

C. V. A. ELEY & T. P. BRADY.
 MINER'S AND THE LIKE ELECTRIC SAFETY LAMP.
 APPLICATION FILED NOV. 18, 1909.

988,321.

Patented Apr. 4, 1911.

3 SHEETS—SHEET 1.

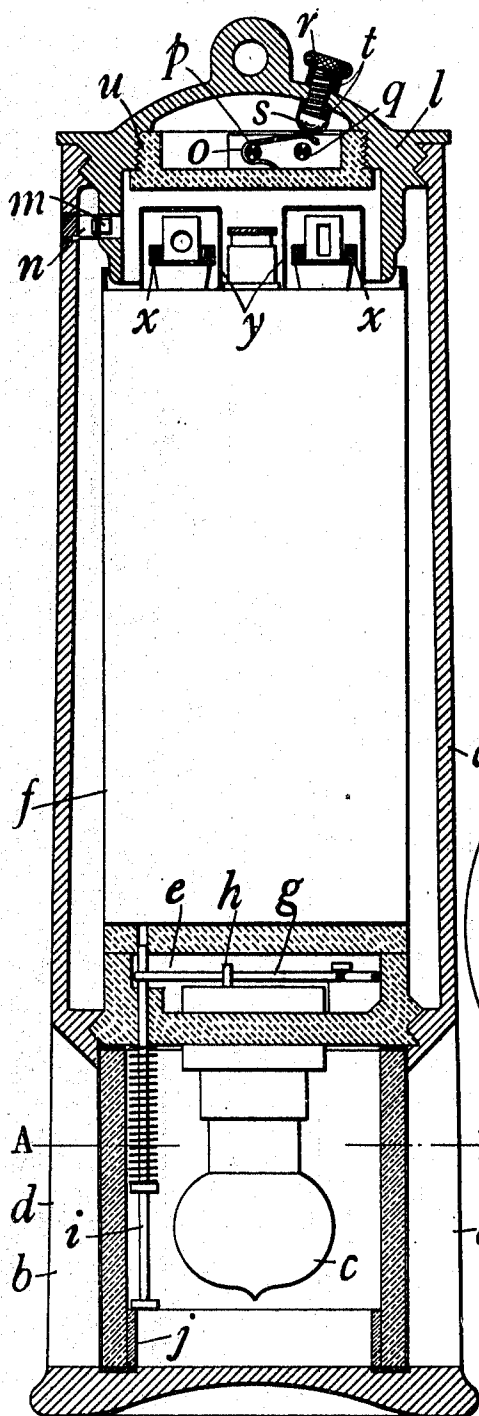


Fig. 1

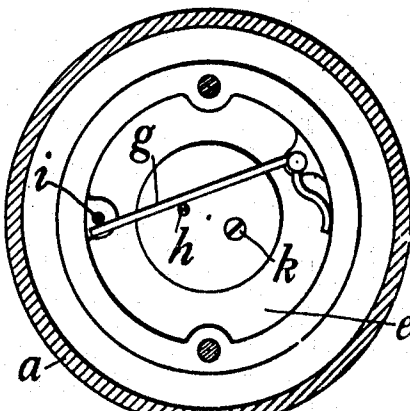


Fig. 2

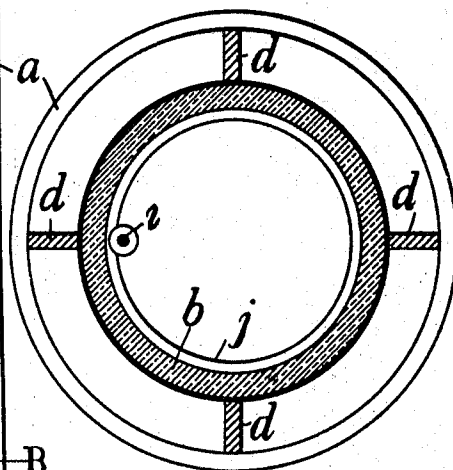


Fig. 3

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3 SHEETS-SHEET 2.

