March 7, 1933. V. WILLOUGHBY 1,900,627

TANK DOME CLOSURE

Filed Aug. 27, 1931

Fig. 1.

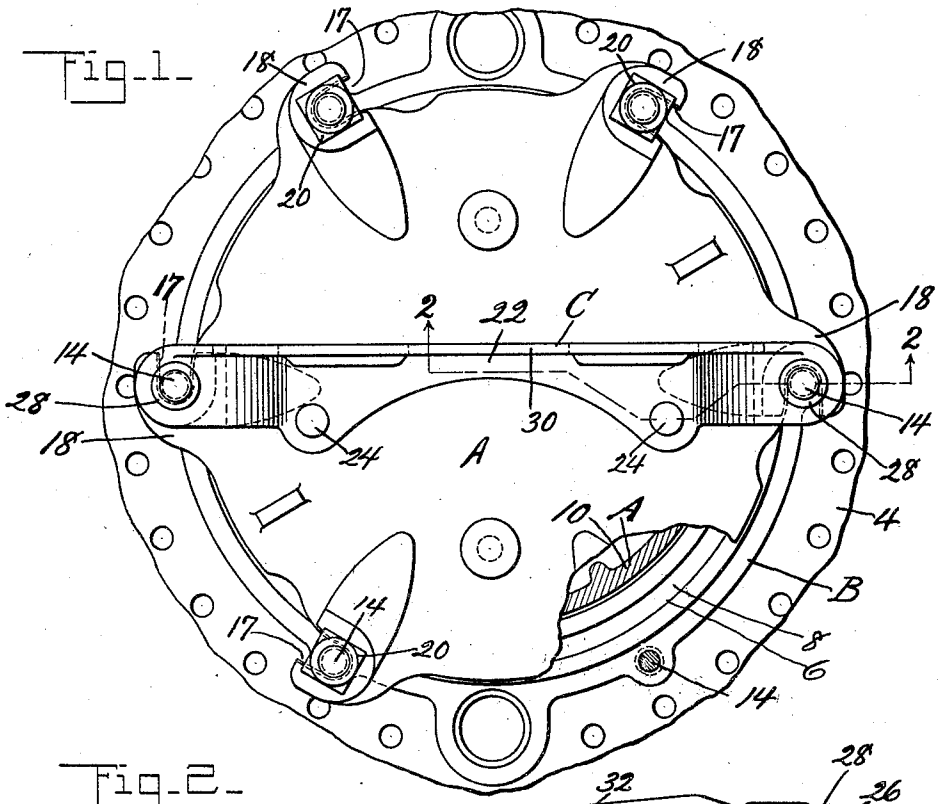


Fig. 2.

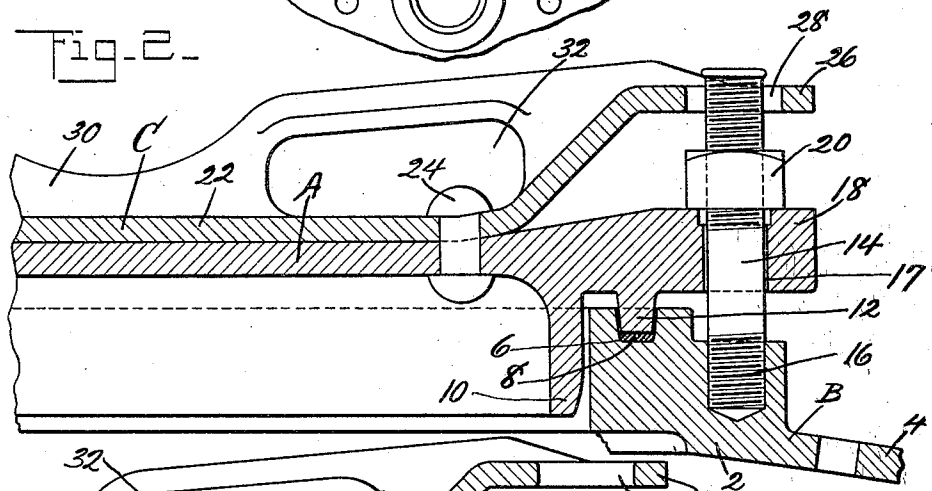
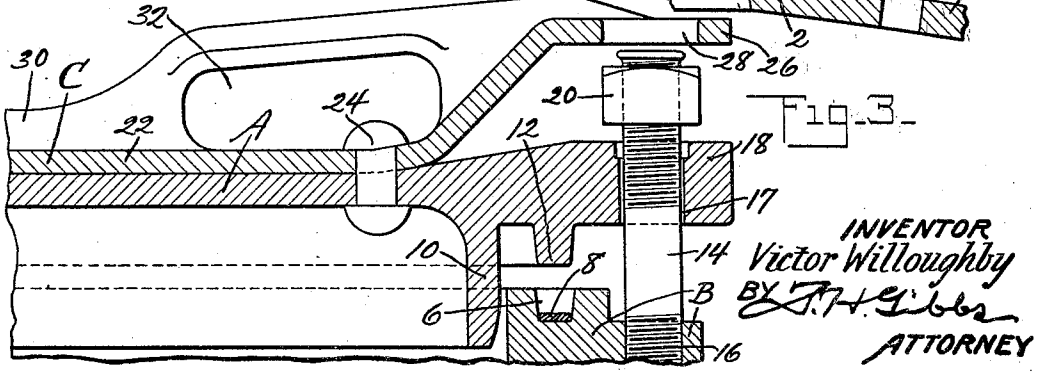


