Dec. 20, 1960 C. F. PASCHEN 2,965,195

PORTABLE LADDER FOR A MANHOLE OR THE LIKE

Filed April 23, 1959

Fig. 1

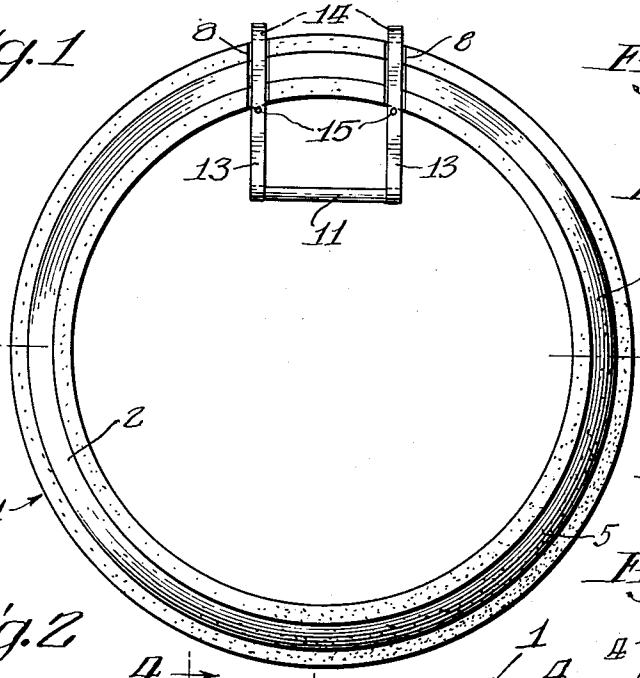


Fig. 4

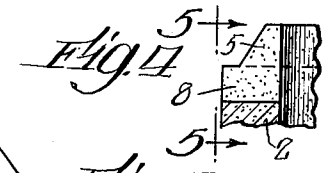


Fig. 5

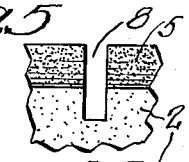


Fig. 6

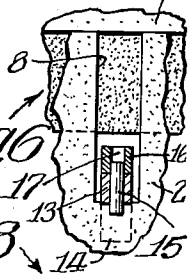


Fig. 3

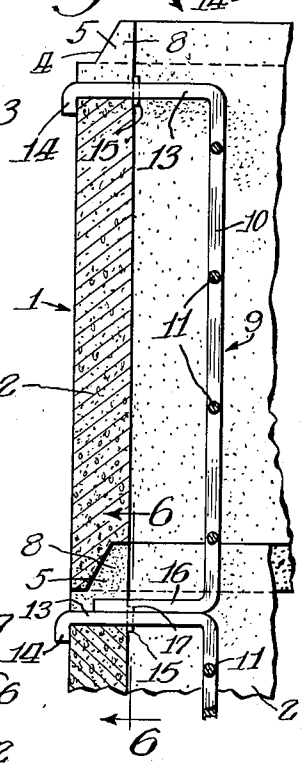
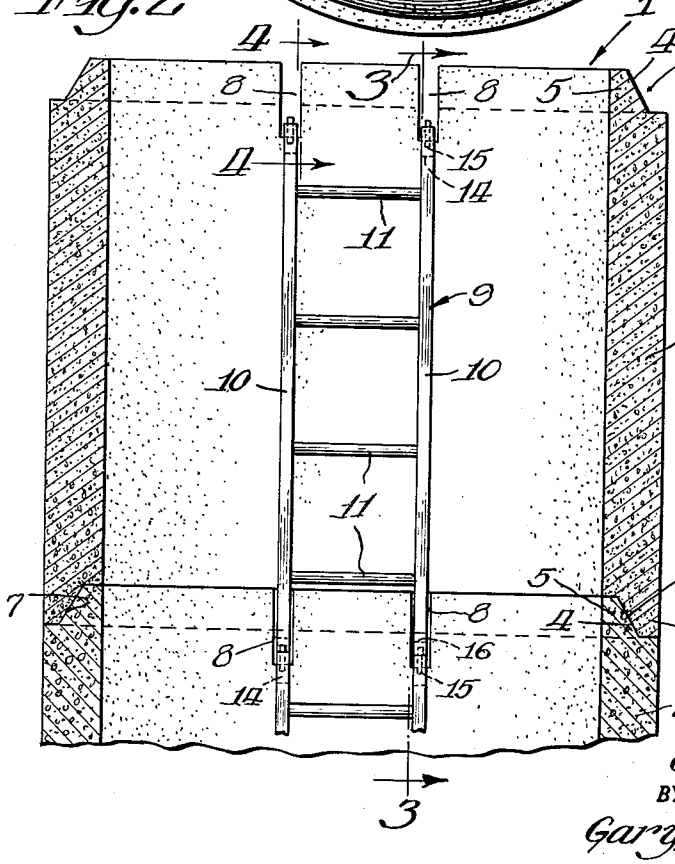