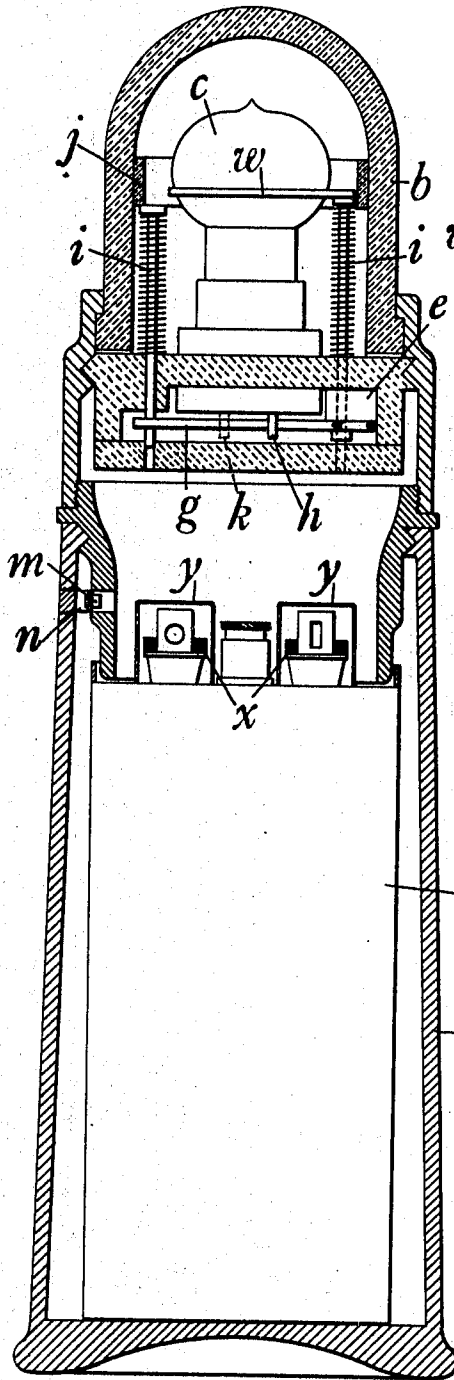


Fig. 4

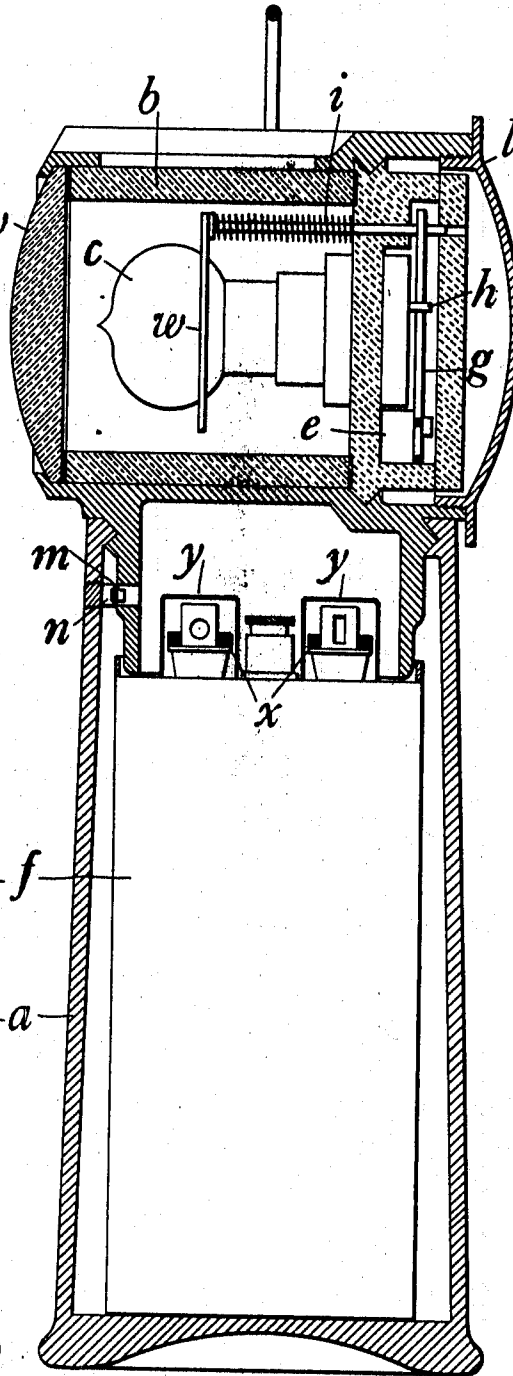


Fig. 5

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3 SHEETS—SHEET 3.

