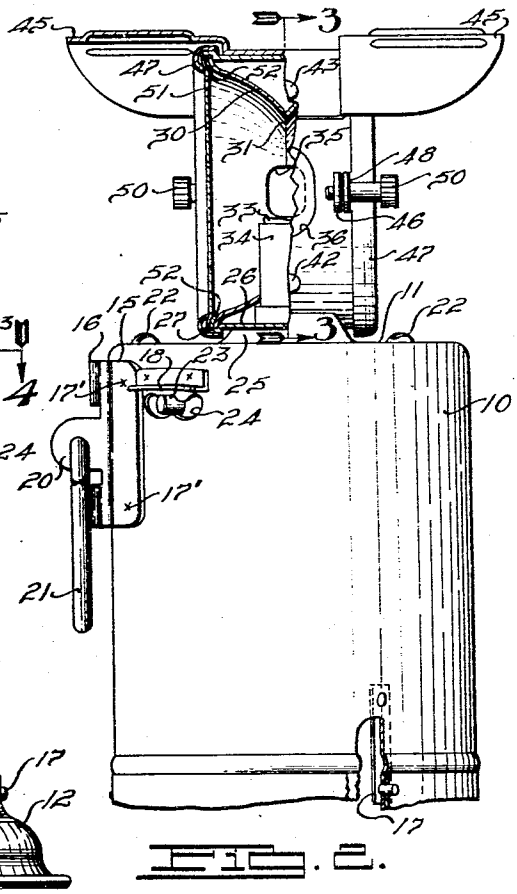


Fig. 2.

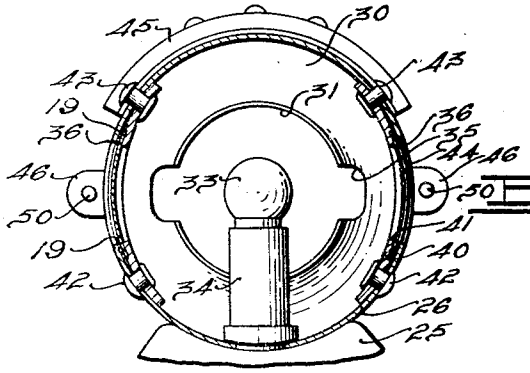


Fig. 3.

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FIG. 4.

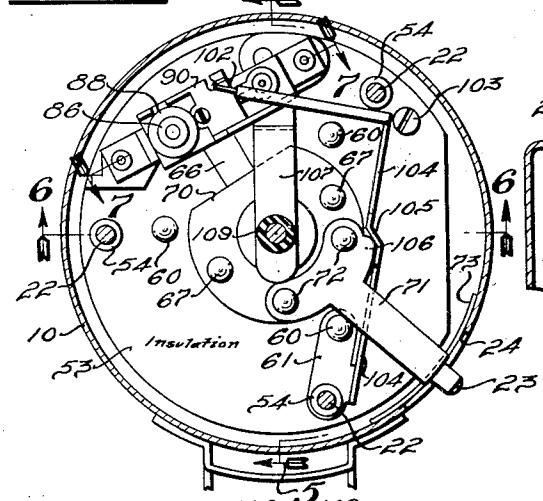
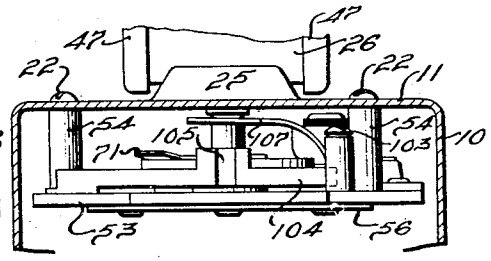


FIG. 5.



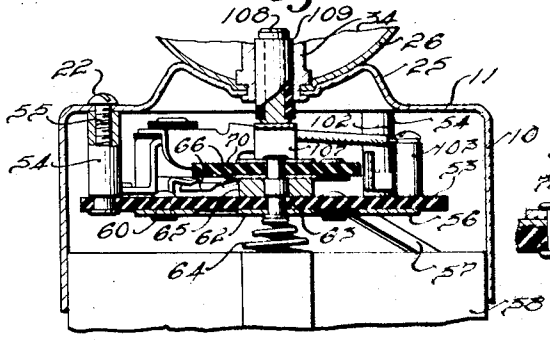


FIG. 6.

