

No. 692,885.

Patented Feb. 11, 1902.

M. D. MACKIE.

GAS DETECTING ATTACHMENT FOR MINERS' SAFETY LAMPS.

(Application filed July 12, 1901.)

(No Model.)

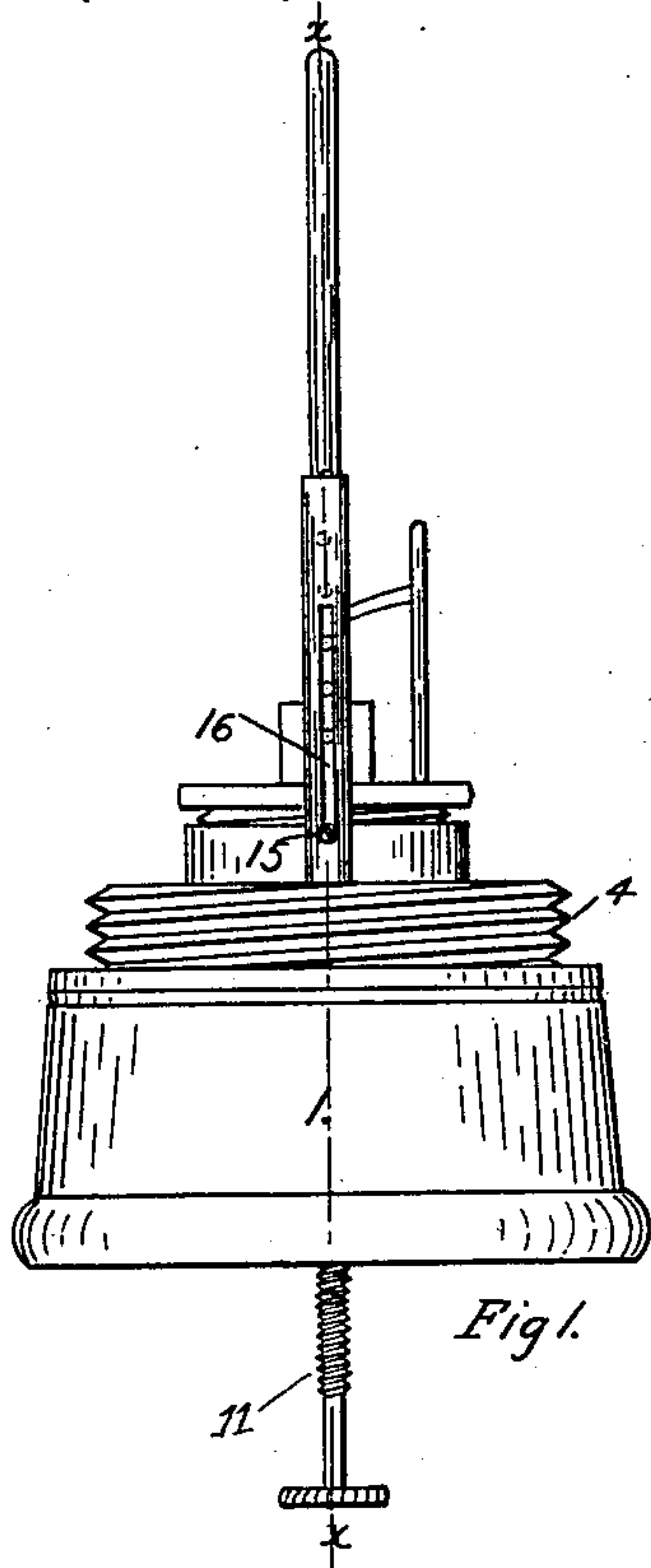


Fig. 1.

