G. F. WOOD-SMITH.

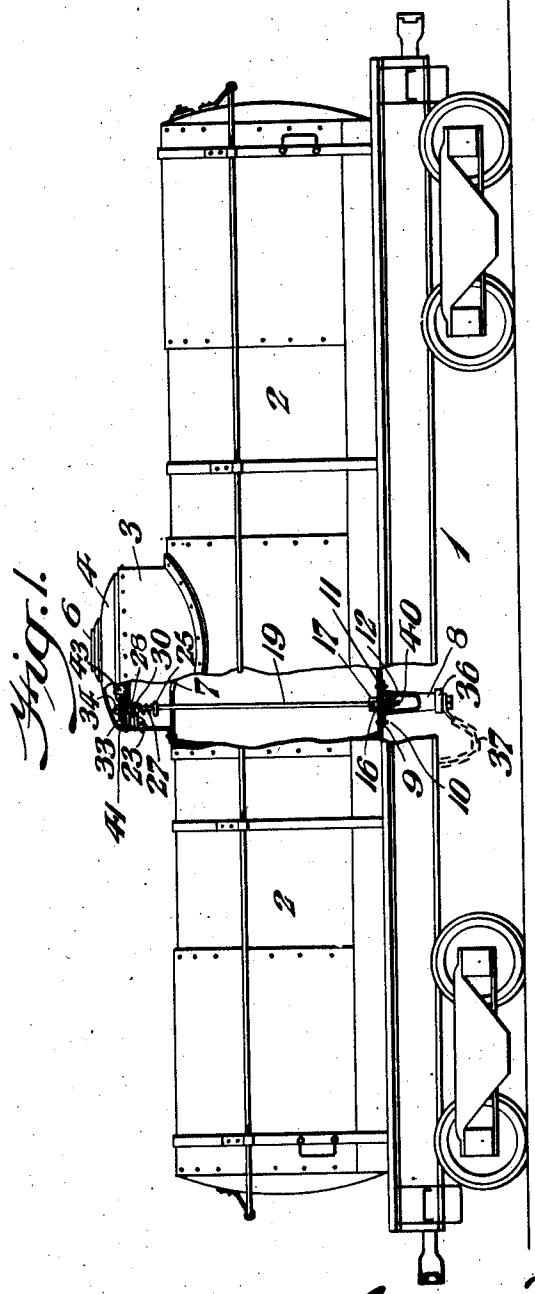
OUTLET VALVE MECHANISM FOR TANK CARS.

APPLICATION FILED SEPT. 14, 1917.

1,339,083.

Patented May 4, 1920.

3 SHEETS—SHEET 1.



INVENTOR

George F. Wood-Smith.

BY

Wiederhein Fairbanks.

ATTORNEYS

G. F. WOOD-SMITH.

OUTLET VALVE MECHANISM FOR TANK CARS.

APPLICATION FILED SEPT. 14, 1917.

1,339,083. Patented May 4, 1920.

3 SHEETS—SHEET 2.

Fig. 2.

