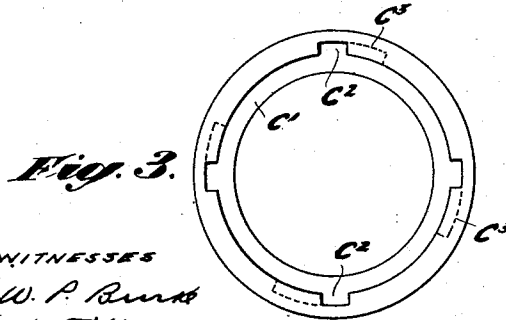
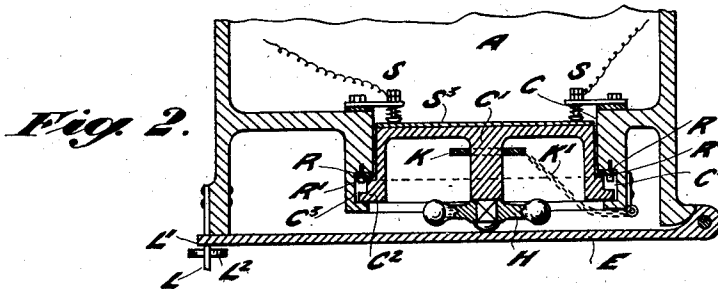
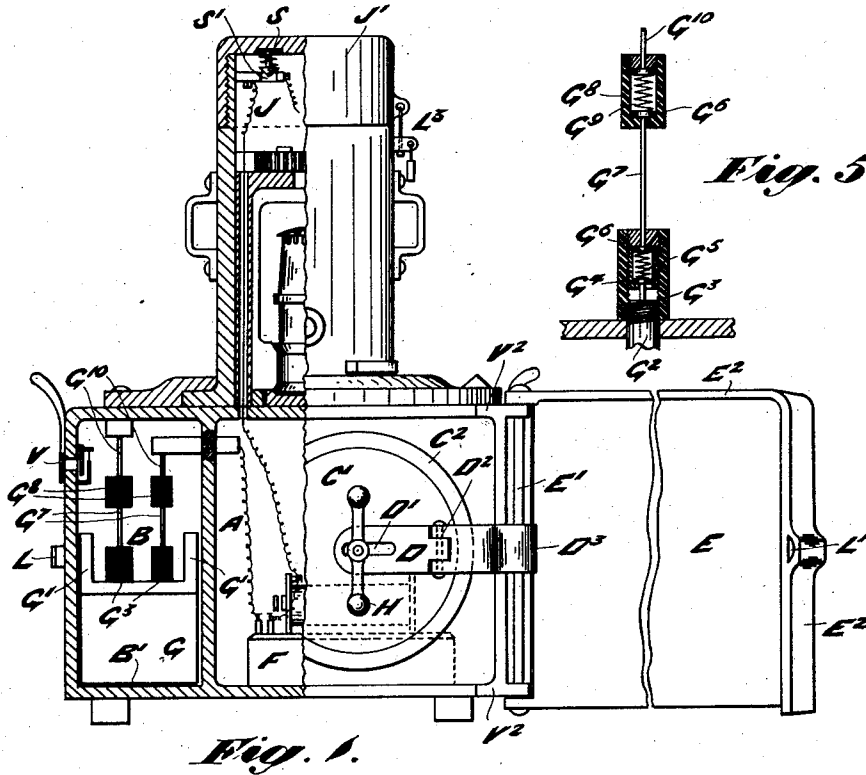


E. A. HAILWOOD.
 APPARATUS FOR IGNITING MINERS' SAFETY LAMPS.
 APPLICATION FILED SEPT. 3, 1909.

1,060,978.

Patented May 6, 1913.

