Dec. 6, 1932. F. L. DIETERICH 1,890,247

TANK CAR VALVE

Filed Dec. 3, 1930 3 Sheets-Sheet 1

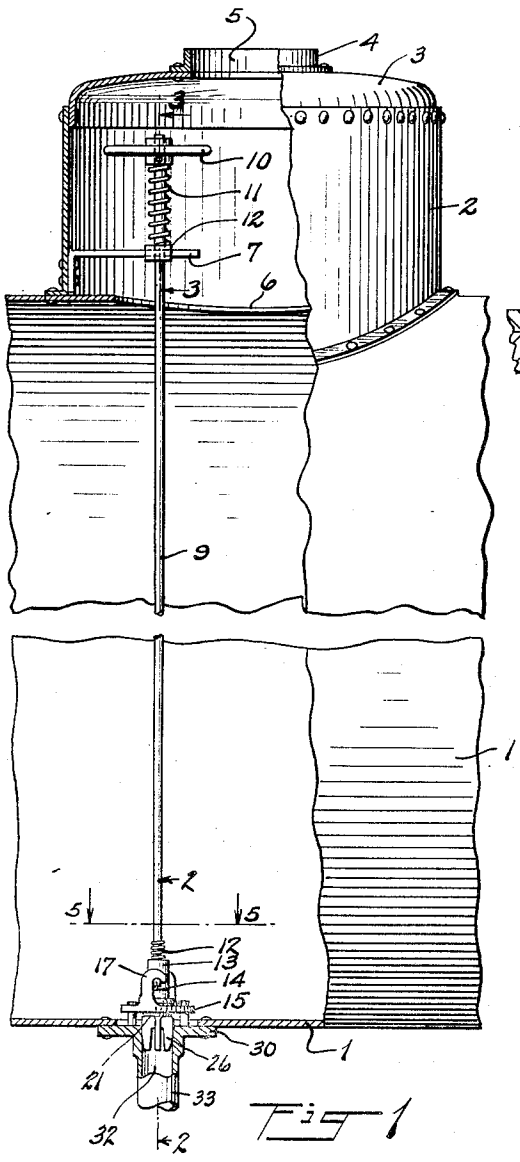


Fig 1

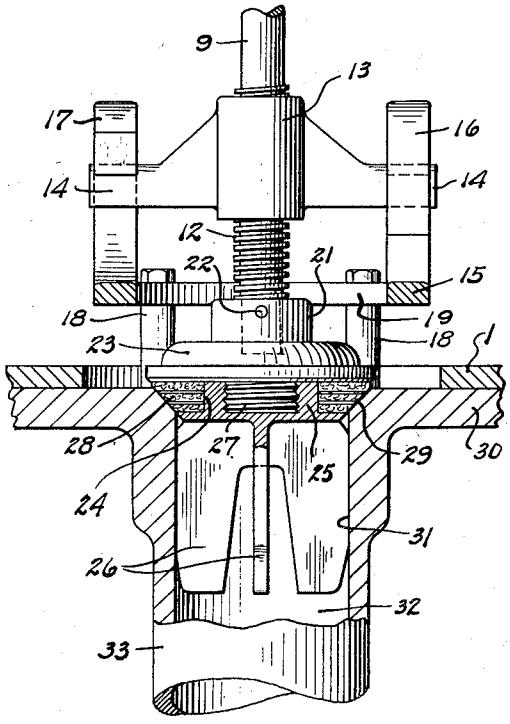


Fig 2

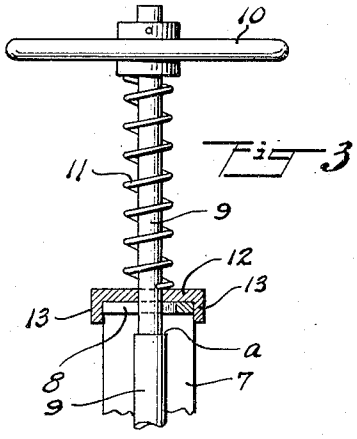


