

April 12, 1938.

H. F. SLOCUM

2,113,713

WARNING DEVICE FOR MANHOLES

Filed Sept. 16, 1937

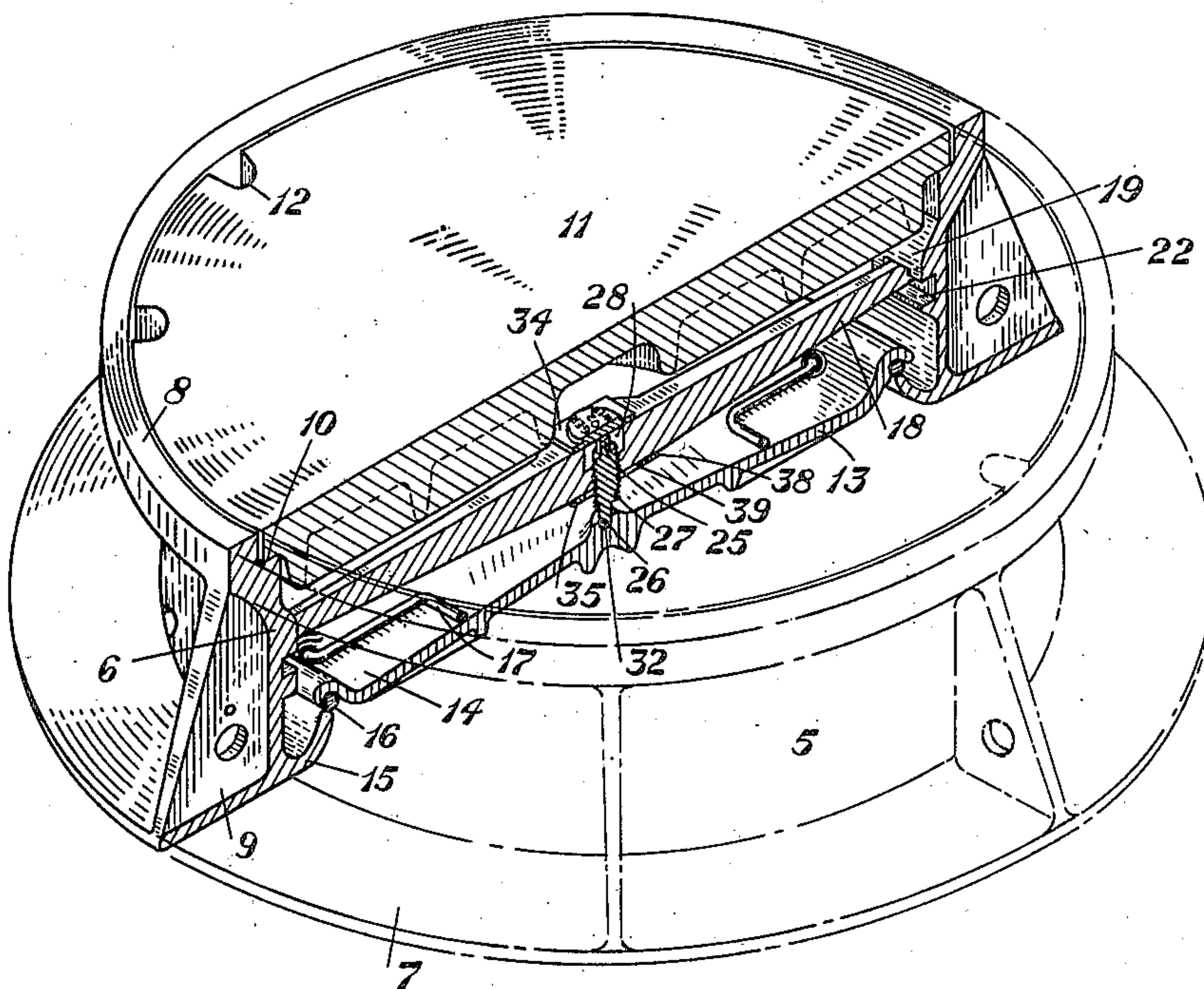


Fig. 1

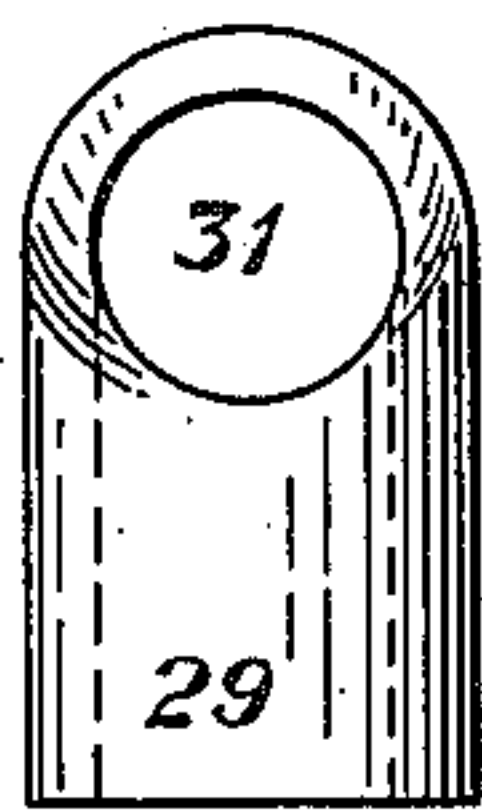


Fig. 2

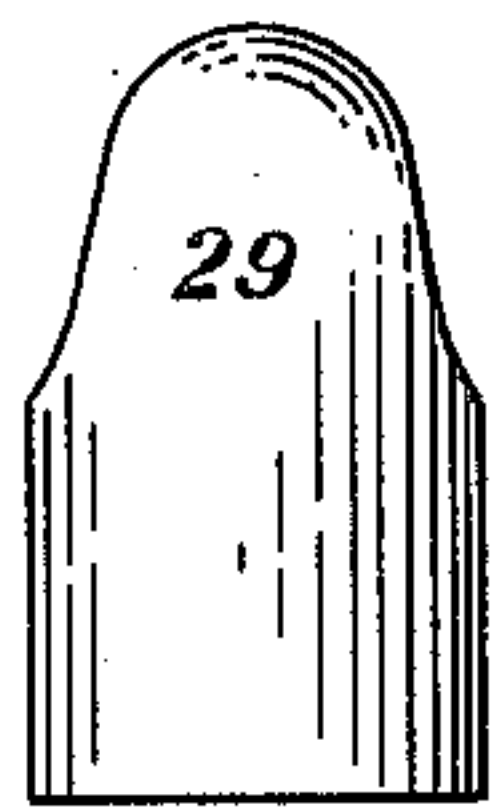


