(No Model.)

H. J. RICHARDS.

MINER'S SAFETY LAMP.

No. 476,488. Patented June 7, 1892.

Fig. 1.

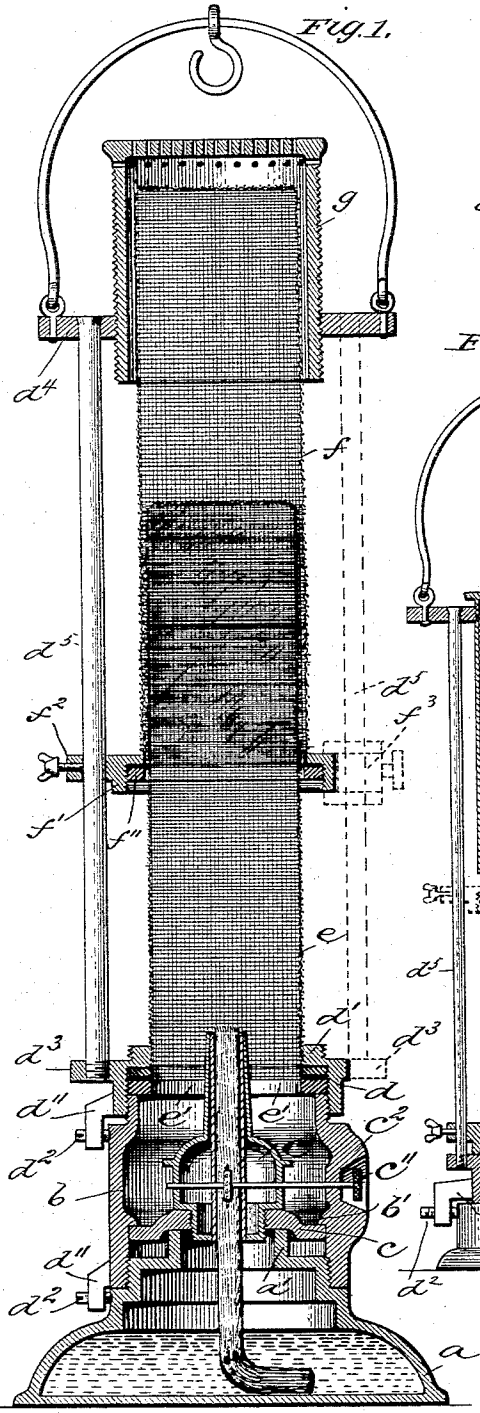


Fig. 2.

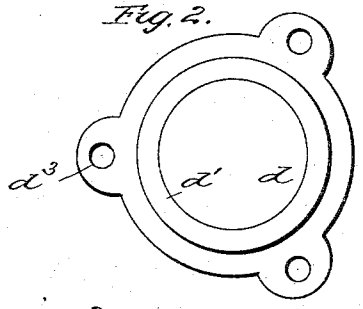


Fig. 3.

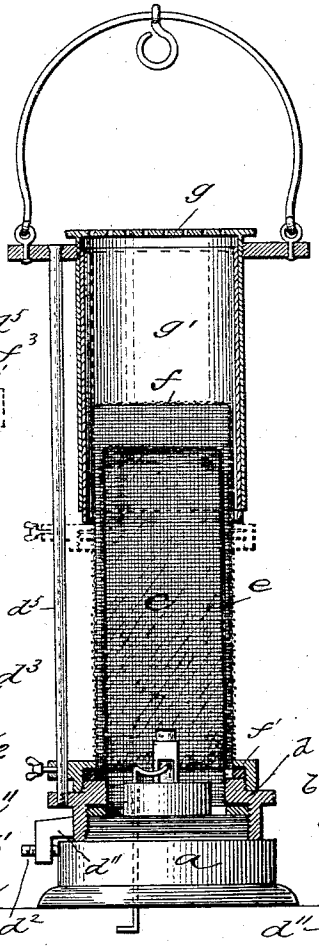
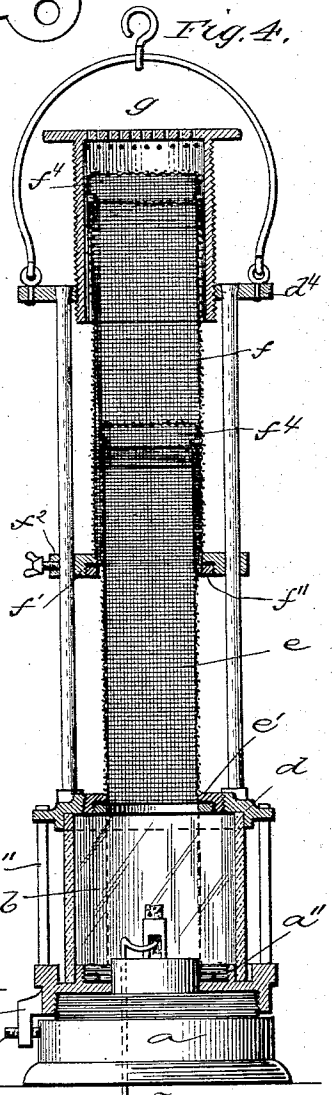


Fig. 4.



