March 7, 1933. V. WILLOUGHBY 1,900,628

TANK DOME CLOSURE

Filed Aug. 27, 1931

Fig. 1.

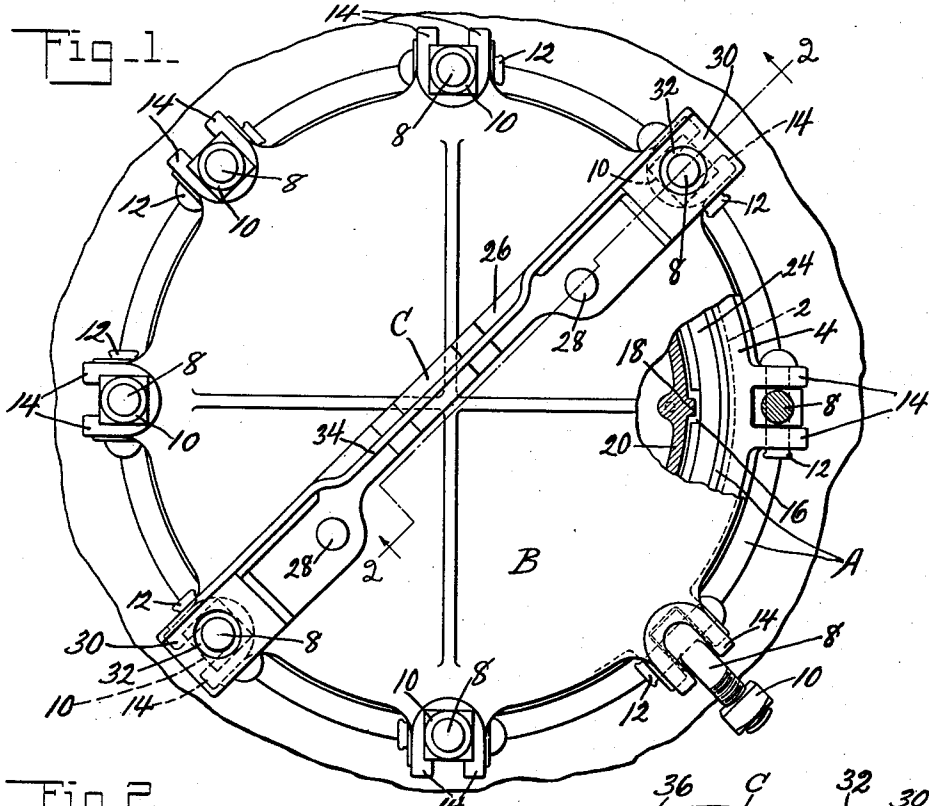



Fig. 2.

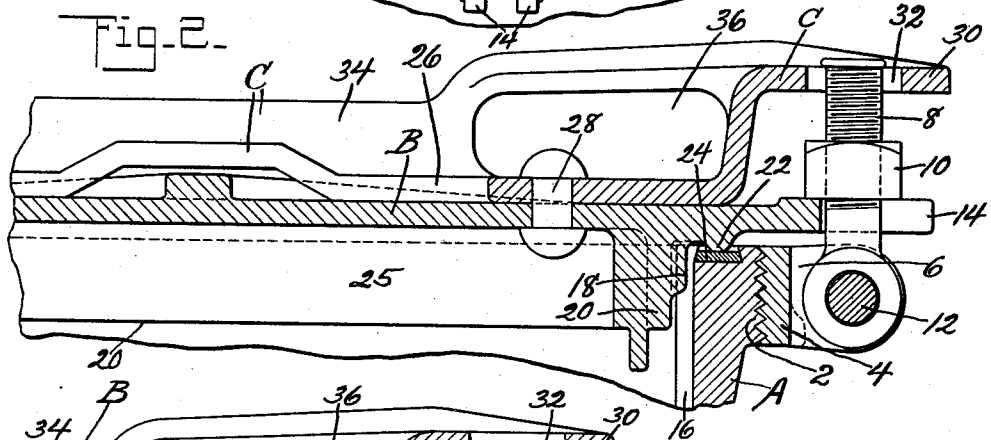
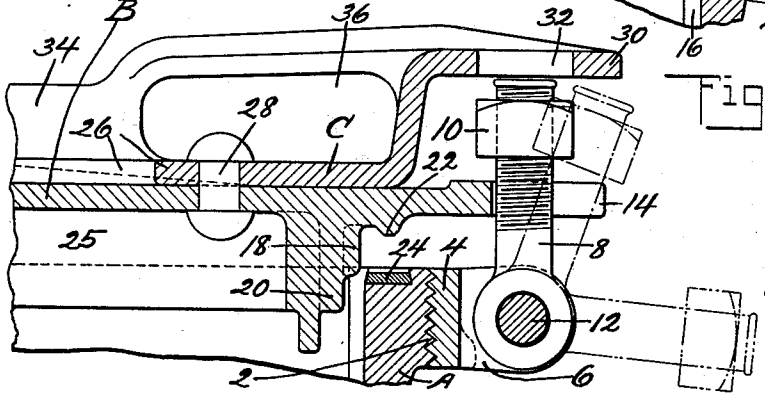



