March 19, 1929. V. WILLOUGHBY 1,706,092

TANK CAR VALVE AND METHOD OF ATTACHING SAME

Filed May 8, 1928

Fig. 4.

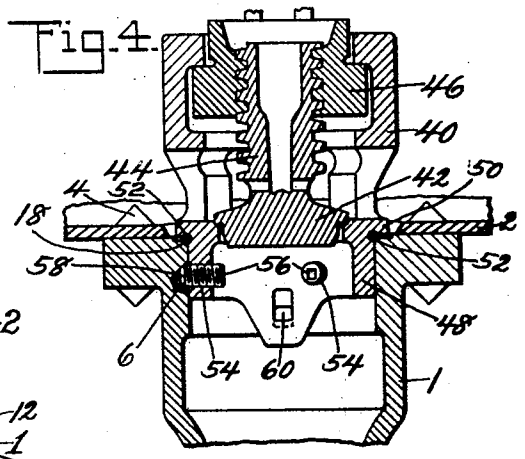


Fig. 2.

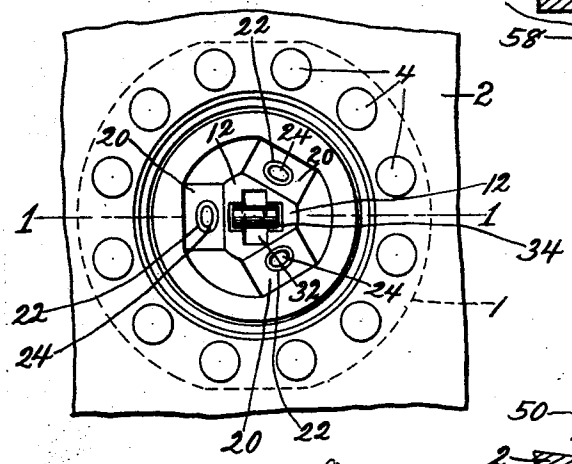


Fig. 3.

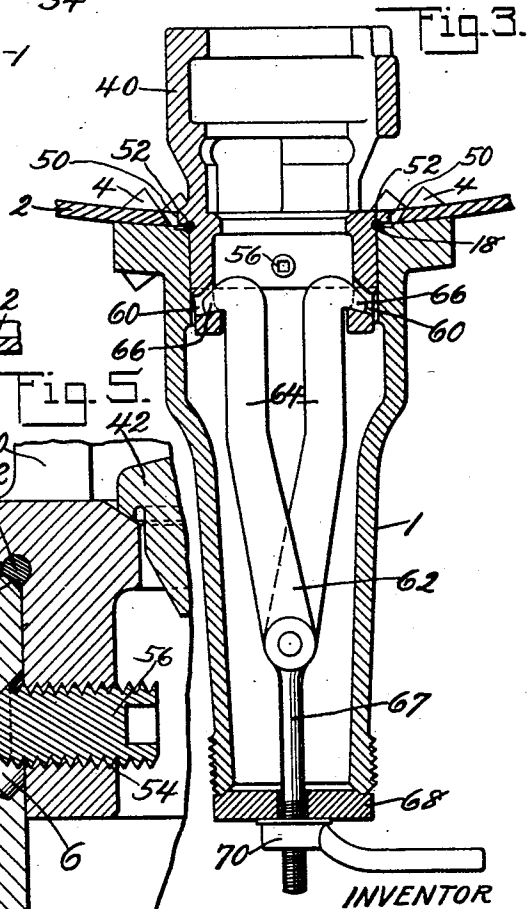


Fig. 1.

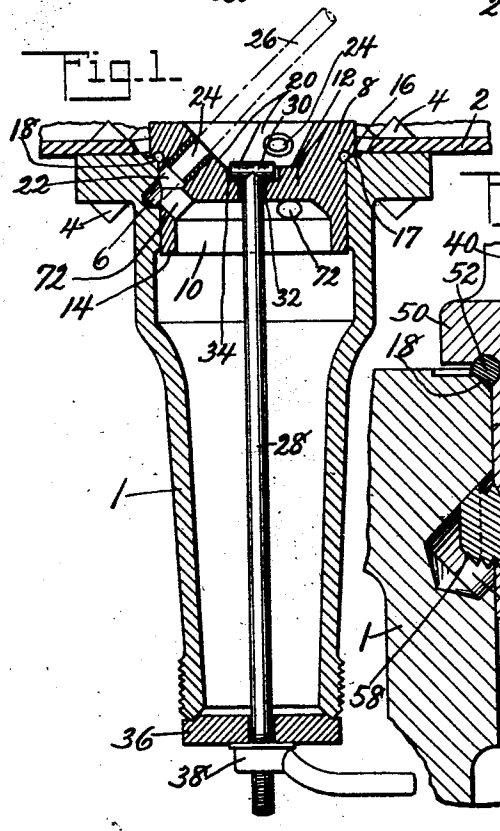
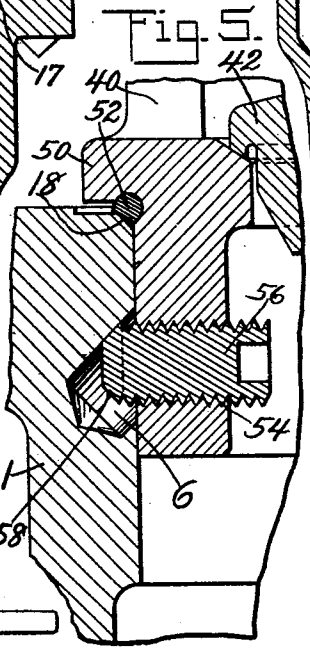


Fig. 5.