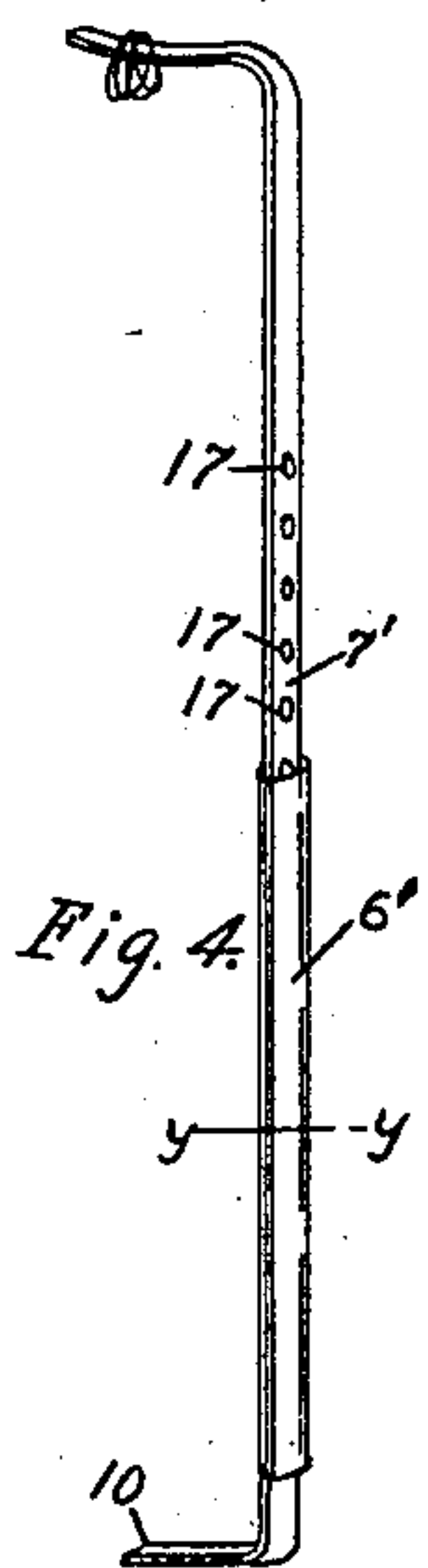


Fig. 4.

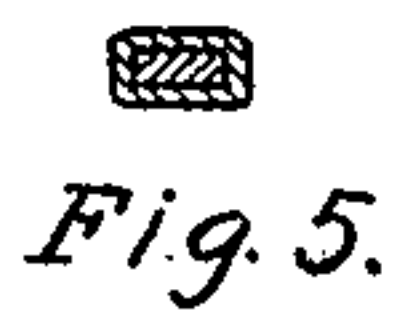


Fig. 5.

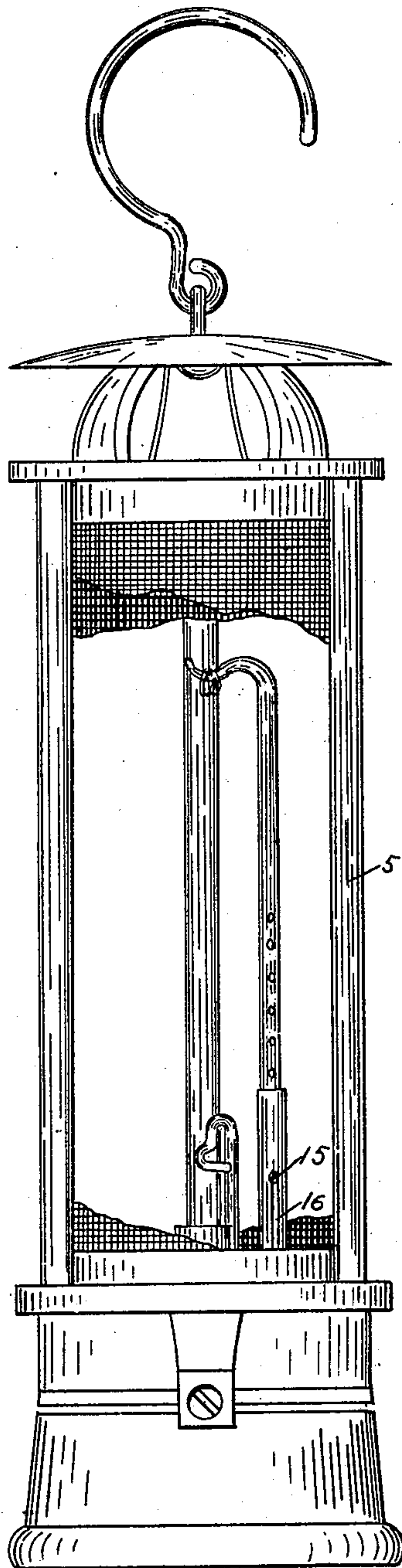


Fig. 6.