Fig. 3.

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# UNITED STATES PATENT OFFICE

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## TANK DOME CLOSURE

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This invention relates generally to closures for car tanks or for other containers and has particular reference to a fastening means for the covers of domes of car tanks.

The present invention has particular reference to a means for preventing complete release of the fastening means for dome covers until after excess gas within the container or car tank has been vented.

The present invention contemplates an attachment adapted to be applied to the bolted type of dome cover now in use to provide a safety appliance which will prevent the complete release of the bolts or certain thereof which normally secure the dome cover in position until excess gas from the container has been vented.

During transportation of volatile liquids such, for example, as gasoline or the like, gas is formed in the container or car tank and unless means are provided for restraining the dome cover against complete removal while there is excess gas pressure in the container it sometimes happens that the internal gas pressure will blow the dome cover away from its supporting medium upon the release of certain of the fastening means thus causing damage to property and also endangering human life. Due to a requirement of the Interstate Commerce Commission it is not permissible to use certain types of dome covers for any container adapted for transporting any commodity which develops a vapor pressure of 16 pounds absolute at 100° F. This requirement will result in the necessity of virtually scrapping a large number of dome covers unless they are provided with safety mechanism or devices which will prevent the complete removal of the cover while there is excess gas pressure in the tank.

The present invention provides a device for attachment to a standard bolted type dome cover which will provide the necessary safety means for preventing the complete removal of the cover while there is excess gas pressure in the tank; this device also eliminating the necessity of scrapping an otherwise serviceable dome cover.

This invention further contemplates the provision of a dome cover having means secured thereto for preventing the complete removal thereof until after excess gas pressure has been vented from the tank or container.

Another object of this invention is the provision of a safety bar with which certain of the bolts now used for securing the dome cover in position cooperate to restrain the bolts against being swung on their pivots to cover releasing position while there is excess gas pressure within the tank.

A further object of this invention is the provision of a dome cover adapted to be secured in position by upstanding bolts, the dome cover having a safety device secured thereto which normally restrains swinging of the bolts to cover releasing position, the device necessitating lifting of the dome cover a predetermined distance to permit complete release of the bolts whereby the cover may be removed.

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 indicates a top plan view of the dome cover with the safety attachment applied thereto, the view showing certain parts in section and other parts broken away.

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 dome ring and dome cover, the dome cover being shown slightly elevated to permit the locking bolt to be removed therefrom.

Referring now more particularly to the drawing in which similar characters of reference designate similar parts of the several views a dome ring is illustrated at A being adapted to support dome cover B having the safety attachment C secured thereto as more fully described hereinafter. The dome cover is of more or less conventional form and is of the bolted type. More particularly the dome cover shown in the drawing is similar to that shown, described and claimed in patent to William K. Auchincloss, No. 1,555,932 of October 6, 1925.

The dome ring A is externally threaded as at 2 and receives an auxiliary ring or collar 4 having a plurality of equally spaced and

outwardly projecting lugs 6, in which bolts 8 carrying securing nuts 10 are mounted by means of pivot pins 12 arranged in the lugs.

The dome cover B is provided with a plurality of equally spaced bifurcated lugs 14 which are so positioned as to receive the bolts 8 when the cover is seated on the dome ring A whereby the cover may be secured in position by tightening the nuts 10. The inner surface of the dome ring A is provided with a vertical slot 16 adapted to receive a lug 18 formed with a projection 20, the projection being annular in form, depending from the dome cover B whereby when the dome cover is positioned on the ring with the lug 18 in the slot 16 the lugs 14 on the cover will be so arranged that the spaces therebetween may receive the bolts 8 when they are swung upwardly on their pivots 12.