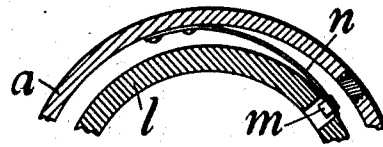


Fig. 6

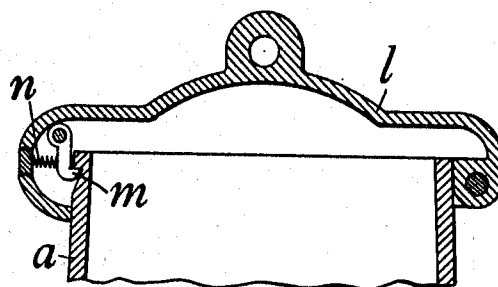


Fig. 7

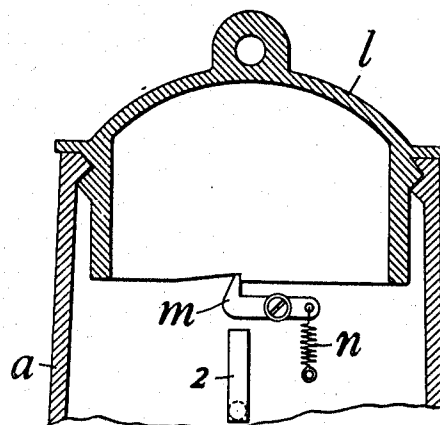


Fig. 8

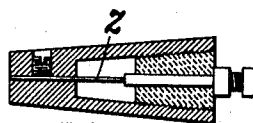


Fig. 9

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UNITED STATES PATENT OFFICE.

CHARLES VICTOR ALBERT ELEY AND THOMAS PATRICK BRADY, OF BIRMINGHAM, ENGLAND.

MINER'S AND THE LIKE ELECTRIC SAFETY-LAMP.

988,321.

Specification of Letters Patent.

Patented Apr. 4, 1911.

Application filed November 18, 1909. Serial No. 528,833.

To all whom it may concern:

Be it known that we, CHARLES VICTOR ALBERT ELEY and THOMAS PATRICK BRADY, subjects of Great Britain, residing at 10 Cambridge Crescent, in the city of Birmingham, England, have invented certain new and useful Improvements Relating to Miners' and Like Electric Safety-Lamps, of which the following is a specification.

10 This invention relates to miners' and like electric safety lamps and has for its object to construct such lamps with improved means for reliably and effectively safeguarding against explosion or fire and preventing
15 unauthorized access to the interior of the lamps.

Referring to the three accompanying sheets of explanatory drawings;—Figure 1 is a vertical section of a miner's lamp having
20 this invention applied thereto. Fig. 2 is a sectional plan showing the automatic circuit breaker and Fig. 3 a sectional plan on A. B. (Fig. 1). Figs. 4 and 5 are vertical sections showing modified forms of our lamps. Fig.
25 6 is a part sectional plan showing the fastening device employed with the lamp illustrated at Fig. 1, while Figs. 7 and 8 are sectional diagrams showing modified arrangements of the closing cap and locking
30 device for the lamp. Fig. 9 is a diagram illustrating one form of fuse employed with our lamps.

The same reference letters in the different views indicate the same or similar parts.

35 In the construction of a miner's safety lamp as shown at Figs. 1 to 3, we employ a cylindrical metal case or body part *a* preferably having the form of the well known miners' lamps now in general use. Such
40 body part may be cast in iron, brass or aluminium. The portion of the case which forms the lantern or lighting chamber is provided with a glass inclosure *b* for the electric bulb *c*. The said glass is suitably
45 protected, such as by bars *d* or wires formed with or attached to the case, or by a sheath formed of the open metal work now generally known as expanded metal. The lamp
50 itself is of any ordinary incandescent electric type and is attached in any convenient manner to a disk or plate at the top or bottom of the lantern or lighting chamber. Such disk forms part of a box *e* containing an automatic circuit breaker. In the draw-
55 ings the box *e* (which is preferably made of