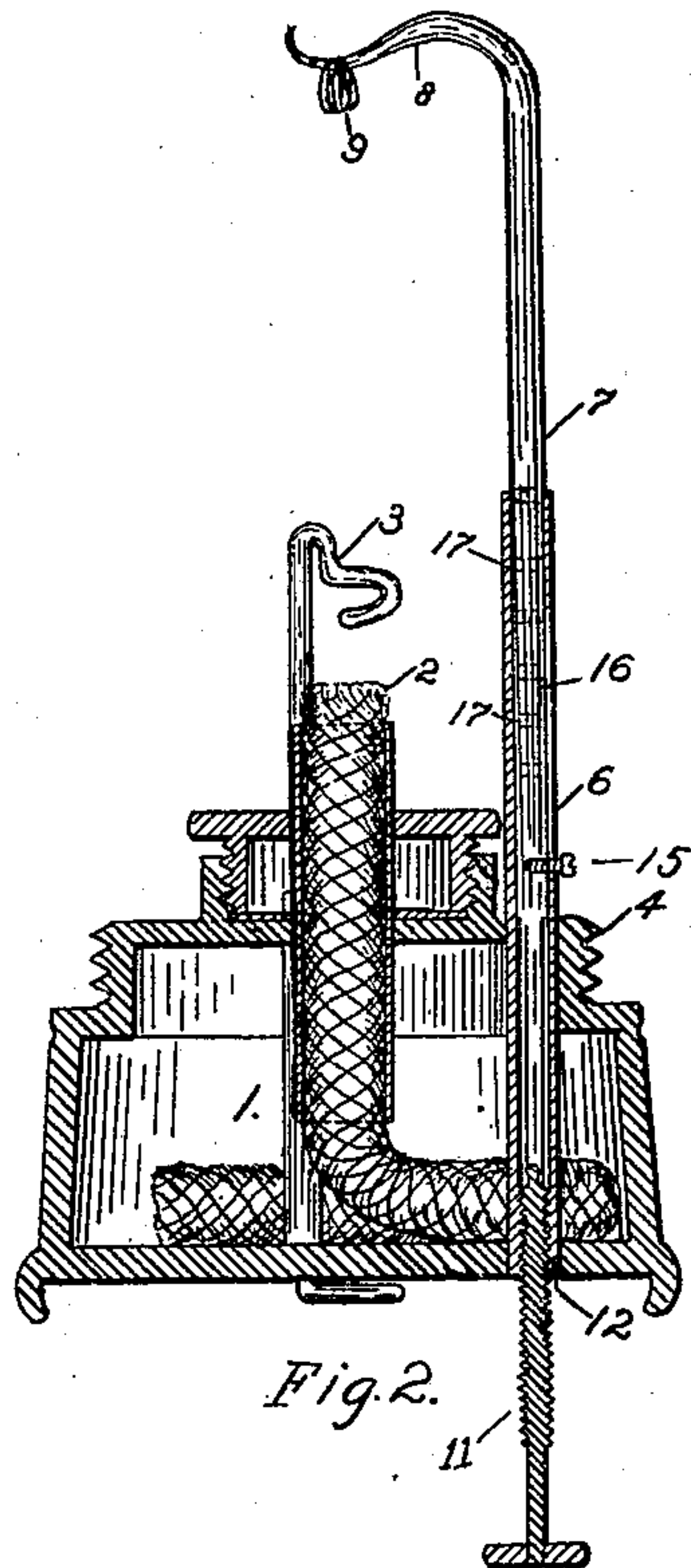


Fig. 2.