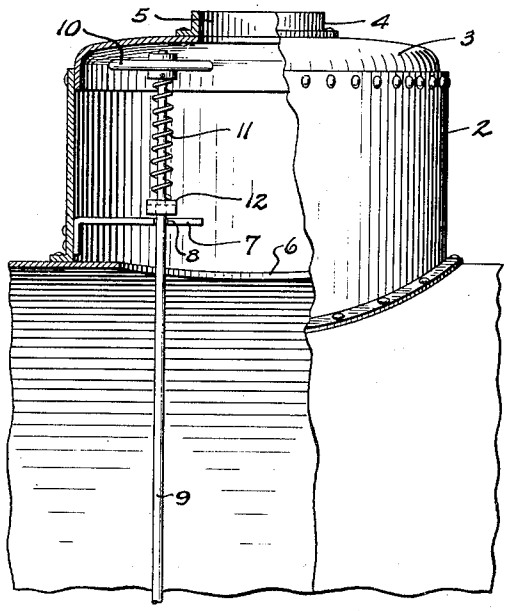
Fig 3

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TANK CAR VALVE

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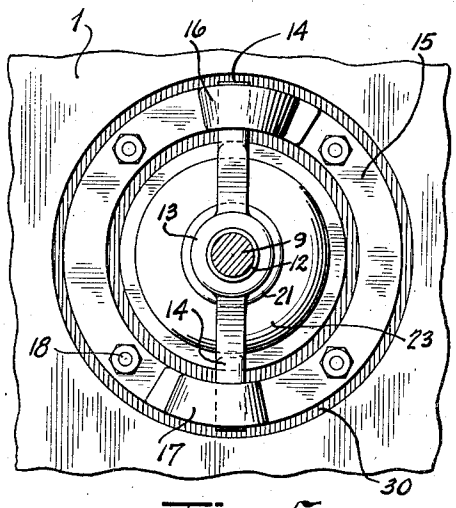