Fig. 3

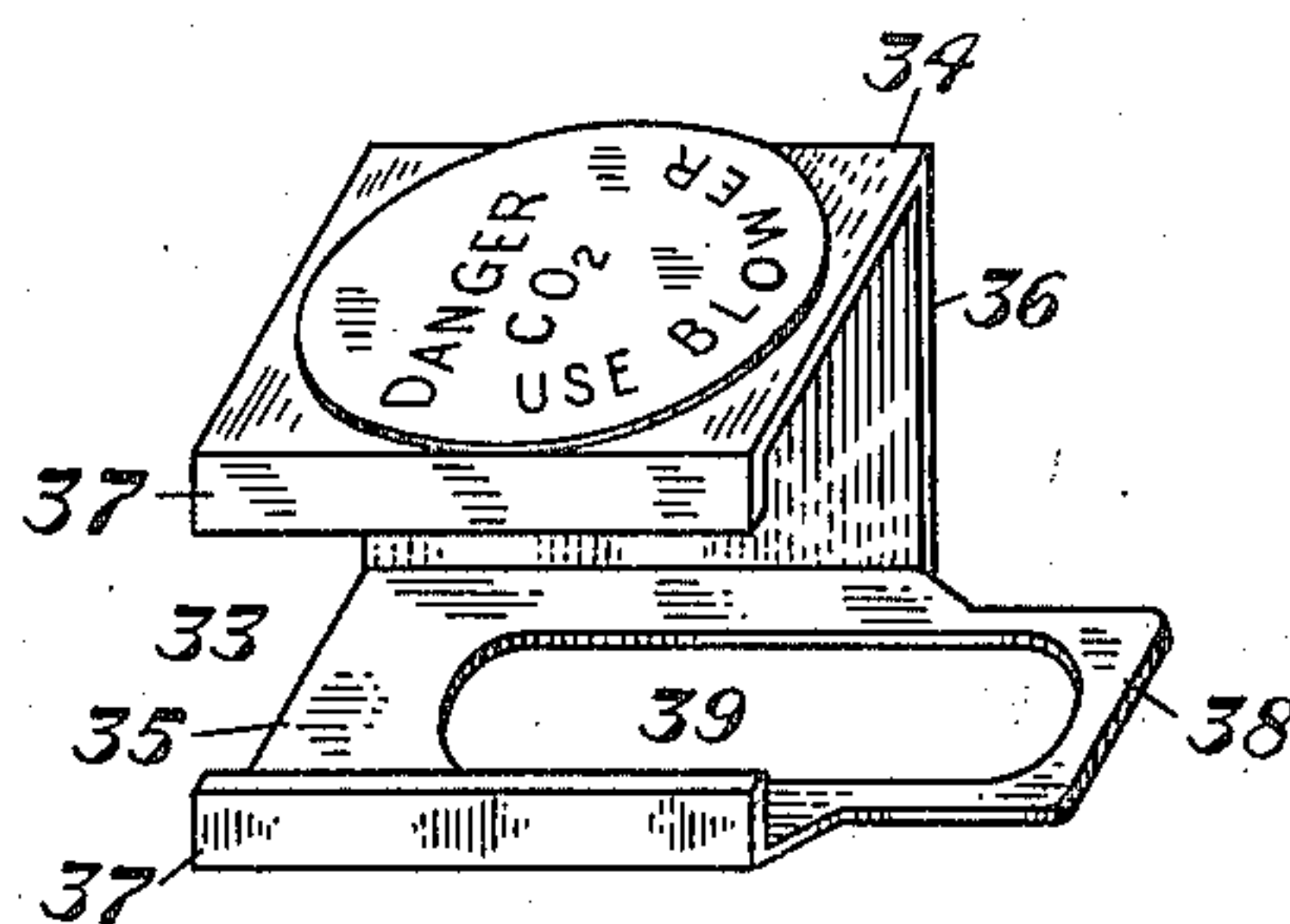


Fig. 4

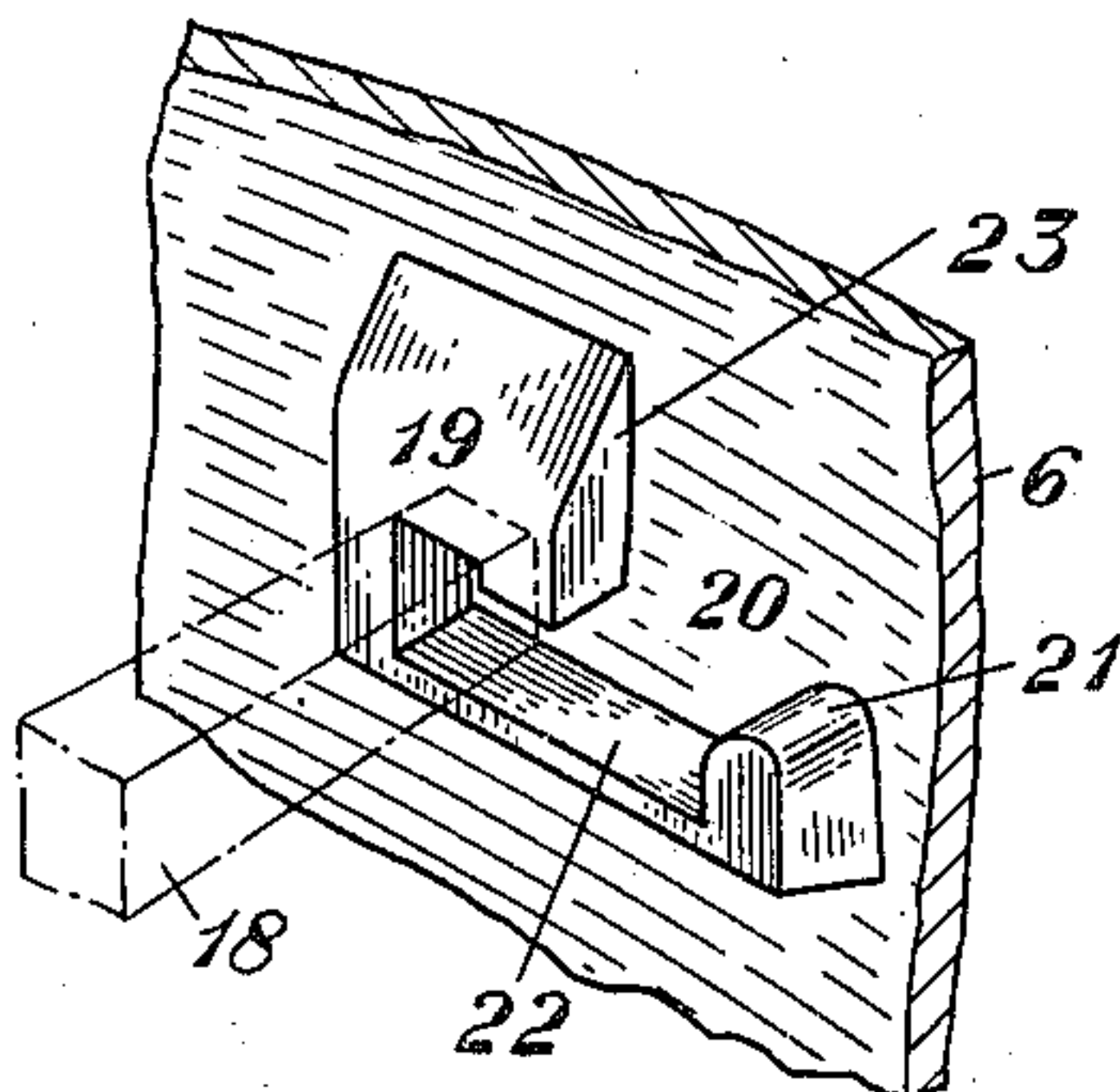


Fig. 6

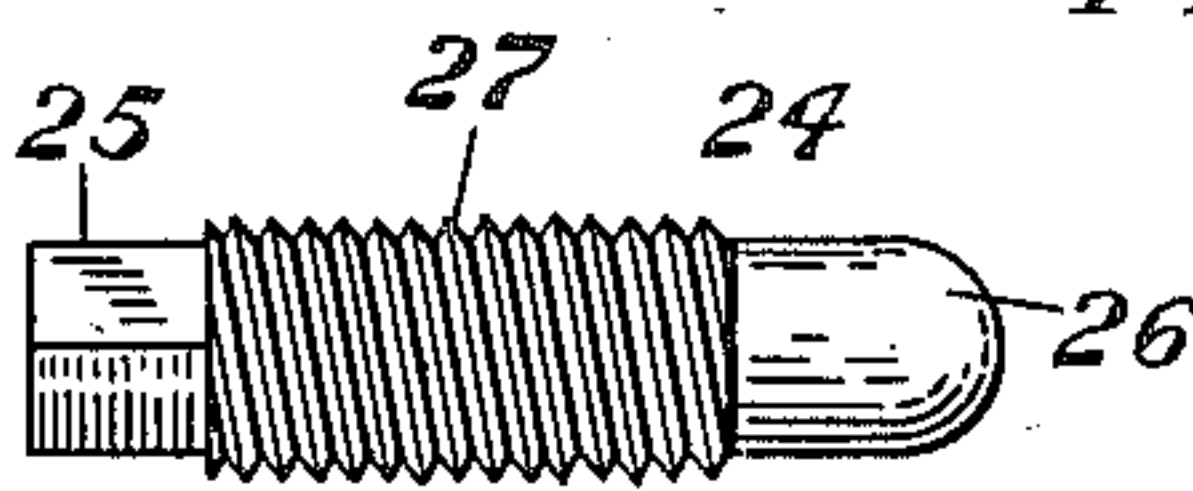


Fig. 5

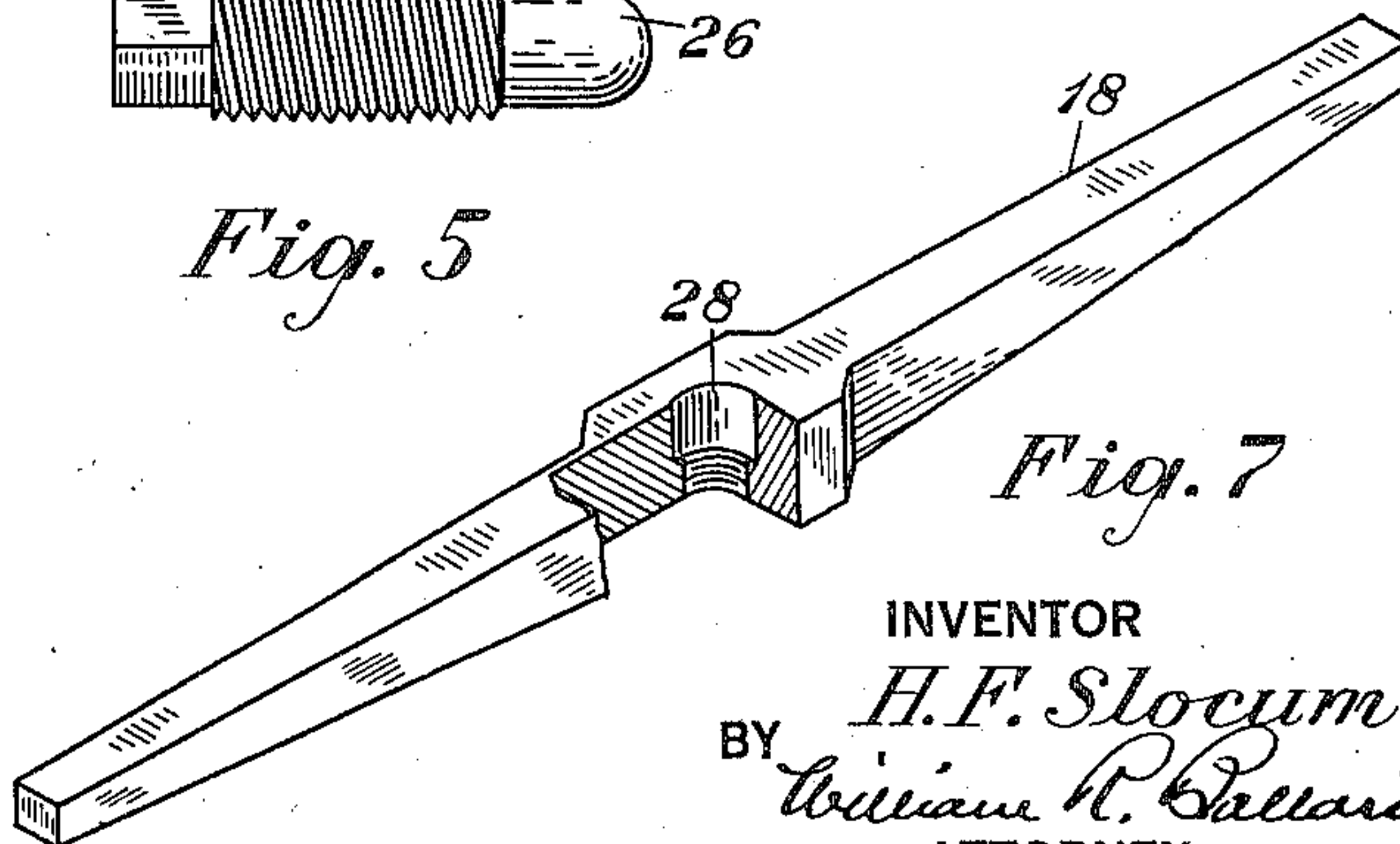


Fig. 7

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2,113,713

WARNING DEVICE FOR MANHOLES

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Application September 16, 1937, Serial No. 164,226

1 Claim. (Cl. 94—35)

This invention relates to manholes through which access may be had to underground conduit systems and the like, and more particularly to devices which may be installed in the manholes as warnings to operators that poisonous gas may be encountered therein.

Illuminating gas (containing CO), which originates from nearby leaky gas mains, may be sometimes found in manholes. The majority of manholes are only temporarily affected by this gas, since the hazard usually disappears after the leak has been corrected and the manhole ventilated.

