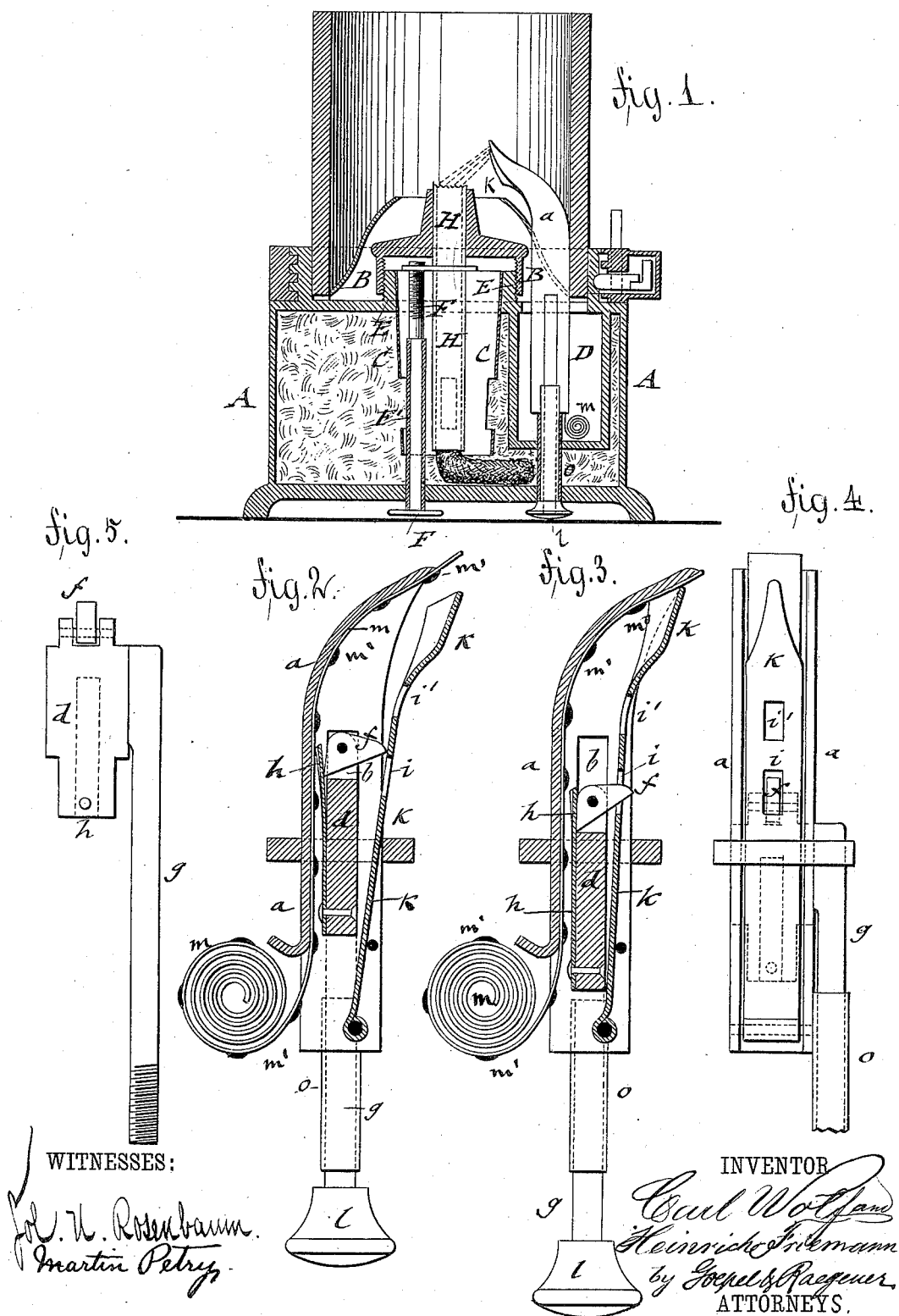


(No Model.)

C. WOLF & H. FRIEMANN.  
MINER'S SAFETY LAMP.

No. 302,878.

Patented July 29, 1884.



# UNITED STATES PATENT OFFICE.

CARL WOLF, OF ZWICKAU, AND HEINRICH FRIEMANN, OF EISLEBEN,  
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## MINER'S SAFETY-LAMP.

SPECIFICATION forming part of Letters Patent No. 302,878, dated July 29, 1884.

Application filed February 21, 1884. (No model.) Patented in Germany September 12, 1882, No. 23,341.

*To all whom it may concern:*

Be it known that we, CARL WOLF, a subject of the King of Saxony, and a resident at Zwickau, Saxony, and HEINRICH FRIEMANN, a subject of the King of Prussia, and residing at Eisleben, have invented certain new and useful Improvements in Miners' Safety Lamps, (which have been patented heretofore by the Government of Germany by Letters Patent No. 23,341, dated September 12, 1882,) of which the following is a specification.

