Aug. 13, 1940. G. J. KRUELL 2,211,134

MACHINE FOR RESEATING MANHOLE FRAMES

Filed Dec. 27, 1938 2 Sheets-Sheet 1

Fig. 1.

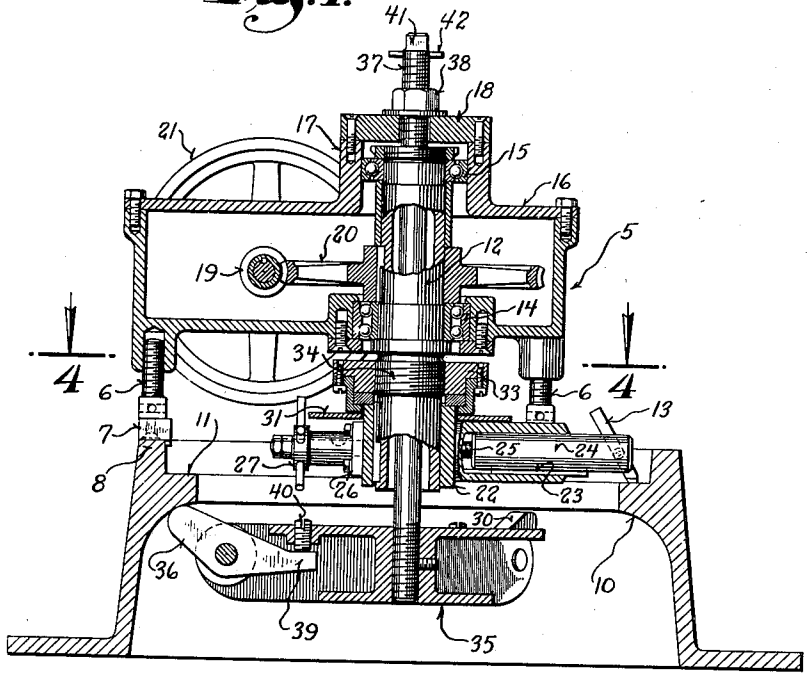
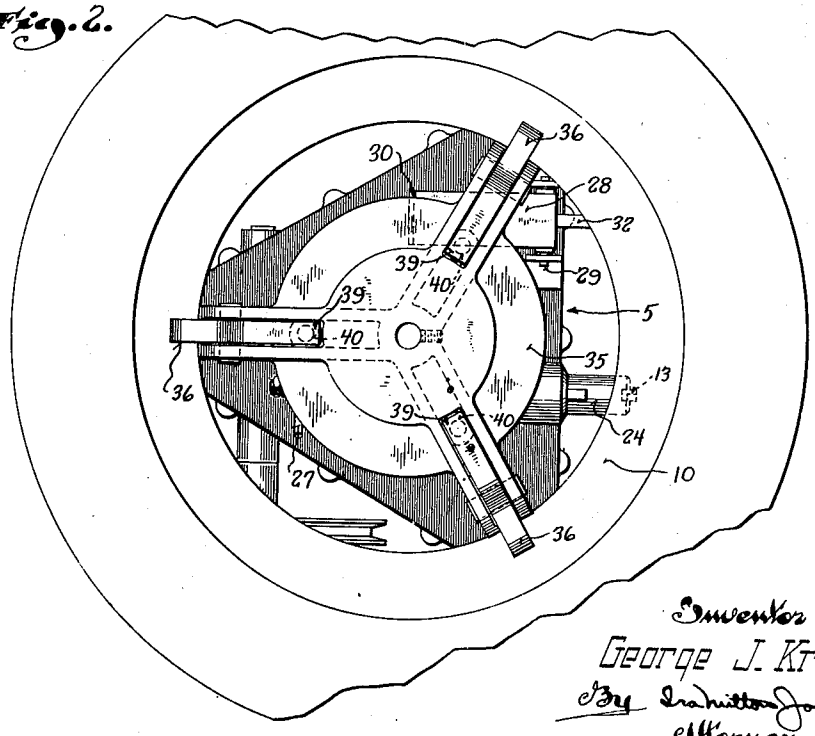


Fig. 2.



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Fig. 3.