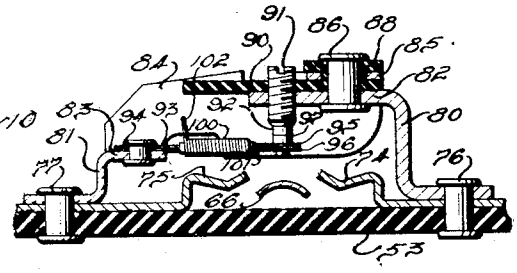


FIG. 7.

FIG. 8.

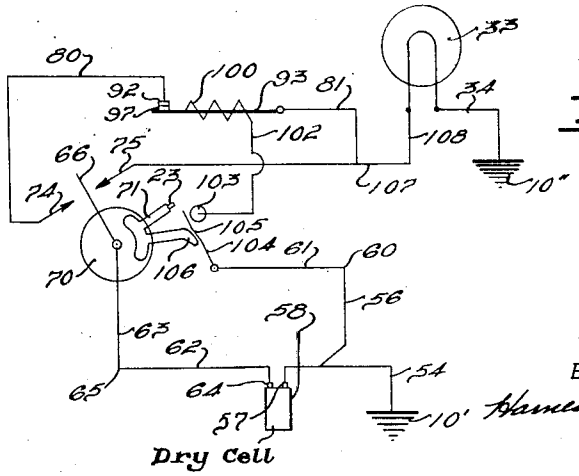


FIG. 9.

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ELECTRIC LANTERN

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Application July 20, 1935, Serial No. 32,327

3 Claims. (Cl. 177—329)

This invention relates to electric lighting devices and more especially to lanterns adapted for use as signal lights.

The principal object of the invention is to improve the art of portable electric signal lanterns of the type which is operated by a dry cell.

Another object is to provide an improved type of signal lantern which may be set to give a steady or an intermittent flashing light.

A further object is to provide an improved switching mechanism for setting the lantern to give a steady light, an intermittent flashing light, and to turn off the lantern.

Another object is to provide in a lantern of the above type, a pair of circuits both adapted to energize an incandescent light bulb, one of said circuits including an interrupting means, and a switch mechanism for said circuits for selectively causing energization of either circuit to obtain steady or intermittent light or to turn off the lantern.

It is also an object of the invention to provide an improved reflector construction for signal lanterns.

Other objects, features and advantages will become apparent from the following description and appended claims.

For the purpose of illustrating the genus of the invention, a typical concrete embodiment of signal lantern is shown in the accompanying drawings, in which:

Figure 1 is a side elevation of a lantern construction made in accordance with the principles of this invention, parts being broken away to show interior details;

Fig. 2 is a similar view taken at right angles with respect to the view of Figure 1, parts being broken away and shown in section;

Fig. 3 is a vertical section taken substantially on the line 3—3 of Figure 2;

Fig. 4 is a horizontal section taken substantially on the line 4—4 of Figure 1;

Fig. 5 is a vertical section taken substantially on the line 5—5 of Figure 4;

Fig. 6 is a vertical section taken substantially on the line 6—6 of Figure 4;

Fig. 7 is an enlarged vertical section taken substantially on the line 7—7 of Figure 4; and

Fig. 8 is a wiring diagram of the lantern circuits.

Referring to the drawings, and more especially to Figures 1 to 3, inclusive, a portable electric flasher lantern is shown which is adapted to be used as a traffic warning or similar danger signal device. The lantern comprises an upright cylindrical receptacle or casing 10 closed at its upper end 11 and provided with a flared base 12 adapted to be detachably secured thereto by means of L-shaped slots 13 and pins 14. A strap member 15 provided with a raised intermediate portion 16 is welded at 17' to the receptacle 10 so that the latter may be padlocked to an immovable object to prevent pilferage of the lantern. A pair of outstanding ears 20 are provided on the strap member 15 and a bail 21 is pivoted to the ears 20. Switch mechanism, shown in detail in Figures 4 to 7, inclusive, and later to be described, is mounted within the upper end of the recetacle 10 and supported from the upper end closure 11 by means of a plurality of screws 22. Adjacent its upper end, the receptacle 10 is provided with a switch slot 24 through which projects a switch actuator button 23 illustrated in off position in Figs. 1 and 2. For steady burning of the lantern, the switch actuator button 23 is shifted to the left side of switch slot 24 and when flashing is desired the switch button 23 is shifted to the right side of slot 24.