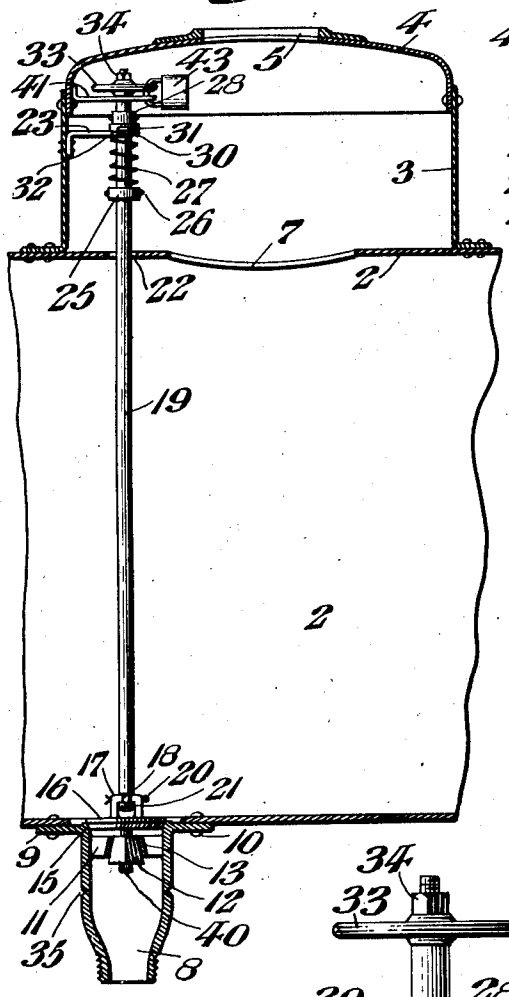


Fig. 3.

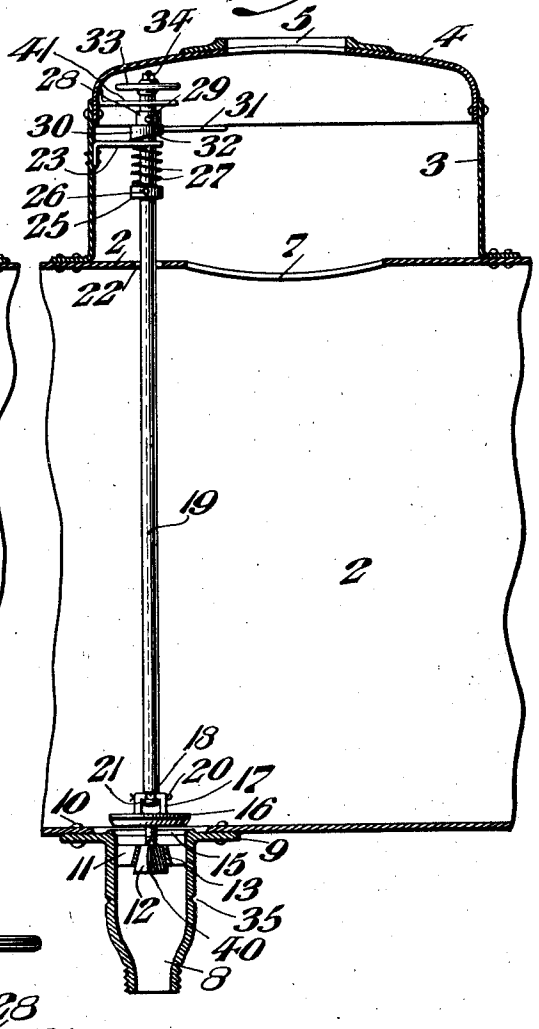
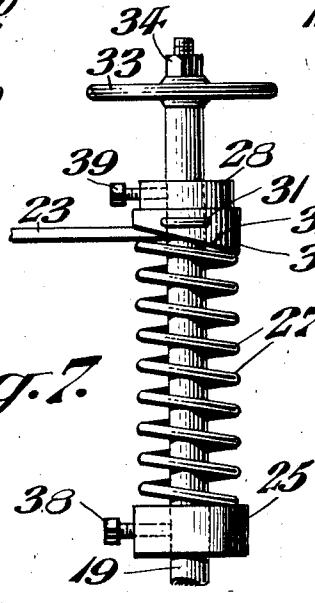


Fig. 7.



INVENTOR

George F. Wood-Smith.

BY Niederheim Fairbanks

ATTORNEYS

G. F. WOOD-SMITH.

OUTLET VALVE MECHANISM FOR TANK CARS.

APPLICATION FILED SEPT. 14, 1917.

1,339,083. Patented May 4, 1920.

3 SHEETS—SHEET 3.

Fig. 4.