Fig. 3.



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UNITED STATES PATENT OFFICE

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TANK DOME CLOSURE

Application filed August 27, 1931. Serial No. 559,633.

This invention relates generally to closures for car tanks or other like containers and has particular reference to closures for the domes of such tanks.

The present invention contemplates the provision of a tank dome cover having means preventing complete removal thereof from the dome until said cover has been lifted and rotated.

Another object of this invention is the provision of a dome cover which is rotatable to and from secured position and which is provided with means restraining said dome cover against accidental rotation when in secured position.

Another object of this invention is the provision of a safety device for dome covers which restrains the cover against complete removal until after excess gas within the tank has been vented to the atmosphere.

Other objects and advantages of this invention will be apparent from the following description taken in conjunction with the accompanying drawing in which:

Figure 1 is a top plan view of the dome cover of the present invention secured in position on its cooperating dome ring, certain parts being broken away and other parts being shown in section.

Fig. 2 is a sectional view on the line 2—2, Fig. 1, and

Fig. 3 is a detail sectional view of a portion of the cover showing the same elevated to permit rotation and removal thereof from its associated dome ring.

Referring now more particularly to the drawing in which similar characters of reference designate similar parts of the several views, the said drawing indicates, and the specification hereinafter describes one embodiment of a dome cover which is mounted for rotation to and from its secured position on a dome ring, but it is to be understood that the invention herein is not limited to the specific details illustrated as obviously the present invention may assume many forms in which the cover may partake of any preferred or desired construction susceptible for rotation to and from secured position on a dome ring.

The drawing indicates a dome cover A adapted to seat on a dome ring B which latter is attached to a container such as a car tank or the like, the usual construction consisting of an attachment of the dome ring to a tank dome. The dome cover A is provided with a safety device or attachment indicated generally at C and forming, with the dome cover, the combination comprising the present invention.

The dome ring in the instance shown comprises an annulus 2 having an attaching flange 4 by which it may be secured to the dome of a car tank or to a container of any preferred or desired construction, the dome ring having a recess 6 formed in its upper edge which receives suitable packing or a gasket 8. The dome cover is shown as being substantially circular in shape and provided with a flange 10 depending from the inner surface of the cover and adapted to be positioned adjacent the inner surface of the dome ring B when the cover is seated. The dome cover A also includes a depending rib 12 arranged concentric to the flange 10 and adapted to be received in the recess 6 and to seat upon the gasket 8 in said recess whereby to seal the interior of the tank against escape of either liquid or gas.

The dome ring is provided with a plurality of spaced upstanding stud bolts 14 secured to said ring in any suitable manner as by being threaded thereto as at 16 and the dome cover is formed with a plurality of spaced lugs 18 projecting radially therefrom and spaced apart distances corresponding to the spaces between the stud bolts 14. As clearly shown in the drawing the lugs 18 are provided with circumferential recesses or slots 17 facing in the same direction and adapted,

upon rotation of the dome cover in one direction, to receive the stud bolts 14 whereby the cover may be secured in position on the dome ring by adjusting the nuts 20 on the stud bolts in an obvious manner.

