June 26, 1934. K. J. HELMHOLTZ 1,964,466

ELECTRIC LANTERN

Filed Jan. 11, 1932

Fig. 1.

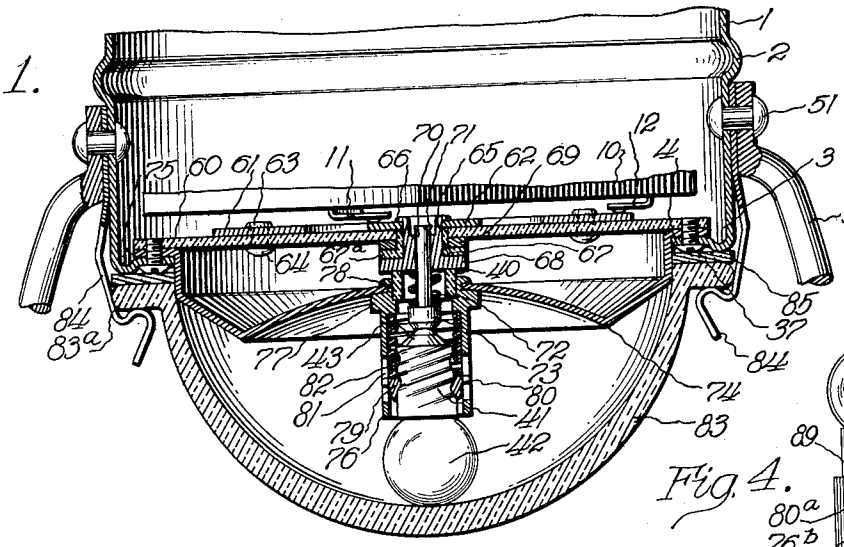


Fig. 4.

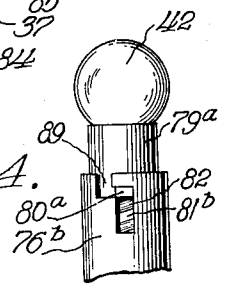
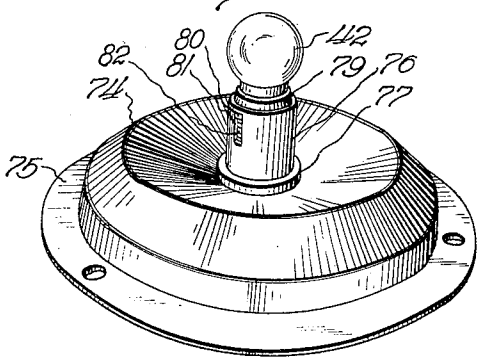


Fig. 2.



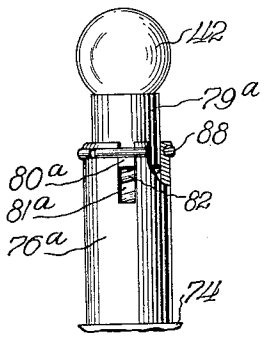


Fig. 3

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ELECTRIC LANTERN

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Application January 11, 1932, Serial No. 585,916

1 Claim. (Cl. 240—11.3)

This invention relates to electric lanterns and analogous devices.

An important object of my invention is to provide an electric lantern particularly adapted for use in oil refineries and other establishments where highly inflammable gases and vapors are present, such lanterns being so constructed as to eliminate possibility of ignition of such gases or vapors in the use of the lantern. Further objects and advantages of my invention will appear from the detail description.

In the drawing:—

Figure 1 is a central vertical sectional view through the lower portion of a lantern in accordance with my invention, parts being shown in elevation;

Figure 2 is a perspective view of the reflector and associated parts of the lantern;

Figure 3 is a detail, partly broken away and in section, of a modified form of a bulb socket and sleeve for use with the lantern; and

Figure 4 is a detail of a second modified form of bulb socket and sleeve for use with the lantern.

The lantern of my invention comprises a cylindrical sheet metal casing 1, which is a good conductor of electricity, provided with suitably disposed ribs 2 formed therein for bracing the casing against radial distortion. At its lower end the casing is provided with a channel element 3 and a flange 4 extending inwardly therefrom, and suitable means is provided for closing the upper end of the casing substantially fluid tight. The casing 1 receives an electric battery 10 of known type disposed within the casing in inverted position. This battery is provided with a central terminal member 11 and an outer terminal member 12 of suitable type.

A downwardly flaring base frame 50 is suitably secured to the casing 1, as by means of rivets 51. The electric battery 10 may be of any suitable or preferred type of dry battery, and is provided with an outer casing or covering which serves both as an insulating and a protecting covering therefor. The battery casing serves to effectively insulate the battery from the surrounding wall of the lantern casing 1. Dry batteries of this general type are well known in the art and need not be illustrated nor described here in detail.

The lantern is provided with a switch structure which comprises a disc 60 of suitable insulating material, upon the upper face of which are mounted concentric contact strips 61 and 62. Strip 61 is secured to the disc by rivets 63 each of which is provided, at its lower end, with a rounded head 64. A metal thimble 65 extends through disc 60 and strip 62, the upper end of this thimble being turned outwardly at 66 into close contact with strip 62. A flanged insulating bushing 67 is disposed about thimble 65 between strip 62 and flange 68 at the lower end of the thimble. A switch arm 69 is mounted, at its inner end, for turning movement on the bushing between flange 67*a* thereof and the under face of disc 61.

A short rod 70 is slidable in a reduced bore extending from the lower end of thimble 65, and has its downward movement limited by an element 71 at the upper end thereof. This rod is urged downwardly by an expansion coil spring 72 disposed about the rod and confined between the lower end of the thimble and an enlarged contact head 73 at the lower end of the rod.

