May 2, 1944. W. A. SANDBERG 2,347,844

MANHOLE STRUCTURE

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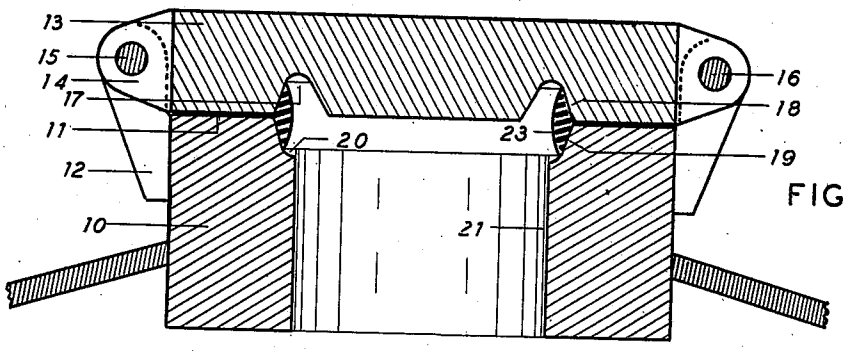


FIG. 1

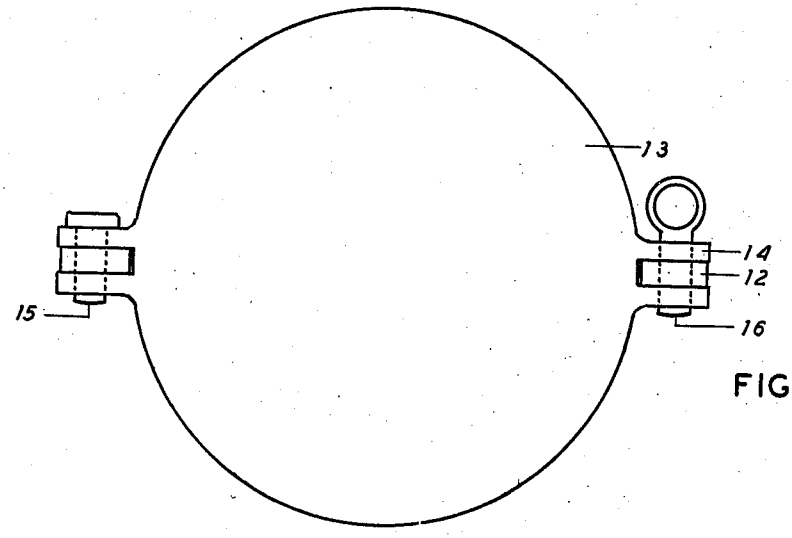
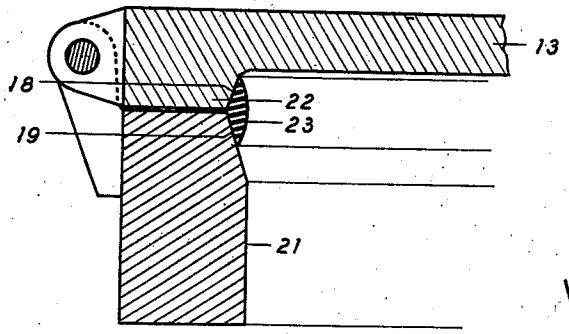


FIG. 2

FIG. 3



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MANHOLE STRUCTURE

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3 Claims. (Cl. 220—46)

The primary object of the invention is to provide a self-sealing access opening or manhole for closed tanks which normally contain fluids under superatmospheric pressure.

An object of the invention is to provide a manhole assembly in which the cover may, if preferred, be held in closed position by slip pins, or by a hinge and a pin, and which does not require to be positioned by bolts, temper screws or other pressure-exerting means.

An object of the invention is to provide a manhole assembly in which the tightness of the leak-resisting seal is proportionate to the fluid pressure existing within the tank rather than to any force tending to approach the metallic elements of the structure toward each other.

The structure described in this application is a modification of and improvement over the structure described in my copending application entitled "Manhole structure," filed April 3, 1939, under Serial No. 265,670.

A preferred form of the invention is shown in the attached drawing and the following description thereof, in which:

Fig. 1 is a vertical section through the axis of the assembly;

Fig. 2 is a plan view of the cover plate and the lugs, and

Fig. 3 is a fragmental section illustrating certain modifications of the structure.