2 SHEETS—SHEET 1.



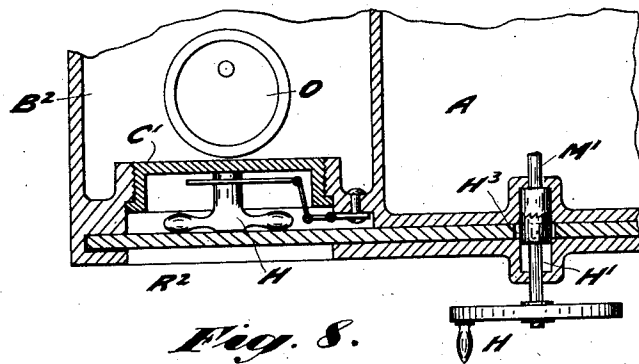
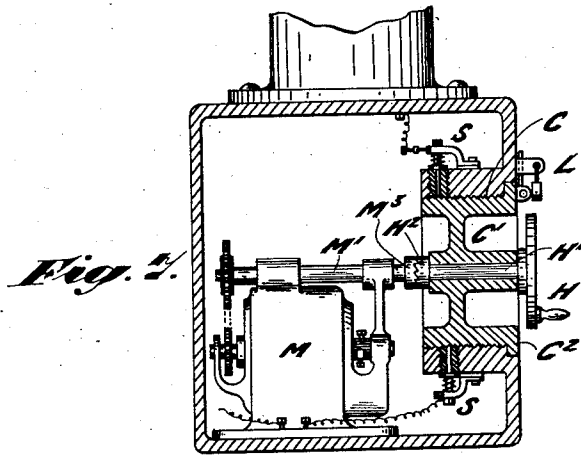
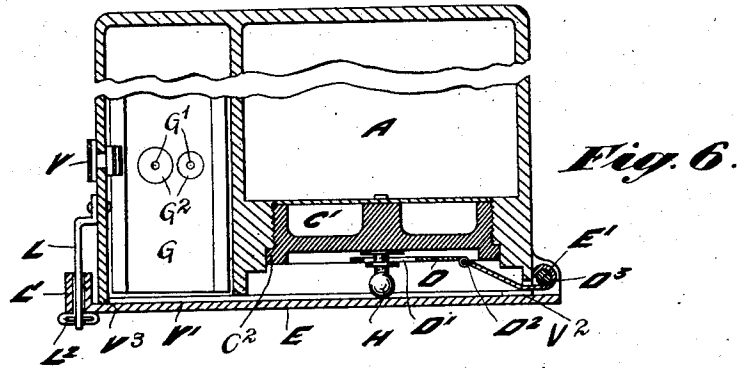
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UNITED STATES PATENT OFFICE.

ERNEST ARTHUR HAILWOOD, OF MORLEY, ENGLAND.

APPARATUS FOR IGNITING MINERS' SAFETY-LAMPS.

1,060,978.

Specification of Letters Patent.

Patented May 6, 1913.

Application filed September 3, 1909. Serial No. 516,146.

To all whom it may concern:

Be it known that I, ERNEST ARTHUR HAILWOOD, a subject of the King of Great Britain and Ireland, residing at 7 Gladstone Terrace, Morley, in the county of York, England, have invented new and useful Improvements in or Relating to Apparatus for Igniting Miners' Safety-Lamps, of which the following is a specification.

The object of my invention is to construct an apparatus for igniting miners' safety lamps with improved casings or chambers, doors, door attaching devices and electric switches in connection with such doors.

In describing my invention in detail, reference is made to the accompanying sheets of drawings, similar letters generally indicating similar parts, in which—

Figure 1 represents a form of my apparatus partly in elevation and partly in section. Fig. 2 represents a sectional plan showing another form. Figs. 3 and 4 represent details of a form of joint hereinafter described. Fig. 5 represents a detail of terminal or like protectors. Fig. 6 represents a sectional plan of the device shown in Fig. 1 taken on a line passing through the ventilator and then down and through the center of the door. Figs. 7 and 8 represent further modifications.

In carrying out my invention, I employ in one form, Fig. 1, a chamber divided into two portions A and B, such portions forming two complete chambers. One of such chambers A (which I term the coil chamber) is provided with a circular opening, in one form, provided with threads for the reception of a circular threaded door C¹. This door may be provided with a flange C² or other means, such as projections, in order to prevent same being passed right through the opening, and also to assist in making a tight joint. The door C¹ is suitably attached to the apparatus in such a manner that same is free to be revolvably opened. Fig. 1 shows one means for this purpose, comprising a hinged plate D, having slide slot D¹ for the reception of the handle H, or a boss on door C¹, one hinge being placed say at D², and the end D³ suitably hinged to the framework of the apparatus, or being turned around the bar or like E¹ which also acts as a support or hinge for an outer or long door E. The chambers A and B are preferably solid and formed from cast iron, that is, cast together, as when cast separately and put together, it

is very difficult to form a gas-tight joint. In the chamber A is placed the coil or like F.