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Patented Mar. 19, 1929. 1,706,092

UNITED STATES PATENT OFFICE.

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TANK-CAR VALVE AND METHOD OF ATTACHING SAME.

Application filed May 8, 1928. Serial No. 276,077.

This invention relates to discharge outlets for tank cars and more particularly to the means for securing the outlet valve in the discharge outlet casing. At present many of the tank cars in use are equipped with a discharge outlet valve which is held to its seat by spring pressure and which may be forced from its seat by a bar inserted through the discharge outlet casing by unauthorized persons desiring to remove the tank contents.

It is an object of this invention to provide a discharge outlet valve which can be used with the discharge outlet casings now used with spring seated valves and which can not be operated by force applied from below, and it is also an object of this invention to provide a method and means by which the valve may be secured to the discharge outlet casings now used with spring seated valves without necessitating the removal of the discharge outlet casing from the tank.

In the drawings:

Figure 1 is a central vertical section, taken as on the line 1—1 of Fig. 2, of a discharge outlet casing of the type used with spring seated valves and having a drill jig mounted therein;

Fig. 2 is a top plan view of discharge outlet casing and drill jig as shown in Fig. 1;

Fig. 3 is a central vertical section of the discharge outlet casing of Fig. 1 and of the cage of the valve mechanism it is proposed to substitute for the spring pressed valve; the means for drawing the cage to its seat in the outlet casing being shown partly in section and partly in elevation;

Fig. 4 is a partial central vertical section of the discharge outlet casing of Fig. 1 with the substitute valve mechanism applied thereto; and

Fig. 5 is a fragmentary section similar to Fig. 4 but drawn to a larger scale and showing the means for securing the valve cage in the discharge outlet housing and of preventing leakage between the valve cage and the discharge valve casing.

In the drawings a discharge outlet casing 1 of the type used in connection with spring pressed discharge outlet valves is shown secured to the tank bottom sheet 2 by rivets 4. In order to provide the tank with a discharge outlet valve of a type which cannot be forced open from the bottom, such as is shown in Patent No. 1,534,139, Ostrander, April 21, 1925, the discharge outlet casing is drilled to provide a plurality of symmetrically spaced bores 6 inclined to a horizontal plane and extending outwardly from the discharge passage of the casing as shown in Figs. 1, 4 and 5. To insure uniform positioning of the bores 6, a drill jig 8 is provided which comprises a circular member 10 having a dished web 12 of less depth than the rim portion 14. The rim portion 14 is of a diameter to snugly fit the upper portion of the discharge outlet casing 1 and is provided with an annular shoulder 16 which engages with the upper surface 17 of the outlet casing 1 outside of the usual valve seat 18. Symmetrically spaced portions of the upper surface of the web are formed as flat inclined surfaces as at 20 and are provided with circular openings 22 drilled perpendicular to the upper surfaces 20 of the web 12 and lined with bushings 24. The bushed openings 22 guide a drill 26, shown in broken lines, by which the bores 6 are formed in the casing 1, thus providing a uniform positioning of the bores 6 in all casings 1.

To prevent movement of the drill jig 8 during the drilling operation, the drill jig 8 is secured in position by a bolt 28 which, at one end, is provided with a head 30 which is inserted through an elongated opening 32 in the web 12 and turned to engage in a depressed seat 34 extending in the web 12 at right angles to the opening 32. The other end of the bolt 28 extends through an opening in the collar or washer 36 and is threaded to receive a nut 38 which is adjusted to engage the collar 36 and jig 8 with the respective ends of the outlet casing 1.

As shown in Fig. 4, the valve mechanism substituted for the spring seated valve comprises a cage 40, a valve 42 having a threaded stem 44 and a collar or nut 46 threaded on the stem 44 and held against continued rotation in the cage 40 so as to raise or lower the valve 42 upon rotation of the valve as shown in the patent referred to above. The valve cage 40 is provided with an annular skirt or flange 48 at its bottom of such diameter as to snugly fit the upper portion of the discharge outlet casing. At the upper end of the flange 48 the cage 40 is provided with an annular outwardly projecting shoulder 50 and between the shoulder 50 and flange 48 there is formed a recess which re-

ceives a suitable packing 52. The flange 48 is provided with radially extending threaded openings 54 positioned to correspond with the bores 6 in the outlet casing 1 and having set screws 56 threaded therein, the outer ends of set screws 56 being tapered as at 58 to correspond to the inclination of the bores 6. The flange 48 is also provided with diametrically opposed openings 60 formed in downwardly projecting portions of the flange 48 so that the openings 60 come below the openings 54.