Fig 5

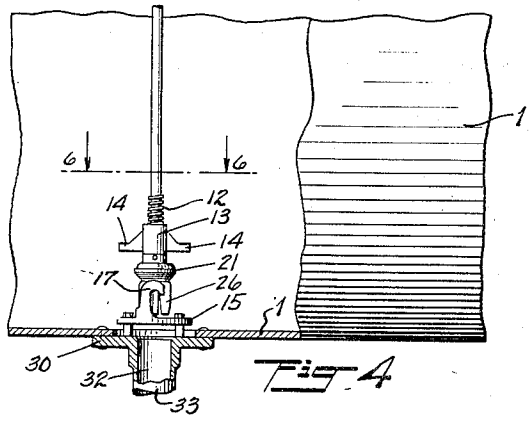


Fig 4

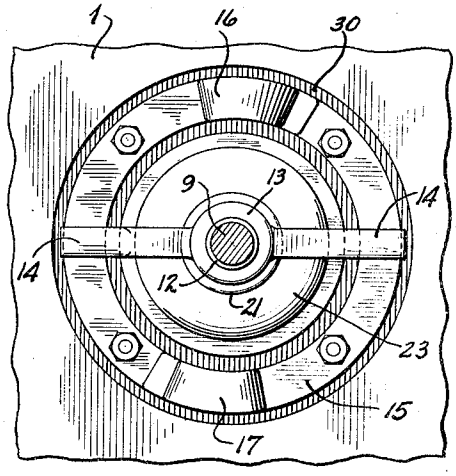


Fig 6

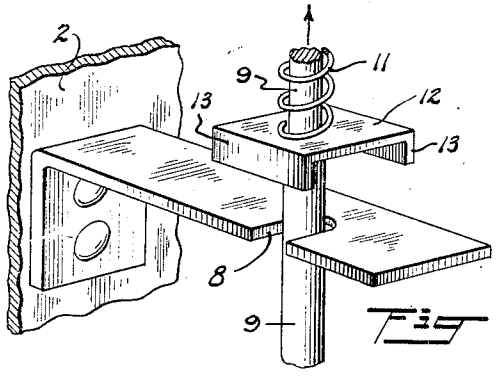


Fig 7

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TANK CAR VALVE

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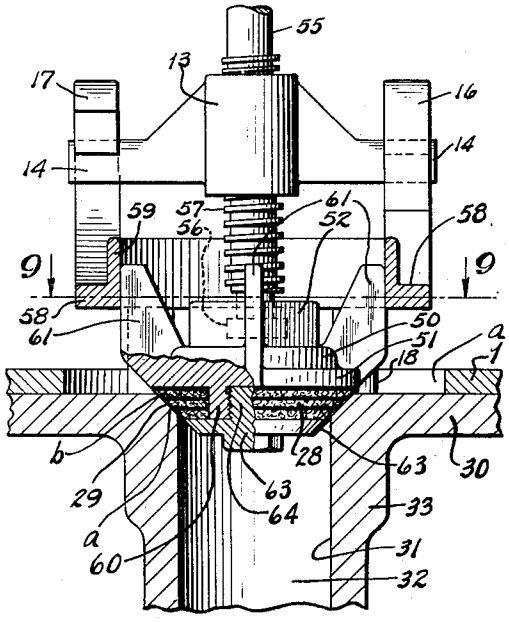


Fig 8

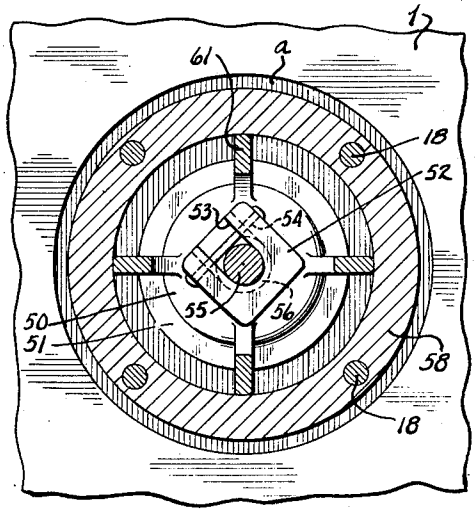


Fig 9

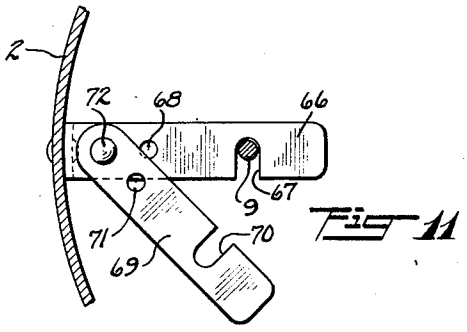


Fig 11

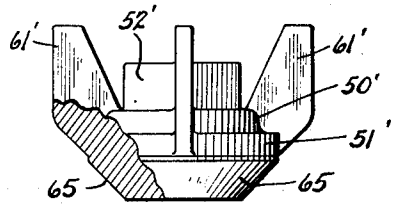


Fig 10

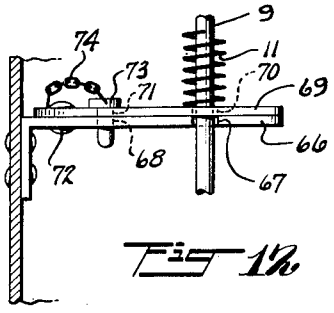


Fig 12

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UNITED STATES PATENT OFFICE

FRANCIS L. DIETERICH, OF NEWARK, NEW JERSEY

TANK CAR VALVE

Application filed December 3, 1930. Serial No. 499,694.

This invention relates to improvements in valves for tank cars and other large receptacles having bottom outlets, boots or legs and which receptacles are of such size as to ordinarily require the entrance of workmen thereinto when it is desired to remove the valve and grind or refinish the seat.