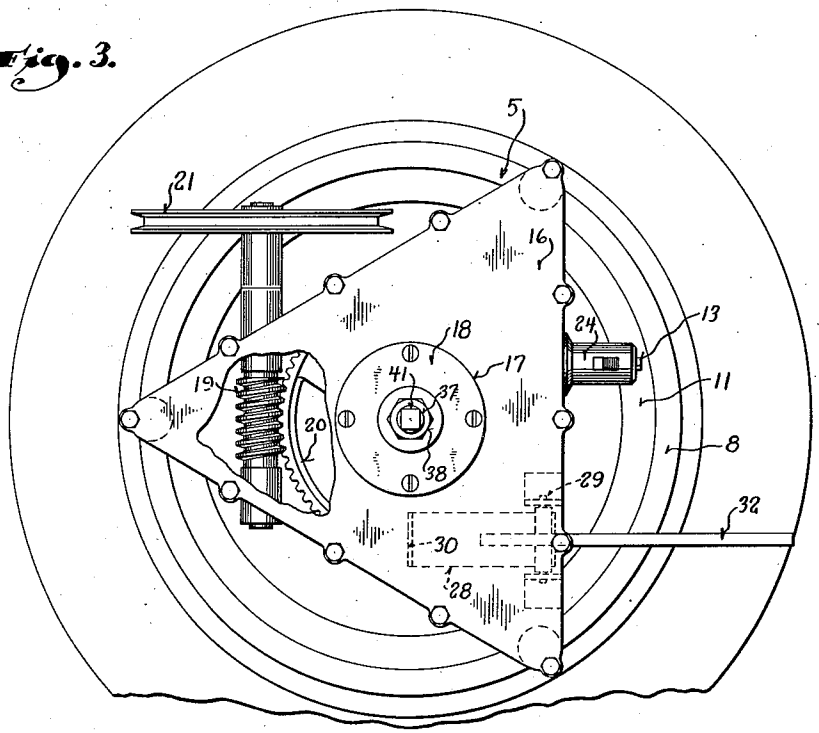


Fig. 4.

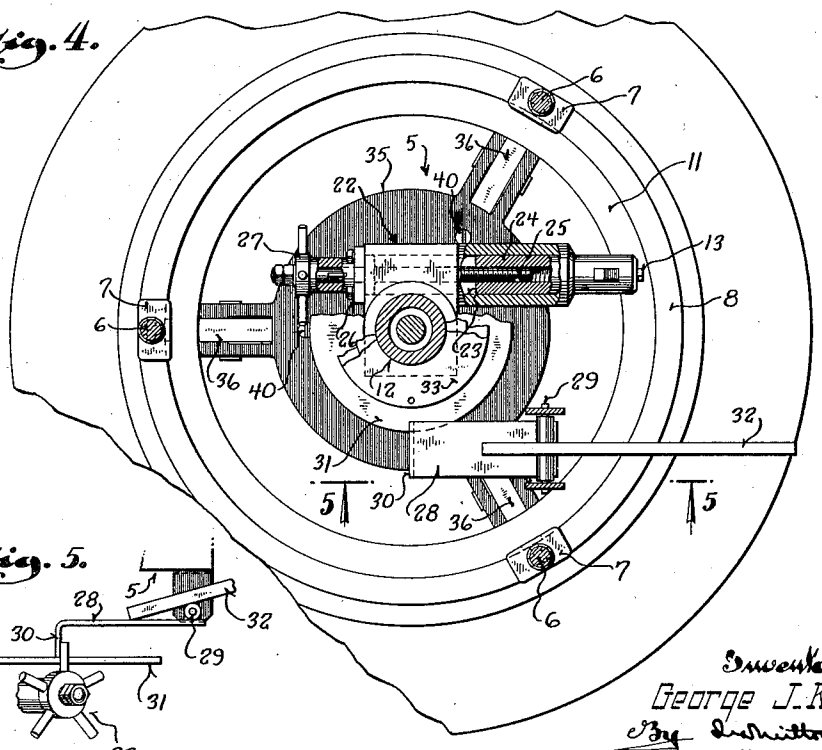


Fig. 5.