To insure the proper seating of the valve cage 40 in the casing 1, tongs 62 are provided comprising arms 64 having oppositely projecting lugs 66 at the outer ends which may be engaged in the openings 60 and pivotally connected at their other ends to the eye of bolt 67. The other end of bolt 67 projects through a collar or washer 68 and is threaded to receive a nut 70 which is adjusted to bring the collar 68 against the bottom of the casing 1 and exert pressure on the cage 40 when the lugs 66 are in engagement in the openings 60.

In converting, for use with a valve mechanism that cannot be opened from below, a discharge outlet casing designed for use with a spring seated valve and secured to a tank, after the removal of the spring seated valve, the drill jig 8 is positioned in the outlet casing 1 and secured in position by adjusting the nut 38 to bring the collar 36 into engagement with the bottom of the outlet casing 1. The bores 6 are then formed by a suitable drill 26 guided in the bushed opening 22, the borings being discharged through openings 72 leading from the openings 22. The drill jig 8 is then removed and the valve cage 40 inserted in the outlet casing 1 with the set screws 56 alined with the bores 6, the tongs 62 engaged in the openings 60 and the nut 70 adjusted to bring the packing 52 firmly against the former valve seat 18 of the outlet casing 1. With the valve cage 40 thus held in position, the set screws 56 are tightened, the taper 58 of the set screws and the inclination of the bores 6 tending to increase the pressure of the packing 52 on the valve seat 18 as the set screws are tightened. After the tightening of the set screws 56, the tongs 62 are released and removed and the valve 42 and collar 46 inserted in the cage. The valve operating rod, not shown, is then inserted in the opening in the valve stem 44.

What is claimed is:

1. The combination with a discharge outlet casing having a plurality of inclined bores projecting outwardly from the inner surface thereof, of a valve cage having a plurality of radially projecting set screws for engaging in said bores.

2. The combination with a discharge outlet casing having a plurality of inclined bores projecting outwardly from the inner surface thereof, of a valve cage having a plurality of radially projecting set screws for engaging in said bores, the ends of said set screws having a taper corresponding to the inclination of said bores whereby tightening of said set screws tends to draw said valve cage into the outlet casing.

3. The combination with a discharge outlet casing having a plurality of downwardly inclined outwardly extending bores, of a valve cage having set screws for engaging said bores.

4. The combination with a discharge outlet casing having a plurality of downwardly inclined outwardly extending bores, of a valve cage having set screws for engaging said bores, said set screws being at an angle to said bores.

5. The combination with a discharge outlet casing having a plurality of downwardly inclined outwardly extending bores, of a valve cage having set screws for engaging said bores, said set screws being at an angle to said bores and having tapered ends corresponding in inclination to said bores.

6. The combination with a discharge outlet casing having a plurality of downwardly inclined outwardly extending bores, of a valve cage having set screws for engaging said bores and packing between said valve cage and casing, said set screws being at an angle to said bores and having tapered ends corresponding in inclination to said bores whereby tightening of said set screws tends to increase the pressure on said packing.

7. The method of securing a valve cage to a discharge outlet casing which comprises drilling a plurality of outwardly extending inclined bores, applying a valve cage having radially projecting set screws corresponding to the bores of the casing, applying pressure to the valve cage to force the cage to its seat in the outlet casing and tightening the set screws to secure the cage in the casing and increase the pressure of the cage on its seat.

8. The method of securing a valve cage to a discharge outlet casing which comprises drilling a plurality of downwardly inclined bores extending outwardly from the discharge passage having radially projecting set screws corresponding to the bores of the casing, applying pressure to the valve cage to force the cage to its seat in the outlet casing and tightening the set screws to secure the cage in the casing and increase the pressure of the cage on its seat.

9. The method of securing a valve cage to a discharge outlet casing which comprises fitting a drill jig to the outlet casing, drilling a plurality of downwardly inclined bores extending outwardly from the discharge passage of the casing guided by the drill jig, removing the drill jig, applying a valve cage having a plurality of radially disposed set screws positioned to correspond with the bores of the outlet casing, applying pressure

to force the valve cage to its seat in the outlet casing and tightening the set screws to secure the cage in the casing and increase the pressure of the cage on its seat.

10. The method of securing a valve mechanism to a discharge outlet casing comprising fitting a drill jig to the outlet casing, drilling a pluality of inclined bores in the outlet casing guided by the drill jig, removing the jig, applying a valve cage having a plurality of radially disposed set screws positioned to correspond with the bores of the outlet casing, applying screw operated tongs to force the cage to its seat in the outlet casing, tightening the set screws to secure the cage in the casing and increase the pressure of the cage on its seat, releasing and removing the tongs and inserting the valve parts in the cage.

In witness whereof I have hereunto set my hand.

VICTOR WILLOUGHBY.