

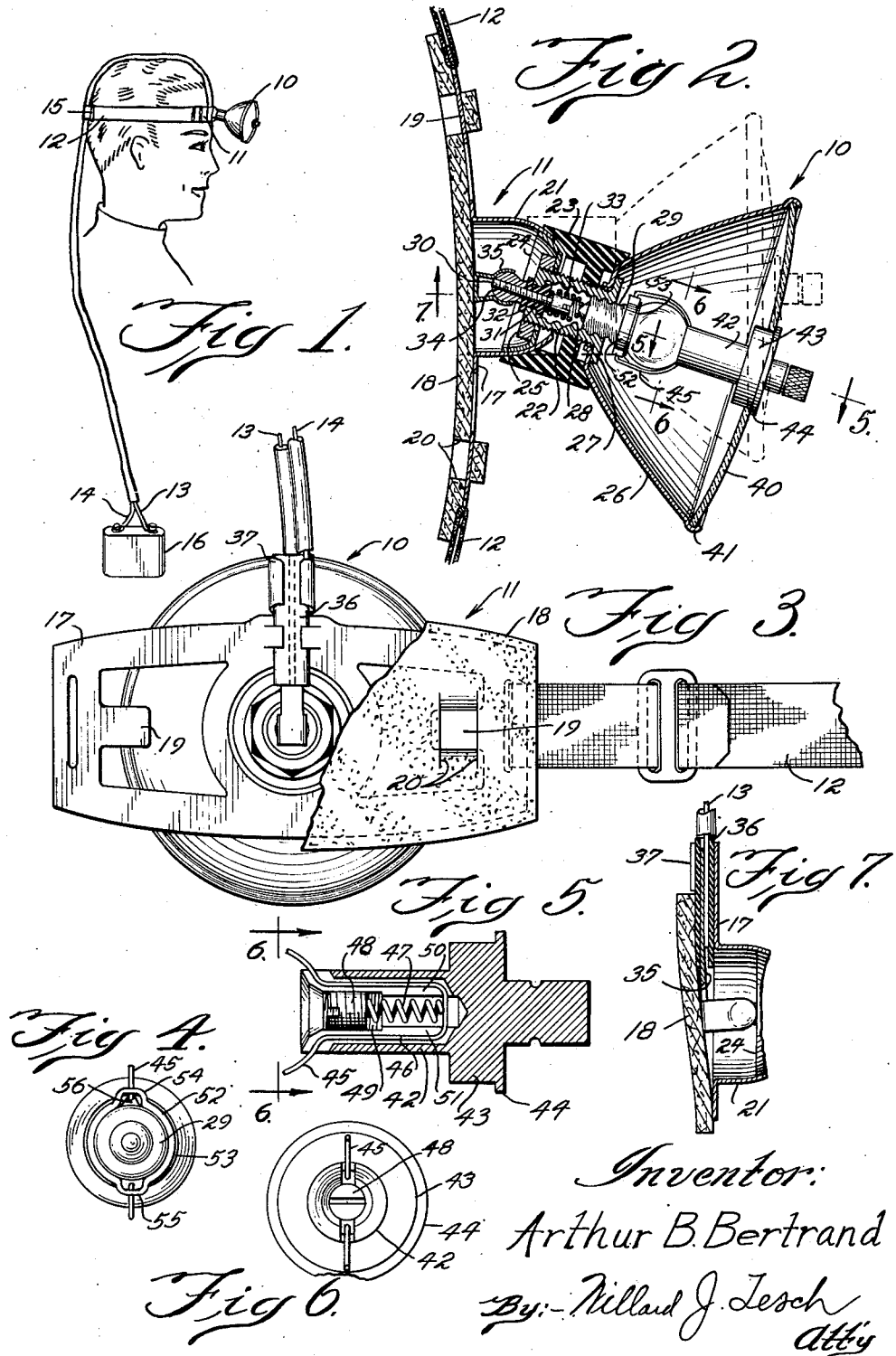
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ELECTRIC LANTERN

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ELECTRIC LANTERN

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The present invention relates to portable battery operated electric lanterns of the focused beam type and particularly to those in which the beam projecting head is angularly adjustable upon a supporting base.

