

(No Model.)

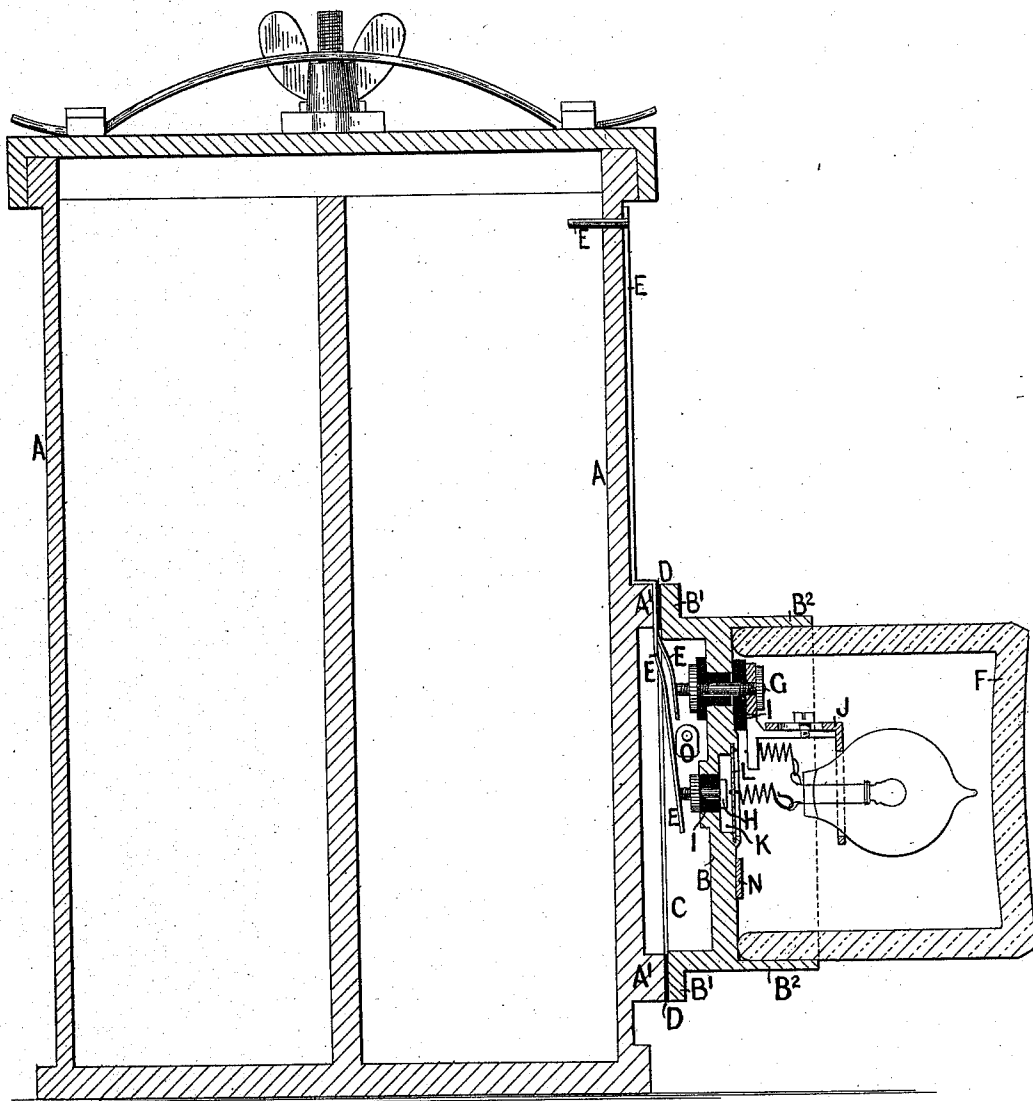
2 Sheets—Sheet 1.

T. COAD.
ELECTRIC SAFETY LAMP FOR MINERS.

No. 413,708.

Patented Oct. 29, 1889.

Fig. 1.



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FIG. 3.