Fig. 2



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PORTABLE LADDER FOR A MANHOLE OR THE LIKE

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3 Claims. (Cl. 182—206)

This invention relates to improvements in a portable ladder for street manholes, sewers and the like, and refers particularly to a portable ladder which may be made in identical units so contrived that a unit ladder or a plurality of units may be employed to gain access to the bottoms of street manholes, sewers or the like of variable depths.

One of the objects of the present invention resides in a ladder construction so contrived as to be quickly and conveniently applied to the inner wall of a street manhole, sewer or the like to gain access to the bottom thereof.

Another important object of the invention resides in a ladder construction which can be made in identical units and which can be used as a single unit or used in a plurality of cooperating units as the depth of the manhole or sewer requires.

A further important object of the invention resides in a unit ladder which may be made of strong light-weight material such as aluminum or the like and can be easily and conveniently transported from place to place.

Other objects and advantages of the present invention will be apparent from the accompanying drawing and following detailed description.

In the drawings,

Fig. 1 is a top plan view of a manhole or sewer with a ladder, embodying the concepts of the present invention, secured to the inner wall thereof.

Fig. 2 is a longitudinal sectional view through the walls of a manhole or sewer taken on line 2—2 of Fig. 1.

Fig. 3 is a detailed sectional view taken on line 3—3 of Fig. 2.

Fig. 4 is a detailed sectional view taken on line 4—4 of Fig. 2.

Fig. 5 is a detailed elevational view looking in the direction of the arrows 5—5 of Fig. 4.

Fig. 6 is a detailed sectional view taken on line 6—6 of Fig. 3.

Referring in detail to the drawing, 1 indicates generally a conventional manhole or sewer, the manhole or sewer being defined by cylindrical sections 2. The sections 2 are preferably made of precast concrete, molded clay tile or the like and all sections are similar and nest or interfit to define a manhole or sewer of desired depth.

The wall of each section at one end is provided with an annular notch 3, the inner wall 4 of the notch being tapered to form a male annular projection 5. The wall of the opposite end of each section is reciprocally formed, having an outer annular projection 6 defining an inner annular female recess 7 into which the projection 5 of the adjacent section interfits. The sections 2, hereinbefore described, are conventional and per se form no part of the present invention.

However, to adapt such conventional sections to use in the present invention, the sections must be slightly modified. The modification simply consists in providing a pair of spaced axial slots 8 in the edge of one end of each section wall. These notches may be provided during the manufacture of the sections or they may be cut or chiseled in the cylindrical sections of preexisting manholes or sewer installations.

Ladder 9 comprising an embodiment of the invention comprises a pair of spaced rails 10 which carry spaced rungs 11. At one end of the ladder, the rails are disposed transversely to the major length of the rails to form parallel attaching members 13 which at their ends carry hook elements 14. Intermediate each attaching member 13 a pin 15 is rigidly carried, said pin preferably extending through the attaching member, but at all events extending above and below the attaching member. The pin 15 is spaced from the hook element 14 a distance slightly greater than the thickness of the wall of the section 2.

At the opposite end of each ladder unit 9, the rails 10 terminate in feet 16 which extend parallel to each other transversely to the major length of the rails and are, in effect, continuations of the rails. Each foot intermediate its length is provided with an aperture 17. As will be hereinafter more fully described, the apertures 17 in the feet 16 are for the reception of the extending end portions of pins 15 when multiple units of the ladder are employed.

In employing the ladder 9, the attaching members 13 may be positioned through the slots 8, the section 10 being inserted in the manhole or sewer, and the hook elements 14 may overlie the outer face of the cylindrical member 2. In this position the pins 15 will overlie the inner face of the member 2 and radial or inward or outward movement of the attaching members 13 relative to the cylindrical wall of the manhole or sewer will be prevented.

The feet 16 will be disposed adjacent the bottom of the member 2 if the depth of the manhole or sewer only requires one cylindrical member 2.