The Interstate Commerce Commission requires means which will prevent blowing off of a dome cover of a tank when the latter is employed for transporting any commodity having a vapor pressure of 16 pounds absolute at 100° F. The present invention contemplates the provision of a dome cover which will satisfy the requirements of the Interstate Commerce Commission in providing for the restraining of the cover against complete removal while there is excess gas pressure in the tank. The present invention also contemplates the provision of an attachment which may be easily and quickly applied to a conventional dome cover whereby the latter is prevented from being completely removed until subsequent to a venting of excess gas from the tank, thereby obviating the necessity of scrapping the dome covers now in use. It will be obvious that the attachment shown, described and claimed herein is admirably adapted for attachment to dome covers now in use.

The safety attachment C forming a part of the present invention comprises a bar 22 secured to the dome cover A by means of suitable fasteners such as the rivets 24; the bar having its ends upwardly offset as at 26 with the offsets arranged over and in spaced relation relative to diametrically opposed lugs 18 of the cover. The offset ends 26 and the bar 22 are each provided with openings or slots 28 into which the upper ends of oppositely arranged stud bolts 14 extend when the cover is in seated position on the dome ring B.

The safety attachment forming a part of the present invention may partake of many forms but in the instance shown includes a vertically arranged stiffening rib 30 the ends of which are provided with openings 32 to form hand holes for manipulating the cover.

Figs. 1 and 2 disclose the cover as seated upon and secured to the dome ring B. It is to be noted that the upper ends of the oppositely arranged stud bolts project into the openings 28. Obviously such an interengagement of the bolts 14 and offset ends 26 of the safety attachment C prevents rotation of the cover on the dome ring B. This is of importance as it has been found in practice that notwithstanding the care exercised by a workman in securing the nuts 20 to the lugs 18, due to twisting and weaving of a tank car and also due to end shocks to which the car may be subjected in service, the dome cover tends to, and often does, rotate on the dome ring, and instances have been known in which the dome cover has rotated to such an extent that it will be blown from the dome ring due to excess gas within the tank. It will be obvious that the inter-engagement of the bolts 14 and offset ends 26 eliminate this disadvantage. When it is desired to remove the dome cover from the dome ring the nuts 20 are backed off on the bolts 14. Should there be excess gas within the tank of sufficient extent to lift the cover from the dome ring after the nuts 20 have been backed on the bolts, it will be obvious that the cover will be lifted until it contacts with the nuts. Immediately this happens gas vents from the tank and the cover then is receded on the dome ring. The nuts 20 arranged beneath the offset ends 26 of the attachment C may be backed to substantially their limits whereupon the cover may be lifted to a position such as shown in Fig. 3 which will free the offset ends 26 from the bolts 14 and permit rotation of the cover to free the lugs 18 from the bolts 14 to permit a complete removal of the cover from the dome ring.

From the above description it is believed that the construction and operation of the device of the present invention will be fully apparent to those skilled in the art. As before mentioned, however, it is to be understood that the drawing is for illustrative purposes only and various changes in the form and proportions of the construction may be made within the scope of the appended claims without departing from the spirit of the invention.

What is claimed is:

1. The combination with a tank dome cover of the character described, of fastening means for said cover brought into operative position by rotation of said cover, and means secured to the cover and normally cooperating with the fastening means for preventing rotation of the cover, said means necessitating raising of the cover to a partially open position to allow rotation and complete removal of said cover.

2. The combination with a tank dome cover of the character described, of fastening means for said cover brought into operative position by rotation of said cover, and means fixedly mounted on and extending across said cover and normally in cooperative relation with the fastening means for preventing rotation of the cover to disengage certain of said fastening means before the cover is raised to a predetermined partially open position.

3. The combination with a tank having a manhole opening of a bolt secured to the tank, a closure for the opening adapted to be engaged with the bolt upon rotation thereof, and a safety element on said cover cooperating with the bolt when the cover is in closed position, the cover being releasable only subsequent to raising thereof to partially open

position whereby the safety element and bolt are free from their cooperative engagement.

