

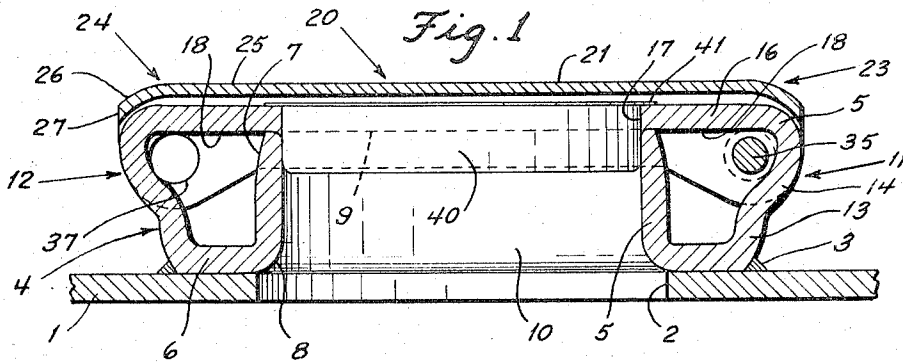
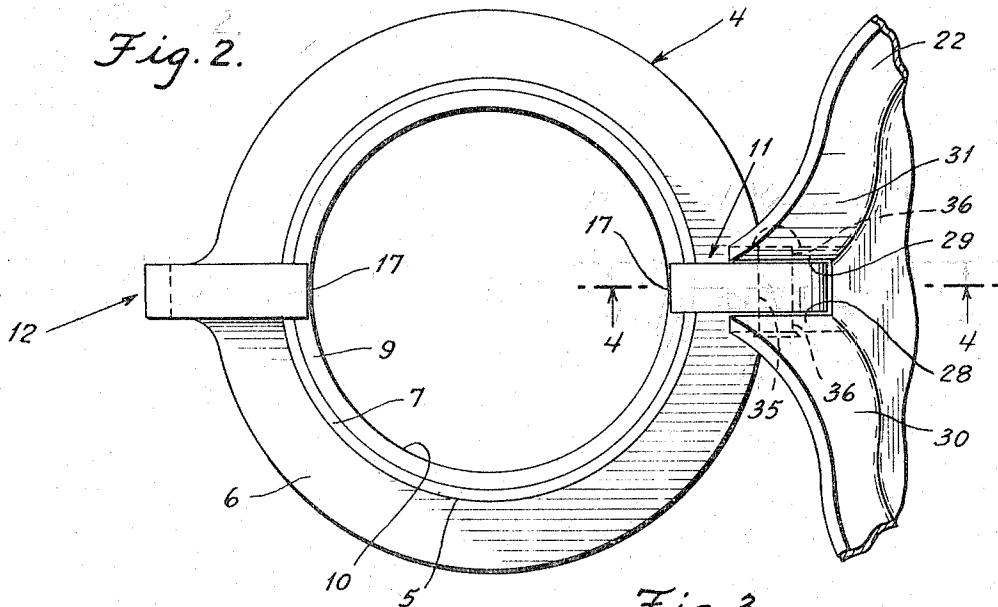
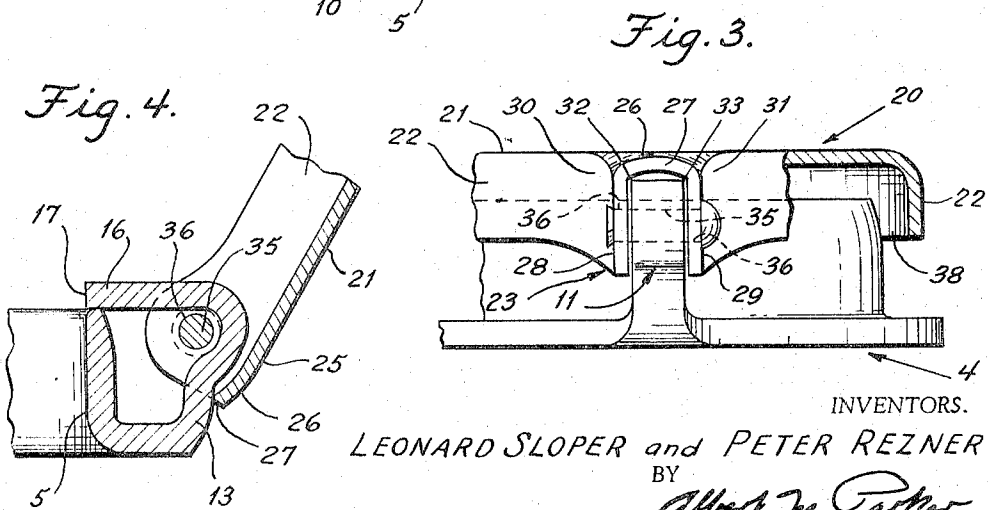
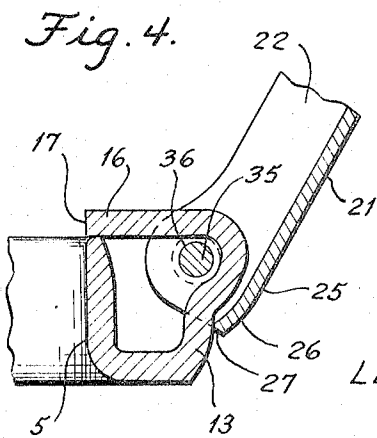
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VENT AND CLOSURE CAP ASSEMBLY