porcelain or other insulating material) is screwed into the case *a* above the glass *b*. The upper portion of the lamp case contains a secondary battery *f* for the supply of the electric current. Within the box *e* we mount
60 the automatic cut-out switch or circuit breaker. Such device comprises a spring contact piece *g* which can be pressed against its spring action into contact with a terminal
65 *h*. In conjunction therewith we arrange in the lantern a device consisting of a spring actuated or other sliding rod *i*, one end of which acts upon the piece *g* to retain it
70 against the terminal *h* while the opposite end abuts upon or is restrained by a ring of glass *j* or other suitable material within
75 the outer glass *b*. A second terminal *k* in the switch box and one end of the piece *g* are connected to the battery terminals and a control switch to be hereinafter referred to.
80 So long as the glass inclosure remains intact the automatic switch or circuit breaker is held in the closed position, and the current flows through the lamp and the light is maintained. But should the glass *b* crack
85 or break the ring *j* will shatter and the rod *i* under the action of its spring will be withdrawn from the piece *g*. The switch, being no longer held, will then automatically open
90 and thus cut the lamp out of circuit. No closing of the lamp circuit after the ring *j* is broken is possible without opening the
95 lamp case, and such opening can only be effected in the manner hereinafter referred to.

The upper part of the lamp case or body is
100 provided with a screwed or other lid or cover *l* which is secured in its closed position by a concealed locking bolt or catch *m* carried on a spring blade *n* which lies around the interior of the lamp case. The bolt is
105 adapted to be withdrawn, to permit opening of the cover for access to the interior of the case, only by means of a magnet or by a key or its equivalent of such a form as will prevent its substitution by a knife or the
110 like.

On the inner side of the lid or cover, we arrange a spring switch piece *o* connected to a terminal *p* and of such construction as will
115 permit of its being pressed into contact with or released from a terminal *q* for the completion or breaking of the electric circuit, by means of a close fitting thumb screw *r*, or the like, actuated from the exterior of the lamp. A stop collar *s* of insulating material is pro-
120

vided on the screw, or other ordinary means adopted to prevent the complete withdrawal. In conjunction with the inner and outer ends of the screw rubber washers *t* are provided to insure gas tight joints around the screw. Preferably the switch in the cover is inclosed by a cap *u*, an important consideration in the construction of all parts of the lamp being to make the interior gas tight.

10 Instead of suspending the lamp in the lantern chamber as shown it may be attached to the bottom of the case, the circuit breaker box being then placed at the lower end of the glass inclosure, and the inner glass ring arranged at the upper end. Fig. 4 shows a lamp mounted at the upper end of the body part *a* and the battery in the lower portion, while Fig. 5 shows the lamp mounted horizontally with a lens *y* in the front end of the glass *b*. The essential elements of the lamps in Figs. 4 and 5 are similar to those in the form shown by Figs. 1 to 3, the corresponding parts being denoted by similar reference letters. The switch piece *o* and screw 25 *r* (not shown) are situated to any convenient part of the lamp case. For securing the part *l* to the body part *a* a locking bolt *m* and spring *n* are employed as shown.

The provision for breaking the circuit as shown in Fig. 5 is arranged to operate with the fracture of the lamp bulb. Instead of the glass ring previously referred to a metal or other ring *w* is placed over the bulb and the spring rod *i* arranged to abut against it. 35 With the breaking of the bulb the rod is liberated and the circuit breaker actuated as above described. In Fig. 4 both rings *w* and *j* are shown, with two spring controlled rods. Two contact pieces *g* are then preferably employed with appropriate connections to the battery so that the circuit breaker operates with the fracture of either the glass *b* or the lamp bulb *c*. It will be understood that any of the arrangements of rings and 45 spring controlled rods may be employed with any of the forms of lamp described.

To avoid improper connection of the terminals of the battery to the mains when charging, one is formed with a circular aperture 50 and the other with a rectangular aperture and correspondingly shaped metal plugs are secured to the wires from the current mains. To connect the plugs it is simply necessary to insert them in the terminal apertures, the requisite security being afforded by rubber 55 spring washers *z*. The wires used in the internal connections of the lamps are also provided with plugs as above described where connection is made with the terminals. 60 Celluloid or like caps *y* are preferably placed over the terminals to insulate them, such caps being perforated for the insertion of the plugs aforesaid. To insure interruption of the circuit in the event of a short circuit 65 or an excessive current from any other cause,

one of the plugs is made hollow and fitted internally with a short length of fuse wire *z* (Fig. 9). One end of the wire is attached to the plug and the other to a metal connection which is insulated from the plug as shown. In a modification the fuse is arranged integrally with one of the battery terminals.