Heretofore, as I am aware, it has been customary to control the outlet from a tank car by means of a valve, usually cam-operated, which was mounted therein in such a manner that while the same could be operated from the outside, usually by means of a cam carried on the upper end of a long rod connected to the valve, nevertheless, where obstructions or foreign material lodged beneath said valve or where the valve seat became scored or worn, it has also been necessary to first preliminarily steam and gas-free the car in those cases where it has been used for the shipment of ignitable or inflammable liquids and then for the workmen to enter the car and manually remove the obstruction which has prevented the proper operation of the valve from the outside of the car or else grind the seat by rapidly manually rotating the valve on the seat, while employing suitable valve grinding compounds.

My investigations have led to the discovery that all of the foregoing objections can be avoided through the equipment of a tank car with a valve mechanism of the construction hereinafter described, which admits of not only of the manipulation of the valve in order to open and close the same, by an operative stationed outside of the car, but even permits of the removal of the valve and the fishing out of large obstructions which have lodged beneath the valve without necessitating the entrance of a workman within the car besides allowing the refinishing of the valve seat from the outside of the car, as well as other advantages as hereinafter set forth.

My invention is fully set forth in the following detailed description and drawings forming a part of this specification, in which latter

Figure 1 is an elevation of my improved valve mechanism as applied to the outlet of a tank car of which a fragmentary elevation partly in section is shown, the valve being shown in an open position with its guide projecting into the outlet conduit;

Fig. 2 is a vertical section on the line 2—2 of Fig. 1, the valve being shown in elevation;

Fig. 3 is a vertical section on the line 3—3 of Fig. 1, the handwheel and operating rod being shown in elevation;

Fig. 4 is a view similar to Fig. 1, but showing the valve completely removed from the outlet conduit and unhooked so as to be free to be removed from the car by an operator positioned without the car;

Fig. 5 is a horizontal section on the line 5—5 of Fig. 1;

Fig. 6 is a horizontal section on the line 6—6 of Fig. 4;

Fig. 7 is an enlarged detail perspective view of the latch mechanism;

Fig. 8 is an enlarged vertical section, the valve being shown partly in operation, of a modified form of valve in which the guides or wings project upwardly above the valve proper;

Fig. 9 is a transverse section on the line 9—9 of Fig. 8;

Fig. 10 is a detail elevation, partly in section, of an all metal valve;

Fig. 11 is a detail plan view and Fig. 12 is a detail elevation, of a modified form of latch.

Referring to the drawings and the construction shown therein, the reference numeral 1 designates the cylindrical body or shell of a tank car, the same having a dome 2, cover 3 and collar or fitting 4, the opening 5 of which is ordinarily closed by a cap (not shown), and which cap is removed when it is desired to introduce liquid through the inlet aperture 6 or to manipulate or remove the valve hereinafter described.

A bracket 7, which projects horizontally from the dome 2, is provided with a marginally intersecting slot 8 adapted to receive the rod or valve stem 9 on the upper end of which a handwheel 10 is rigidly secured. A coil spring 11 is interposed between the handwheel and a locking-plate 12, the latter being slidably mounted on the reduced upper end

of said rod and being normally adapted, under the influence of said spring, to rest on the shoulder *a*. Said plate 12 has depending opposing lateral flanges 13 which are normally adapted to embrace the bracket 7 and retain the rod 9 within the slot 8.

A threaded locking collar 13, having opposing laterally projecting arms 14, is rotatably mounted on the threaded portion 12 of said rod 9, said collar functioning, in cooperation with said latter threaded portion 12 to permit of the optional raising or lowering of said valve with respect to its seat and also to normally limit the extent to which the valve can be elevated off of its seat while also permitting of its complete removal from the car from the outside, when desired, without requiring the entrance of a workman into the car.