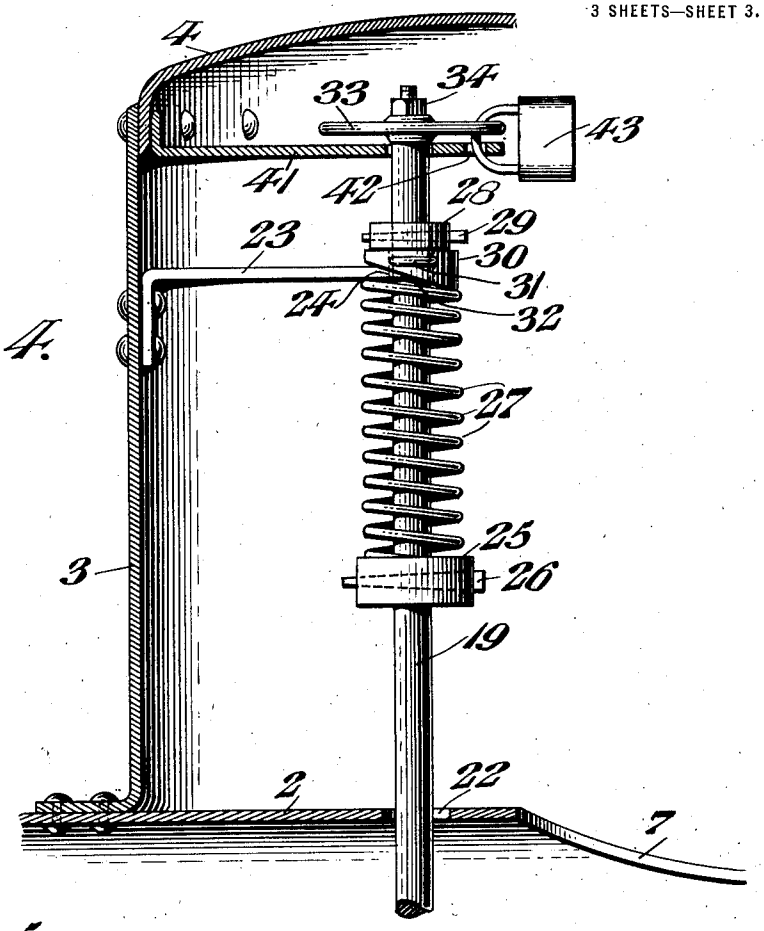


Fig. 5.

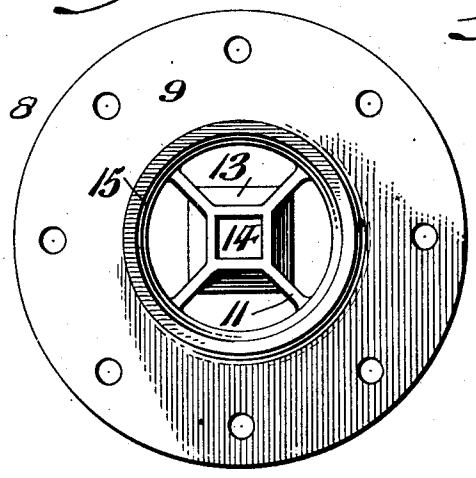
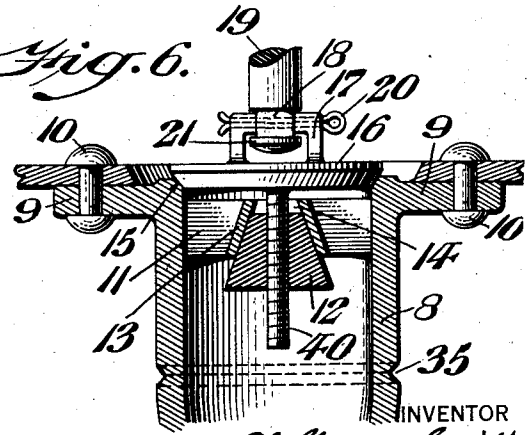


Fig. 6.



INVENTOR

George F. Wood-Smith

BY Wiedersheim & Fairbanks

ATTORNEYS

UNITED STATES PATENT OFFICE.

GEORGE F. WOOD-SMITH, OF ST. LOUIS, MISSOURI, ASSIGNOR, BY MESNE ASSIGNMENTS, TO STANDARD TANK CAR COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF DELAWARE.