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3,302,816

VENT AND CLOSURE CAP ASSEMBLY

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This invention relates to closures for storage tanks and is particularly concerned with pivotally mounted closure cap assemblies adapted to close and simultaneously vent the openings through which such tanks are filled.

In the fabrication of steel tanks such as are used for the storage of fuel and like products, it has heretofore been the practice to provide two separate openings in addition to the opening through which the contents are dispensed. One of these openings permitted filling of the tank and the other served as a vent. In prior art tank constructions, the opening used for filling was commonly closed by welding a screw-threaded closure flange over said opening and threadedly engaging a cap or plug therewith. As can be readily appreciated, a substantial cost was involved in the use of this type of threaded fitting. In addition, a suitable fitting was required for the separate vent opening to protect the same against entry of foreign matter. This vent fitting, although not as elaborate as that provided for the fill opening, nonetheless added an appreciable amount to the over-all cost of the tank.

The unitary vent and closure cap assembly of this invention has changed this cumbersome and expensive practice by providing a single closure fitting through which the tank can be both filled and vented. The closure assembly herein disclosed not only eliminates the need for a separate vent fitting, but in addition, also effects a substantial saving due to its simple yet effective construction in that there is no threading or other machining required in the manufacture thereof.

These and other advantages are accomplished by welding about an opening in a wall of the tank a one-piece steel closure flange comprising an upstanding neck surrounded at its lower end by a flat base having integrally formed therewith a pivot means and a lock receiving means. Pivotally secured to said closure flange is a one-piece steel cap having integrally formed therewith a cooperating pivot means and lock receiving means. In order to adequately vent the tank, the overlying cap is supported above the upper end of the closure flange neck in spaced relationship thereto, allowing the free passage of air in and out of the tank but guarding against the entry of foreign particles. In addition, a removable lightweight dust seal may be inserted within the flange neck by the manufacturer so as to guard against entry of dirt and dust during fabrication, subsequent shipment, and installation of the tank.

Thus it is seen that the fabrication of steel storage tanks has hereby been greatly simplified by the invention in providing a unitary closure and vent assembly which embodies both a functional improvement and a substantial cost advantage over the practice heretofore pursued.

It is accordingly a principal object of the invention to provide new and improved closures for steel storage tanks.

Another object is to provide a unitary tank fitting which functions as both a closure and a vent.

A further object is to provide a heavy gauge steel closure flange and cap assembly, each having pivot pin re-

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ceiving means and lock receiving means integrally formed therewith.

Other and more detailed objects will in part be obvious and in part pointed out as the description taken in conjunction with the accompanying drawing proceeds.

In that drawing:

FIG. 1 is a vertical sectional view of the vent and closure assembly in accordance with the invention;

FIG. 2 is a top plan view showing a portion of the cap broken away and in open position and showing the dust cap removed;

FIG. 3 is a partial elevational view with a portion of the cap broken away;

FIG. 4 is a vertical sectional view of the pivotal connection between the flange and cap taken on line 4-4 of FIG. 2 and looking in the direction of the arrows.

As seen in FIG. 1 the tank wall 1 is provided with an opening 2 over which is welded, as shown at 3, a closure flange generally indicated by the numeral 4. The flange 4 is an integrally formed member which comprises an upstanding neck 5 and an annular laterally outwardly extending base 6 at the lower end of the neck. With the exception of the slightly beveled portion 7, the neck 5 presents a substantially straight walled cylinder having a smooth interior surface 10 joining the base 6 in a radiused lower end 8 and having an upper edge 9.