4. A tank dome closure comprising a dome ring, a dome cover to seat on said ring, means to secure the cover to the ring engaged with the cover by rotation of the latter relative to said ring, and means on the cover cooperating with the securing means when the cover is in closing position for restraining said cover aganst complete removal when it is raised by the pressure in the tank, said means necessitating raising of the cover to partially open position to allow rotation and complete removal thereof.

5. The combination with a tank having a manhole opening and a closure therefor, of means for holding the closure in closed position comprising a bolt adapted to be engaged with said closure upon rotation of the latter, means on the closure cooperating with the bolt for normally restraining the closure against rotation and necessitating raising of the closure to a partially open position to permit rotation of the cover and complete removal thereof.

6. The combination with a tank having a manhole opening and a closure therefor, of means for holding the closure in closed position comprising a bolt and nut, the cover engaging said bolt upon rotation, a rigid member secured to the cover and having a bolt engaging portion spaced above the cover, said bolt cooperating with said portion when the cover is closed whereby rotation of said cover is prevented and said nut contacting the closure when the latter is forced upwardly by pressure in the tank to prevent complete removal of the closure.

7. The combination with a tank having a manhole opening and a closure therefor, of means for holding the closure in closed position comprising a bolt and nut, the cover engaging said bolt upon rotation, a rigid member secured to the cover and having a bolt engaging portion spaced above the cover, said bolt cooperating with said portion when the cover is closed whereby rotation of said cover is prevented and said nut contacting the closure when the latter is forced upwardly by pressure in the tank to prevent complete removal of the closure, said closure being rotatable to be completely removed only subsequent to raising to partially open position whereby the bolt is disengaged from the said rigid member.

8. In combination, a closure for normally closing a receptacle, fasteners for said closure brought into and out of operative position upon rotation of said closure, and a restraining element secured to the closure with which the fasteners cooperate when the latter are in operative position to restrain the closure against rotation and necessitating lifting of the closure to a predetermined position to permit rotation and complete removal of said closure.

9. A tank dome closure comprising a dome ring having stud bolts fixedly secured thereto, a dome cover adapted to seat on said ring and provided with projecting lugs adapted to engage said bolts upon rotation of the cover, and a safety member secured to the dome cover and arranged in cooperative relation with certain of said lugs whereby when the cover is seated on the ring certain of the bolts project into said member and the cover thus restrained against rotation, the safety member necessitating the positioning of the cover in spaced relation to the dome ring to permit rotation of said cover.

10. In a tank dome closure, in combination a dome ring having spaced locking bolts projecting therefrom, a cover having circumferentially directed notches to receive said bolts on rotative movement of said cover on said ring, and a safety bar secured to the outer face of the cover having outwardly spaced ends substantially opposite certain of said notches and providing lateral interference to the locking bolts until the cover is relieved substantially from its fully closed position on the ring.

11. In a tank dome closure, in combination a dome ring having circumferentially spaced locking bolts, a cover having means at the edge thereof to engage said bolts on rotative movement of the cover, and a safety bar secured diametrically of the cover on the outer face thereof and provided with a grip and offset end portions, the latter assuming positions with respect to certain of said bolts which prevent rotation of the cover to remove same until after it has been substantially relieved from the ring.

12. In a tank dome, a dome ring, and closure means for said dome comprising a dome cover adapted to seat on said ring and provided with a circumferentially slotted lug projecting therefrom, and a safety bar secured to the cover with a portion thereof spaced from but in substantial alinement with the lug.

13. In combination with a dome cover having an axially projecting circumferentially slotted lug, a safety bar secured to the cover and having a portion thereof spaced from the lug and provided with an aperture substantially in alinement with said lug.

14. In a tank dome closure comprising a dome ring, a cover provided with a lug, and a bolt secured to the dome ring and adapted to engage the lug upon rotation of the cover, the combination with means for preventing removal of the cover until the latter is raised to a predetermined position, comprising a rigid element attached to the cover and adapted to receive the bolt when the latter is in lug engaging position.

15. In a tank dome closure comprising a

dome ring, a cover provided with a lug, and a bolt secured to the dome ring and adapted to engage the lug upon rotation of the cover, the combination with means for preventing removal of the cover until the latter is raised to a predetermined position, comprising a safety bar secured to the cover and provided with an aperture into which the bolt extends when in engagement with the lug.

In witness whereof I have hereunto set my hand.

VICTOR WILLOUGHBY.