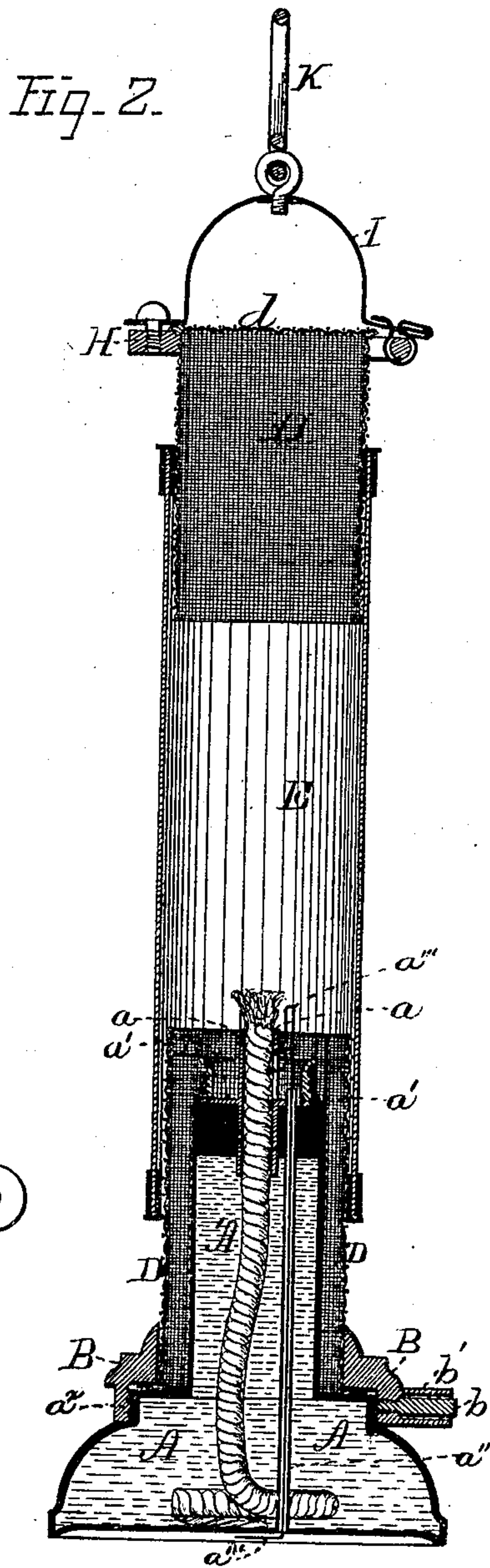
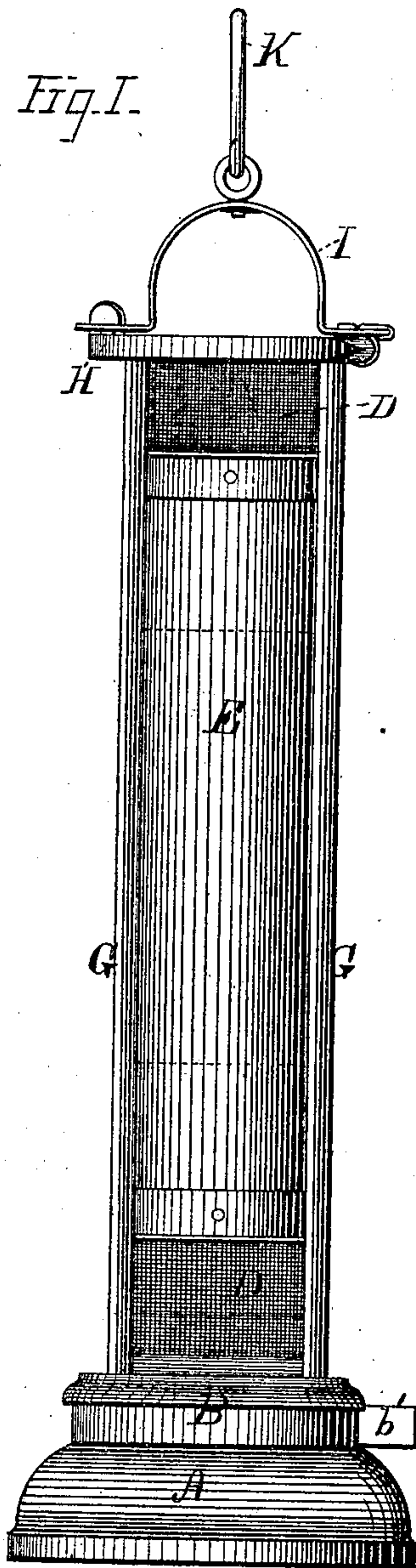


B. TAPPAN.  
Miners' Lanterns.

No. 148,525.