OUTLET-VALVE MECHANISM FOR TANK-CARS.

1,339,083. Specification of Letters Patent. Patented May 4, 1920.

Application filed September 14, 1917. Serial No. 191,426.

To all whom it may concern:

Be it known that I, GEORGE F. WOOD-SMITH, a citizen of the United States, residing at St. Louis, State of Missouri, have invented a new and useful Outlet-Valve Mechanism for Tank-Cars, of which the following is a specification.

In tank cars as now constructed, the car is weaker in its center than any other place, on account of the large opening in the top of the tank which allows entrance to the dome. The result of this is that when the tank car is traveling around a sharp curve the tank assumes an oval contour, and the outlet valve opens, permitting the contents of the tank to escape. This opening of the valve also occurs while the tank car is in transit due to the vibration set up by the movement of the car.

The outlet valves in devices of this character can be easily tampered with as now constructed since the cap on the outlet leg can be unscrewed and without opening the dome cover on the top of the tank, a bar can be pushed through the outlet leg and the valve lifted off of its seat, and a portion of the contents of the tank thus removed. Furthermore, the dome cover can be unscrewed and an inexperienced man can open the valve, thus permitting the contents of the tank to escape.

With the above in view, my present invention consists of a novel construction and arrangement of an outlet valve mechanism for tank cars whereby the valve can be positively locked in position and rendered foolproof.

A further object of my invention is to devise a novel valve mechanism which controls the flow of the liquid and which while preferably located in the outlet leg may be located in any other desired place and still accomplish the same function.

A further object of my invention is to devise a valve mechanism, wherein the valve will remain closed if the outlet leg becomes broken.

A further object is to utilize the same operating rod to unlock the valve as is used to lift the valve.

Further objects of my invention are to devise a novel construction of an outlet leg, a novel construction of valve mechanism, novel means for actuating the valve to effect its opening and closing, and novel means for locking the valve rod to the dome in order to prevent any unauthorized person from tampering with the valve mechanism.

Other novel features of construction and advantage will hereinafter appear in the detailed description of my invention.

In the drawings, I have illustrated typical embodiments of the invention which in practice will give satisfactory and reliable results, although it is to be understood that these embodiments are typical only and that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described.

Figure 1 represents, in side elevation, and partly broken away, a tank car, in conjunction with which a novel outlet valve mechanism embodying my invention may be employed.

Fig. 2 represents in sectional elevation the tank and valve mechanism, the valve being shown in its closed position and locked.

Fig. 3 represents in sectional elevation the tank and valve mechanism, the valve being shown in its open position.

Fig. 4 represents, in sectional elevation and on an enlarged scale, a portion of the tank and valve mechanism.

Fig. 5 represents a top plan view of the outlet leg.

Fig. 6 represents, in sectional elevation and on an enlarged scale, a portion of the valve mechanism and its adjuncts.

Fig. 7 represents, in side elevation, another embodiment of my invention.

Similar numerals of reference indicate corresponding parts.

Referring to the drawings:—

1 designates a tank car of any desired or conventional type which is provided with a tank 2, a dome 3 and a dome head 4, which latter is provided with the usual manhole 5 and cover 6.

7 designates the opening from the dome into the tank. 8 designates the outlet leg which is of novel construction and forms a part of the outlet valve mechanism. The outlet leg is so designed that the velocity of flow of the commodity passing through the

valve when open is not decreased. This outlet leg consists of a tubular casing having a flange 9 at its upper end which is secured to the tank in any desired manner and, as illustrated, by means of rivets 10.

11 designates a diaphragm or spider within the bore of the outlet leg and provided at its central portion with means to prevent rotation of a nut 12. This means is illustrated as consisting of a hollow nut 13 having a polygonal shaped opening 14 through it which corresponds in contour to the polygonal shape of the nut 12.