An upwardly concaved metal reflector 74 is disposed within flange 4 of the casing 1, and is provided with a flange 75 seating upon the upper face of flange 4. Screws 37 serve to secure the reflector and the disc 60 in position. A metal sleeve 76 is secured to the reflector centrally thereof, by means of a flange 77 and a reduced neck 78, both formed integrally with the sleeve, the neck extending through the reflector and having its upper end turned outwardly so as to clamp the reflector securely between the flange and the upper end of the neck. An insulating bushing 40 seats in neck 77 about spring 71 and rod 69.

Sleeve 76 slidably receives a metal collar 79, downward movement of which is limited by short studs 80, which project from the collar and operate in slots 81 in the sleeve and terminating short of the lower end thereof. An expansion coil spring 82, disposed within sleeve 76, and confined between the upper end thereof and collar 79, urges the latter downwardly. This collar is interiorly threaded for reception of the metal shell 41 on the stem of an incandescent bulb 42 of known type, this shell constituting one terminal of the bulb, which is also provided with a central terminal 43. A glass dome 83 of approximately hemispherical cross-section is secured upon the lower end of the casing by spring clips 84, which are secured to the casing by certain of the rivets 51. These clips are suitably shaped to exert appreciable pressure against the under face of a flange 83*a* extending outwardly from the dome. The clips press flange 83*a* tightly against a sealing gasket 85 of cork, or other suitable material, confined between the flange and channel element 3. This provides a fluid tight seal between the dome and the bottom of the casing. The dome normally holds bulb 42 in raised posi-

tion with the central terminal 43 thereof in contact with head 73, and the studs 80 spaced a considerable distance from the lower ends of slots 81, as in Fig. 1. This dome tapers in thickness from its central portion to its periphery and also serves as a lens to concentrate the light rays, which is advantageous.

Switch arm 69 is turnable on thimble 65 into circuit opening position and circuit closing position provided at the outer end thereof. With arm 69 in circuit closing position this arm contacts head 64 of rivet 63, so as to close the circuit of bulb 42 through contact strip 61, rivet 63, arm 69 and the casing wall, reflector 74, sleeve 76 and collar 79 and shell 41 to the bulb filament, terminal 43, head 73, rod 72 and thimble 65 to contact strip 62. By moving arm 69 into circuit opening position it is moved out of contact with the rivet thus opening the circuit.

The construction shown is particularly advantageous as providing an additional seal for the lower end of the casing and a guard for the bulb 42. If this bulb were unprotected, there would be the danger that the hot filament would ignite highly inflammable gases and vapors in the surrounding atmosphere, in the event of breakage of the bulb. With the construction shown, if the bulb 42 were broken, spring 82 would project collar 79 downwardly so as to open the circuit automatically, and dome 83 would effectively prevent ignition of surrounding gases or vapors either by the hot filament or any spark incident to opening of the circuit. If the dome 83, or both the dome and the bulb 42, were broken, spring 82 would act to open the circuit automatically and instantaneously before the surrounding inflammable gases or vapors had an opportunity to come into sufficiently close proximity to either the filament or contact elements to be ignited. This lamp has been subjected to rigorous tests in atmospheres heavily charged with highly inflammable gases and vapors, and such tests have definitely demonstrated that it can be used in such atmospheres with entire safety.

In the modified form of sleeve and socket structure shown in Fig. 3, sleeve 76*a* is provided with slots 81*a* extending from the end of the sleeve which, in use, is its lower end. Collar 79*a* is slidably mounted in the sleeve, outward movement of this collar being limited by contact of studs 80*a*, on the collar, with a split resilient ring 88. This ring seats tightly in a groove formed in the sleeve, circumferentially and adjacent the lower end thereof, the adjacent end of the sleeve being turned over the ring. Collar 79*a* is much wider than collar 79 of Fig. 9, and fits the interior of sleeve 76*a* snugly. This form of construction is advantageous as facilitating assembly, while preventing looseness of the collar 79*a* in sleeve 76*a*.

The construction illustrated in Fig. 4 is quite similar to that of Fig. 3, except that sleeve 76*b* is provided with a bayonet slot 89 opening into the upper end of each of the slots 81*b*. This facilitates insertion of collar 79*a* into the sleeve 76*b*, and removal of this collar from the sleeve, when desirable or necessary.

It is to be understood that the casing of my lantern need not be absolutely fluid tight, it sufficing if the casing and associated parts are so constructed and related as to shield any flame or spark, which may occur within the casing, sufficiently to prevent ignition of highly inflammable gases or vapors present in the atmosphere surrounding the lantern.

While I have shown the automatic circuit opening means of my invention, by way of example, as applied to an electric lantern, it is capable of being used in ordinary lighting circuits by providing a suitable member disposed to normally hold the bulb in circuit closing position. In the event of breakage of the bulb, the circuit is instantaneously and automatically opened in the manner above described. This feature of my invention is of particular value in mines, oil refineries and other places where inflammable gases and vapors are present.

What I claim is:—

In an electric lantern, a metal casing provided at one end with an inwardly extending flange, an insulating member extending across said end of the casing inwardly of the flange, a metal reflector closing said end of the casing and having a rim portion secured between said member and the flange in contact with the latter, a metal sleeve secured to the reflector in electrical conducting relation therewith, a contact member carried by said insulating member and extending into the inner end of the sleeve and insulated therefrom, a lamp comprising a frangible bulb and a base slidable in the sleeve and having a stem terminal electrically connected to said sleeve and a center terminal disposed to contact said contact member when the lamp is in normal retracted position in the sleeve and to be out of contact with said contact member when the lamp is projected outward of the sleeve, means yieldingly urging the lamp outward of the sleeve, and means comprising a frangible dome secured to said end of the casing and cooperating therewith and with the reflector to enclose the lamp and normally hold it in its retracted position in the sleeve.

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