T. A. EDISON.

ELECTRIC SAFETY LANTERN.

APPLICATION FILED OCT. 16, 1914.

1,266,779.

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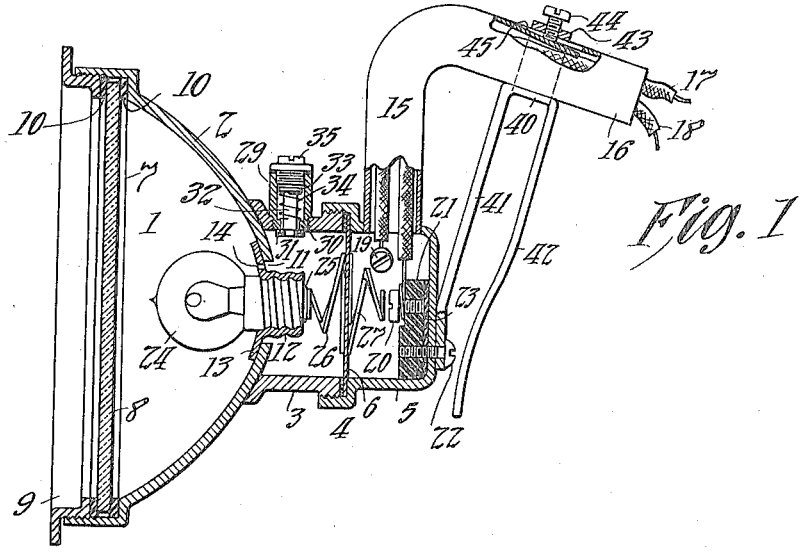

Fig. 1

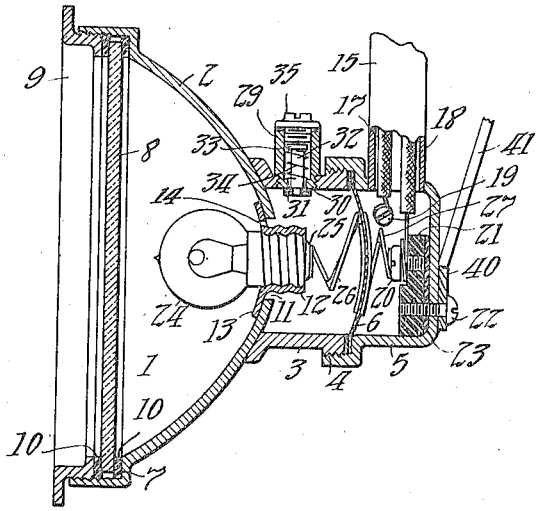

Fig. 2

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UNITED STATES PATENT OFFICE.

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ELECTRIC SAFETY-LANTERN.

1,266,779. Specification of Letters Patent. Patented May 21, 1918.

Application filed October 16, 1914. Serial No. 866,943.

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, a citizen of the United States, and a resident of Llewellyn Park, West Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Electric Safety-Lanterns, of which the following is a description.

My invention relates to electric safety lanterns which, while adapted for general use, are especially designed for use in mines, tunnels, powder magazines and other places where readily combustible gases or other materials of a highly combustible or explosive nature are liable to be present.

The principal object of my invention is to provide a simple and an improved lantern of this character and one of such construction as to insure against the ignition of gases or other combustible materials thereby, especially in case of damage to the lantern.

Other features of my invention reside in the details of construction and combinations of elements hereinafter more fully described and claimed.

In order that my invention may be more clearly understood, attention is directed to the accompanying drawing forming a part of this specification and in which—

Figure 1 represents a central cross sectional view, partly in elevation, of a preferred form of my improved lantern showing the lamp circuit open; and

Fig. 2 is a similar view showing the lamp circuit closed.

The same reference characters are used throughout the drawing to designate corresponding parts.