In the form illustrated, the opening 14 has a rectangular contour with tapering side walls which converge upwardly. The upper end of the outlet leg 8 is provided with an inclined wall 15 which forms a valve seat for a valve 16 which is provided with the upwardly extending ears 17 which have preferably an angular contour and are spaced from each other in order to receive the square end 18 of a valve rod 19. The valve rod 19 is secured to the ears 17 by means of a fastening device 20 which in the form illustrated consists of a cotter pin. The lower end of the valve rod 19 terminates in a head 21 adapted to contact with the ears 17 to raise the valve. By such construction, the valve rod 19 and the valve 16 rotate in unison and when the valve is unlocked and the valve rod moves upwardly, the valve is free to move with it. The valve rod 19 passes through an aperture 22 in the tank 2 and extends into the dome 3.

23 designates a bracket secured to the dome 3 in any desired manner and having an aperture 24 through which the valve rod 19 passes. 25 designates a collar secured to the valve rod 19 by means of a tapered pin 26 and between this collar 25 and the bracket 23 is interposed a spring 27. 28 designates a collar located above the bracket 23 and secured to the valve rod 19 by means of a tapered pin 29. Interposed between the collar 28 and the bracket 23 is a cam 30 provided with an operating handle 31 and with the cam face 32 which is adapted to ride on the bracket 23 to effect the upward movement of the valve rod 19 when the valve is unlocked. The upper end of the valve rod 19 terminates in proximity to the manhole 5 and is provided with a hand wheel or equivalent device 33 which is secured to such valve rod in any desired manner, such as for example by a nut 34 in threaded engagement with the valve rod 19.

The outlet leg 8 extends a considerable distance below the center sill of the underframe of the tank car and is provided with a peripheral groove 35 so that in case the outlet leg should come into contact with an obstruction, it will break off at such groove, leaving the valve securely locked in closed position. The lower end of the outlet leg is provided in the usual manner with a cap 36 in threaded engagement therewith and connected to the underframe of the tank car by means of a chain 37. The set collars 25 and 28 are preferably adjustable on the valve rod 19, as shown in Fig. 7. In this figure, instead of employing the pins which pass through the collars and engage the valve rod, the collar 25 is provided with a set screw 38 and the collar 28 is provided with a set screw 39 and since the other parts correspond to that seen in Fig. 4, I have identified them by corresponding reference characters. The valve 16 is provided with a threaded stem 40 with which the nut 12 is in threaded engagement.

41 designates a bracket which is preferably employed, said bracket being carried by the dome head 4 in any desired manner and being provided with an aperture 42, thereby enabling one to lock the valve rod by means of a padlock 43, the hasp of which passes through the hand wheel 33 and the aperture 42. This prevents any unauthorized person from tampering with the valve locking mechanism.

The operation of my novel outlet valve mechanism for tank cars will now be readily understood by those skilled in the art to which this invention appertains and is as follows:

Assuming that the outlet valve mechanism is in its closed position, the operator rotates the hand wheel 33 in the proper direction to cause the nut 12 to move downwardly on the rotation of the valve rod 19, it being understood that the valve rod is connected to the valve in such a manner that they rotate in unison. The valve 16 is now unlocked. The operator then turns the handle 31 through a semi-circle to cause the cam 30 to ride on the bracket 23, thus raising the valve 16 and allowing the commodity to discharge through the outlet leg. When the handle 31 is returned to its initial or normal position, the spring 27 causes the valve to close. The valve is then locked in position by rotating the hand wheel 33, thus causing the nut 12 to travel up on the threaded stem 40 of the valve 16 and the valve is positively locked in its closed position. The amount of opening of the valve 16 will thus depend upon the extent to which the valve rod 19 has been revolved.

It will be understood from the foregoing that the outlet or discharge valve 16 is positively locked in position so that it cannot open when the tank car is travelling around a sharp curve and my novel valve mechanism will allow the tank to assume an oval contour without permitting the valve to open.

It will further be apparent that the controlling means for the valve cannot be tampered with, as it is located within the dome

and inaccessible when the car is in transit since the cover of the dome is sealed.