Patented March 10, 1874.



WITNESSES=

Gas. E. Hutchinson  
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Orindle and Deane, his Attys



# UNITED STATES PATENT OFFICE.

BENJAMIN TAPPAN, OF STEUBENVILLE, OHIO.

## IMPROVEMENT IN MINERS' LANTERNS.

Specification forming part of Letters Patent No. **148,525**, dated March 10, 1874; application filed November 19, 1873.

*To all whom it may concern:*

Be it known that I, BENJAMIN TAPPAN, of Steubenville, in the county of Jefferson and in the State of Ohio, have invented certain new and useful Improvements in Safety-Lamps for Miners; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing making a part of this specification, in which—

Figure 1 is a side elevation of my improved lamp, and Fig. 2 is a vertical central section of the same.

Letters of like name and kind refer to like parts in each of the figures.

The object of my invention is to provide a lamp or lantern for the use of miners which shall be strong, easily made, of good lighting capacity, and quite safe in use in mines, whatever may be the state of the air therein; and to this end it consists in a lamp or lantern provided with a mica chimney or casing, at the upper and lower ends whereof are sections of wire-gauze or finely-perforated metal of corresponding shape, and in so uniting or connecting the said sections and casing to each other, and to the lamp, that the union shall be very tight and secure. It consists, finally, in the general detail of construction of this safety lamp or lantern for miners' use, whereby a safe and effective lighting device is produced.

In the annexed drawings, A represents the oil-cup, which has an extended neck, A', and the wick-tube *a*, which is attached to a disk, *a'*, placed upon a flange on the inside of the neck A', and is secured in place by a ring, which is screwed down upon it. A small tube, *a''*, passes from the base of the oil-cup to and just above said disk, and in it is placed a clearing wire and pick, *a'''*. The lower end of said wire is bent so as to serve as a handle on the under side of the cup, to move the pick, while the end near the wick is so bent that it can be turned horizontally to clean the wick, or moved up and down in the wick-tube slot to raise the wick. The oil-cup has a screw-thread on its exterior surface, at *a<sup>x</sup>*, by means of which it is fitted into the ring or flange B on the screw-thread on the inner face of said flange. When the oil-cup is screwed into this flange in this manner, it can be locked in by means of the

screw-bolt *b*, the outer end of which projects from the said ring or flange through the socket *b'*. The said outer end is flat, and can be readily grasped by the bifurcated end of the key C, and easily turned in and upon the screw-thread on the oil-cup, and will thus hold these said parts rigidly together, so that no ordinary use or moderate shaking or concussion will detach them, or separate them, from each other. Thus the lamp will seldom—indeed, almost never—fall out, or be shaken from its seat. D is the wire-gauze. This gauze, or finely-perforated metal, is placed both at the top and bottom of mica portion E, thus making provision for the escape of the products of combustion at the upper part of the cylinder which surrounds the wick and constitutes the flame-chamber, and for the admission of sufficient quantity of air to support combustion of the lamp-wick, and at the same time preventing any flame or fire escaping beyond the inner periphery of said chamber or gauze, as well as the entrance of any of the explosive or dangerous gases. The piece of gauze at the lower end of the chimney is secured to the flange or ring B by bending its ends outward, so that they will catch or engage upon the shoulder on the inner side of the flange, or in any fast or safe manner that workmanlike skill shall suggest. It projects upward, surrounding the neck of the oil-cup, and terminates about on a line with its top, so that its upper edge is very near even with the top of the wick-tube. The mica portion E of the casing is made in any ordinary or well-known manner, and may be of any suitable size or shape—that is, triangular, square, polygonal, or cylindrical—and may be made in one or many pieces. Its lower and upper ends may be made of such shape and size as to fit tight and firmly upon and over or inside the ends of the wire-gauze. I may make one or both of these connections in this way, and one or both by flaring the end of the wire-gauze, so that it shall fit into a ring or annulus, and upon the shoulder thereof. The end of the mica portion of the casing will also fit into or upon this ring, and be held firmly in place.