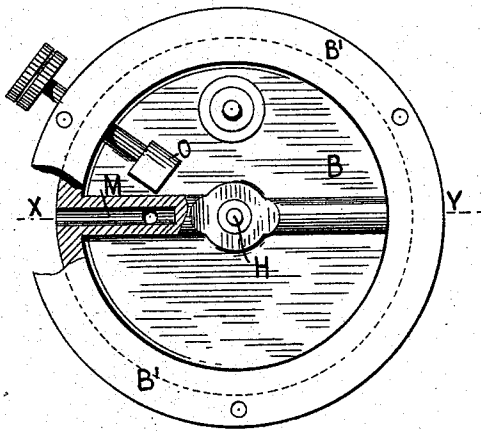


FIG. 2.

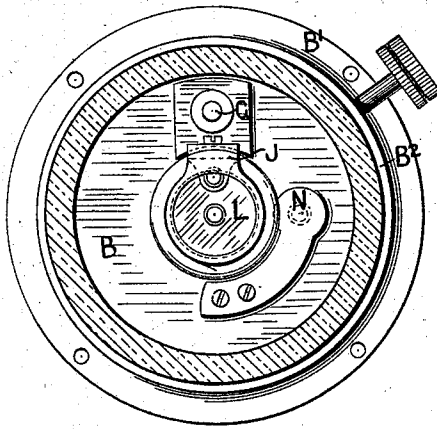


FIG. 4.

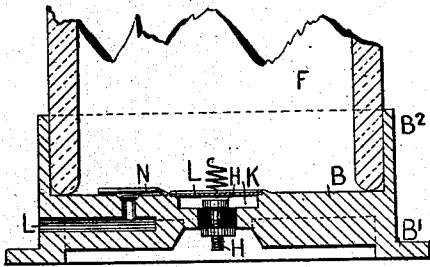


FIG. 5.

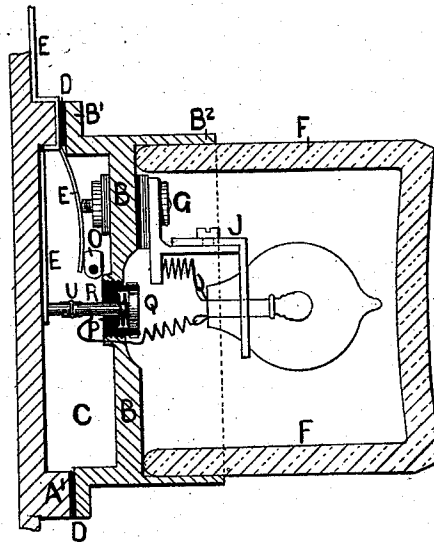
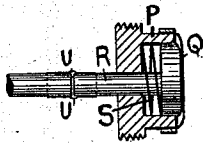


FIG. 6.



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UNITED STATES PATENT OFFICE.

THEOPHILUS COAD, OF FOREST GATE, COUNTY OF ESSEX, ENGLAND.

ELECTRIC SAFETY-LAMP FOR MINERS.

SPECIFICATION forming part of Letters Patent No. 413,708, dated October 29, 1889.

Application filed May 21, 1889. Serial No. 311,536. (No model.) Patented in England January 5, 1884, No. 806.

To all whom it may concern:

Be it known that I, THEOPHILUS COAD, a subject of the Queen of Great Britain, residing at Forest Gate, Essex, England, have invented certain new and useful Improvements in Portable Electric Safety-Lamps for Miners, (for which I have obtained a patent in Great Britain, No. 806, bearing date January 5, 1884.) of which the following is a specification.

In electric safety-lamps as hitherto constructed for use in mines the incandescent lamp has been fitted on the outside of the battery, and is consequently liable to be easily broken, when the filament will generally retain the necessary heat sufficiently long to ignite carbureted hydrogen, and consequently an explosion may ensue. Another source of danger in the present form of safety-lamps is due to the "sparking" that takes place on making and breaking contact when this occurs surrounded by explosive gases.

The object of this invention is the construction of a safety-lamp which shall be free from these two sources of danger.