It will also be apparent that since the valve is positively locked in position, the vibration occurring when the car is in transit cannot unlock the valve or permit it to open.

It will now be apparent that I have devised a novel and useful construction of an outlet valve mechanism for tank cars which embodies the features of advantage enumerated as desirable in the statement of the invention and the above description, and while I have, in the present instance, shown and described preferred embodiments thereof which will be found in practice to give satisfactory and reliable results, it is to be understood that these embodiments are susceptible of modification in various particulars without departing from the spirit or scope of the invention or sacrificing any of its advantages.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is: —

1. In a device of the character stated, the combination with a tank car, of an outlet leg, a valve controlling said outlet leg, and means including a part concealed within the upper end of said outlet leg to positively lock said valve in closed position, said means being incapable of being actuated through the discharge end of said outlet leg.

2. In a device of the character stated, the combination with a tank car, of an outlet leg, a valve controlling said outlet leg, and means including a part concealed within the upper end of said outlet leg to lock said valve in closed position and to adjustably limit the extent of its opening, said means being incapable of being actuated through the discharge end of said outlet leg.

3. In a device of the character stated, the combination with the tank and dome, of an outlet leg for said tank, a valve controlling said outlet leg, a spring to seat said valve, means to lock said valve in closed position, said means including a member fixed to said outlet leg and concealed within its upper end and a movable member controlled by said valve, and devices within said dome to actuate said locking means.

4. In a device of the character stated, the combination with the tank and dome, of an outlet leg for said tank, a valve controlling said outlet leg, a spring to seat said valve, means including a nonrotatable member concealed within and connected to the upper portion of said outlet leg to lock said valve in closed position, and devices within said dome to actuate said locking means.

5. In a device of the character stated, the combination with the tank and dome, of an outlet leg for said tank, a valve controlling said outlet leg, locking means for said valve including a nonrotatable part concealed within the upper end of said leg and a second part prevented from rotation by said first part and capable of relative longitudinal movement with respect to said valve, a rod for said valve, means to actuate said rod to effect the locking and unlocking of said valve, a spring to seat said valve, and means to move said rod to open said valve, said means being concealed within said dome.

6. In a device of the character stated, the combination with the tank, of an outlet leg for said tank having a diaphragm and a fixed nut provided with a polygonally-shaped opening, a movable polygonally shaped nut to engage the walls of said opening, a valve controlling said outlet leg and having a stem in threaded engagement with said movable nut, means to open said valve, and means to rotate said valve to cause said movable nut to approach or move away from said fixed nut.

7. In a device of the character stated, the combination with the tank, of an outlet leg for said tank, a valve controlling said outlet leg, a spring to seat said valve, means to open said valve, means to rotate said valve, a stem for said valve, a nut on said stem, and means concealed within and connected to the upper portion of said oulet leg and coöperating with said nut during the rotation of said valve to effect the locking or unlocking of said valve.

8. In a device of the character stated, the combination with the tank, of an outlet leg for said tank, a valve controlling said outlet leg, a spring to seat said valve, means to open said valve, means to rotate said valve, a stem for said valve, and means including a fixed part secured within the upper end of said outlet leg and a movable part on said stem coöperating with said valve during its rotation in one direction to lock said valve in closed position, and coöperating with said valve during its rotation in a reverse direction to unlock it.

9. In a device of the character stated, the combination with the tank, of an outlet leg secured thereto, a valve controlling said outlet leg, a stem for said valve, a nut in threaded engagement with said stem, means fixed within the upper end of said outlet leg to prevent rotation of said nut and permit its limited longitudinal movement toward said valve, a valve rod, a spring cooperating with said valve rod to seat said valve, means to actuate said valve rod to open said valve, and means to rotate said valve rod.

