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O. N. GREDELL

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MANHOLE COVER

Filed March 15, 1930

Fig. 1.

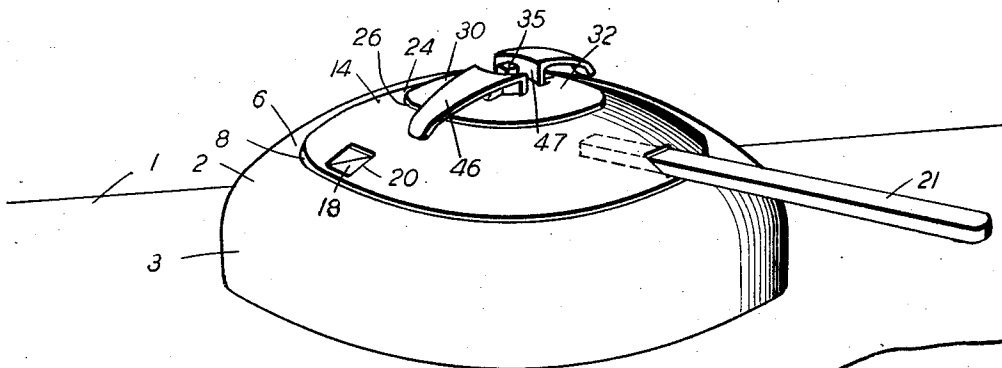


Fig. 3.

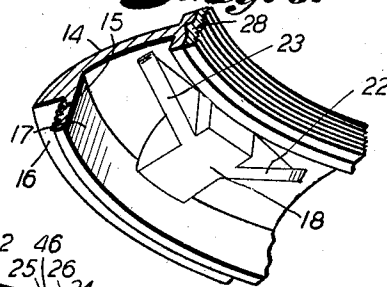
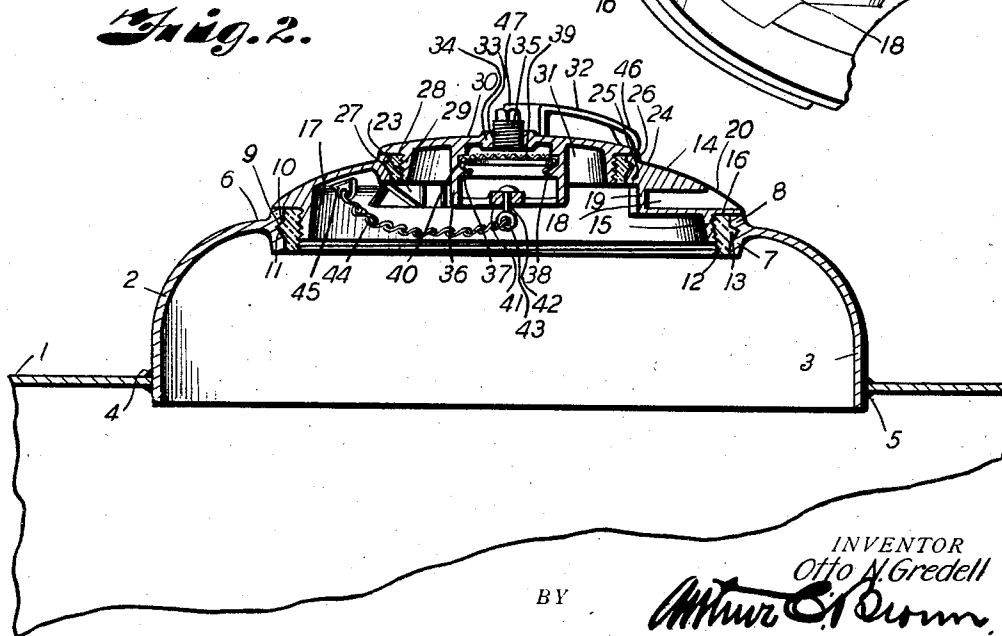


Fig. 2.



BY

INVENTOR
Otto N. Greddell
Arthur C. Brown
ATTORNEY

UNITED STATES PATENT OFFICE

OTTO N. GREDELL, OF KANSAS CITY, MISSOURI, ASSIGNOR TO STANDARD STEEL WORKS,
OF NORTH KANSAS CITY, MISSOURI, A CORPORATION OF MISSOURI

MANHOLE COVER

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My invention relates to manhole and like covers for closing openings in containers such as tanks.