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Patented Aug. 13, 1940 2,211,134

UNITED STATES PATENT OFFICE

2,211,134

MACHINE FOR RESEATING MANHOLE FRAMES

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Application December 27, 1938, Serial No. 247,911

18 Claims. (Cl. 82—4)

This invention relates to portable refacing machines for recutting or reseating the cover seats of circular manhole heads or frames.

Manhole frames, as is well known, are set into the pavement of the street with the upper rim of the frame flush with the surface of the street; and their removable covers are supported on seats formed by inwardly directed annular flanges near the top of the frames.

These seats for the manhole covers are, of course, subject to wear and very often are worn unevenly so that the cover does not lie flat but is free to rock. This condition is objectionable for many reasons, among which may be mentioned the more rapid wearing of the cover and seat due to the constant motion and also the noise incidental thereto as vehicles pass over the cover.

This invention, therefore, has as one of its objects to provide a portable machine for satisfactorily resurfacing or recutting the seats of manhole frames.

Another object of this invention is to provide a machine of the character described, in which all of the parts are permanently assembled so that none of them, as for instance the clamping instrumentalities, can drop into the sewer during the setting up of the machine and its operation.

Another object of this invention is to provide a machine of the character described, which is readily adjustable to different manhole frames and which is so designed that it may be rigidly clamped to the frame to insure rapid and accurate resurfacing of the seat.

Another object of this invention resides in the provision of novel means for automatically feeding the cutting tool across the face of the seat as the machine operates.

With the above and other objects in view which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described, and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

The accompanying drawings illustrate one complete example of the physical embodiment of the invention constructed in accordance with the best mode so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a vertical sectional view through a machine embodying this invention illustrating its application to a manhole frame;

Figure 2 is a bottom view thereof;

Figure 3 is a top view thereof with a part broken away to illustrate structural details;

Figure 4 is a horizontal sectional view taken through Figure 1 on the plane of the line 4—4; and

Figure 5 is a fragmentary detail view illustrating the manner in which the tool is automatically fed across the face of the seat.

Referring now particularly to the accompanying drawings in which like numerals indicate like parts, the numeral 5 designates generally the main supporting structure of the machine which is illustrated in the present instance as a hollow gear box of substantially triangular shape.

At the corners of this triangular supporting structure, there are downwardly projecting bosses into which supporting legs 6 are threaded, the lower ends of which have blocks 7 freely rotatably mounted thereon. The bottoms of these blocks are shaped to engage over the inner periphery of the exposed rim 8 of the manhole frame. The height of the legs is thus readily adjustable while they rest on the exposed rim 8.

As is customary, the manhole frame has an inturned annular flange 10, the top of which provides a seat 11 for the cover (not shown). It is this seat which becomes worn and warped during use and which must be refaced to insure the cover lying flatly in place.

The legs 6 are thus adjusted so that the supporting structure 5 holds a rotatable vertically disposed spindle 12, which is mounted thereon, exactly perpendicular to the plane of the seat 11. This spindle 12 carries the refacing tool 13 in a manner to be hereinafter described.

The spindle is journalled in bearings 14 and 15 carried respectively by the bottom wall of the hollow supporting structure 5 and its cover 16, the cover being provided with an upstanding hub 17 to receive the bearing 15. This hub is closed by a cap 18. The spindle is driven by a worm 19 journalled in appropriate bearings carried by opposite side walls of the supporting structure and meshing with a worm wheel 20 which is fixed to the spindle. A pulley 21 fixed to the worm shaft exteriorly of the supporting structure provides for the application of driving force to the worm from any suitable external source.

It is to be observed that the hub of the worm wheel rests on the inner race of the bearing 14 so that the spindle is thereby supported against dropping.

Slidably splined to the lower end of the hollow

spindle 12 is a tool arbor indicated generally by the numeral 22 which projects to one side of the spindle and has a bore 23 lying in a plane normal to the axis of the spindle to slidably receive a boring bar 24. A key in a keyway holds the boring bar against turning while enabling the same to be adjusted axially by means of a screw 25 threaded into the boring bar and held against axial motion by a cap 26 fixed to the tool arbor.

A handle 27 having a plurality of radially projecting fingers provides means for turning the screw 25 to slide the boring bar in one direction or the other. This adjustment of the boring bar obviously carries the tool 13 toward or from the axis of the spindle so that the tool may be progressed across the face of the seat 11 during the refacing operation.

