May 28, 1946. J. D. CEADER 2,400,916

SAFETY LAMP

Filed Sept. 11, 1944

FIG. 1.

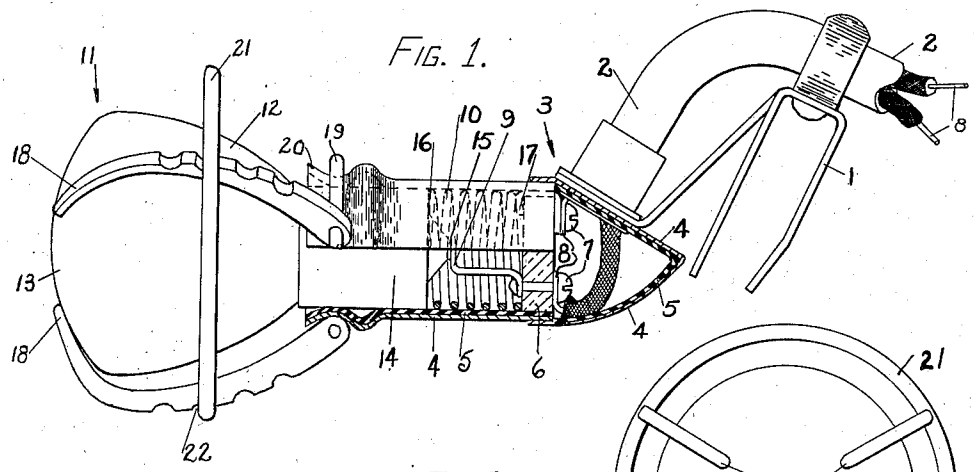


FIG. 2.

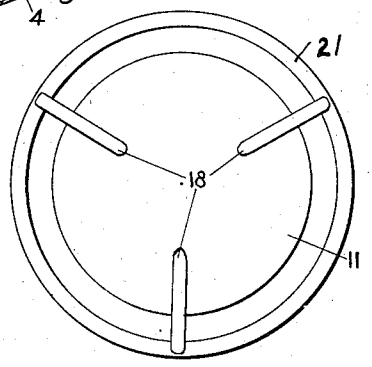


FIG. 3.

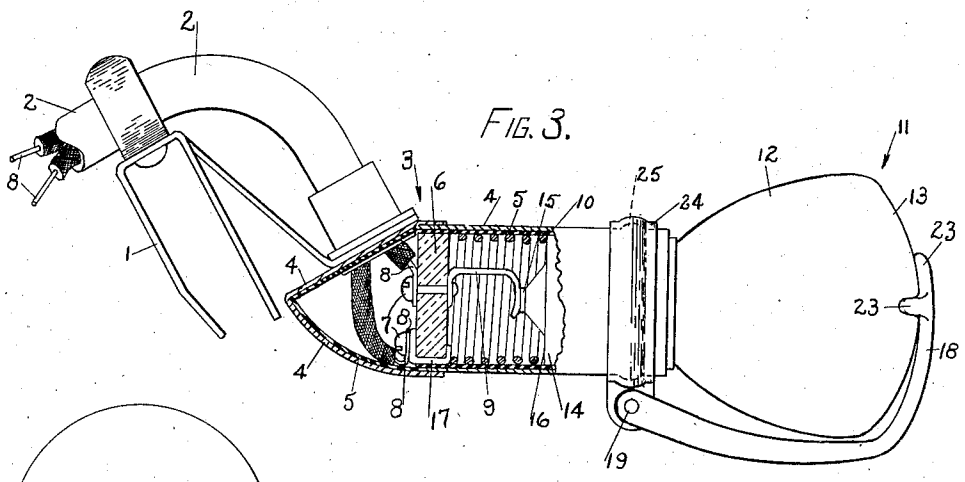
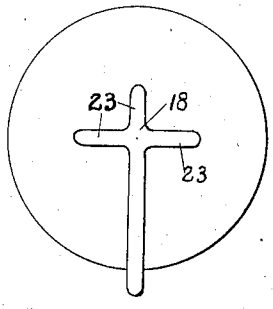


FIG. 4.



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UNITED STATES PATENT OFFICE

2,400,916

SAFETY LAMP

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Application September 11, 1944, Serial No. 553,517

1 Claim. (Cl. 240—11.3)

This invention relates to electric safety lamps for the use of miners and others who work where inflammable, explosive, or other thermo-reactive atmospheres or gases may be encountered. The invention aims to provide protection against danger from breakage of a lamp bulb by promptly stopping the flow of current to the lamp. A further aim is to accomplish this in a simple and convenient way, without necessity for heavy or complicated apparatus; on the contrary, the equipment can be made very light and compact, and easy and inexpensive to make and use. The invention is applicable to lamps with plural end contacts on their bases, and to lamps with plural filaments, as well as to the single filament, single contact lamps in connection with which it is here illustrated and particularly explained. Various features and advantages of the invention will appear from the description of species and forms of embodiment, and from the drawing.

In the drawing, Fig. 1 is a side view of a safety lamp equipment conveniently embodying the invention, certain parts being partly broken out and in section; and Fig. 2 is a corresponding end view.