A more serious condition exists where carbon dioxide gas (CO₂) is present in manholes. As is well known, this is a heavy and suffocating gas sometimes referred to as "dead air", and is usually found at the bottom of the manholes. Sewer gases and natural decomposition of vegetable or animal matter in the surrounding earth are largely responsible for its presence. Hence its recurrence is more persistent and harder to remove by virtue of its heavier-than-air property.

In order that workmen or others entering manholes may be safeguarded from hazards due to the noxious fumes above outlined, it is highly desirable that all manholes where gases are likely to be present be marked to give definite warning of their condition. This warning will provide notice that the manhole is unsafe and that proper ventilation thereof is necessary before anyone should enter.

It is one of the objects of this invention to provide a warning device of the above character.

Another object is to provide a warning device so mounted on the manhole equipment that it cannot be accidentally displaced therefrom.

A further object is to provide a warning device normally positioned to prevent access to the manhole and to give definite notice that danger may be encountered therein.

These and further objects will be apparent from the following description, when considered in connection with the accompanying drawing in which one embodiment of the invention is illustrated.

Referring to the drawing, Figure 1 is a perspective view, partly in section, of a manhole organization showing the improved warning device applied thereto.

Figs. 2 and 3 are elevational views of a socket key which may be used to operate the locking means for the manhole arrangement.

Fig. 4 is a perspective view of a collar which is slidably mounted on a cross-member and indi-

cates that danger may be encountered in the manhole.

Fig. 5 is an elevation of an interengaging plug which forms one element of the locking organization for the manhole.

Fig. 6 is a perspective view of a catch which is provided in the manhole frame and in which the cross-bar shown in Fig. 7 is retained; and

Fig. 7 is a perspective view of a cross-bar with which the collar shown in Fig. 4 and the plug shown in Fig. 5 are adapted to engage.

Referring to the drawing, 5 designates a casting of suitable metal forming a manhole frame which is set in the ground in such manner that its top surface lies substantially level therewith in a well understood manner. The frame 5 includes a cylindrical wall 6 at the bottom of which is provided an annular flange 7. A second annular flange 8 is formed about the upper portion of the frame, and reinforcing ribs 9, which are radially disposed about the outer surface of the cylindrical wall 6, extend between the upper and lower flanges. An annular ledge or shoulder 10 is provided about the inner surface of the flange 8 which forms a seat for a top or outer circular cover 11 for the manhole. This cover may be provided about its periphery with slots 12 in which a suitable implement may be inserted to pry the cover from its seated position. A second, or inner circular cover 13, as shown in Fig. 1, forms a drip pan, and also provides part of the locking assembly, as will be presently described. This cover is provided with a circumferential rim 14 which is of substantially inverted U-shaped formation in cross-section. The rim 14 is adapted to register with a substantially circular lip 15 which extends inwardly from the wall 6, and a rubber or like gasket 16 lies in interposed relation between the rim 14 and lip 15. This gasket when compressed between these elements forms a water-tight seal and prevents surface drainage from entering the manhole. A pair of U-shaped handles, each shown in the drawing as being broken away, are pivotally connected to the top surface of the cover 13, as indicated at 17, 17. These handles serve to assist in removing and replacing said cover.

A cross-bar 18 is positioned in the manhole between the covers 11 and 13 and its somewhat tapered extremities are fitted into slots 19 which form catches in which said extremities are retained in lock position. The cross-bar is of suitable rugged material which will not buckle or become distorted in use. It is preferred to have four catches disposed about the inner surface of

the cylindrical wall of the frame 5 at a distance of approximately 90° from each other. One of these catches is shown enlarged in Fig. 6. The slots, which are opposite each other in the interior of the manhole frame, engage with the respective extremities of the cross-bar, which may be introduced through the openings 20. The openings 20 lie between stop shoulders 21 positioned on horizontal portions 22 and the vertical walls of lock lugs 23. It will be obvious that by inserting the extremities of the cross-bar 18 in the vertical openings 20, and rotating said bar, its extremities will be introduced into the respective chambers formed in the slots 19, as may be seen in Fig. 6. The bar is locked in this position by the aid of a screw-threaded plug 24 in a manner to be presently described. This plug is provided at its upper end with a triangular portion 25, and at its opposite or lower end, with a somewhat rounded or ball point portion 26, while a threaded portion 27 lies between these ends.