The central portion of the upper end closure 11 is pressed outwardly to form a partially cylindrical saddle seat 25 on which is supported a hollow cylindrical or tubular lamp housing 26 secured to the upper end closure 11 of receptacle 10 as by welding. The margins of the laterally directed open ends of the tubular member 26 are offset slightly in a radially outward direction as indicated at 27. Seated within the recesses provided by offset portions 27 are a pair of concave reflectors 30, preferably parabolic in curvature and having the inner end portions thereof cut off on planes normal to the axis of the reflectors and approximately intercepting the principal focus of each reflector. Each reflector 30 is provided with a central opening 31 at the inner end thereof and the margins of these openings are arranged in abutting relation, the length of the cylindrical housing 26 being such that with the reflectors in the positions indicated in Fig. 2, the outer marginal edges of the reflectors will be seated within the recesses provided by the offset portions 27.

As indicated in Figs. 1, 2 and 6, a socket 34 projects through slots 32 in the reflectors and is riveted to a lower central portion of the lamp housing 26 and the central portion of the saddle 25 of the upper end closure 11 of the receptacle. The socket extends upwardly so that a bulb 33 will be positioned centrally within the lamp housing 26 as indicated in Figs. 1 and 2. Slots 35, similar to slots 32, are also cut in the reflectors

30 adjacent and leading into the central openings 31 at the two lateral margins thereof and openings 36 are provided in the lamp housing 26 in alignment with the openings formed by slots 35 so that side beams of light may be projected from the lantern in directions normal to the main beams cast by the lantern. Curved backing plate members 40 provided with openings 41, corresponding with the openings 36 in the sides of the lamp housing 26, are fastened by means of rivets 42 and 43 to the lamp housing in order to hold a lens material 44 between the backing plates and lamp housing and across the openings 36. The lens material 44 is preferably in the form of colored, flexible and transparent material such as red sheet celluloid and the like. The rivets 43 also serve to secure a visor member 45 to the top of the lamp housing 26. At the lateral margin of the backing plates 40, radially outwardly extending ears 46 are provided and extended through suitable slots in the lamp housing 26 for the purpose of securing rims 47 to the lamp housing 26. The rims 47 are also provided with ears 48, and screws 50 are projected through the ears 48 and threaded into the ears 46 for securing the rims 47, transparent lens 51 and washers 52 to the lamp housing, as indicated in Fig. 2. A spring catch 17 is secured adjacent the bottom of receptacle 10 and cooperates with a suitable aperture in the detachable base 12 for locking these elements together. A visor 18 is secured to the receptacle 10 above the switch slot 24 to prevent water entering the receptacle in the event of exposure of the lamp to rains. A rubber gasket 19 is interposed between each of the side lenses 44 and the lamp housing 26 for the same purpose. A plurality of holes 21' are provided in the bottom of the base 12 outside the confines of a cup 28 secured to said base for positively locating a dry cell in position and to keep such dry cell dry in the event that water should enter the dry cell receptacle either from the top or bottom. The holes 21' serve to drain water from the receptacle.

Reference may now be had to Figs. 4 to 8, inclusive, which depict the construction and arrangement of the switching mechanism secured to the upper end closure 11 of battery receptacle 10 by means of the screws 22. The switch mechanism comprises an insulator plate 53 which serves as the base of the switching mechanism and has riveted thereto three support posts 54 internally threaded at their upper end as indicated at 55 for the reception of the securing screws 22. Tightening these screws brings the support posts 54 tightly into engagement with the upper end closure 11 so as to render the receptacle waterproof at these points. An annular contact plate 56 is fixed to the bottom surface of the insulating base 53 and is adapted to contact a leaf spring terminal 57 of a dry cell 58 disposed within the receptacle 10. The annular or ring contact 56 is secured to the insulating base 53 by means of rivets 60, one of which conductively engages a union 61, electrically connected, as indicated in the lower half of Fig. 4, to one of the support posts 54 so that the ring contact 56 is grounded to the receptacle 10 through a rivet 60, union 61 and a support post 54 and its securing screw 22. A contact disc 62 is centrally fixed by means of a rivet 63 to the bottom surface of the insulating base 53 in spaced relation with respect to the annular or ring contact 56. The rivet 63 or contact disc 62 is adapted to engage the central terminal 64 of dry cell 58. A spacer disc 65, of conductive material, is arranged about the intermediate portion of rivet 63 and is adapted to engage a switch arm 66 secured by means of rivets 67 to a rotatable insulating plate 70. The insulating plate 70 and switch arm 66 are adapted to be rotated by means of a manual actuator arm 71 secured to the insulating plate 70 by means of rivets 72 and provided at its outer end with an arcuate plate portion 73 adapted to be biased by the arm 71 into engagement with the inner surface of battery receptacle 10 adjacent the slot 24 both to close the latter to prevent entrance of dirt or rain and to provide a frictional drag for preventing accidental or undesired displacement of the switch actuator button 23 fixed thereto.