It is an object of the invention to provide a lantern of the type described which is of simple construction and in which the direction of the beam is angularly adjustable in substantially any desired plane.

It is a further object of the invention to provide an improved portable electric lantern in which the light projecting head may be quickly and easily manipulated to release it from one angular position, move it, and lock it in another.

Further objects are to provide an improved safety switch and improved means for focusing the beam and for replacing exhausted incandescent lamps in lanterns of the type described.

In the drawing:

Fig. 1 is a perspective view of a battery operated lantern or flashlight embodying the present invention mounted on the head of a user by means of a head band;

Fig. 2 is a partial horizontal sectional view of the lantern of Fig. 1;

Fig. 3 is a partial rear view of the lantern of Figs. 1 and 2;

Fig. 4 is an enlarged fragmental rear view of the incandescent lamp and its supporting means;

Fig. 5 is an enlarged fragmental sectional view along the line 5—5 of Fig. 2 but turned at an angle of 90° to said line 5—5;

Fig. 6 is a fragmental sectional view along the line 6—6 of Figs. 2 and 5, and

Fig. 7 is a fragmental sectional view along the line 7—7 of Fig. 2.

In Fig. 1 the reference numeral 10 indicates generally the adjustable head or beam projector of the lantern. This head 10 is supported on a base 11, which is secured to the wearer's head by means of a headband or strap 12. Electrical conductors 13 and 14 extend upwardly from the base 11 and pass over the top of the wearer's head to the rear thereof where they are secured to strap 12 by a clip 15, and then extend downwardly and are electrically connected to a battery 16 which may be carried on the user's person. The conductors assist in supporting the lantern on the wearer's head by preventing it from slipping downwardly.

As shown in Figs. 2 and 3, the base 11 comprises a shaped metal plate 17 to which the ends of strap 12 are fastened. A pad of soft material 18, such as sponge rubber, is attached to

the interior side of the plate 17 and serves as a cushion against the user's forehead. Tabs 19 extending from the plate 17 co-operate with slits 20 in the pad 18 to fasten the said pad in position.

A hollow metal dome member 21 projects forwardly from metal plate 17, the curved portion of the dome being substantially hemi-spherical in shape. A relatively large clearance opening is provided at the apex of the dome 21 and a movable lantern head member 22, which also serves as a lamp socket, extends through said opening, the opening being considerably larger than the head member 22. The head member carries a pair of guiding and clamping members 23 and 24 which are shaped to accommodate dome 21 between them. The external guiding and clamping member 23 is threaded upon the head member 22 and the internal member 24 is supported on the head member 22 by a threaded nut 25. A generally dish-shaped reflector 26 is clamped between the forward surface of the clamping member 23 and a flange 27 at the forward end of the head member 22.

The head member 22 is threaded internally to form a socket 28, which receives and makes electrical connection with an ordinary incandescent electric lamp 29. The socket is relatively long in order to accommodate therein several parts in addition to the lamp 29, as will be described hereinafter. An aperture is provided in the base of the socket, through which aperture a threaded bolt 30 passes. The bolt is insulated from the socket by means of member 31 and washer 32 of electrical insulating material. The head of the bolt is within the socket and a contact member 33, in the form of a coiled spring, is clamped at one end between the head of the bolt and the insulating member 31. The rearward end of the bolt has a spherically shaped threaded nut 34 thereon which is screwed against insulating washer 32 and holds the bolt in position. The forward end of the coiled spring contact member 33 makes resilient pressure contact with the end terminal of lamp 29. The diameter of the said coiled spring is considerably smaller than the internal diameter of socket 28 in order to maintain adequate mechanical clearance between the two to prevent short circuits between them. The spherical nut or ball 34 is held under resilient pressure between the opposed fingers of a spring contact clip 35, which is supported on and projects forwardly from base plate 17. Ball 34 is located at substantially the center of curvature of the spherical portion of dome 21. Contact clip 35 has a shank portion extending upwardly

from the fingers and is connected, as by means of solder, to the conductor 13, as shown in Fig. 7. The contact clip 35 is insulated from plate 17 by means of a sleeve of electrical insulating material 36, and is held in position by an integral extension 37 of the plate, the ends of the extension 37 being folded about the sleeve 36. The second conductor 14 is clamped between sleeve 36 and one end of plate extension 37 and is soldered to the said plate extension.