Referring to the drawing, the ring or neck 10 is a short section of thick walled metallic tube which is passed through a corresponding opening in the wall of the tank and made fast thereto in any suitable manner, as by welding. The upper end of the neck is squared off as at 11. A lug 12 is projected, outwardly and upwardly, from directly opposite sides of the neck.

The cover plate 13 is of the same external form as the neck, usually but not necessarily circular, and has a pair of lugs 14 projected outwardly from each side to straddle the upper end of lug 12. The three lugs on each side are drilled through to receive pins 15 and 16, one of which may be utilized as a hinge-pin while the other may be provided with a ring or handhold to assist in its withdrawal.

The pins should be fitted as closely in the drill holes as is consistent with withdrawing them by hand, and the holes should be so placed as to be in register when the cover plate is resting on the upper end of the neck without any interposed packing. One of these pins may function as a hinge or pivot pin and the other as a locking pin, or both may be withdrawn to permit the plate to be removed.

On the lower side of cover plate 13 is formed a circular, inwardly looking face 18, which is inclined at an acute angle to the axis of the assembly. This face 18 may be formed as one side of a groove 17, as illustrated in Fig. 1, or on the inner side of a downwardly projected flange 22 as illustrated in Fig. 3.

Within the neck and at its upper end is formed a face 19 which also is arranged at an acute angle to the axis, preferably at the same angle thereto as face 18. This face 19 may be formed in an annular recess 20 as shown in Fig. 1, or may be drawn back from the inner wall of the neck as shown in Fig. 3.

Finally, a ring 23 of flexible, fluid-tight material is placed in the obtuse V-groove formed by the juncture of faces 18 and 19 when the plate is in place. This gasket ring may be of any material which is sufficiently flexible and at the same time resistant to the fluid to be contained in the tank, as for example rubber, neoprene, Duprene, etc.

In assembling this structure, the ring gasket 23 is inserted to about half of its depth into the gently tapered socket formed by face 19, into which it should fit smoothly and without crowding. The cover plate is then lowered in such manner that the projecting upper half of the gasket enters the gently tapered socket formed by face 18, after which the cover is pinned in place. Seal against leakage is then provided by the forcing of the gasket ring against the inclined faces by internal fluid pressure acting on the free side of the gasket.

It should be noted that while the lower side of plate 13 and the upper end 11 of the neck should be fitted and held in close proximity, to prevent destruction of the gasket by extrusion through any opening of material width, they should not be provided with a face gasket nor otherwise arranged to provide a fluid-tight joint. The sealing effect of gasket 23 is dependent on pressure difference between the two sides of the gasket.

I claim as my invntion:

1. In a manhole structure having a metallic neck projecting through the wall of a tank, a cover plate adapted to be rigidly retained in substantial contact with the end of said neck, a tapered face formed within the outer end of said neck and a corresponding, inward-looking tapered face formed on the lowed side of said cover plate, said faces forming opposite, acute angles

with the axis of said neck: sealing means consisting of a thin gasket of resilient, fluid-tight material resting loosely in the shallow recess formed by the juncture of said oppositely inclined tapered faces and adapted to be compressed solely by fluid pressure acting from within said tank, said gasket having two substantially straight faces abutting said tapered faces and meeting at an obtuse angle and a free face in the form of a relatively flat circular arc, said free face being convex and the intersection of said arc with said abutting faces forming feather edges on said gasket.

2. In a manhole structure having a neck projecting from the wall of a tank, a cover plate removably retained at the outer end of said neck, and a shallow groove formed at the juncture of said plate with said neck, said groove having tapered faces meeting at an obtuse angle: sealing means consisting of a ring gasket lying loosely in said groove and adapted to be brought into fluid-tight engagement therewith solely by fluid pressure acting from within said neck, said gasket having a convex free face of such curvature as to form feather edges at the intersection of such curvature with the exterior faces of said gasket which contact the tapered faces of said groove.

3. In a manhole structure having a cylindrical neck, a cover plate adapted to be locked in metallic contact with the end of said neck, and a shallow depression formed along the line of juncture of said neck with said cover plate: sealing means consisting of a resilient, freely movable ring gasket resting loosely within said depression and adapted to be brought into non-leaking engagement with said neck and cover plate solely by unbalanced fluid pressure applied to the free face of said gasket, said free face being of flatly convex form, said gasket having external faces mating with the walls of said depression and meeting at an obtuse angle and forming feather edges with the edges of said free face.

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