Over the circular door C¹ I arrange a long door E, the said door will cover or partially cover the circular door, or engage projections or recesses in same, while when closed the long door E will cover up the opening of the chamber B, which I term the generator chamber. The door E in some instances not being required to fit tightly over the openings to the two chambers may be provided with a flange or distance pieces, in order to leave a gap in a manner as to insure the generator chamber B being well ventilated.

The construction in Fig. 1 shows the door E with flanges E², E² on two sides, and this arrangement will answer the purpose of guarding the ventilation gaps V¹ (Fig. 6), such gap being formed by bosses or the like V² cast preferably on the door E. A further means of ventilation may comprise additional ventilators communicating with the outside of the apparatus through guarded gauze protectors, an example being shown at V, Fig. 1.

In the chamber B is placed the accumulator or generator G and the lower face B¹ of the chamber B may slope down to the front in order to allow for draining away any acid which may be spilled. In order to prevent the battery from tilting and allowing its terminals to make contact with the side walls of the chamber B an insulator guard G¹ with upstanding sides may be placed as shown, or the said chamber may have its walls lined with wood or other insulating materials, and in order to protect or insure no sparking taking place at the terminals or contacts in the chamber, I prefer to arrange same somewhat as shown in Figs. 1 and 5, in which the terminal G² is provided with a preferably screwed head, such head being embraced by an insulating sleeve G³ containing an un-insulated spring contact nose G⁴, the spring G⁵ electrically engaging a nose G⁶, to which is attached an insulated conductor G⁷, this conductor may also be provided with an additional swivel joint, the lower end of insulated conductor G⁷ and nose G⁶ are a revolving fit, and thus do not interfere with the screwing home of sleeve G³, furthermore, the other end of conductor G⁷ passes into insulating sleeve G⁸ terminating in a nose such as G⁹, and a spring G⁹ electrically connects the end of conductor G⁷ to the end of

another conductor G^{10} , this latter conductor being suitably connected to a terminal or terminals suitably insulated and attached to the frame work of the apparatus or the wall

dividing chambers A and B.
The door E is provided with a locking device preferably arranged so that the final lock or lock bolt can only be attached and the door locked, when the said door and the said circular door are firmly closed; the device L, L^1 and padlock L^2 (Fig. 6) will answer this purpose, handle H or a projection on circular door C^1 being of such a length that unless the door C^1 is driven right home, it will be impossible to pass the padlock through the aperture in the locking device.

The lamp ignition contact piece will terminate in the chamber A, suitable insulated electric conductor wires will lead into the upper portion J above the lamp chamber containing guard and sweep gear and switch mechanisms, and to insure a flame tight joint the cover J^1 screw on to the body J and be locked thereto by a device such as L^3 , the screwing down of the cover J^1 would cause an insulated contact member S to bridge a gap S^1 in the electric circuit, only when the cover is screwed home, the contact S being preferably of the spring depressed type. Other switches would be arranged in the now well known manner so as to close only on the closing of the lamp admittance door of the lamp chamber. The door C^1 in closing may make similar contacts to that described in reference to S and S^1 .

In a modified form, Fig. 2, the aperture C need not be threaded and the door C^1 may have an insulated or uninsulated portion S^3 which will when the said door C^1 is firmly closed, engage and bridge insulated contacts S. In order to insure a flame tight joint, I permanently attach a rubber or like ring R to the frame work of chamber A by means of a junk ring R^1 , the door C^1 being recessed to allow for the extra thickness of this ring as shown. The door C^1 may be provided with projections C^2 to engage recesses C^3 in the frame work, the said door being pushed home and in one form, given a quarter or less turn to secure same in the manner of a bayonet joint. The handle H is of such a length as to only allow the door E to be closed when the door C^1 is closed; and in order to secure the door C^1 to the apparatus a ring K and chain K^1 or linked rods or hinges may be used as permanent attaching means. In place of attaching the rubber ring R permanently to the door aperture C, the said ring may be attached to the door.