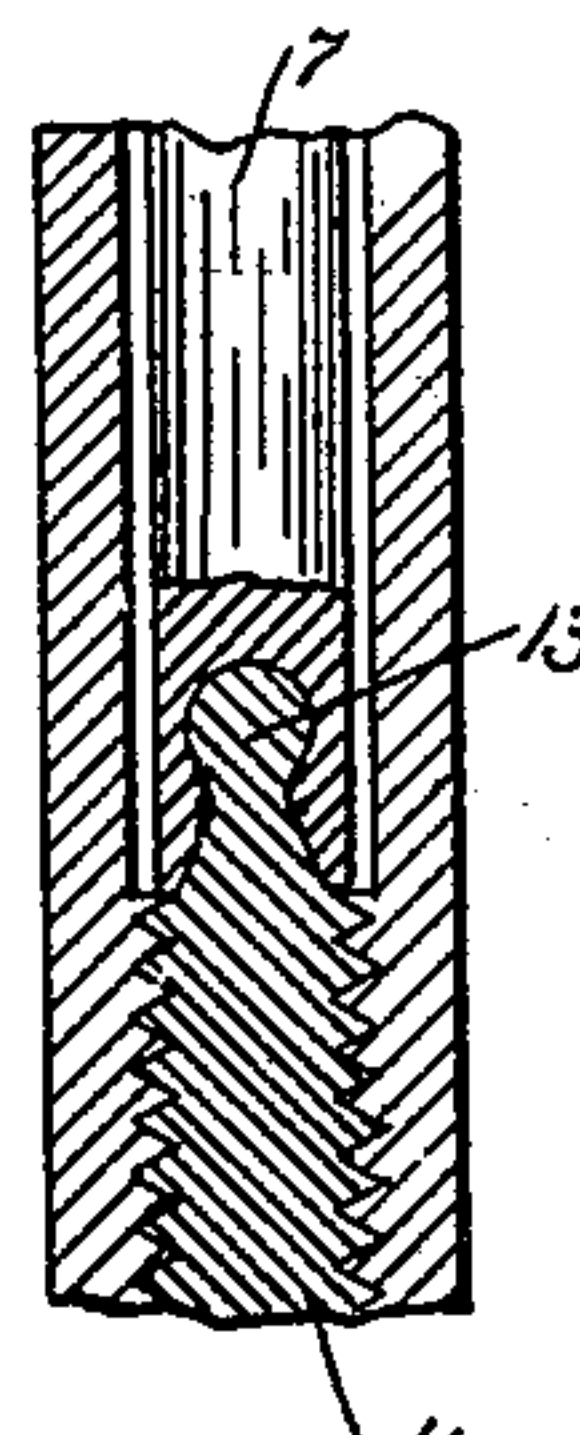


Fig. 3.

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GAS-DETECTING ATTACHMENT FOR MINERS' SAFETY-LAMPS.

SPECIFICATION forming part of Letters Patent No. 692,885, dated February 11, 1902.

Application filed July 12, 1901. Serial No. 67,996. (No model.)

To all whom it may concern:

Be it known that I, MATTHEW D. MACKIE, a citizen of the United States, residing at Scranton, in the county of Lackawanna and State of Pennsylvania, have invented certain new and useful Improvements in Gas-Detecting Attachments for Miners' Safety-Lamps, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to gas-indicators used in connection with miners' safety-lamps for detecting the presence of fire-damp or marsh-gas, otherwise known as "proto carbureted-hydrogen gas," chemically represented by the formula CH_4 ; and the objects of the invention are to provide a simplified and inexpensive construction for such indicators, to provide a device of the kind attachable to ordinary safety-lamps now in use, to provide a detector that will detect the presence of the gases with greater certainty, and show more definitely the quantities present than those heretofore in use, and other objects, as are herein specified, and more particularly pointed out in the claims.

To these ends the invention consists of the construction, arrangement, and combination of the several parts, as specified, and illustrated in the drawings, in which—

Figure 1 is a side elevation of the bowl of a miner's lamp to which my detector has been attached. Fig. 2 is a view taken in cross-section on the line $x x$ of Fig. 1. Fig. 3 is an enlarged portion of Fig. 2, illustrating more fully a detail thereof. Fig. 4 is a substitute form for my attachment separate and detached from the body of a lamp. Fig. 5 is a view in cross-section taken on the line $y y$ of Fig. 4. Fig. 6 is a view of a miner's lamp complete, having part of the gauze removed, showing my attachment as it appears in use.

Similar characters of reference denote like and corresponding parts throughout the several views.

Referring to the drawings, 1 denotes the bowl of a miner's safety-lamp, provided with a wick 2, a wick-adjuster 3, and a screw-threaded attachment 4, by means of which it is attached to the body of a lamp 5 in the usual way. The attachment of my device is made to the bowl of the lamp by inserting a