As clearly shown in Fig. 2 the dome cover is provided with a depending annular projection 22 which engages a packing or gasket 24 inset in the upper edge of the dome ring A. In the event that it is desired to insulate the cover, the annular rib 20 obviously defines a recess 25 within which the insulation may be placed and retained by suitable fastening means secured to the rib 20.

The drawing indicates the auxiliary ring 4 providing a supporting or securing means for the bolts 8 but it is to be understood that this is merely by way of example as obviously the dome ring A may be formed with integral lugs to support the securing bolts 8.

This invention contemplates means which prevent the release of all of the securing bolts 8 until excess gas pressure is vented from the tank or container and further contemplates the provision of a safety device which may be easily and quickly applied to bolted types of dome covers to effect such result. Now referring again more specifically to the drawing, the safety device C comprises a bar 26 secured to the upper surface of the dome cover B by suitable fasteners such as the rivets 28; the bar C extending entirely across the cover and having the ends thereof arranged in a plane different from and, in the instance shown, above the plane of the attaching portion of the bar. In the instance shown the ends are upwardly offset as shown at 30 to overlie diametrically opposed lugs 14 of the cover. The offset ends 30 of the bar are each provided with openings 32 arranged in such position that normally the upper ends of the adjacent securing bolts 8 project thereinto as clearly shown in Fig. 2.

The attachment C may be of any preferred or desired form but in the instance shown is provided with a vertically arranged stiffening rib 34 the ends of which are slotted as at 36 to define handle portions whereby the cover may be lifted to the position shown in Fig. 3 to permit release of the bolts which are engaged in the openings 32.

Figs. 1 and 2 disclose the cover as being bolted tightly to the dome ring A. When it is desired to remove the cover from the ring the nuts 10 on the bolts which are not engaged with the offset ends 30 of the bar 26 are backed on the bolts and those bolts swung out of the lugs 14, then the nuts 10 on the bolts which are engaged with the offset ends 30 are released. It will be obvious that should excess gas pressure be present in the tank the cover will be lifted to contact the nuts 10 and these bolts can not be swung on their pivots out of dome securing position as obviously the nuts must be adjusted a considerable distance on the bolts in order that they may clear the lugs 14 when the bolts are swung. After the gas has been vented from the tank the cover will reseat on the dome ring. The nuts 10 on the bolts 8 which are still in engagement with the lugs 14 may then be further adjusted on the bolts and the cover lifted to the position shown in Fig. 3 whereupon the bolts 8 may be swung on their pivots as shown in dotted lines in said Fig. 3 to completely release the dome cover for removal.

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. It is to be understood, however, that the drawing is for illustrative purposes only and various changes in the form and proportions of the device 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 normally holding said cover in closed position, and means fixedly mounted on said cover in cooperative relation to certain of said fastenings as to prevent disengagement of the latter from said cover until said cover is raised to a predetermined partly open position.

2. A tank dome closure comprising a dome ring, a collar threaded on said ring, a cover supported by said ring, bolts pivotally mounted on said collar and adapted to engage lugs on said cover for securing the latter to said collar, and safety means fixedly mounted on said cover adapted to receive certain of said bolts in their engaged position and prevent their disengagement until said cover is raised a predetermined amount.

3. A tank dome closure comprising a dome ring, a collar threaded on said ring, a cover supported by said ring, bolts pivotally mounted on said collar and adapted to engage lugs on said cover for securing the latter to said collar, and safety means fixedly mounted on and extending across said cover adapted to receive certain of said bolts in their engaged position and prevent their disengagement until said cover is raised to a predetermined partly open position.

4. A tank dome closure comprising a dome ring having axially disposed seats in its inner peripheral face, a collar and a cover carried by said ring, said cover having projections entering the seats in said ring and preventing rotation of said cover, a bolt pivotally mounted on said collar and adapted to engage a lug on said cover for securing the latter to said collar, a safety member fixedly mounted on said cover and having a portion disposed over said lug, said portion adapted to receive said bolt in its engaged position whereby to prevent its disengagement until said cover is raised to a predetermined partly open position.

