(No Model.)

I. KITSEE.

FIRE DAMP INDICATOR.

No. 262,054. Patented Aug. 1, 1882.

Fig. 1.

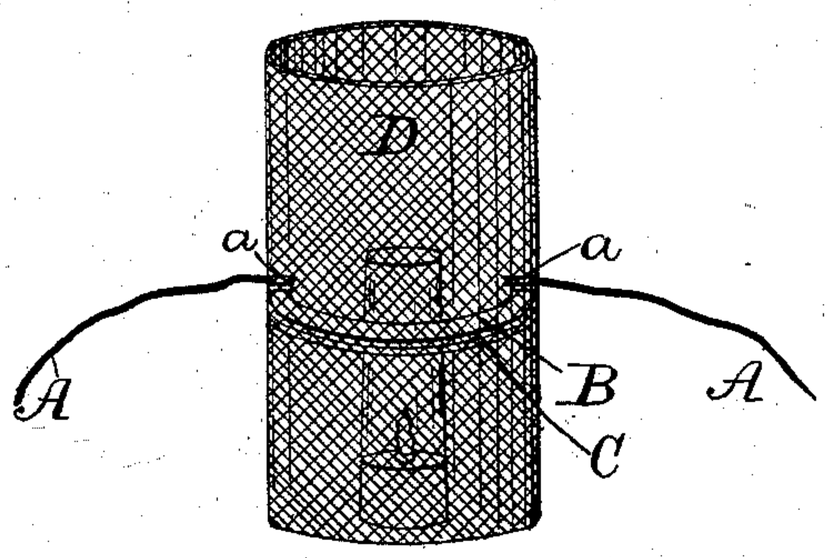


Fig. 2.

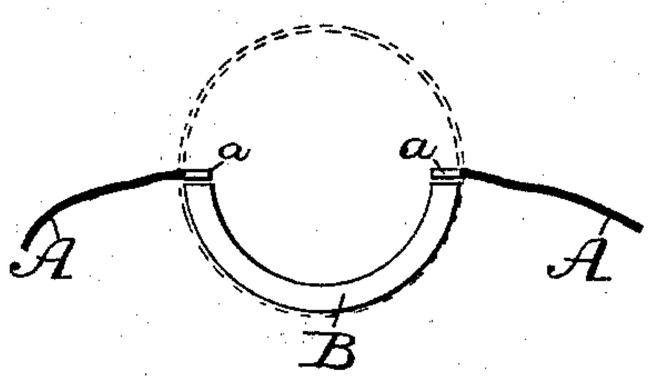


Fig. 3.