Preferably this adjustment is effected by means of an arm 28 pivotally supported from the underside of the supporting structure as at 29 and provided with a downwardly extending finger 30 which rests on a plate 31 supported above the tool arbor in position to be engaged by the fingers of the adjusting handle 27 as the spindle revolves. A handle 32 fixed to the arm 28 provides means for moving the same to an active position. To insure the presence of the operator, the handle 32 is of such length and weight as to normally hold the finger 30 out of alignment with the fingers of the adjusting handle 27 so that the operator must manually operate the same to effect adjustment of the tool.

Vertical adjustment of the tool arbor, and consequently the tool, is effected by means of a nut 33 freely rotatable but non-longitudinally movably connected with the tool arbor and threaded on a portion 34 of the spindle.

To clamp the machine in place, a clamping head 35 is insertible through the bore of the manhole into position to have pivotally mounted dogs 36 carried thereby engage under the ledge formed by the flange 10. Hence, by drawing up on the clamping head, the entire machine is clamped to the manhole frame. For this purpose, a tension rod 37 is fixed to the clamping head and supported from the cap 18 by a tensioning nut 38.

The clamping head 35 is substantially in the form of a spider having its arms bifurcated to receive therebetween the dogs 36. These dogs are so proportioned as to the distribution of their weight that in their normal positions they swing down into operative positions so that upon insertion of the clamping head through the bore of the manhole frame, they automatically assume their operative positions with their tail ends 39 bearing against screws 40 threaded in the spider arms. The clamping head thus may be said to have automatically extendible arms.

By virtue of the screws 40, the relative positions of the outer active ends of the dogs 36 with respect to the clamping spider as a whole are adjustable to accommodate irregularities in the ledge under which they engage. Such irregularities are further compensated by the free swinging manner in which the tension rod is mounted, it being noted that the tension rod is considerably smaller in diameter than the bore of the hollow spindle.

The squared end 41 of the clamping screw enables the entire clamping head to be turned to dispose its dogs 36 in proper relationship to the legs 6; and to prevent accidental disassembly of the screw 37 from the cap 18, a suitable cross pin 42 or other obstruction is carried by the upper end of the screw.

From the foregoing description taken in connection with the accompanying drawings, it will be readily apparent to those skilled in the art that this invention provides a novel machine for resurfacing the seats of manhole frames and that this machine is so constructed that all of its parts are permanently assembled and secure against detachment during application and use of the machine with the result that the loss of parts by having them drop down into the sewer is avoided.

It is also evident that the required adjustments, both for properly setting the machine in place for use and for the tool during the cutting operation, are easily and quickly made.

What I claim as my invention is:

1. In a machine for reseating manhole frames, the combination of: a supporting structure adapted to bear against the exposed rim of a manhole frame; a clamping device carried by said supporting structure and insertible through the bore of the manhole frame, said clamping device having portions adapted for engagement with an undersurface of the manhole frame for securing the supporting structure to the manhole frame; a rotatable spindle journalled in the support; and a tool carried by said spindle and adjustable to actively engage the seat of the manhole frame.

2. In a machine for reseating manhole frames: a supporting structure adapted to rest on the exposed rim of a manhole frame; a vertical clamping rod carried by the supporting structure and extending down into the bore of the manhole when the supporting structure is in place; clamping arms carried by said rod and engageable with an undersurface of the manhole frame; means for drawing the rod upwardly to clamp the manhole frame between the supporting structure and the clamping arms; a vertically disposed rotatable spindle journalled in the supporting structure; and a boring bar adjustably mounted on the rotatable spindle and adapted to carry a tool for active engagement with the seat of the manhole frame.

3. A machine for reseating manhole frames in which the seat constitutes the upper surface of an inwardly extending annular flange comprising: a supporting structure; means on the supporting structure engageable with the exposed rim of a manhole frame at spaced points; a rotatable hollow vertical spindle journalled in the supporting structure; a boring bar carried by the spindle and adapted to position a tool for active engagement with the seat of the manhole frame; a clamping member having parts engageable with the undersurface of said inwardly directed annular flange of the manhole frame; and means carried by the supporting structure and extending through the hollow vertical spindle for drawing the clamping member into firm engagement with said undersurface of the flange on the manhole frame, said means being spaced from the internal walls of the hollow spindle throughout its entire length.