A transparent lens 40 having a central opening therein is mounted in a bezel 41 at the rim of reflector 26. The lens 40 may be composed of glass but preferably is of transparent flexible resilient material, a plastic, such as the various condensation products, cellulose acetate, etc., being suitable.

The reflector 26 is clamped tightly between flange 27 of head member 22 and the clamping member 23 so that the reflector, socket and clamping member rotate as a unit when the reflector is turned. Nut 25 at the inner end of the head member 22 is in frictional engagement with internal clamping member 24 which, in turn, is in frictional engagement with the dome 21, with the result that clamping member 24 and nut 25 are held stationary and do not rotate when the reflector is turned, and the clamping engagement of member 24 against dome 21 is released by turning the reflector in a counterclockwise direction and is applied again by turning the reflector in a clockwise direction. The nut may be permanently fastened to internal clamping member 24. When it is desired to change the angular adjustment of the lantern head on its base, as is indicated in dotted lines in Fig. 2, it is necessary only to rotate the reflector slightly in the counterclockwise direction to release the head, move it to the desired position, and rotate it in the opposite direction to again tighten it in place, where it is held firmly by the said clamping engagement. The curved shape of the co-operating surfaces of dome 21 and clamping members 23 and 24 permits the head to be adjusted angularly to substantially any desired plane and position. When the lantern head is moved from one angular position to another the metal contact ball 34 turns between the fingers of contact clip 35, which fingers act as a fulcrum, and also maintain electrical contact with the ball at all times. The resilient shank of clip 35 will bend and twist enough to accommodate any slight motion of the contact ball 34.

Means are provided for manipulating lamp 29 from the forward exterior of the lantern head through the opening in the lens 40, for the purpose of rendering the lamp operative and inoperative, focusing it, and replacing it when it becomes exhausted. The means comprises a cylindrical stem or operating member 42, which extends through the opening in lens 40 and is substantially in axial alignment with lamp 29. The operating member 42 is knurled at its outer end and has an enlarged intermediate portion 43 which engages the edges of the opening in lens 40 and which has a flange 44 upon the forward portion thereof, which flange prevents the said enlarged portion 43 from being moved inwardly beyond the lens. A bail 45 is mounted at the inner end of the operating member 42. This end of the operating member is provided with a bore partially threaded as shown at 49 in Fig. 5, and the bail 45 has an elongated central portion 46 which extends into the said bore and is held in position by coiled spring 47. The spring is

maintained under pressure by means of a threaded plug 48. The bore of the operating member is enlarged to provide longitudinal guide slots 50 and 51 for the bail 45, as shown in Fig. 5. The head of plug 48 is slotted so that it may be manipulated by means of a screw driver.

A collar 52 is mounted pivotally upon the ends of bail 45, and encircles the threaded base of lamp 29, the forward edge of said collar resting against the outwardly extending flange 53 of the threaded base of the said lamp, as shown in Fig. 2, and holding the bulb of the lamp against the rearward end of the operating member. The portions 54 and 55 of the collar 52 which receive the ends of the bail are offset outwardly to accommodate the end portions of the bail between the collar and the threaded base of the lamp. The collar is arranged so that the drop of solder 56 which is usually found at the portion of the lamp base adjacent the lamp bulb is located within the recess formed by one of the offset portions 54 and 55. The drop of solder 56 is shown in Fig. 4 to be located within offset portion 54. The annular rearward end of operating member 42 is tapered inwardly and plug 48 is screwed into the bore beyond this point to form a recess or seat for the lamp bulb, and the latter is held against the said seat under resilient pressure by means of spring 47 pressing forwardly against the bail 45. To remove the lamp from its support, it is drawn away from the end of the operating member a short distance, spring 47 undergoing compression during this time, and the lamp 29 and collar 52 are pivoted upon the bail 45 until the lamp extends crosswise of the operating member after which it may be removed by being drawn forwardly out of the collar. The lamp is inserted in the support by reversing the procedure.