5. A tank dome closure comprising a slotted dome ring, a collar threaded on said ring, a cover on said ring, said cover having projections entering the slots in said ring, bolts pivotally mounted on said collar and adapted to engage lugs on said cover for securing the latter to said collar, a safety member fixedly mounted on said cover and having portions disposed over certain of said lugs, said portions adapted to receive bolts adjacent thereto and prevent their disengagement until said cover is raised to a predetermined partly open position.

6. A tank dome closure comprising a slotted dome ring, a cover and a collar carried by said ring, an annular projection on said cover extending into said ring, bifurcated lugs on said annular projection engaging in the slots in said ring to prevent rotation of the cover with respect to the ring when the cover is in seated position, bolts pivotally mounted on said collar and adapted to engage certain of the bifurcated lugs on the periphery of said cover for securing the latter to said collar, and a safety member fixedly mounted on said cover and having end portions disposed over certain of said bifurcated lugs, said portions normally receiving certain of said bolts whereby to prevent their disengagement until said cover is raised to a predetermined partly open position.

7. The combination with a tank dome, of a dome cover therefor, bolts pivotally mounted on said dome and normally engaging lugs on said cover for securing the latter on said dome, a safety bar extending across and fixedly attached to said cover, said bar having an aperture in each end adapted to receive the free ends of certain of said bolts thereby preventing disengagement of the latter from said lugs until said cover is raised to a predetermined partly open position.

8. The combination with a tank dome, of a dome cover therefor, bolts pivotally mounted on said dome and normally engaging lugs on said cover for securing the latter on said dome, a safety bar extending across and fixedly attached to said cover and having hand grips formed therein, said bar also having an aperture in each end adapted to receive the free ends of certain of said bolts thereby preventing disengagement of the latter from said lugs until said cover is raised to a predetermined partly open position.

9. The combination with a tank having a man hole opening, of a closure for the opening, bolts pivotally connected to the tank and cooperating with the closure, nuts on said bolts for securing the closure in closed position and for limiting the rise of the cover when the latter is forced upwardly by pressure within the tank, and a safety element secured to the closure with which the bolts cooperate, said element normally restraining the bolts against pivotal movement and said bolts being releasable from the safety element only when the closure is in a predetermined raised position.

10. The combination with a tank having a man hole opening, of a closure for said opening, pivotally mounted fasteners normally holding the closure in closed position, and means preventing movement of said fasteners on their pivots and for preventing complete removal of the cover when the latter is forced upwardly by pressure within the tank comprising a rigid member secured to the closure and normally in cooperative relation with said fasteners, said member necessitating raising of the cover a predetermined amount whereby said fasteners are disengaged from said member to allow pivotal movement of said fasteners.

11. The combination with a bolted type dome cover having bolt receiving lugs, of a safety device comprising a rigid element rigidly secured to the outer face of the cover and having portions spaced outwardly from certain of the bolt receiving lugs which provide lateral interference with the bolts in said lugs when the dome cover is in full closure position and until it has been moved outwardly a predetermined distance.

12. A safety device for tank dome closures comprising a rigid element having an attaching portion and end portions in a horizontal plane different from that of the attaching portion, said end portions being so formed and arranged as to cooperate with dome closure locking elements in such a manner as to prevent disengagement of said locking elements until the dome closure is raised to partly open position.

13. In a tank dome closure including locking elements and a dome cover with which said elements cooperate, a safety device comprising a bar for attachment to said cover and having portions spaced from the cover so formed and arranged as to cooperate with certain of the locking elements in such a manner as to prevent disengagement of the latter until the closure is raised to partly open position.

14. A safety device for railway car tank

dome closures comprising a bar adapted to be secured to a closure, said bar having an offset end portion provided with an opening so arranged as to receive locking means engaging the dome closure.

15. A safety device for railway car tank dome closures comprising a bar adapted to be secured to the closure and provided with offset end portions each having an opening for receiving locking elements engaging the closure, said offset end portions being so arranged relative to the remainder of the bar and said locking means as to prevent release of the latter until the closure has been partly raised.

16. A safety device for railway car tank dome closures comprising a member adapted for attachment to the outer surface of a closure and comprising a hand-grip portion and offset end portions, the latter having openings adapted, upon movement of the closure to closed position, to receive locking elements engaging said closure.

17. An article of manufacture comprising a safety bar for attachment to a tank dome cover, said bar having an attaching portion provided with openings adjacent its ends so arranged as to receive fasteners directly engaging the dome cover in locking relation.

In witness whereof I have hereunto set my hand.

VICTOR WILLOUGHBY.