The like method of connection could be used at the upper end of the mica portion of the casing, so that when the mica portion and the



supplemental upper and lower wire-gauze sections are set in position the entire chimney thus formed can be fastened and clamped in proper position by means of the hinged and locked cap, as will be explained hereafter; but these are simply details of the construction that may be used in carrying out my invention, and in and of themselves are not unlike what is now well known; and while these and yet other means may be used for carrying out my invention, none of them will modify or change the same in any essential degree.

The upper piece of gauze should have a head or cover, as at *d*. This may be made a part of the said piece by shaping it out in a press, or by stamping; or a flat piece or disk of gauze or finely-perforated metal may be secured on and over the upper end, in any well-known manner.

The mica portion of the casing and the upper and lower cylinders or sections of wire-gauze are protected and supported by means of standards or wire rods G, which are usually fitted into or secured upon the lower ring or flange B. Their upper ends are in like manner fitted into or secured to the ring H. The top or cap I is hinged to this. By means of the hinge it can be turned back, and thus leave the top of the lamp or lantern open. In this way the several parts can be removed when there is occasion for cleaning or repairs. The top, when shut down, may be fixed in place by a lock or spring, and when thus fastened in place the mica and perforated sections, with their bands, connecting rings or pieces, are bound and clamped into position, so that no opening or crevice is allowed of sufficient size for the admission of dangerous and explosive gas. In and upon its upper side is a ring or handle, K, by means of which it can be hung up or carried about.

For excellence in use, my device presents many rare and most valuable advantages. It is so strong that it cannot be easily broken under any ordinary circumstances of use. The chimney, being made of mica, will not be broken by the varying effects of heat and cold, while at the same time it will allow nearly or quite fully the same amount of lighting rays from the lamp-flame to pass through it as glass will. The casing thus constructed with the mica and the sections of wire-gauze cannot be easily broken by the pieces of coal, slate, or stone which are occasionally sent forth from the blows of the pick when the miner is at work, nor will the mica, when heated, be broken by the spattering of water upon its exterior surface. It constantly happens in mines that the trickling water, or the water from opening of an unexpected spring, falls upon the outside case of the lantern. This

renders the ordinary glass chimney, globe, or lens entirely impracticable in a miner's lamp. By placing the gauze or finely-perforated metal both at the lower and upper end of the chimney, a sure and perfect combustion of the oil is obtained, and also almost every opportunity or chance for explosion prevented.

The ordinary miner's safety-lamp is made on the principle of the "Davy lamp," and has wire-gauze continuously from the lamp up to the cap. This cap is held in place, and the gauze also protected, by wire bars or rods extending from the ring or annulus about the lamp to that at the top, and secured at both ends; while the gauze makes the lamp safe, there is sent out from the wick-flame but a small per cent. of its illuminating power. To remedy this defect miners have used various expedients. Sometimes a reflector has been placed opposite the flame and inside the surrounding or incasing wire-gauze. At other times a reflector has been placed outside the wire-gauze. Again, a glass lens has been placed in the wire-gauze on a line with the flame; and yet again ordinary glass has been used. But it will be readily seen that my device, as above described, is very different from each and all these. The several sections composing the lantern case or chimney are easily made and securely adjusted in relative position, and the lighting power of the flame to a large extent secured, and thus the lantern presents a simpler and better device than any other of the kind I am aware of. It is sufficiently strong to safely withstand almost any exposure or usage.

Having thus fully set forth the nature and merits of my invention, what I claim as new is—

1. In a miner's safety lamp or lantern, substantially as described, a casing composed of a central section of mica and an upper and a lower section of wire-gauze or finely-perforated metal, the said section entirely surrounding the upper part of the lamp, the wick or flame chamber, and the space above, and fitted in, upon, or over each other, and held in position in manner set forth.

2. The mica portion of the casing E, having wire-gauze sections D D fitted to its edges at top and bottom, as described, and combined with the lamp A A', rods G, flange B, ring H, end-hinged and lock cap I, substantially as and for the purposes set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 17th day of November, 1873.

BENJ. TAPPAN.

Witnesses:

JOHN R. YOUNG,  
JAMES H. GRIDLEY.