The lamp is inserted into the socket by passing the operating member 42, having the lamp 29 mounted thereon, lamp end foremost through the opening in lens 40 and screwing the lamp into the socket by turning operating member 42. The solder drop 56 and the collar recess interlock to transmit the movement of the operating member to the lamp. The bail 45 may have a lateral spread greater than the diameter of the opening in lens 40 but it is resilient and bends readily when passing through the opening. The removal of the lamp for replacement is accomplished by turning the operating member to unscrew the lamp from the socket, withdrawing the lamp and operating member through the opening of the lens and removing the lamp from its support and inserting a new one in the manner described heretofore.

Focusing may also be accomplished by screwing the lamp forwardly and rearwardly by turning the operating member, the spring socket terminal 33 being sufficiently long to maintain contact during such operation. The lamp may be screwed inwardly after flange 44 has engaged lens 40, spring 47 undergoing compression during this time.

The lantern may also be rendered operative and inoperative by turning the operating member. To render it inoperative the lamp is screwed outwardly until the end terminal is disconnected from spring contact member 33 and to render it operative the lamp is screwed inwardly again until the said terminal and contact member come into engagement. The position of spring contact 33 must be such that the circuit will not be disconnected during focusing of the lamp. The

opening and closing of the circuit takes place in a small enclosed space isolated from the general atmosphere and the danger of explosion by arc-igniting the combustible vapors which may be present in the atmosphere is minimized. The lantern is, therefore, adapted for use as a safety lamp for miners.

The electrical connection in the operative position of the lantern extends from the end terminal of lamp 29 through spring 33, bolt 30, ball 34, clip 35 and conductor 13 to the battery 16, thence through conductor 14, plate extension 37, plate 17, dome 21, clamping member 24, and socket 28 to the threaded terminal of the lamp 29.

The present invention provides a lantern of simple construction which is adjustable to project a light beam at various angles with respect to the base. It also provides a simple and convenient safety switch and means for focusing the lamp in a universally adjustable lantern. Furthermore, the invention provides a system in which the lamp itself may be easily adjusted or removed and replaced without dismantling the lantern head.

It will be apparent to those skilled in the art that the particular embodiment herein shown and described is an example illustrating my present invention and that the same is capable of many modifications and variations. As an example, clip 35 and ball 34 co-operate to form a ball and socket joint, and it is understood that other forms of universal joint may be used. In addition, the spring 47 may not be required. If the lens is of resilient material, it will bend inwardly as the lamp is screwed into the socket after flange 44 engages the lens. The clearance required for the insertion and removal of the lamp from the supporting collar 52 may be provided by shaping the bail so that it is bowed whereby it will straighten and become elongated to permit the withdrawal of the bulb of lamp 29 from the seat at the interior end of the operating member. For the above reasons, I do not wish to be limited except by the scope of the appended claims. The words "forward", "rearward" and similar terms are not used in a limiting sense in the specification and claims, but only for the purpose of facilitating the description.

I claim:

1. An electric lantern comprising a base, a hollow dome on said base and projecting forwardly therefrom, said dome having an opening therein, a universal joint comprising two co-operating members, one member of said joint being mounted in substantially fixed position on said base within said dome, and the other being movable and extending through said opening in said dome, said movable member of said universal joint carrying clamping members arranged on opposite sides of said dome, said clamping members being adapted to clamp and release said dome upon rotation of said movable member in opposite directions respectively, whereby said movable member may be clamped in various positions, a reflector mounted upon said movable member, an incandescent lamp mounted in said reflector, electric terminals in co-operative relation to said lamp, and supply conductors connected to said terminals, the members of said universal joint forming a portion of one of said supply conductors.

2. In a device of the class described, the combination of a generally dish-shaped reflector, a closure lens for said reflector and a lamp socket at the base of said reflector, said lens having an

opening therein, an elongated member extending through said opening and being movable with respect to said lens, one end portion of said operating member being arranged exteriorly of said lens, an incandescent lamp, means for mounting said lamp upon the interior end of said operating member and transmitting rotary movement from said operating member to said lamp, said lamp being adapted to be arranged in threaded engagement with said socket, an electric terminal in said socket, said terminal being electrically insulated from said socket and arranged in opposed relation to the end terminal of said lamp, and electrical supply conductors connected to said socket and said terminal respectively, said lamp being screwed inwardly and outwardly in said socket upon rotation of said operating member in opposite directions respectively whereby said lamp end terminal may be connected and disconnected from said terminal within said socket to render said device operative and inoperative and said lamp may be focused and also removed and inserted in said socket by the rotation of said operating member.