In most instances, however, the depth of the manhole or sewer will be such as to require a plurality of cylindrical members 2. In this case, the cylindrical members are positioned end to end in nested fashion wherein the projection 5 of a lower member 2 will interfit with the annular groove 7 of an upper member. The members 2 are so positioned that the slots 8 of the superimposed members are in substantial vertical alignment. In this position, the feet 16 of an upper ladder section 10 are positioned in the slots 8 of a lower cylindrical member 2, and the attaching members 13 of a lower ladder section are also positioned in said same slots, the feet of the upper ladder section being superimposed above the attaching members 13 of the lower ladder section. In this position pins 15 of the attaching members 13 of the lower ladder section will be engaged in the apertures 17 of the feet of the upper ladder section. The hook elements 14 of the attaching members 13 of the lower ladder section will engage the outer face of the lower cylindrical member 2 and pins 15 carried by the attaching members 13 will engage the inner face of the wall of the lower cylindrical member 2 to prevent undesirable movement of the lower ladder section and also to prevent such undesirable movement of the lower end of the upper ladder section.

As many ladder sections 10 as desired may be similarly interfitted to provide a ladder 9 of a length appropriate to the depth of the manhole or sewer.

As an advantage, the ladder sections may be applied, in the manner described, from the top of the manhole or sewer, downwardly, and may be removed from the bottom upwardly.

If desired, the unit ladder or a ladder comprising a plurality of sections may be employed as a permanent installation in the manhole, in which case, after the ladder has been installed, as hereinbefore described, the

apertures or slots in the manhole wall may be filled with a suitable grout.

The function of the pins 15 is to contribute stability of the ladder sections with respect to the manhole or sewer wall and with respect to each other. Such pins may be supplanted by other obvious equivalents such as lugs or washers or each attaching member 13 may carry a pin at its lower edge and be provided with an aperture at its upper edge and each foot may carry a pin at its lower edge which would, at the juncture of the ladder sections, engage in the aperture in the corresponding attaching member. These and other modifications are broadly contemplated in the present invention and it is not intended that the invention be limited to the exact details shown and described, except as necessitated by the appended claims.

I claim as my invention:

1. A portable ladder for a manhole defined by a wall provided with a pair of spaced slots, said ladder comprising spaced parallel rails, spaced rungs carried by said rails, an attaching member carried at a corresponding end of each rail, said attaching member being disposed transversely to the length of said rail for positioning in a respective slot in said manhole wall, a hook element carried at the end of each attaching member for overlying engagement with the outer face of said manhole wall, a rigid abutment carried intermediate the length of each attaching member extending above and below same for overlying engagement with the inner face of said manhole wall, and a foot provided with an aperture intermediate its length carried at the opposite end of each rail and extending transversely to the length of said rail in substantially parallel relationship to said attaching members, said aperture being spaced from the rail equidistant to the abutment carried by the attaching member.

2. A portable ladder for a manhole defined by a wall provided with pairs of spaced slots, said ladder comprising a plurality of ladder sections, each section comprising spaced parallel rails, spaced rungs carried by said rails of each ladder section, an attaching member carried at a corresponding end of each rail of each ladder section, each attaching member being disposed transversely to the length of said rail for positioning in a respective slot in said manhole wall, a hook element carried at the end of each attaching member for overlying engagement with the outer face of said manhole wall, a rigid abutment carried intermediate the length of each attaching member extending above and below same for overlying engagement with the inner face of said manhole wall, and a foot provided with an aperture intermediate its length carried at the opposite end of each rail of each ladder section and extending transversely to the length of said rail in substantially parallel relationship to said attaching members for extending into a respective slot provided in the adjacent manhole wall, said aperture being spaced from the rail equidistant to the abutment carried by the attaching member.

3. A portable ladder for a manhole defined by a wall provided with pairs of spaced slots, said ladder comprising a plurality of ladder sections, each section comprising spaced parallel rails, spaced rungs carried by said rails of each ladder section, an attaching member carried at a corresponding end of each rail of each ladder section, each attaching member being disposed transversely to the length of said rail for positioning in a respective slot in said manhole wall, a hook element carried at the end of each attaching member for overlying engagement with the outer face of said manhole wall, a rigid abutment carried intermediate the length of each attaching member extending above and below same for overlying engagement with the inner face of said manhole wall, and a foot provided with an aperture intermediate its length carried at the opposite end of each rail of each ladder section and extending transversely to the length of said rail in substantially parallel relationship to said attaching members for extending into a respective slot in the adjacent manhole wall, said aperture being spaced from the rail equidistant to the abutment carried by the attaching member, and means carried by each abutment engaging in the aperture of each foot which extends into said respective slot.

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