Referring to the drawing, reference character 1 represents the lamp casing which preferably comprises a parabolic reflector 2, preferably formed of metal, and a cylindrical hollow chamber 3 suitably secured to the rear end of the reflector, preferably by being brazed thereto. Suitably secured to the rear end of the chamber 3, as by being threaded thereto at 4, is a hollow cap or cup-shaped member 5, this member serving to fasten a flexible diaphragm 6, preferably formed of metal, against the open rear end of the chamber 3 in fluid tight engagement therewith. The front end of the reflector is provided with an annular seat 7 and is closed by a glass or lens 8 securely held in said seat by a threaded ring 9. Suitable washers 10, 10 are disposed between the glass 8 and the ring 9 and seat 7 in order to render the forward end of the lamp casing fluid tight. The rear end of the reflector is provided with an opening 11 communicating with the chamber 3, in which opening is disposed a lamp socket 12. The forward end of the lamp socket is provided with a flange 13 which is suitably secured, as by brazing, to the reflector about the opening 11 therein. The flange 13 is provided with one or more apertures 14 whereby communication is established between the interior of the reflector 2 and the chamber 3. Secured to the cup-shaped member 5 is a tubular member preferably formed of thin sheet metal and comprising a vertical portion 15 and a rearwardly extending portion 16. Flexible conductors 17 and 18 are disposed within the tubular member and extend from the vertical portion 15 thereof into the cup-shaped member 5 and from the end of the rearwardly extending portion 16 for connection with a suitable source of current, such as a storage battery (not shown). The end of conductor 17 within member 5 is grounded to the latter as by means of a binding screw 19 and the corresponding end of conductor 18 is connected to a stationary contact 20. Contact 20 is preferably in the form of a screw and is threaded into an insulating block 21 which is secured to the end wall of the cup-shaped member 5 as by means of a screw 22. An insulating strip 23 is disposed between the block 21 and the end wall of member 5 to insulate the end of screw 20 from said wall.

An incandescent lamp 24 is disposed within the reflector 2, the plug thereof being threaded into the socket 12. The lamp plug is provided with a button 25 which constitutes one terminal of the lamp. The flexible diaphragm 6 has secured to one side thereof a light metallic spiral spring 26 adapted to engage the terminal 25 of the lamp when the latter is secured in the socket 12. A relatively stiff metallic spiral spring 27 is secured to the other side of the diaphragm 6 and is adapted to engage the stationary contact 20.

The chamber 3 is provided with an improved valve which permits fluid to be

forced or pumped into the chamber but which effectively prevents the escape of fluid therefrom. This valve comprises a tubular valve casing or sleeve 29 threaded into an opening provided in the wall of chamber 3, the outer end portion of the valve casing being internally screw threaded and the inner end portion thereof being provided with an internal annular flange 30. Reference character 31 represents a check valve which is provided with a stem 32 passing loosely through the flange 30 and having at its inner end a shoulder 33. A compressed coiled spring 34 surrounds the valve stem 32 between its shoulder 33 and the annular flange 30 of the valve casing and constantly tends to hold the valve 31 against the seat therefor provided by the inner end of the casing 29. Reference character 35 represents a cap which is threaded into the internally screw threaded end portion of the valve casing and prevents dirt from entering the latter and also serves as additional means for preventing the escape of fluid from the lamp casing.

In order that the lantern may be readily and securely attached to an object such as the ordinary miner's cap, I provide the same with a substantially U-shaped bracket 40. One leg 41 of this bracket is suitably secured at its end, as by means of screw 22, to the end wall of the cup-shaped member 3, while the other leg 42 thereof is in the form of a spring finger or hook and is adapted to extend through the usual aperture in the top of the lantern supporting bracket of a miner's cap and to press against the rear of this bracket. The bracket 40 is provided at its base with a stirrup 43 through which the rearwardly extending portion 16 of the tubular member containing the conductors 17 and 18 extends. A screw 44 is threaded through the stirrup 43 and acts to fasten the bracket 40 more securely to the lantern. The tubular portion 16 is preferably slitted to provide the same with a resilient strip 45 in the upper portion thereof and the screw 44, in addition to the function just described, also acts to prevent the breaking of the connections between the conductors 17 and 18 and screws 19 and 20 by forces applied to the conductors beyond the lantern, by depressing the strip 45 to thereby firmly clamp the conductors 17 and 18 between the latter and the lower portion of the tubular member, as clearly shown in Fig. 1.

The flexible diaphragm 6 normally tends to assume the position shown in Fig. 1 and when in this position the stiff spring 27 will be disengaged from contact 20. The light spring 26 will then be in engagement with the terminal 25 of the lamp and will be under such a compression that, when the diaphragm is flexed to its operative position in which spring 27 engages contact 20 to close the lamp circuit, it will merely expand without disengaging the terminal 25, as shown in Fig. 2.