A ring 15, having integral opposing, but oppositely projecting hook members 16 and 17, respectively, is secured by bolts 18 to the outlet leg, hereinafter described, said hooks being adapted to respectively engage with the opposing arms 14 when the latter are in the position shown in Fig. 1 and prevent the accidental release of the said arms during the normal operation of the valve by means of the handwheel 10 and valve stem or operating rod 9. The opening 19 of the ring 15 is of slightly greater diameter than the maximum diameter of the valve 21 which, in the construction shown in Fig. 2, is secured to the lower end of the operating rod and immediately below the threaded portion thereof by a pin 22. Said valve, in the form shown in Fig. 2, comprises two pieces, the upper one having an enlarged flanged portion 23 and the lower member 25 is cut away to form a gasket-receiving peripheral recess 24. Integral, depending wings 26 serve as guides for the valve during the seating and unseating movements thereof. A depending threaded boss 27, carried by the upper member 23 is adapted to be screwed into the central recess in the lower member 25 and permit of the high compression of a laminated gasket, preferably comprising compressed layers of cork 28 and layers of vulcanized fibre 29 cemented together. The outlet leg or boot has a flange 30 which is riveted to the bottom of the car and a depending outlet conduit 31, whose bore 32 is adapted to snugly receive the wings 26 and accurately guide the same.

In the modified construction shown in Fig. 8, a modified form of valve is employed in which the guide wings project upwardly from the valve proper. This valve comprises a top member 50 having a peripheral flange 51 of a diameter greater than the extreme diameter of the valve seat. The said upper member of the valve is formed into a square head 52 which has an under-cut slot 53 in which a pin 55 is projected in such a manner as to act as a guide and retainer for the rod 55 when the enlarged end 56 is inserted into said slot 53 and is in the extreme innermost position therein. The rod 55 is provided with a thread 57 that engages the internal threads of the collar 13 similarly to the construction shown in Figs. 1 and 2. The ring 58 is similar to the ring 15, except that it is provided with a vertical flange or aligning collar 59. The member 50 is recessed to receive a laminated gasket similar to that shown in Fig. 2 and the boss 60 is provided with a central threaded recess into which the lower member is threaded as hereinafter described. Said upper member 50 is also provided with upwardly projecting integral guide wings 61 that are adapted to slidably engage the inner face of the aligning collar 59. The lower member 63 of the valve has a central threaded stud 64 that is adapted to be threaded into the central recess in the boss 60 when the upper and lower valve members and gasket are assembled whereby the gasket can be effectively compressed during such assembly.

In Fig. 10, the valve shown is generally similar to that illustrated in Fig. 8 except that the entire valve is formed of a single piece of metal. The same comprises a member 50′, having a flange 51′, a square head 52′, integral wings 61′ and an inclined valve face 65, said valve being mounted similarly to that shown in Fig. 8.

The form of latch construction shown in Fig. 11 comprises a bracket member 66, generally similar to the standard bracket now commonly employed, except that the same has a marginal slot 67 and a locking pin receiving-aperture 68. A pivotal co-operating locking element 69 is provided with a slot 70 which is adapted to co-operate with the slot 67 to embrace the rod 9 and accurately guide the same when the aperture 71 is in registry with the aperture 68 aforesaid. The bracket and locking element 69 are secured together by a rivet 72 and a locking pin 73, which is preferably carried by a chain 74, likewise anchored to said rivet, serves to positively lock the elements of the latch together.

Among the advantages of my improved valve mechanism are its cheapness and simplicity and the facility with which it can be substituted for the valve at present employed as standard equipment on tank cars in those cases where it is desired to replace the present type of valve with a dependable leak-proof valve which can be entirely removed from the outside of the car when re-seating operations on the valve seat are to be performed or when it is desired to replace a gasket on the valve. Furthermore, where my preferred type of laminated valve is employed, the fact that the valve is formed of two co-operating members having threaded engagement with each other, permits of the high compression of the laminated gasket after the application of the same to the valve

member which carries the same, the same preferably being compressed to about one-third of its original thickness and, as a consequence, the cork laminations become highly resistant to abrasive or chemical action, thereby materially enhancing the durability and solvent resistance thereof, but without affecting its ability to embed or accommodate, due to the elasticity of the valve face, any small particles of rust or foreign materials which become lodged between the face of the gasket and the valve seat whereby a tight seal is insured under conditions that would otherwise in the case of a metal-to-metal seal, set up a decided leaking of the valve. Since moreover the fact that valve is softer than the seat, any abrasive particles which, as above stated, may become embedded in such resultant valve face, are far less likely to score the valve seat and thereby the frequent re-seating of the latter is also avoided.