The cross-bar 18 is provided at its midpoint with a countersunk opening 28, to which a threaded opening is connected. The plug 24 is adapted to be inserted in these openings, and its threaded portion may engage with and extend through a like portion in the wall of the opening, while the upper portion of said plug lies within the countersunk opening. The upper or countersunk portion of the opening 28 in the cross-bar is of sufficient diameter to permit the entrance of a key or socket wrench 29. This wrench, as shown in Figs. 2 and 3, is provided with a cylindrical casing within the lower portion of which is formed a triangular recess or opening which is adapted to engage the triangular portion 25 of the plug 24. The upper portion of the key 29 is provided with an opening 31 through which a bar may be inserted to facilitate the turning of the key when applied to the plug 24.

The inner cover 13 has a cup-like or socket portion 32 formed at its axis which lies directly beneath the opening 28 in the cross-bar 18. This socket portion is adapted to receive the ball point 26 of the screw plug 24. When rotation is imparted to the plug 24 by the key 29, said plug is caused to engage and apply pressure to the inner cover 13 to cause it to be firmly locked in position and engage and compress the gasket 16. The rotation of the plug 24 also causes the cross-bar 18 to be raised so that its extremities are interlocked in the chambers or recesses of the oppositely positioned slots 19 on the interior wall of the frame and prevented from being rotated in an obvious manner. The head portion of the screw plug 24, in its locked position, will lie flush or a trifle below the top surface of the cross-bar 18.

A collar, as more particularly appears in Fig. 4, is slidably mounted on the cross-bar 18. This collar may be made from any suitable metal such as bronze, and is provided with a rectangular top plate 34. A circular portion with raised lettering thereon is positioned on the plate 34, and this lettering may be in the form of a legend, as shown in the drawing, to indicate that danger may be encountered in the manhole. A bottom plate 35 is interconnected with the top plate 34 by a side wall

36 and respective flanges 37, 37 extend toward each other from the plates 34 and 35 of the collar 33 and lie opposite the side wall 36. The lower plate 35 is provided with an extension 38, which projects beyond the side wall 36, and a longitudinal slot 39 is cut through the plate 35.

When the collar 33 is in normal position it fits snugly about the center of the cross-bar 18 and in this position covers the top of the locking plug 24. When the locking plug is in position, its lower end extends through the longitudinal slot 39 of the collar, and this permits only a limited movement of the collar along the cross-bar 18. Thus, if it is desired to obtain access to the locking plug, it is necessary to move the collar to the left or toward the outer edge of the slot 39 and beyond the right edge of the upper plate 34. When the collar is in this position, the locking plug may be screwed or unscrewed to respectively apply or relieve pressure on the inner cover 13 of the manhole. If it is desired to remove the collar from the cross-bar for replacement or other purpose, the locking plug may be unscrewed until its bottom is flush with the lower surface of the cross-bar, thereby permitting the collar to be slipped over either end of the cross-bar.

It will be apparent from the above that access to a manhole cannot be had until the collar has been moved from its position over the locking plug and that the collar cannot be accidentally displaced from the cross-bar. The presence of the collar, therefore, not alone gives visual warning to the operator that the manhole is unsafe, but also prevents access thereto until the collar is moved as described. When the collar has been moved, the locking plug and inner cover may be removed, as above outlined, and access may be obtained to the manhole to ventilate or otherwise rid it of the poisonous gas. The inner cover and locking plug, together with the collar, may be restored to their normal positions, of course, when it is desired to close the manhole.

While there is shown and described herein one preferred form of the invention by way of illustration, it is understood that it is not limited or confined to the precise details of construction herein described and delineated, as modification and variation may be made within the scope of the appended claims without departing from the spirit of the invention.

What is claimed is:

In manhole construction, a frame having a flange upon which a cover may rest, a cross-member having ends interlocked with said frame above said cover, a threaded element adjustable with respect to said cross-member to apply pressure to said cover thereby locking the cover and cross-member in their relative positions, said adjustable element being recessed in the cross-member so as to be accessible and operable only by a suitable key, and a collar for indicating to an operator that danger may be encountered in the manhole, said collar being slidably movable on the cross-member from a position above the recessed adjustable element to a position where access may be had to operate said adjustable element.

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