A manhole cover must be adapted to afford access to the tank on which it is mounted, for introducing or withdrawing liquid, cleaning the tank, inspecting the interior, and similar purposes, and when the contained liquid is relatively volatile, the cover when closed must securely seal the manhole opening to prevent escape of gases. The production of an efficient seal is usually accomplished by screwthreading a cover into the periphery of the manhole opening, and removal of a cover may be rendered difficult by the tightness with which the cover engages the tank to effect the seal, and by corrosion of screwthreads forming the joint between cover and tank. Means heretofore applied to covers to facilitate removal thereof for example lugs on the covers, are inconvenient to operate, form objectionable protuberances on the cover, usually tend to weaken the covers, tend to break when force is applied to rotate the covers, and afford opportunity for applying only one lever for rotating a cover.

The principal objects of my invention therefore are to facilitate application and removal of a manhole cover, to obviate hazard of breakage of cover parts when a screwthreaded cover is rotated for application or removal, to form means within a cover to receive a tool for removing the cover, to reinforce tool-receiving means on a cover, to reinforce the portions of a tank that receive a cover, and to adapt a cover for insertion of a lever thereinto for rotating the cover.

In accomplishing these and other objects of the invention, I have provided improved details of structure, the preferred forms of which are illustrated in the accompanying drawing, wherein:

Fig. 1 is a perspective view of a portion of a tank provided with my improved manhole cover.

Fig. 2 is a central vertical section through the tank portion and cover.

Fig. 3 is a detail perspective view from beneath of a portion of the cover including the

reinforced inner end of a lever socket projecting into the cover.

Referring in detail to the drawing:

1 designates a portion of the upper metal wall of a liquid container such as a truck tank in which a manhole opening is formed. A dome-like cover member 2 mounted in the opening includes a tubular skirt portion 3 having a circular periphery engaging the inner edge of the tank wall at the opening and fixed to the wall by suitable means such as welding 4, the skirt projecting downwardly into the tank to provide extensions which may receive lower or inner welds 5.

The dome has a relatively large axial opening formed by an inwardly extending substantially horizontal portion 6 thereof, and outer and inner flanges 7 and 8 extend at right angles to said portion to form a ring-like inner periphery for the dome having substantial vertical width.

An internally threaded ring 9 preferably of brass having exterior protuberances such as a rib 10, may be incorporated with the dome member upon construction thereof, preferably by casting the dome member to form the flanges 7 and 8 around the outer periphery of the ring, whereby the rib 10 is embedded in the rim of the dome member around the axial opening thereof. The rib 10 preferably is adapted to form an annular groove 11 on the median line of the face of said dome rim having an upper wall 12 inclined slightly downwardly inwardly to the median line of the portion 6, and a lower wall 13 substantially at right angles to the wall 12, whereby the ring is securely retained to receive a cover member 14 adapted to be easily applied for closing the manhole opening or to be removed for affording access to the tank for cleaning or the like.

The member 14 comprises an arcuate casing having a depending threaded flange 15 inwardly offset from the margin thereof to engage the ring 9 and form a shoulder 16 adapted to seat on the registering upper edges of the flange 8 and ring 9, the inner circular wall 17 of the casing defining a recess therein and a portion of said wall forming the inner face of the flange 15.

The inserted ring 9 thus forms a mounting edge member having substantial thickness and area and better adapted to be threaded and support the cover member, and to resist corrosion, distortion and wear at the joint than the edge of a metal tank, particularly if the tank metal is relatively soft.

Formed in the casing 14 upon initial manufacture thereof, are a plurality of horizontal elongated socket members 18 rectangular in cross section and having axes extending radially to the axis of the casing, the inner ends of the sockets being closed by stop walls 19 and the open outer ends registering with openings 20 in the body of the member to admit a suitable lever 21 for effecting rotation of the member.

In order to reinforce the sockets and cover member to resist strains due to operation of the lever, ribs or wings 22 and 23 engage the inner wall of the cover member and the side walls of the sockets, and are preferably formed integrally with the members with which they are engaged.