In carrying out this invention I arrange an incandescent lamp within a glass covering hermetically air-tight, such glass covering being held by a metal carrier suitably arranged to be connected to a battery. In the bottom of the metal carrier within the glass covering is arranged a flexible diaphragm capable of being depressed by a pressure of air within the glass covering, such depression of the diaphragm being arranged to complete the electric circuit for the lamp. Consequently on the breaking of the glass cover the pressure of the air is removed from the diaphragm, which immediately returns to its normal position, thereby breaking the circuit and automatically extinguishing the lamp. To prevent the dangers of explosion by the sparking, I arrange that the making and breaking contact shall take place in a hermetically-tight chamber to which no gas has access. These results I attain by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a sectional elevation of lamp complete; Fig. 2, a front or top view of incandescent-lamp chamber; Fig. 3, an under side view of Fig. 2; Fig. 4, a sectional view of Figs.

2 and 3; Fig. 5, a sectional modification of part embodied in Fig. 1; Fig. 6, a detached view on larger scale in previous figure.

A is the battery-case, having a boss A' for the incandescent-lamp-holding part B, to be attached by screws by aid of flange B', so as to form a chamber C between the bottom of B and front of battery-case. This chamber is made gas-tight by a washer of india-rubber D. Within this chamber the leads E for the current of the battery are conducted. The bottom B has a rim B² to hold a glass envelope F, which is made hermetically tight. Passing through the bottom of B are pegs G H, which make contact with the ends of the leads E. These pegs are insulated by vulcanite I. Peg G is electrically connected to the lamp-socket J, to which one of the spring-connections for the lamp is attached. In the middle of the bottom B a recess K is made and covered over with a diaphragm L, preferably of very thin metal, to which the other connection for the lamp may be attached and arranged for contact with the top of the peg H on the depression of the diaphragm, thereby completing the circuit and lighting the lamp. The depression of the diaphragm is proposed to be effected by a pressure of air introduced into the glass envelope F by suitable force-pump through the passage M, the exit of which is closed by a spring-valve N. It will be readily understood that the breaking of the envelope F will at once admit of the escape of the compressed air, which will cause the diaphragm to rise to its normal position, thereby breaking the circuit and extinguishing the lamp.

To enable the lamp to be extinguished at will without letting out the compressed air, the bottom B is fitted with a switch arrangement O, consisting of a piece of vulcanite eccentrically attached to a stem and turned by outside handle, which enables the end of one of the leads E, normally in contact with one end of the peg H, to be held off same.

Where a more yielding material than metal is used for the diaphragm L—such as india-rubber—I prefer the arrangement shown in Figs. 5 and 6. A suitable collar P is screwed through a hole in bottom B, having the top covered over with a yielding material Q,

pressed up by the head of the stem R. By the spring S one end of one of the spring-connections of the incandescent lamp is carried through bottom B and attached to stem R, which on being pressed down by a pressure within the glass envelope completes the circuit by coming down on contact-stud T, connected to one of the leads E. To prevent all danger from sparking when the contact is not made and broken in a gas-tight chamber, I cover the contact parts of stem R and stud T with a piece of thin india-rubber tubing U.

Having now described my invention, what I claim is—

1. A portable electric safety-lamp for miners, having a battery, an incandescent lamp suitably connected thereto within an air-tight glass envelope, a passage for the introduction of air into glass envelope, arranged to be closed, and a movable contact-point arranged to complete the circuit on depression, normally held out of circuit by spring appliance, having one of the connections for the lamp attached to a flexible diaphragm within the glass envelope operated by a pressure of air to depress the movable contact-point to complete the circuit, all substantially as described and set forth.

2. In a portable electric safety-lamp for miners, having a battery, an incandescent lamp suitably connected thereto within an air-tight glass envelope, a passage for the in-

roduction of air into glass envelope, arranged to be closed, and a flexible diaphragm within the glass envelope, arranged to be depressed by a pressure of air within the glass envelope, in combination with a movable contact-point arranged under flexible diaphragm, capable of depression by the diaphragm to complete the circuit, normally held out of circuit by spring appliance, and having one of the connections for the lamp attached, substantially as described and set forth.

3. In a portable electric safety-lamp for miners, having a battery, an incandescent lamp suitably connected thereto within an air-tight glass envelope, a passage for the introduction of air into glass envelope, arranged to be closed, and a movable contact-point arranged to complete the circuit on depression, normally held out of circuit by spring appliance and having one of the connections for the lamp attached, in combination with a flexible diaphragm within the glass envelope capable of depression by a pressure of air with the envelope to operate a movable contact-point, substantially as described and set forth.

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