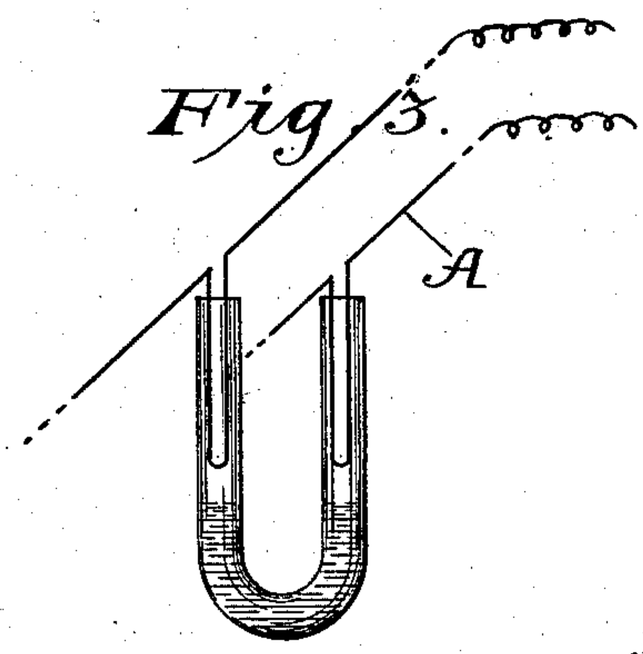
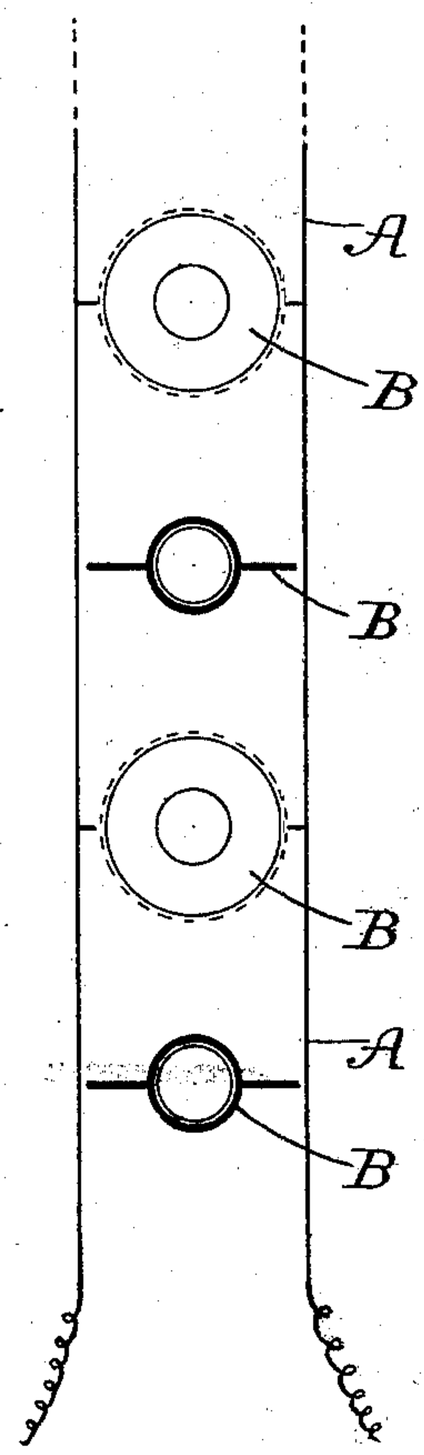


Fig. 4



WITNESSES

F. M. Birnham.

L. D. C. Jacobson

INVENTOR

Isidor Kitsee

By his Attorneys

Abraham and Mayer

UNITED STATES PATENT OFFICE.

ISIDOR KITSEE, OF CINCINNATI, OHIO.

FIRE-DAMP INDICATOR.

SPECIFICATION forming part of Letters Patent No. 262,054, dated August 1, 1882.

Application filed December 31, 1881. (No model.)

To all whom it may concern:

Be it known that I, ISIDOR KITSEE, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and useful Improvement in Fire-Damp Indicators, of which the following is a specification.

My invention relates to devices for automatically indicating the presence of fire-damp in mines. By use of the ordinary portable safety-lamp the presence of fire-damp is indicated by the flame which arises within the surrounding wire-gauze. When the volume of fire-damp equals one-sixth to one-fifth of the volume of the atmosphere combustion ensues, and a flame arises within the space inclosed by the wire-gauze, which flame increases in volume and intensity as the fire-damp increases, thus giving to the miner carrying the lamp or other person seeing the flame notification of the existence of an undue and dangerous quantity of fire-damp in the mine; but this condition may occur in a part of the mine not being worked, and where no one is present, and it may be, moreover, desirable not to depend solely upon the workman who carries a portable lamp to notify the superintendent or other officer of the presence of fire-damp in dangerous volume.

The object of my invention is to give automatic notification at any desired place of the existence of fire-damp wherever existing in a mine.

My invention is applicable to the safety-lamps in ordinary use, in which the principle of the Davy lamp is employed; but I do not desire to limit myself to the specific construction of the lamps, as my device can be employed in any form of lamp which is surrounded by wire-gauze or minutely-perforated inclosures of any character; and although I herein describe my invention as applied to a lamp surrounded by wire-gauze, I desire to be distinctly understood as claiming any form of lamp which has minutely-perforated inclosures in whole or in part, whether or not the wire-gauze usually employed in practice.