4. A machine of the character described comprising: a supporting structure having vertically spaced aligned bearings; spaced legs for the supporting structure; a hollow spindle rotatably mounted in the supporting structure bearings; a boring bar carried by the spindle and extending laterally therefrom; and clamping means independent of said hollow rotatable spindle and cooperable with the legs to secure the machine to work to be acted upon including a tension rod inside the hollow rotatable spindle and supported

from the supporting structure, said tension rod being of such diameter as to be capable of lateral movement inside the hollow rotatable spindle.

5. A machine of the character described comprising: a head; a vertical tubular spindle journalled in the head; a drive transmission carried by the head for turning the spindle; a boring bar carried by the spindle and adapted to carry a cutting tool; a clamping member movable toward the head in a clamping action for clamping the machine to the work to be acted upon; and means passing through the vertical tubular spindle with a substantially large clearance space between the walls of the tubular spindle and said means for drawing the clamping member toward the head.

6. In a manhole frame reseating machine: a supporting structure adapted to rest on the exposed rim of a manhole frame; a cutter assembly rotatably journalled in said supporting structure; a clamping member having extendible arms adapted to pass through the bore of the manhole frame and when extended to bear against an undersurface of the manhole frame; and a tension rod carried by the supporting structure so as to be independent of said cutter assembly and connected with the clamping member to move the same toward and away from the supporting structure without affecting the adjustment of the cutter assembly.

7. In a manhole frame reseating machine: a supporting structure adapted to rest on the exposed rim of a manhole frame; a clamping member having extendible arms adapted to pass through the bore of the manhole frame and when extended to bear against an undersurface of the manhole frame; a tension rod carried by the supporting structure and connected with the clamping member to draw the same toward the supporting structure; and a tool carrier rotatably supported by the supporting structure and having the tension rod disposed therein so that the tool carrier is rotatable about the tension rod with a substantial clearance space therebetween.

8. In a manhole frame reseating machine: a rigid supporting structure; a plurality of spaced supporting legs for the supporting structure, said legs being engageable with the exposed rim of a manhole frame; a clamping member of a size to pass through the bore of the manhole frame and having extendible arms for engagement with an undersurface of the manhole frame to cooperate with the legs of the supporting structure for rigidly clamping the same to the manhole frame; means connecting the supporting structure and the clamping member so as to permit the clamping member to shift laterally with respect to the supporting structure, said means being operable to draw the clamping member toward the supporting structure in a clamping action; and a rotatable tool carrier supported from the supporting structure and rotatable about said last named means.

9. In a manhole frame reseating machine: a rigid supporting structure; a plurality of spaced supporting legs for the supporting structure, said legs being engageable with the exposed rim of a manhole frame; a clamping member of a size to pass through the bore of the manhole frame and having extendible arms for engagement with an undersurface of the manhole frame to cooperate with the legs of the supporting structure for rigidly clamping the same to the manhole frame; means connecting the supporting structure and the clamping member and operable to draw the same toward each other in a clamping action while permitting a degree of lateral motion therebetween; a rotatable tool carrier supported from the supporting structure and rotatable about but spaced from said last named means; and a drive transmission mounted on the supporting structure for driving the tool carrier.

10. In a machine of the character described: a supporting structure; a rotatable tool carrying spindle journalled in the supporting structure; a tool arbor mounted on the spindle and extending laterally therefrom, said arbor including a boring bar endwise adjustable to carry a tool toward and from the axis of the spindle; a rotatable adjusting member connected with the boring bar for adjusting the same; and an actuating device manually movable into engagement with said rotatable adjusting member during rotation of the tool carrying spindle for automatically adjusting the boring bar.

11. In a machine of the character described: a supporting structure; a spindle journalled in the supporting structure; a tool arbor slidably splined to the spindle; means for sliding the tool arbor axially along the spindle and for holding the tool arbor in position thereon; a boring bar slidable axially in the tool arbor to carry a tool mounted on the boring bar toward and from the axis of the spindle; and means carried by the tool arbor for adjusting the boring bar.