Figs. 3 and 4 show a bayonet joint arrangement for the unthreaded door, in which the projections C^2 of the door C^1 will be pressed into the angle recesses C^3 which on their longer arms slope slightly inward in

order to tighten the door on its seat. The plain circular door C^1 may be independent of the long door E, or may be hinged thereto after the manner shown in Fig. 1. In this case the bayonet joint may be dispensed with, and the closing movement of the long door and the locking thereof, will insure a flame tight joint being made in the opening C. The door C^1 may itself be provided with any suitable locking device, arranged in a manner such that only when the door is firmly closed can the lock bolt or like be placed into position, the locking device being by preference attached to a fixed (as against loose) portion of the apparatus.

In a further form, Fig. 7, I have shown in sectional elevation a form in which a single chamber is employed and the chamber fitted with a dynamo M instead of an accumulator. In this form I have also dispensed with the outer door E. The door C^1 is threaded as shown, and in the walls of opening C may be placed switch members S, such members being arranged slightly away from one another, that is to say, not diametrically opposite; on the complete screwing home of the last thread on the door C^1 such door or projections on same will close the switch members. A handle H mounted on a shaft H^1 will carry a clutch member H^2 of any suitable type such as a ratchet member, or a squared portion of shaft H^1 may engage a hollow portion of shaft M^1 of the dynamo gear. In the former case the shaft M^1 will carry a similar ratchet member M^3 . These members will engage when the door C^1 is shut, and the dynamo may be actuated. The door C^1 may be provided with a lock device L. A fuse may be inserted in the electric circuit in any convenient manner to safeguard against short circuits or undue fluctuations in the electric circuit. Instead of the lamp chamber being placed over the chamber C, same may be cast with said chamber.

Fig. 8 shows a sectional plan of a further modification, showing a rectangular lamp chamber B^2 and a generator chamber A, the lamp admittance opening having a door C^1 somewhat of the type referred to previously and illustrated in Figs. 1, 2 and 6, the hinge for the door C^1 being by preference a multiple one in order to facilitate the easy withdrawal and insertion of the door. A rod or sliding door R^2 is arranged in combination with the apparatus in a manner such that the door C^1 must be closed before the door or rod R^2 can be closed, and in the type as shown in the drawings, the said door or like R^2 carries an aperture H^3 which will coincide with the handle shaft H^1 and dynamo shaft M^1 , only when the door or rod R^2 is completely closed, the clutch or like may then be put into gear and the dynamo operated.

It will be understood that I do not confine my invention to the particular combinations hereinbefore described and illustrated, the devices shown being combined to reduce the number of illustrations. Portions shown in one figure may be used in another, and other portions may be omitted, as for instance, I may in some forms discard the contacts S and S¹ and employ doors which are in no way connected with the electric circuit.

What I claim as my invention is:—

1. In apparatus for igniting miners' safety lamps underground, a chamber comprising two portions one of which is provided with a circular recess and a circular door to fit such recess and to make when closed a flame tight joint, an outer door, said circular door being arranged so that only when same is firmly closed can said outer door be closed and locked, substantially as described.

2. In apparatus for igniting miners' safety lamps, in combination with a generator or coil chamber provided with a circular door, an outer door which may only be closed and fastened when the said circular door is firmly closed, substantially as described.

3. In apparatus for igniting miners' safety lamps, a chamber having a circular opening provided for the reception of a circular door, a circular door cooperating with said opening, in combination with an outer door which may be closed and fastened only

when the circular door is home in the said opening, substantially as described.

4. In apparatus for igniting miners' safety lamps, a casing having a circular opening a circular door cooperating therewith, a retaining device, said device being operatively attached to such door, the other end of the device being secured to the framework of the apparatus, the whole being so arranged as to allow of the opening and closing of the said door without detaching same from the framework of the apparatus, substantially as described.

5. In apparatus for igniting miners' safety lamps, a casing comprising coil and generator chambers, an outer door associated with one of said chambers, and an outer door E to act as a door to both coil and generator chambers, said outer door being adapted to be closely fastened only when the inner door is shut, substantially as described.

6. In apparatus for igniting miners' safety lamps, in combination, a chamber, a flat circular door associated therewith, outer fastening means therefor and so positioned that said door must be closed before said outer fastening means may be closed over same, substantially as described.

In witness thereof, I have hereunto set my hand, in the presence of two witnesses.

ERNEST ARTHUR HAILWOOD.

Witnesses:

FREDK. H. FOSS,
GEO. MIDGLEY.