Referring to the accompanying drawings, in which similar letters of reference indicate like parts, Figure 1 represents a lamp surrounded with wire-gauze, having my invention attached thereto. Fig. 2 is a part thereof in detail. Fig. 3 represents a bent tube containing mercury, and having in the opening in each arm thereof a point of an electric-circuit wire. Fig. 4 represents my invention of a system wherein lines of positive and negative wires are led in any required direction, and are conducted in near proximity to the expansible metal in each lamp of the route.

Within the wire-gauze, surrounding the lamp, is adjusted a piece of metal readily expansible by heat. This metal may be semicircular or of a complete circle, or of any other desirable form. The two wires from an electric apparatus extend through the wire-gauze or perforated inclosure, having necessary insulators in such a manner that one wire is nearly in contact with one part of the expansible metal and the other wire is adjusted toward or placed in juxtaposition to another part of the expansible metal. It is preferable that to each wire should also be attached a tip of metal readily expansible under the influence of heat. When the flame arising from the combustion of fire-damp is formed within the perforated surrounding, the metal expands, as also does the tip on the wires, thus forming metallic contact, and an electric circuit is completed which operates any form of alarm mechanism connected to the electric apparatus. Though in the drawings illustrating my invention applied to a single lamp a semicircular plate is shown as adapted by expansion to be brought into contact with the wires, yet it is not necessary that this connection should be made by means of expansible metal on the ends of the wires, as any contact between any part of the metal and the wires would answer the purpose and be within the scope of my invention by completing the electric circuit.

In the drawings, D represents a safety-lamp in which wire-gauze is used.

B is an expansible metallic plate lying loosely upon the flange C.

A A are wires from an electric apparatus.

a a are metallic tips, readily expansible under the influence of heat, (shown at the ends of the wires A A.) When the flame from the combustion of the fire-damp arises within the wire-gauze or perforated surroundings the

metal C is expanded, as are also the tips *a a*, thus effecting the required contact and forming a complete electric circuit by which the alarm is given through the electric apparatus.

Fig. 3 illustrates a form of my device wherein a bent tube is supplied with mercury, which, when rising in the arms of said bent tube and coming in contact with the current-wires, completes the electric circuit.

I have hereinbefore confined the description of my invention as applied to a single lamp for the purpose of enabling persons skilled in the art to which it belongs to perfectly understand the principle, and to construct and use my device; but it is manifest that in practice it will be requisite to establish a perfect system of annunciators, so that notification of increase of fire-damp in dangerous volume shall be given wherever it occurs. In such a system each of the current-wires must be continuous and unbroken its whole length. In other words, a positive and negative wire will have to be led over a large field, and must be so arranged with respect to each lamp as to enable each lamp in the route to act independently. In order to effect this result the expansible metal must in each lamp be placed in near proximity to both the positive and negative wires, as illustrated in Fig. 4.

What I claim is—

1. In a fire-damp indicator, a safety-lamp provided with one or more pieces of metal readily expansible by heat within the perforated inclosure, said inclosure further provided with the terminal ends of the wires of an electric battery so arranged that when said metal expands an electric circuit is completed, substantially as described.

2. In a fire-damp indicator, the combination of a safety-lamp supplied within the space inclosed by its perforated surrounding with one or more pieces of metal, B, readily expansible by heat, with the current-wires A, said wires being connected to an electric battery, all so arranged as to actuate an alarm-annunciator connected to said battery, as and for the purpose intended, substantially as described.

3. An automatic fire-damp-indicator system consisting of a series of safety-lamps, each of said lamps within perforated surroundings being provided with one or more pieces of metal readily expansible by heat, in combination with the wires of an electric circuit, all so arranged that when one or more of the metal pieces within any one of the series of lamps expands it will close an electric circuit and actuate an alarm-annunciator attached to a terminal battery, whereby notice will be given of the existence and location of fire-damp in dangerous volume, substantially as described.

ISIDOR KITSEE.

Witnesses:
S. H. JACOBSON,
E. S. KAUFMAN.