In the construction shown in Fig. 2, the valve 21 being rigidly pinned to the rod 9 by means of the pin 22, lends itself to being unseated by an operator introducing a tool through the boot to engage the wing member 26, whereby the valve can be unscrewed and unseated without necessitating the opening of the dome. Such operation is particularly desirable where a car is loaded with gasoline obtained from casing head gas owing to the extreme volatility thereof, whereby the liquid gasoline can be withdrawn from a point below the accumulated vapors without the loss of large quantities of entrained gasoline as would occur were the dome to be opened and the accumulated vapors allowed to escape.

While my invention in its broadest aspects is not confined to the use of a resilient valve face, such a valve face is in addition to the reasons hereinbefore mentioned, particularly desirable, since it prevents the stretching of the threads when excessive pressure is applied to the handwheel on the top of the valve rod 9 by the operator, and furthermore it renders the application of such excessive pressure unnecessary in order to effect a tight seal. Furthermore, such elastic gasket when interposed between the two separate members of the valve, not only serves when compressed to prevent the entrance of liquids into the threads on the threaded boss 27, but also as a result of said compression, the character of such gasket becomes very materially changed and becomes highly resistant to abrasions and to the action of solvents and chemicals, especially when such gasket is composed of laminations of cork and fibre, such as hereinbefore referred to. In addition to this, the high compression of such cork and fibre results in preventing the entrance of liquids into the gasket and thereby even ordinary fibre, such as kraft paper, can be employed in lieu of vulcanized fibre.

Various modifications within the scope of the appended claims may be made without departing from the spirit of my invention.

Having thus described my invention, what I claim and desire to obtain by United States Letters Patent is:—

1. In a valve mechanism for tank cars, the combination comprising an elongated operating rod provided with means adjacent its upper end for rotating the same, said rod being of sufficient length to project from the dome of said car into proximity to a valve seat located in the bottom of the tank car, a valve member mounted on the lower end of said rod, a collar on the lower end of the rod for effecting the raising or lowering within defined limits of said valve with respect to its seat according to the direction in which said rod is rotated, means, including a spring, for normally holding said collar against rotation during the normal raising or lowering of said valve while permitting of the rotation of the collar when the operating rod is depressed, guide means secured to said tank car for supporting said operating rod adjacent its upper end and means for normally maintaining said rod in operative relation with said guide means.

2. In a valve mechanism for tank cars, the sub-combination comprising a valve adapted to be normally seated on a valve seat of a tank car, an elongated operating rod carrying a collar and means for holding said collar against rotation during the normal raising or lowering of the valve while permitting of the disengagement of said collar from said latter means and of its rotation when the operating rod is depressed, whereby said valve can be quickly released and removed from the car.

3. In a valve mechanism for tank cars, the combination comprising an elongated operating rod carrying a collar and provided with means adjacent its upper end for rotating the same, said rod being of sufficient length to project from the dome of said car into proximity to a valve seat located in the bottom of the tank car, a valve mounted on the lower end of said rod, said valve comprising top and bottom members, in threaded relation with each other, having an interposed gasket adapted to be held under high compression therebetween and one of said members having vertically extending guide wings adapted to hold said valve in alignment during the normal raising or lowering thereof from the seat, a screw on the lower end of the rod for effecting the raising or lowering within defined limits of said valve with respect to its seat according to the direction in which said rod is rotated, means, including a spring, for normally holding said collar against rotation during the normal raising or lowering of said valve while permitting of the rotation of the collar when the operating rod is depressed, guide means se-

cured to said tank car for supporting said operating rod adjacent its upper end and means for normally maintaining said rod in operative relation with said guide means.