The flange base 6 has a substantially continuous peripheral outer edge except for two relatively narrow diametrically opposed lugs 11 and 12 which are seen to have a similar configuration comprising a lowermost upwardly formed portion 13, an outwardly and upwardly curved portion 14, an inwardly turned portion 15 and a substantially flat radially inwardly extending arm 16 having a lower surface 18 and terminating in an end surface 17. In order to achieve a maximum rigidity of the lugs 11 and 12, the end surfaces 17 thereof terminate in their inward extent in substantial vertical alignment with the flange interior surface 10. Thus the inner end portion of the lower surface 18 of the lugs 11 and 12 overlies the upper edge 9 of the flange neck 5. In the event additional strength and rigidity is required by the lugs, end portions 17 of arms 16 may be secured such as by welding to the top edge 9.

Turning now to a consideration of the closure cap generally indicated by the numeral 20, the cap is also formed as an integral member and comprises a disc-like top wall 21 bordered by an integrally formed downwardly depending skirt 22. At diametrically opposed positions, the cap 20 is provided with a pair of similar radially outwardly extending channel portions 23 and 24 integrally formed with the skirt 22 and top wall 21. Each of these channel portions is formed with an elongated top wall 25 which is a continuation of the cap top 21 and which slopes downwardly as indicated at 26 terminating in a free edge 27. Each of the channel portions 23 and 24 has a pair of opposed sidewalls 28 and 29 which are continuations of the cap skirt 22 and are joined thereto by the outwardly curved portions 30 and 31. As seen particularly in FIG. 3, the sidewalls 28 and 29 are substantially enlarged so as to extend below the cap skirt 22.

In assembling the cap and flange components of the invention, the sidewalls 28, 29 of each of the channel portions 23 and 24 of the cap 20 straddle the corresponding lugs 11 and 12 on the closure flange with the interior surface of the channel portions contacting the lugs as indicated at 32 and 33 as shown in FIG. 3. Axially aligned apertures 36 and 37 are formed in the respective sidewalls 28 and 29 of the channel portions 23 and 24.

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A rivet 35 is inserted through the aligned apertures 36 in the channel portion 23 so as to permanently secure the channel 23 of the cap to the lug 11 of the flange and to form a pivotal connection between the cap and the flange. In fully seated or closed position, the cap 20 may be similarly secured to the flange lug 12 by means of a padlock or other suitable locking means inserted through the apertures 37 in the sidewalls of the channel 24. Thus it can be seen that the cap may be fixedly secured or locked to the flange so as to prevent any unauthorized access to the tank. The inside diameter of the skirt 22 of the cap 20 is greater than the outside diameter of the neck 5 of the flange so that when the cap overlies the top of the neck 5 an annular space 38 is formed between the skirt 22 and the neck 5. The interior surface of the cap is retained in spaced relationship to the upper edge 9 of the flange neck 5 by the lugs 11 and 12 thereby forming a passageway which connects the space 38 with the interior of the tank for venting the same. This passageway is so dimensioned and sufficiently protected as to prevent the entry of objectionable foreign matter.

Upon removal of the locking device, the cap 20 may be quickly and easily pivoted to open position about rivet 35 in lug 11 enabling the tank to be filled. The cap is securely held in open position as illustrated in FIG. 4 with the channel edge 27 bearing against the lug portion 13. The particular configuration of the channel 23 and lug 11, as herein described, is such that at any position the cap may assume, the rivet 35 remains positioned within the lug as shown in FIG. 4. This construction eliminates any possibility of the cap becoming dislodged from or jammed within the lug 11 as the cap is opened and closed.

In order to guard against any dirt or foreign matter entering the tank during initial fabrication shipment, or installation, a light-weight sheet metal dust cover 40 may be temporarily inserted and held by a press fit within the flange opening. This cover, as shown in FIG. 1, is cup-shaped and bordered by an annular flange 41 which rests upon the top surface of the lugs 11 and 12. Once the tank is installed and ready for filling, the dust cover 41 may easily be pried out or otherwise removed such as by gripping the flange 41 with a pair of pliers.

Since variations and modifications in the construction of the vent and closure cap assembly as described in the foregoing and shown in the accompanying drawing, may readily suggest themselves to those skilled in the art, it is to be understood that the same can be made without departing from the spirit and scope of the invention. It is accordingly intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted in an illustrative and not in a limiting sense.