10. In a device of the character stated, the combination with the tank and dome, of an outlet leg secured to it, a valve controlling said outlet leg, locking devices concealed

within the upper end of said outlet leg and incapable of being operated through the discharge end of it and controlled by said valve to lock it in closed position, and to permit its opening, a valve rod connected with said valve, a bracket carried by said dome, a set collar on said valve rod, a spring between said bracket and set collar, a second set collar on said valve rod, a manually controlled cam between said second set collar and bracket to raise said valve rod, and means connected with said valve rod to rotate it.

11. In a device of the character stated, the combination with the tank and dome, of an outlet leg secured to it, a valve controlling said outlet leg, locking devices concealed within the upper end of said outlet leg and incapable of being operated through the discharge end of it and controlled by said valve to lock it in closed position and to permit its opening, a valve rod connected with said valve, a bracket carried by said dome, a set collar adjustable on said valve rod, a spring between said bracket and set collar, a second set collar adjustable on said valve rod, a manually controlled cam between said second set collar and bracket to raise said valve rod, and means connected with said valve rod to rotate it.

12. In a device of the character stated, the combination with the tank, of an outlet leg secured to it and provided with a diaphragm and a fixed nut having a rectangularly shaped opening, the walls of which converge upwardly, a rectangularly shaped movable nut having tapering walls to engage the walls of said fixed nut, said leg having a valve seat, a valve to engage said seat and having a valve stem in threaded engagement with said movable nut, a valve rod connected with said valve to rotate in unison with it and to lift it, a spring coöperating with said valve rod to seat said valve, means to actuate said valve rod to unseat said valve, and independent means to rotate said valve.

13. The combination of a tank car having an outlet and provided with a dome, of a valve controlling said outlet, means controlled by said valve to lock it in closed position, said means being concealed within the upper end of said outlet leg and being incapable of being operated through the discharge end of said outlet devices accessible only within said dome to actuate said locking means, and locking mechanism for said devices.

14. The combination of a tank car having an outlet, of a valve controlling the flow of liquid through said outlet, a spring to seat said valve, a rod controlling the unlocking of said valve, and means to secure said rod in locked position, said means including a longitudinal movable part carried by said valve and a fixed part connected within said outlet, said parts being concealed within the upper end of said outlet.

15. The combination of a tank car having an outlet and provided with a dome, of a valve controlling the flow of liquid through said outlet, a rod connected with said valve, means including a fixed and a movable part coöperating with said valve to cause it to open when said valve is rotated, said parts being concealed within the upper end of said outlet and said fixed part forming a part of said outlet, a spring to seat said valve, a bracket carried by said dome, and a lock engaging said bracket and preventing rotation of said rod.

16. The combination with a tank car, of an outlet leg, a valve controlling said outlet leg, and means carried within the upper end of said outlet leg to positively lock said valve in closed position, said means being incapable of being operated through the discharge end of said outlet leg, said outlet leg having a weakened portion below said locking means, whereby the valve remains closed on the breakage of the outlet leg at its weakened portion.

17. In a tank car, in combination, an outlet leg having its discharge end of reduced diameter, a valve controlling said outlet leg, and means concealed within the upper end of said outlet leg to effect the locking and unlocking of said valve, said means having such relation to the inlet and outlet end of said leg that the velocity of flow of the commodity passing through it when the valve is open is not decreased.

18. The combination with a tank car, of an outlet leg, a valve controlling said outlet leg and having a depending threaded stem, a nut movable on said stem, and a nonrotatable nut within the upper end of said outlet leg and carried by it and coöperating with said movable nut to prevent its rotation and to permit relative longitudinal movement of the fixed and movable nut.

19. The combination with a tank car and its dome, of an outlet leg having within its upper end a fixed nut, a valve controlling said outlet leg, a nut rotatably carried by said valve and prevented from rotation by said fixed nut, a rod connected with said valve and extending into said dome, a bracket carried by said dome, a set collar on said rod below said bracket, a spring between said bracket and said collar, a cam on said rod and coöperating with said bracket to raise said valve, a handle on said rod to rotate said valve, and locking mechanism for said handle.

GEORGE F. WOOD-SMITH.

Witnesses:
M. D. KRENKEL,
J. H. MCCARTNEY.