4. In a valve mechanism for tank cars, the combination comprising an elongated operating rod provided with means adjacent its upper end for rotating the same, said rod being of sufficient length to project from the dome of said car into proximity to a valve seat located in the bottom of the tank car, a valve member mounted on the lower end of said rod, a screw on the lower end of the rod for effecting the raising or lowering within defined limits of said valve with respect to its seat according to the direction in which said rod is rotated, means, including a spring and a screw collar mounted on said rod and having opposing laterally projecting arms, for normally holding said collar against rotation during the normal raising or lowering of said valve while permitting of the rotation of the collar when the operating rod is depressed, whereby said valve can be quickly released and removed from the car, guide means secured to said tank car for supporting said operating rod adjacent its upper end and means for normally maintaining said rod in operative relation with said guide means.

5. In a valve mechanism for tank cars, the combination comprising a valve member having guide wings vertically projecting therefrom, a valve stem secured to said valve, a collar in threaded engagement with the lower portion of said valve stem disposed immediately above said valve, said collar having opposing lateral arms, opposing hooks adapted to be secured to the bottom of said tank car, which hooks are adapted to normally engage said arms of said collar and prevent the rotation of said collar while permitting of the raising and lowering of said valve member, elastic means for normally holding said arms in engagement with the respective hooks and means carried by the shell of said car for guiding said wings and centering the valve during the raising and lowering thereof from its seat.

6. In a tank car valve, the sub-combination comprising a valve, an operating rod swiveled thereto, a portion of said rod immediately above said valve being threaded, a threaded collar mounted on the threaded portion of said rod, said collar having opposing lateral arms, means adapted to normally engage the opposing arms while permitting of the seating and unseating of the value when desired, a spring carried by said rod for normally holding said arms in engagement with said means, means secured to the upper part of said car for guiding the upper end of said stem and locking means for holding said guide and said rod in slidable engagement with each other while permitting of the release of said rod from said guide when desired.

7. In a valve mechanism for tank cars, the combination comprising an elongated operating rod, the same being provided with a handwheel at its upper end, a bracket adapted to be secured to said tank car for guiding the upper end of said operating rod, means for maintaining said rod in engagement with said bracket while permitting of the sliding movement of the rod with respect to said bracket, a coil spring interposed between said bracket and the upper end of said rod for normally holding said rod in an elevated position, a valve swiveled to the lower end of said rod, a collar mounted on said rod immediately above said valve, said collar being adapted to serve as a bushing to admit of the raising and lowering of said valve by the rotation of said rod and having laterally opposing arms projecting therefrom, oppositely disposed members adapted to be secured to the bottom of the tank car adjacent the valve seat thereof and adapted to engage the opposing arms of said collar when the operating rod has been elevated under the influence of said spring and said arms have been brought into an engaging position with said opposing members whereby rotation of said collar is prevented when said operating rod is at its uppermost limit, but said members being adapted to release the arms of said collar and permit of rotation thereof when the operating rod is forcibly depressed.

8. In a valve mechanism for tank cars, the sub-combination comprising an annular plate adapted to surround the valve seat of a tank car, means for securing the same to said tank car in proximity to said seat, hook-members, upwardly projecting, but oppositely extending with respect to each other, carried by said plate and diametrically disposed with respect to each other along the periphery thereof, a valve operating rod, a bracket serving to guide and support said rod at the upper end thereof, a spring adapted, when said rod is mounted on said bracket, to normally exert an upward thrust thereon, a valve carried by the lower end of said rod, guide members projecting vertically from said valve and adapted to center said valve on said valve seat during the normal raising and lowering operations thereof, a thread formed on said rod adjacent the lower end thereof, a bushing member mounted on said threaded portion of said rod, said bushing having opposing laterally projecting arms adapted to engage the aforesaid hook members when said arms are brought into position directly beneath said hook members and when applied downward pressure on the operating rod is released whereby the upward movement of said valve is limited while said bushing is in engage-

ment with said hook member, but said valve can be readily removed from said car when said hook members are disengaged from the arms of said bushing.

Signed at New York, in the city, county, and State of New York, this 26th day of November, 1930.

FRANCIS L. DIETERICH.