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MINER'S SAFETY-LAMP.

SPECIFICATION forming part of Letters Patent No. 476,488, dated June 7, 1892.

Application filed February 10, 1892. Serial No. 421,020. (No model.)

To all whom it may concern:

Be it known that I, HENRY J. RICHARDS, a citizen of the United States, residing at Wilkes-Barré, in the county of Luzerne and State of Pennsylvania, have invented certain new and useful Improvements in Miners' Safety-Lamps, of which the following is a specification, reference being had therein to the accompanying drawings, in which—

Figure 1 is a vertical sectional view of my improved lamp; Fig. 2, a detail plan view of one of its parts; and Figs. 3 and 4 vertical sectional views of different forms of the lamp embodying substantially the same features and principle as the form shown in Fig. 1.

This invention relates to miners' safety-lamps of the Davy type; and it consists of certain new and useful improvements, which are fully hereinafter described, and particularly pointed out in the claims.

In the drawings, *a* designates the oil-well, which is of the usual construction and has formed around its opening an upwardly-extending flange *a'*. Screwed to the oil-well, so as to be readily removed, is a short open-ended cylinder *b*, which is provided with an internal flange *b'* near its lower end, which flange engages over the edge of a removable disk *c* and clamps the same down tightly on the well-flange *a'*, this disk being preferably centrally dished to receive the flange. Screwed into a threaded opening in the center of said disk is the burner *c'*, which may be of the ordinary construction and is provided with a toothed wick-raising wheel whose shaft *c''* extends horizontally outward through the cylinder *b* to be within easy reach of the operator, a recessed boss being formed on the exterior of the cylinder to receive and protect the milled head on the end of the shaft from injury. Screwed on the upper end of the cylinder *b* is a head or ring *d*, provided with a central opening in which is secured the lower end of the gauze tube *e*, the lower end of the gauze being clamped in place by a threaded ring *e'*, this ring being preferably clamped between the upper end of the cylinder *b* and the head *d*, as shown in Fig. 1. To prevent the head *d* and cylinder *b* from turning independently of each other and the bowl, locking devices are provided consisting of depending arms *d''*, carried by the head and cylinder and provided with radial locking-screws d^2, adapted, respectively, to bear against the exterior of the cylinder and the bowl, as shown in Fig. 1. The cage of the lamp is formed by three or more vertical rods d^5, screwed into strong radial ears d^3 on the heads *d* at their lower ends and riveted or otherwise secured to a ring d^4 at their upper end, this ring d^4 being provided with the usual bail.

Over the closed upper end of the gauze cylinder *e* is placed another gauze cylinder *f* of substantially the same length as the inner cylinder, but slightly larger in diameter. This supplemental cylinder is closed at its upper end and secured at its lower end within a ring *f'*, which is adapted to slide up and down within the cage formed by the rods, the rods serving to guide it in its vertical movements. One or more of the rods may pass through ears f^2 on the ring *f'*, as shown, in order to guide it positively. A set-screw may be tapped through one of these ears and adapted to bear on the rod, as shown at the left side of Figs. 1, 3, and 4, in order to hold the ring and its gauze cylinder in any of its adjusted positions; but as this manner of guiding and holding the ring prevents the same being rotated independently of the rods (as is sometimes desirable) the ears may be done away with and a suitable sliding clamp on one or more of the rods employed for this purpose, as shown at f^3 in dotted lines in Fig. 1. This clamp f^3 may be employed to vertically adjust the ring and cylinder, but at the same time will not prevent the same being rotated independently of the rods. Screwed into the central opening in the ring d^4 is an externally-threaded adjustable hood or cap *g*, which embraces the upper end of the gauze-cylinders and is provided with suitable perforations in its upper end for the purpose of permitting the escape of the products of combustion. This hood or regulator is adjustable vertically by screwing to accommodate itself to the height of the outer tube, as shown in Fig. 1.