When the lantern is operative the path of the current therethrough is as follows: through one conductor 17 to binding screw 19, then through the walls of cup-shaped member 5, chamber 4 and reflector 2 to the lamp socket 12, then through the lamp 24 and terminal 25 thereof, spring 26, diaphragm 6, spring 27 and contact screw 20 to the other conductor 18.

To render the lantern operative, the fluid tight casing 1 is supplied with sufficient fluid pressure, by forcing fluid thereinto past the check valve 31, to flex the diaphragm to the position shown in Fig. 2 and thereby close the lamp circuit. In case of such damage to the lamp casing as will destroy its fluid tight character, as for example, the breaking of the glass front or lens 8, the compressed fluid will escape therefrom and diaphragm 6 will at once assume the position shown in Fig. 1. This will effect the extinguishing of the lamp by withdrawing the spring 27 from engagement with the contact 20 and thereby breaking the lamp circuit.

The use of the spring 26, which is not attached to the lamp, but merely loosely engages one terminal thereof, and the manner in which the lamp is mounted enables the lamp, when broken or burned out, to be very readily replaced.

The form of springs 26 and 27 and the manner in which they are mounted and coact with the lamp terminal 25 and the screw 20 are such as to insure a very effective contact between the said springs, terminal, and screw, somewhat in the nature of a sliding contact.

While I have specifically described the preferred embodiment of my invention, it is to be understood that many changes may be made in the size, form and arrangement of the parts thereof without any departure from the spirit of the invention and the scope of the appended claims.

Having now described my invention what I claim as new and desire to protect by Letters Patent is as follows:

1. In an electric safety lantern, an incandescent lamp and an electric circuit including said lamp, a contact, and a device comprising flexible means disposed between said contact and one terminal of the lamp and movable with respect to said contact to effect the making and breaking of the circuit, said flexible means normally tending to assume circuit breaking position and being provided with resilient conducting means unattached to the lamp but engaging one terminal thereof in all positions of the flexible means, substantially as described.

2. In an electric safety lantern, an incandescent lamp, and an electric circuit includ-

ing said lamp, a contact, and means comprising a flexible diaphragm movable with respect to said contact to effect the making and breaking of the circuit, said flexible diaphragm normally tending to assume circuit breaking position and being provided on one side thereof with a coiled spring unattached to the lamp but engaging one terminal thereof in all positions of the flexible diaphragm, substantially as described.

3. In an electric safety lantern, an incandescent lamp, and an electric circuit including said lamp, a contact and a flexible diaphragm movable with respect to said contact to effect the making and breaking of the circuit, said diaphragm normally tending to assume circuit breaking position, being provided on one side thereof with resilient means unattached to the lamp but engaging one terminal thereof in all positions of the diaphragm, and being provided on its other side with resilient means adapted to engage and disengage said contact, substantially as described.

4. In an electric safety lantern, a fluid tight casing comprising a reflector and a hollow chamber communicating therewith, one wall of said chamber comprising a flexible member, an incandescent lamp disposed within said reflector, and an electric circuit including said lamp, said flexible member being movable under variations in fluid pressure in said casing to effect the making and breaking of said circuit, substantially as described.

5. In an electric safety lantern, a fluid tight casing comprising a reflector and a hollow chamber, one wall of the chamber comprising a flexible member, said reflector being provided with an opening communicating with said chamber, a lamp socket secured to said reflector about said opening and being provided with means establishing communication between said chamber and reflector, an incandescent lamp mounted in said socket, and an electric circuit including said lamp and said flexible member, said flexible member being movable under variations in fluid pressure in said casing to effect the making and breaking of said circuit, substantially as described.

6. In an electric safety lantern, a fluid tight casing one wall of which comprises a flexible diaphragm, an incandescent lamp mounted in said casing, an electric circuit including said lamp and controlled by said diaphragm, said diaphragm normally tending to assume circuit breaking position but being movable by fluid pressure in said casing to circuit closing position, and a resilient member secured to said diaphragm and unattached to but engaging one terminal of said lamp when the diaphragm is in either of said positions, substantially as described.

This specification signed and witnessed this 13th day of October 1914.

THOS. A. EDISON.

Witnesses:
WILLIAM A. HARDY,
MARY J. LAIDLAW.