Figs. 3 and 4 are views similar to Figs. 1 and 2 illustrating a modification.

Fig. 1 shows the invention as embodied in a miner's safety lamp equipped with a known type of fastener 1 for mounting the lamp on a miner's cap (not shown), and with a flexible cable 2 for connecting it to a battery (not shown) that may be carried on the miner's back, or to any other source of current. These parts 1, 2 are shown attached to a holder or socket 3 that includes an external casing or shell 4 provided with an insulative lining 5 and having mounted therein an insulative part 6 that carries screw connectors 7, 7 for lead-wires 8, 8 of the cable 2, as well as contacts 9, 10 for an electric lamp 11. The lamp 11 may be an incandescent filament lamp, or a discharge lamp of fluorescent or other type, or any other suitable electric lamp. As shown, it comprises a shouldered bulb with a parabolic, spherical, or otherwise rounded rear reflector portion 12 and a spherically rounded radiation-transmitting front portion 13, as well as a neck which provides a mounting or base portion 14, or is equipped therewith. Associated with this portion 14 of the lamp are contact terminals 15, 16 for coacting with the contact means 9, 10 already mentioned as associated with the holder 3. The lamp contacts shown are a center contact 15 at the end of an insulative conical projection on the base 14, and an annular contact shoulder 16 surrounding this conical projection. The socket contacts shown are a C-bent and somewhat resilient metal strip 9 fixed on the insulative part 6 and electrically connected to one of the connectors 7, and a helical metal wire compression spring 10 accommodated in the shell lining 5 around the contact 9 and electrically connected to the other connnector 7 by a metal strip 17 set into the part 6. This spring 10 bears against the lamp base shoulder 16 and urges the base 14 and its center contact 15 away from the center contact 9 of the socket 3.

For normally holding the lamp 11 and its base 14 in place in the holder or socket 3, and likewise holding the contacts 15 and 9 together, one or more retainers or hooks 18 associated with the holder 3 are arranged to hook over suitable shoulder(s) on the lamp bulb: viz., in the device here illustrated, over the shouldered front bulb portion 13. As shown in Figs. 1 and 2, three hooks 18 are mounted around the open front end of the holder 3 so that they can swing together on the bulb end 13 after the bulb has been placed in the holder, or vice-versa. For this purpose, the rear ends of the hooks 18 may be pivoted on a ring 19 fitted into an annular groove in the forward end of the holder shell 4, behind a shoulder formed by a flare 20 at the mouth of this shell. To hold the hooks 18 together in engagement with the shouldered bulb end 13, a tie in the form of a springy, resilient wire ring 21 is shown embracing the shanks of the hooks (and the corresponding portion of the bulb), behind the greatest spread of the hooks at the largest diameter of the bulb. To supplement friction in holding the tie ring 21 in place, the shanks of the hooks may have serrations or rounded notches 22 for a ring to engage in. The spring of the ring 21, supplemented by some resilient flexure of the hooks 18, makes it easy to assure a convergent grip of the hooks on the bulb 11 with considerable resilient pressure.

So long as the bulb 11 is intact, the hooks 16 hold it in the position shown in the holder, with the spring 16 under elastic compression against the base contact 10, and the center contacts 15, 9 engaged. If and when the bulb 11 is broken, its diminished strength assures its being collapsed and shattered by the force of the spring 16 and the convergent resilient pressure of the hooks 18. When this happens, the spring 16 is free to push the base 14 outward in the holder or socket 3, separating the contacts 15, 9, breaking the circuit, and stopping the flow of current. The usual gas filling in the lamp 11 serves to prevent con-

tact of the surrounding atmosphere with the electric translation means (e. g., filament(s) or electrode(s)) in the lamp bulb until these parts have cooled to the point where there is no further danger of explosion or the like.

The device illustrated in Figs. 3 and 4 differs from that just described in having only a single hook 18, which hooks over the front bulb end 13 and bears thereon symmetrically around the bulb axis, having for this purpose a plurality of radial arms or fingers 23. The rear end of this hook 18 is shown as pivoted at 19 to lugs on a collar 24 clamped around the open end of the holder shell 4 over an annular shoulder 25 embossed in the shell. When the bulb 11 has been placed in the holder 3 and the hook 18 swung into position as shown, the pressure of the spring 16 and the bulb 11 against the hook 18 and its fingers 23 retains the hook against accidental disengagement as long as the bulb remains intact. When the bulb 11 is broken, the force of the spring 16 collapses and shatters it and also pushes the base 14 away from the contact 9 and breaks the circuit, etc., just as in the device of Figs. 1 and 2.

What I claim as new and desire to secure by Letters Patent of the United States is:

In a lamp holder of the type comprising a socket including a shell adapted to receive the base of an electric lamp and containing contacts engageable with contacts on said lamp base, and spring means urging the lamp outwardly of the socket and out of engagement with at least one of the sockets contacts, means to retain the lamp in said socket comprising a plurality of hook-shaped fingers pivotally supported from said shell at their rearward ends to hook over the front end of the bulb of said lamp to retain the lamp in the socket, and resilient tie means embracing the bulb and said fingers to hold said fingers in closed position around said bulb.

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