12. In a machine of the character described: a supporting structure; a spindle journalled in the supporting structure; a tool arbor slidably splined to the spindle; means for sliding the tool arbor axially along the spindle and for holding the tool arbor in position thereon; a boring bar slidable axially in the tool arbor to carry a tool mounted on the boring bar toward and from the axis of the spindle; means carried by the tool arbor for adjusting the boring bar; and means manually positionable into the path of the adjusting means for effecting automatic adjustment of the boring bar as the spindle rotates.

13. In a machine of the character described: a supporting structure; a unitary cutter assembly comprising a spindle journalled in the supporting structure; a tool arbor slidably splined to the spindle; means for sliding the tool arbor axially along the spindle and for holding the tool arbor in position thereon; a boring bar slidable axially in the tool arbor to carry a tool mounted on the boring bar toward and from the axis of the spindle; means carried by the tool arbor for adjusting the boring bar; and a drive transmission carried by the supporting structure for rotating the spindle.

14. In a machine of the character described: a supporting structure; a vertical hollow spindle journalled in the supporting structure; a tool arbor mounted on the hollow spindle; a boring bar carried by the tool arbor and positioned in a plane normal to the axis of the spindle with the axis of the bar spaced from the axis of the spindle; means for adjusting the boring bar axially of itself; a drive transmission carried by the supporting structure for imparting rotation to the spindle; and clamping means for securing the machine to work to be acted upon including a part projecting through the hollow rotatable spindle so as to be capable of lateral movement therein.

15. In a machine of the character described: a supporting structure; a vertical hollow spindle journalled in the supporting structure; a tool arbor mounted on the hollow spindle; a boring

bar carried by the tool arbor and positioned in a plane normal to the axis of the spindle with the axis of the bar spaced from the axis of the spindle; means for adjusting the boring bar axially of itself; a drive transmission carried by the supporting structure for imparting rotation to the spindle; and clamping means for securing the machine to work to be acted upon including a part projecting through the hollow rotatable spindle, said part being considerably smaller than the bore of the spindle so as to enable limited swinging movement thereof to permit the clamping means to adjust itself to the work without affecting the spindle.

16. A machine for reseating manhole frames comprising: a gear box; a plurality of supporting feet for the gear box adapted to rest on the exposed rim of a manhole frame to support the gear box thereabove; a vertical hollow spindle journalled in the gear box and extending downwardly therefrom; transmission gearing inside the gear box for imparting rotation to the hollow spindle; a boring bar carried by the spindle for actively engaging a tool with the seat of the manhole frame; a clamping member having extendible arms adapted to pass through the bore of the manhole frame and engageable with the undersurface of the ledge which forms the seat of the manhole frame; and a tension rod passing through the hollow vertical spindle and exposed on top of the gear box to afford access thereto for drawing the clamping member upwardly to secure the machine to the manhole frame, said tension rod at all times maintaining the clamping member assembled with the gear box.

17. A machine for facing off the horizontal circular cover seats of manhole frames comprising: a supporting structure; a tool carrier including a vertical rotatable spindle journalled in the supporting structure and having means for carrying a tool for active engagement with the seat of the manhole frame; a plurality of legs for the supporting structure adapted to bear against the exposed rim of the manhole frame; means for adjusting the length of said legs so that the supporting structure may be positioned to hold the rotatable spindle exactly perpendicular to the plane of the manhole cover seat; and means at all times connected with the supporting structure and cooperable with said legs for clamping the machine to the frame of the manhole.

18. A machine for facing off the horizontal circular cover seats of manhole frames comprising: a supporting structure; a tool carrier including a vertical rotatable spindle journalled in the supporting structure and having means for carrying a tool for active engagement with the seat of the manhole frame; a plurality of legs for the supporting structure adapted to bear against the exposed rim of the manhole frame; means for adjusting the length of said legs so that the supporting structure may be positioned to hold the rotatable spindle exactly perpendicular to the plane of the manhole cover seat; and means connected with the supporting structure and cooperable with said legs for clamping the machine to the frame of the manhole, said last named means permitting a degree of relative motion between the clamping means and the supporting structure to permit the clamping means to adjust itself to irregularities in the frame of the manhole while enabling the tool carrier to remain undisturbed.

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