The cover wall 24 of the casing is provided with a central opening, and has flanges 25 and 26 and a groove 27 similar to the flanges 7 and 8 and groove of the dome member 2, and a ribbed brass ring 28 is fixed against rotation on the circular edge of the wall 24 around the opening therein, to receive the threaded skirt or flange 29 of a second removable cover member or cap 30 having a recess 31 and a cover wall 32 provided with a central opening 33 surrounded by a thickened wall portion 34 and normally closed by a threaded plug 35.

The ring 28 is preferably installed by casting or moulding the cover wall 24 around the ring to embed the rib thereof in the edge of the wall.

A tubular boss or chamber wall 36 surrounding the opening 33 exteriorly to said portion 34 depends through the recess 31 in the cap 30 into the recess of the casing 14, and is provided with an internal annular groove 37 and a projecting annular flange 38 below the groove to receive and support a relatively fine mesh copper fire screen 39 mounted on a spring wire ring 40.

A spider-like transverse bar 41 secured to the lower edge of the boss has an opening to receive a swivel pin 42 having an eye 43 and a chain 44 having one end mounted in said eye is fixed to a lug 45 on the inner face of the cover wall 24 of the casing 14 for providing a flexible connection between the cap and casing, whereby loss of the cap will be avoided when the same is removed for inspection of the tank or the like.

Levers 46 having vertical end spacing portions 47 fixed to the cap adjacent the plug provide fixed means for rotating the cap to apply or remove the same, and also form guards for the plug.

In use the arcuate cover support fixed to the tank forms an expansion dome extending substantially above the top of the tank, the arcuate removable cover members contributing to the volume of the dome, and being elevated above the tank for convenient application of levers for removal of the cover.

The cap may be easily removed by application of force to the fixed lever handles, and will be retained in connection with the cover casing 14 by the chain.

The cover casing 14 may be rotated by levers inserted in the sockets, and any requisite amount of force may be applied for securing the cover in the opening or removing it therefrom, since the reenforced sockets are capable of resisting severe strains, and strains are transmitted to the relatively heavy skirt portion of the casing.

Attention is called to the merging of the surface of the dome member 2 into the smooth curved surface of the cover 14, whereby a cover is provided that forms a symmetrical crown for the dome, and affords opportunity for forming the laterally directed openings of the sockets to admit the levers. The sockets may thus be located at the lower end of the cover adjacent the threaded flange, whereby the pressure of the levers will be applied close to the threaded joint, and the levers will move substantially in the horizontal plane of the base of the cover. The reinforcing internal ribs will receive the lateral pressure of the inner ends of the levers.

The outer ends or mouths of the sockets are flush with the arcuate surface of the cover, and the socket walls thus provide reenforced lever-receiving abutments or plates to anchor the inner ends of the levers, said abutments being recessed within the cover and offering no projections exterior to the dome.

A plurality of levers may be applied to several sockets coincidentally, for removing a cover.

What I claim and desire to secure by Letters Patent is:

1. In a device of the character described, a recessed cover having a depending threaded flange and a laterally directed lever-receiving aperture, and means fixed to said cover in the recess for anchoring the inner end of a lever adapted to be inserted in the aperture for rotating the cover.

2. In a device of the character described, a cover member having an apertured wall forming a recess, a socket member mounted in said recess having an open end registering with the aperture in said wall, and a rib fixed to said socket and said wall for bracing the socket member.

3. In a device of the character described, a cover member having a curved top wall provided with an aperture at its lower edge to receive a lever for rotating the cover, and

means including abutments in said cover in alignment with the edges of said aperture for receiving lateral pressure of the lever.

4. In a device of the character described, a
5 convexly curved cover member having a depending circumferential flange forming a recess and for securing the cover to a manhole, and a socket member in the recess having a closed rectangular shaped socket opening
10 through the convex portion of the cover member adjacent its periphery to admit the end of a rectangular shaped bar for rotating the cover.

5. In a device of the character described,
15 a dome having a convexly curved upper portion provided with a manhole opening, and a convexly shaped cover for the opening having a curved surface conforming substantially to the curvature of the dome and having
20 inwardly extending sockets adjacent its lower edge to admit the end of a bar for removing the cover from the dome.

In testimony whereof I affix my signature.

OTTO N. GREDELL.

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