Heretofore heavy non-volatile oils and fatty substances have been exclusively burned in miner's safety-lamps, because such oils or fats reduced the danger of explosion. This advantage, however, is counteracted by the fact that whenever the wick is turned up too high so as to cause imperfect combustion, carbon-particles are deposited upon the wire-gauze and become heated to incandescence, so as to ignite the fire-damp on the outside. Numerous accidents have been traced to this source.

The object of our invention is to construct a miner's safety-lamp suitable for the use of volatile hydrocarbon oils. When in a lamp filled with such volatile oils the wick is turned up too high, the heating of the lamp causes a rapid and excessive formation of vapors, which prevent the entrance of atmospheric air to the burner through the gauze, and soon extinguish the lamp. It is true that in this case, also, carbon or lamp-black is deposited; but it is not continued sufficiently long to cause danger. The liability of such lamps to be extinguished calls for means to relight them without the necessity of opening them, so that the miner is not compelled to leave the mine for the purpose.

Our invention consists of a miner's safety-lamp for burning light or volatile hydrocarbon oils arranged with a perforated tube around the wick-tube, the interior space of the bowl around the perforated tube being filled with an absorbent.

The invention also consists of a percussion lighting device located in a chamber of the lamp-bowl, and means for operating said lighting device from the outside.

In the accompanying drawings, Figure 1 represents a vertical central section of our im-

proved miner's safety-lamp. Figs. 2 and 3 are detail vertical transverse sections of the percussion lighting device attached to the lamp, showing, respectively, the hammer in raised and lowered position. Fig. 4 is a front view of the percussion-lighter, and Fig. 5 a front view of the slide-piece which operates the hammer and feeds the fulminate tape forward.

Similar letters of reference indicate corresponding parts.

A in the drawings represents the bowl of a miner's lamp, which is provided with the usual appliances of safety-lamps, such as glass cylinder, wire-gauze, &c.

B is a screw-cap closing the neck E of the bowl.

H is a round wick-tube, which fits into a corresponding tubular opening of the screw-cap B. The lower part of the wick-tube H, inside of the bowl A, is surrounded by a larger recessed or perforated tube, C, which extends downward from the neck of the bowl A. The space between the tube C and the wall of the bowl A is filled with a suitable absorbent, such as cotton or infusorial earth, whereby the accumulation of vapors is prevented and the danger of explosion obviated. A screw, F, passes through a tube, F', projecting upward from the bottom of the bowl, and serves for raising or lowering the wick-tube. A chamber, D, is formed within the bowl for the reception of the percussion lighting device. (Represented in detail in Figs. 2 to 5.) By this device the lamp can be lighted without opening the same or without compelling the miner to leave the mine for the purpose of relighting an extinguished lamp.

The percussion lighter consists of the following elements: A shell or case, *a*, a slide-piece, *d*, guided in slots *b* of the shell *a*, a rod, *g*, attached to the slide-piece *d*, and provided with a knob, *l*, at the outer end, a tube, *o*, passing from the bottom of the bowl into the chamber D, and serving as a guide for the rod *g*, a dog, *f*, pivoted to the top of the slide-piece *d*, a spring, *h*, attached to the slide-piece, a spring-hammer, *k*, with notches *i*, and a fulminate tape, *m*, provided with pellets *m'*. The end of the tape *m* is passed along

the inner surface of the back of the shell *a*, so as to present one of the pellets after the other to the action of the hammer. Assuming the parts of the percussion-lighter to be in the positions shown in Fig. 3, then by pushing upon the slide-piece *d* the dog *f* is turned so as to force the upper end of the spring *h* against the tape *m*, pushing it thereby in upward direction. As the dog *f* leaves the lower notch, *i*, in the hammer *k*, the latter is pressed outwardly until the dog *f* arrives at the upper slot *i'*, when the hammer is suddenly released, so as to strike against the pellet *m'* at the upper end of the shell *a*, whereby said pellet is ignited and the lamp lighted. When the lamp is to be lighted again, the slide-piece *d* is pulled back by the knob *l* into the position shown in Fig. 3, the dog yielding without acting on the spring *h* or hammer *k*. In this position the percussion device is ready for action whenever the lamp has to be relighted again.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. In a miner's safety-lamp, the combination, with a bowl, A, having a chamber, D, cap B, and wick-tube H, of a percussion lighting device located within the chamber D of the bowl, and means for actuating said lighting device from the outside of the lamp, substantially as and for the purpose specified.

2. In a miner's safety-lamp, the combination, with the bowl A, cap B, wick-tube H, and chamber D, of a percussion lighting device composed of shell *a*, slide-piece *d*, spring *h*, dog *f*, notched spring-hammer *k*, guide-tube *o*, and a fulminate tape *m*, substantially as specified.

In testimony that we claim the foregoing as our invention we have signed our names in presence of two subscribing witnesses.

CARL WOLF.  
HEINR. FRIEMANN.

Witnesses:

EMIL CAPITAINE,  
B. ROY.