As indicated best in Fig. 7, the switch arm 66 is adapted to engage either of two switch clips 74 or 75 or to lie therebetween, the switch clips being fixed to the insulating base 53 by rivets 76 and 77. The rivets 76 and 77 each secure a support member 80 or 81 to the insulating base 53 and in electrically conducting relation with respect to the switch clips 74 and 75, respectively. The support 80 includes a horizontally disposed portion 82 offset with respect to the insulating base 53 and arranged above the switch clip 74. The support 81 includes a similar offset portion 83 spaced at a lesser elevation above the insulating base 53, a vertically arranged portion 84 extending in back of and adjacent the offset portion 82 and a forwardly directed portion 85 extending horizontally above the offset portion 82 of support 80. The offset portions 82 and 85 of supports 80 and 81 are secured against relative movement with respect to each other by means of a rivet 86 insulated with respect to the portion 85 of support 81 by means of insulators 88 and 90. The portion 82 of support 80 is threaded adjacent its free end for reception of an adjustment screw 91 provided with a contact 92 at its lower end, the adjustment screw also being threaded to the insulator 90 so that the latter locks the screw against undesired rotation to prevent the contact 92 from being thrown out of adjustment.

A thermally responsive element 93 is secured at one end by means of a rivet 94 to the portion 83 of support 81. The thermally responsive element 93 comprises a pair of metallic strips 95 and 96 of such character that the coefficient of expansion of the upper strip 95 is greater than that of the lower strip 96. The strips 95 and 96 are secured together at one end by means of the rivet 94 and at the other end by means of a contact 97. As the strip elements 95 and 96 are heated, the strip element 95 will have a greater linear expansion than the strip 96 and cause the element 93 to bow downwardly a slight amount with reference to its fixed end and cause the contact 97 to separate from the contact 92. As the temperature of the thermally responsive element 93 decreases the element 93 will straighten and contact 97 will again engage the contact 92. The adjustment screw 91 permits setting of contact 92 to adjust the temperatures at which make and break of the contacts 92 and 97 will occur. A heating coil 100 making electrical contact with the thermally responsive element 93 only at the end 101 thereof is wound about the element 93 and is provided with a conductor 102 leading to a binding post 103. The union 61 is provided with a leaf or spring contact 104 having an angular cam-engaging portion 105, the leaf contact 104 extending to a point adjacent but normally spaced

from the binding post 103, as indicated in Fig. 4. The manual actuator arm 71 is provided with a cam portion 106 cooperable with the cam-engaging portion 105 when insulator plate 70 is rotated in a counter-clockwise direction from the position indicated in Fig. 4 to deflect the leaf contact 104 and bring its free end into engagement with the binding post 103 so as to complete the circuit between the union 61 and binding post 103 connected by conductor 102 with the heating coil 100. The leaf or spring contact 104 serves as a switch arm of the switch mechanism and cooperates with binding post 103 serving as a switch contact to complete a circuit including these elements. The switch clip 75 is also provided with a leaf contact 107 extending upwardly and then horizontally to a point spaced above the rivet 63, as indicated in Figs. 4, 5 and 6. A contact plug 108 is arranged within the bulb socket 34 and insulated therefrom by means of an insulator 109.