Instead of a screwed cover as illustrated in Fig. 1 a hinged cover *l* may be adopted as represented in Fig. 7. This is secured by a spring catch *m* arranged to engage the body part of the lamp. For releasing the cover the catch is withdrawn by a magnet or special key. In the modified form of catch shown in Fig. 8, the catch *m* is situated at the lower or inner edge of the cover and a notch is formed in the said edge for engagement by the catch. Adjacent to the operative edge of the catch is provided an iron stem 2 secured to the outer body part *a*. On the application of a magnet to the case at or near the stem the catch is withdrawn against its spring *n*. When screwed into position the cap is automatically locked by the catch. 90

We do not limit ourselves to any one position of the lantern or lighting chamber or of the disk or box carrying the cut out switch, or of the screwed, hinged or other cover part, but arrange the same and also the battery in such positions with respect to the lamp case or body as may be best adapted to suit varying services or requirements. 95

Having thus described our invention what we claim as new and desire to secure by Letters Patent is;— 100

1. In miners' and like electric safety lamps, the combination with a body part, a battery contained in said body part, a light inclosure and a lamp bulb contained in said inclosure, of a circuit breaker, a rod controlling said circuit breaker and arranged in part within said inclosure, a spring tending to move the rod and release the circuit breaker, and a ring in the light inclosure adapted to normally retain the rod against its spring and to liberate the same upon fracture of a part of the lamp giving access to the light, substantially as described. 105

2. In miners' and like electric safety lamps, the combination with a body part, a battery contained in said body part, a light inclosure and a lamp bulb contained in said inclosure, of a circuit breaker, a rod controlling said circuit breaker and arranged in part within said inclosure, a spring tending to move the rod and release the circuit breaker, and a glass ring arranged in conjunction with the light inclosure and the rod and adapted to fracture and release the latter upon breakage of the inclosure, substantially as described. 110

3. In miners' and like electric safety lamps, the combination with a body part, a battery contained in said body part, a light 130

inclosure and a lamp bulb contained in said inclosure, of a circuit breaker, a pair of rods independently controlling said circuit breaker and arranged in part within said inclosure, springs tending to move the rods and release the circuit breaker, a glass ring arranged in conjunction with the light inclosure and one of the rods and adapted to fracture and release the latter upon breakage of the inclosure, and a ring in conjunction with the lamp bulb and the other rod and adapted to release the latter rod upon breakage of the bulb, substantially as described.

15 4. In miners' and like electric safety lamps, the combination with a body part, a battery contained in said body part, a light inclosure and a lamp bulb contained in said inclosure, of a terminal in the lamp circuit, 20 a spring contact piece in conjunction with said terminal, a rod arranged in part within the light inclosure and adapted to retain the contact piece in its operative position, a spring tending to move the rod and 25 release the contact piece, and means in the light inclosure adapted to normally retain the rod against the spring and to liberate the same upon fracture of a part of the lamp giving access to the light, substantially as 30 described.

5. In miners' and like electric safety lamps, the combination with a body part, a battery contained in said body part, a light inclosure and a lamp bulb contained in said

inclosure, of a terminal in the lamp circuit, 35 a spring contact piece in conjunction with said terminal, a rod arranged in part within the light inclosure and adapted to retain the contact piece in its operative position, a spring tending to move the rod and release 40 the contact piece, and a glass ring arranged in conjunction with the rod and the inclosure and adapted to fracture and release the rod upon fracture of the inclosure, substantially as described. 45

6. In miners' and like electric safety lamps, the combination with a body part, a battery contained in said body part, a light inclosure and a lamp bulb contained in said inclosure, of a circuit breaker, an insulating 50 box containing the circuit breaker and carrying the lamp bulb, a controlling rod for the breaker passing through the box and projecting within the light inclosure, a spring tending to move the rod and release 55 the circuit breaker, and a ring in the lighting chamber adapted to normally retain the rod against its spring and to liberate the same upon fracture of a part of the lamp giving access to the light, substantially as 60 described.

In testimony whereof, we affix our signatures in presence of two witnesses.

CHARLES VICTOR ALBERT ELEY.
THOMAS PATRICK BRADY.

Witnesses:

JOHN MORGAN,
ERNEST HARKER.