Having described our invention what we claim as new and desire to secure by Letters Patent is:

1. A closure and venting fitting for tanks comprising a pivotally interconnected closure flange and cap, said flange having an upstanding cylindrical neck terminating in an upwardly facing free edge, a laterally outwardly extending annular base surrounding the lower end of said neck adapted to be secured about a tank wall opening, said base terminating in an outwardly facing free edge, a pair of diametrically opposed lugs integrally formed with said flange extending outwardly from said outwardly facing free edge, said lugs having an uppermost inwardly curved portion and an arm extending radially inwardly from said inwardly curved position, said cap disposed in overlying engagement with said closure flange and having a disc-like top, a depending skirt surrounding said top, a pair of diametrically opposed channel portions integrally formed with said cap extending laterally outwardly from said top, said channel portions having a top wall formed as an extension of said disc-like cap top, and spaced side walls depending from said channel top wall and extending laterally outwardly from said skirt, said channel portions confining said respective lugs therewithin.

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2. A closure and venting fitting as in claim 1 and apertures formed in said channel side walls for the reception of means to secure said respective channel portions to said lugs.

3. A closure and venting fitting as in claim 1 said lug arms terminating in their inward extent adjacent said upwardly facing free edge.

4. A closure and venting fitting as in claim 1 wherein said cap is supported on said lugs with said cap top vertically spaced from said upwardly facing free edge.

5. A closure and venting fitting as in claim 4 wherein the inside diameter of said cap skirt is substantially greater than the outside diameter of said flange neck.

6. A closure and venting fitting for tanks comprising a pivotally interconnected closure flange and cap, said flange having an upstanding cylindrical neck terminating in an upwardly facing free edge, a laterally outwardly extending annular base surrounding the lower end of said neck adapted to be secured about a tank wall opening, said base terminating in an outwardly facing free edge, a pair of diametrically opposed lugs integrally formed with said flange having a portion extending outwardly and upwardly from said base and an arm extending radially inwardly from said outwardly and upwardly extending portion, said cap disposed in overlying engagement with said closure flange and having a disc-like top, a depending skirt surrounding said top, a pair of diametrically opposed channel portions integrally formed with said cap extending laterally outwardly from said top and adapted to engage said respective lugs.

7. A closure and venting fitting for tanks comprising a pivotally interconnected closure flange and cap, said flange having an upstanding cylindrical neck terminating in an upwardly facing free edge, a laterally outwardly extending annular base surrounding the lower end of said neck adapted to be secured about a tank wall opening, said base terminating in an outwardly facing free edge, a pair of diametrically opposed upstanding lugs integrally formed with said flange, said cap disposed in overlying relationship with respect to said closure flange and having a disc-like top, a depending skirt surrounding said top, a pair of diametrically opposed channel portions integrally formed with said cap extending laterally outwardly from said top, said channel portions having a top wall formed as an extension of said disc-like cap top, and spaced side walls depending from said channel top wall and extending laterally outwardly from said skirt, said channel portions confining said lugs respectively therewithin.

8. A closure and venting fitting for tanks comprising a pivotally interconnected closure flange and cap, said flange having an upstanding cylindrical neck terminating in an upwardly facing free edge, a laterally outwardly extending annular base surrounding the lower end of said neck adapted to be secured about a tank wall opening, said base terminating in an outwardly facing free edge, a pair of diametrically opposed upstanding lugs integrally formed with said flange, said cap disposed in overlying relationship with respect to said closure flange and having a disc-like top, a depending skirt surrounding said top, a pair of diametrically opposed, downwardly opening, channel portions integrally formed with said cap extending laterally outwardly from said top and confining said respective lugs therewithin, said cap supported on said lugs with said cap vertically spaced from said upwardly facing free edge.

9. A closure and venting fitting as in claim 8 wherein the inside diameter of said cap skirt is substantially greater than the outside diameter of said flange neck.

10. A closure and venting fitting as in claim 8 and a dust cover frictionally engaged within said flange neck.

11. A closure and venting fitting for tanks comprising a pivotally interconnected closure flange and cap, said flange having an upstanding cylindrical neck terminating in an upwardly facing free edge, a laterally outwardly extending annular base surrounding the lower end of said neck adapted to be secured about a tank wall opening, said base

terminating in an outwardly facing free edge, a pair of diametrically opposed lugs integrally formed with said base extending upwardly beyond said upwardly facing free edge, said cap disposed in overlying relationship with respect to said closure flange and having a disc-like top, a depending skirt surrounding said top, said cap supported on said lugs with said cap top vertically spaced from said upwardly facing free edge whereby a vent space is provided between said flange and said cap.

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References Cited by the Examiner

UNITED STATES PATENTS

2,173,787 9/1939 Luckel ----- 220—32

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