Reference may now be had also to Fig. 8 in which the switch parts illustrated in Figs. 4 to 7 are indicated diagrammatically and designated by the same numerals, and the operation of the switch mechanism will be described. With the switch parts in the positions indicated in Figs. 4 to 8 no circuit is completed through the dry cell and through the filament of bulb 33 so that the lantern is switched off and the bulb 33 is not energized. Rotation of the insulator plate 70 by the manual actuator arm 71 and actuator button 23 in a clockwise direction as viewed in Figs. 4 to 8 and from above the lantern positioned as indicated in Figs. 1 and 2, causes the switch arm 66 to contact the switch clip 75 completing the circuit through the dry cell 58, grounded at one side by means of the conductive support post 54 to the casing 10 as indicated at 10', through dry cell terminal 64, disc contact 62 and rivet 63, switch arm 66, switch clip 75, leaf conductor 107, plug contact 108, the filament of bulb 33 and socket 34, which is grounded to the lantern receptacle casing 10 as indicated at 10'' in Fig. 8. This completes the circuit for steady light. The cam 106 does not force the leaf contact 104 into engagement with the binding post 103 with the switch arm either disengaged from switch clips 74 and 75 or in contact with the switch clip 75 so that the heater coil of the thermally responsive element 93 of the interrupting mechanism is not energized. The rotation of the insulator plate 70 by means of the manual actuator arm 71 and switch button 23 in a counter-clockwise direction as viewed in Figs. 4 to 8 or from above the lantern as illustrated in Figs. 1 and 2 causes the switch arm 66 to engage the switch clip 74 and also brings the cam 106 into engagement with the portion 105 of the leaf spring contact 104 forcing the latter into engagement with the binding post 103. Such rotation of the insulator plate 70 of the switching mechanism completes the circuit from the ground 10', through the support post 54, dry cell terminal 57, dry cell 58, terminal 64, disc contact 62, rivet 63, switch arm 66, switch clip 74, support member 80, contact 92, contact 97, thermally responsive element 93, support element 91, spring contact 107, plug 108, the filament of light bulb 33, bracket 34 to the ground 10''.

This circuit is intermittently interrupted due to the fact that the cam 106 forces the leaf contact 104 into engagement with the binding post 103 so that a circuit is also closed from the dry cell terminal 57, grounded by means of the support post 54 to the casing 10, as indicated at 10', and through the ring contact 56, rivet 60, union 61, leaf contact 104, binding post 103, conductor 102, coil 100, contacts 97 and 92, support member 80, switch clip 74, switch arm 66, rivet 63, disc contact 62 to the dry cell terminal 64. The latter circuit causes energization of the heating coil 100 so that the thermally responsive element 93 becomes heated causing greater linear expansion of the strip element 95 thereof than that of the leaf 96 so that the contact 97 separates from the contact 92 breaking both the circuits through the heating coil 100 and through the filament of light bulb 33. As soon as these circuits are broken the coil 100 and thermally responsive element 93 cool down so that contact 97 is again brought into engagement with contact 92 completing the circuit through the heating coil 100 and through the filament of bulb 33. The repeated engagement and disengagement of the contacts 97 and 92 energizes and deenergizes the heating coil 100 and the filament of bulb 33 causing the lantern to give an intermittently interrupted light as the thermally responsive element 93 is heated or allowed to cool.

It will be noted that in accordance with the above arrangement of circuits, the full voltage of the dry cell is applied across the lamp bulb 33 regardless of whether switch 66 is positioned to produce a steady or an intermittent light. This is of particular importance in view of the fact that the voltage of commercial dry cells is quite limited. If the lamp bulb and heating coil 100 were connected in series in the flasher circuit, the lighting, as well as the heating effect would be seriously impaired, and the lamp would be brighter when arranged for a steady or constant light than when adjusted to flash intermittently.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be had without departing from the spirit thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. In a lantern, an electric lamp bulb, an electric dry cell, a switch supporting plate, a single pole double throw switch arm carried by said plate, a pair of contacts adapted for alternative engagement by said arm to complete alternative circuits, one circuit being an uninterrupted circuit containing the lamp bulb, the dry cell, the switch arm and one of said contacts in series and the other circuit containing the lamp bulb, the dry cell, the switch arm, the other contact and a current interrupter in series, said interrupter being of the heat responsive type and having a pair of separable contacts, a heating circuit for said interrupter connected in series with the interrupter contacts, and means mechanically operated from said switch arm for breaking the heating circuit when the switch arm is moved toward said one contact.

2. In a lantern, an electric lamp bulb, an electric dry cell, an interrupter of the heat responsive type having a heating circuit for energizing the same, and a switch element having means operable in one position to establish an uninterrupted circuit through said dry cell and said lamp and operable in another position of said element for establishing a circuit through said dry cell and said lamp and a shunt circuit around said lamp and through said interrupter

heating circuit, said interrupter being in series with said last mentioned lamp circuit and said heating circuit whereby on energization it will intermittently interrupt said last mentioned lamp circuit.

3. In a lantern, in combination, an electric light bulb, an electric dry cell, a pair of circuits each including said bulb and said dry cell, one of said circuits including a heat responsive current interrupter having a pair of contacts for interrupting said circuit and a heating coil, said coil being connected in parallel with said bulb, switch means for selectively closing either of said circuits to cause steady or intermittent energization of said light bulb, and means for interrupting flow of current to said heating coil when the other of said circuits is energized.

LEE M. WILEY.