tube or sheath 6 vertically through the bowl of the lamp, securing it therein by soldering or any other suitable means. Arranged to slide in this sheath is a support 7, having a bent-over portion 8, at the top of which are attached several loops of platinum wire 9 in a position which is directly over the top of the wick 2, so that the heat of the flame will act directly upon the wire when in use. The sliding portion 7 is round in cross-section, but may be substituted by a flat or other-shaped strip, as 7', which slides in the suitable sheath 6', designed to be passed through the body of the bowl of the lamp in a similar manner as sheath 6. In the substitute form the support 7' is continued downward through the tube and terminates in a handle 10, by means of which the support may be slid upward or downward to adjust it to the height required when in use. In the regular form shown in Fig. 2 the support 7 is connected by a suitable attachment-swivel to a screw-threaded member 11, secured by internal screw-threads 12 in the lower part of the sheath 6. The swivel connection consists of a head 13, revoluble within a recess which is a counterpart thereof in the lower end of the sliding support 7. The scope of the sliding support 7 may be limited by a small set-screw 15, extending outward through a slot 16 in the sheath 6, and graduation-marks, which may be small drill-holes, as 17 17, &c., are provided at a distance apart corresponding to the measurement of a known percentage of gas. In the example shown the graduation-marks are about three-sixteenths of an inch apart, and in the use of the device this will represent about one-fourth of one per cent. of variation in the percentage of gas in the air tested. The length or the scope of the support may of course be varied and the scale may be placed differently. It may be placed on the rods of the lamp, if preferred, or a scale may be erected inside the lamp for the purpose, or the scale may be placed on that part of the sliding rod which extends below the lamp-bowl, and any intermediate percentages to one-tenth of one per cent. may be indicated thereon with advantage.

To use my device, the bowl of an ordinary miner's lamp is punctured above and below and fitted with a sheath in which a sliding

support may be operated, and any means of adjustment may be resorted to consistent with the care which is required to keep the flame from coming in contact with the external air of the mines. It is understood, of course, that the supported loops of platinum wire 9 are within the usual gauze, and the presence of gas is indicated by the effect of the flame on this platinum wire. The detection of gas detectable by this instrument depends on the fact that carbureted hydrogen gas (CH_4) or flame in which it is burning effects candescence on the platinum wire to a degree corresponding with the percentage of its presence, so that where there are small quantities of gas the red hue of the platinum wire will be apparent at a much less distance above the flame, and where greater quantities are present the red hue will become apparent at a much greater distance above the flame, so that the scope of the supporting-rods in my detectors should be arranged to detect the highest and lowest percentages which may be expected to be found where they are to be used. When entering a place where gas of the kind is supposed to exist, the platinum wire will be raised to its highest position and then gradually lowered until the red hue appears, and marks on the graduated scale will then show what percentage of gas is present, or the reverse process by lowering first will serve as well.

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

1. The herein-described gas-detector for miners' safety-lamps comprised in a sheath extending through the bowl of the lamp, a sliding rod passed therethrough and surmounted by a hook to which is suspended a substance sensitive to burning gases, the said substance being suspended directly over the flame of the lamp, and shiftable toward and from the said flame substantially as and for the purpose specified.

2. A gas-detector for miners' lamps comprised in a sliding support in the vicinity of the flame of the lamp, a sensitive substance held by said support directly over the flame of the lamp, and means for shifting the said substance toward and from the flame, substantially as specified.

3. A gas-detector for miners' safety-lamps

comprised in a suitable support for a sensitive substance directly over the flame of the lamp, and means for shifting said substance toward and from the flame, substantially as specified.

4. A gas-detector for miners' safety-lamps of the kind described consisting of a slidable support in the vicinity of the flame of the lamp, a portion of platinum wire suspended from said support directly over the flame, and means for sliding the support upward and downward so as to shift the platinum wire toward and from the flame, substantially as specified.

5. The herein-described gas-detector comprised in a sheath extending through the bowl of the lamp, a sliding support fitted therein, said support supporting a portion of platinum wire directly over the flame and shiftable upward and downward by sliding the support through the sheath aforesaid, substantially as specified.

6. The herein-described gas-detector for miners' safety-lamps comprised in a sheath extending through the bowl of the lamp, a sliding support fitted therein, said support supporting a portion of platinum wire directly over the flame, the lower portion of said sheath provided with an internal screw-thread, a screw-threaded member fitted therein and adapted to drive the support upward and downward, substantially as and for the purpose specified.

7. In combination with a miner's safety-lamp, a gas-detector comprised in a sheath or tube extending vertically through the bowl of the lamp, a sliding rod extending through said sheath and slidable therein, the said sliding rod supporting a loop of platinum wire or other substance having an affinity for burning marsh-gas, the said substance being supported directly over the flame of the lamp and shiftable upward and downward, together with a graduated scale for indicating the various percentages of gas according to the effect of the flame on the substance aforesaid, substantially as specified.

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

MATTHEW D. MACKIE.

Witnesses:

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