The advantages of a lamp constructed as described and shown are important. In the first place there will be very little or no danger of the oil leaking from the oil-well by tilting the lamp and collecting on the gauze and

there taking fire, as the cylinder will catch and retain any oil that may find its way out of the oil-well, as is obvious, and thereby prevent it collecting on the gauze. This removes one of the most serious defects of the old style of lamp. The most important advantages, however, are those arising from the use of the telescoping gauze cylinders and the adjustable hood. The supplemental gauze cylinder is provided in order that the safety of the lamp may be increased in case the volume of gases in the mine is too great for a single gauze. When the gases are present in large quantities, the outer cylinder may be adjusted entirely down, as shown in Fig. 2, the internally-threaded ring f' being screwed over an externally-threaded flange d' on the head d, as shown in Fig. 3, if it is desired to permanently secure it in its lowered position. When the gas is not sufficiently dense for both cylinders, the outer cylinder may be adjusted to any height desired, according to the quantity of gas in the mine, as is evident. With the single-gauze lamps accidents frequently occur by reason of the gas passing through the gauze and there exploding with sufficient violence to burst the gauze; but this danger will be reduced to a minimum in my lamps.

If desired, the double-gauze tubes may be secured into the ordinary lamp-bowl in common use without the interposition of the cylinder b, as shown in Fig. 3, the ring d being screwed directly to the bowl. As also shown in this figure, the hood g may be made longer to receive a vertically-adjustable section g', telescoping into it. The object of this is to shield the lamps by letting down the adjustable section to any extent the exigencies of the case may require. This shield is particularly desirable in passing through old abandoned workings where gas is frequently found standing, the section being let down to partially or wholly inclose the gauze, according to the quantity of gas.

As shown in Fig. 4, the gauze cylinders may be provided with gauze caps f^4, if desired. As also shown in this figure, the cylinder b may be made of glass and clamped to the ring screwed on the lamp-bowl by vertical bolts b'', connecting the upper and lower heads, and the ring e' (to which the lower end of the inner gauze is attached) may be screwed down into the central opening in the upper head or ring d. Thus screwing the ring e' into the upper ring enables it to be let down over the wick-tube, as shown in dotted lines, and screwed to a flange a'' on the lower head should the cylinder become cracked and broken. This is a good feature, as it will enable the lamp to be used after its cylinder is broken until a new cylinder can be conveniently procured and secured in place, thereby frequently saving a loss of time to the miner.

Another advantage of the double gauze cylinder is that there is less danger from swinging the lamp back and forth while walking in the mines. The frame or cage of this lamp is very strong, as the rods are not screwed into recesses formed in the upper head or ring, as in the ordinary lamps, but are screwed through strong ears on the same.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a safety-lamp, the combination of a bowl and burner carried thereby, a gauze cylinder secured over the burner, a supplemental gauze cylinder secured over said cylinder, and means for vertically adjusting said supplemental cylinder, substantially as described.

2. In a safety-lamp, a bowl carrying a burner, a ring removably secured to the bowl, vertical rods screwed into ears on the ring, a ring connecting the upper ends of the rods, a gauze cylinder secured to the ring between the rods, a supplemental gauze cylinder inclosing the inner cylinder and carrying a ring at its lower end, and means for vertically adjusting the supplemental cylinder and ring on the rods, substantially as described.

3. In a safety-lamp, the combination of a bowl carrying a burner, a ring d, carried by the bowl and provided with an upwardly-extending threaded flange d', a gauze cylinder e, secured to the ring inside of the flange, and a supplemental gauze cylinder embracing the inner cylinder and carrying a threaded ring at its lower end, substantially as described.

4. The combination of the bowl and burner, an inner gauze cylinder, a cage supporting a threaded ring above the gauze cylinders, a supplemental or outer gauze cylinder adjustably secured over the inner cylinder, and an externally-threaded hood g, screwed into the said ring, substantially as described.

5. The combination of a lamp bowl and burner, the burner being carried by a removable disk c, a cylinder screwed to the bowl and clamping the disk thereto, and a ring screwed on the upper end of the cylinder and carrying a cylinder, substantially as described.

6. The combination of a bowl flanged around its opening, a disk clamped over the opening and having screwed into it a burner, a cylinder screwed to the bowl and provided with an internal flange engaging the disk, a wick-adjusting wheel having its shaft passed out through the cylinder, a ring secured on the upper end of the cylinder, and a gauze cylinder supported on the ring, substantially as described.

7. The combination of a lamp-bowl carrying a burner, a cylinder carried by the bowl, a threaded ring secured on the upper end of the cylinder, and a ring screwed into said ring and carrying a gauze cylinder, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

H. J. RICHARDS.

Witnesses:
C. D. DAVIS,
E. J. CUSSEN.