3. In a device of the class described, the combination of a generally dish-shaped reflector, a closure lens for said reflector and a lamp socket at the base of said reflector, said lens having an opening therein, an elongated operating member extending through said opening and being movable with respect to said lens, one end portion of said operating member being arranged exteriorly of said lens, an incandescent lamp having a threaded metal base and a bulb, a yoke member mounted upon the interior end of said operating member, said yoke member encircling the metal base of said lamp and holding the bulb thereof against said interior end of said operating member, said yoke being adapted to transmit rotary movement from said operating member to said lamp, said lamp being in threaded engagement with said socket, an electric terminal in said socket, said terminal being electrically insulated from said socket and arranged in opposed relation to the end terminal of said lamp, and electrical supply conductors connected to said socket and said terminal respectively, said lamp being screwed inwardly and outwardly in said socket upon rotation of said operating member in opposite directions respectively whereby said lamp end terminal may be connected and disconnected from said terminal within said socket to render said device operative and inoperative and said lamp may be focused and removed and inserted in said socket by the rotation of said operating member.

4. The device of claim 3 in which a recess is formed in the inner end of the operating member to receive the forward end of the lamp bulb, and spring means is provided for attaching said yoke to said operating member, said spring means constantly urging said lamp bulb into said recess and permitting the withdrawal of said lamp bulb from said recess.

5. The device of claim 3 in which the yoke is mounted pivotally at the inner end of the operating member whereby the lamp may be pivoted to an angular position with respect to said operating member and removed from said yoke.

6. The device of claim 3 in which the yoke has an indentation therein and the base of the lamp has a protuberance co-operating with said indentation for transmitting the rotary movement of the operating member to the lamp.

7. The device of claim 3 in which the metal base of the lamp has an outwardly extending

flange at the end thereof adjacent the lamp bulb and the yoke rests against the side of said flange remote from said bulb.

8. In an electric lantern having a closure lens having an opening therein, means for controlling an incandescent lamp comprising a stem member adapted to extend through said opening, and means for mounting an incandescent lamp upon an end of said stem member with the base terminal of said lamp projecting away from said member and transmitting rotary motion from said member to said lamp.

9. An electric lantern comprising a base, a hollow dome on said base, said dome having an opening at the apex thereof, a movable lantern head member passing through said opening, said opening being larger than said head member, said head member carrying guiding and clamping members arranged on opposite sides of said dome and in co-operative relation to the surfaces of said dome and being adapted to clamp and release said dome upon rotation of said head member in opposite directions respectively, said head member being adjustable to substantially any desired angular position with respect to said dome, a reflector mounted in fixed relation upon said movable member, a lens mounted over said reflector and a lamp socket mounted in said reflector, said lens having an opening therein, an elongated operating member extending through said opening and being movable with respect to

said lens, an incandescent lamp mounted upon the interior end of said operating member and adapted to rotate with said operating member and be arranged in threaded engagement in said socket, an electric terminal in said socket, said terminal being electrically insulated from said socket and arranged in opposed relation to the end terminal of said lamp, and electrical supply conductors connected to said socket and said terminal respectively, said lamp being screwed inwardly and outwardly in said socket upon rotation of said operating member in opposite directions respectively whereby said lamp end terminal may be connected and disconnected from said terminal within said socket to render said lantern operative and inoperative, and said lamp may be focused and removed and inserted in said socket by the rotation of said operating member.

10. Means for manipulating an incandescent lamp comprising a stem member having a recess in one end portion thereof, a yoke extending beyond said end of said stem member and being adapted to accommodate the base of said lamp and hold the bulb of said lamp against said end of said stem member, said yoke having a portion thereof extending into said recess, and spring means within said recess and pressing against said portion of said yoke to urge said yoke toward said end of said stem member.

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