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A. CAMPBELL

TANK VALVE MECHANISM

Filed April 6, 1921

Fig. 1

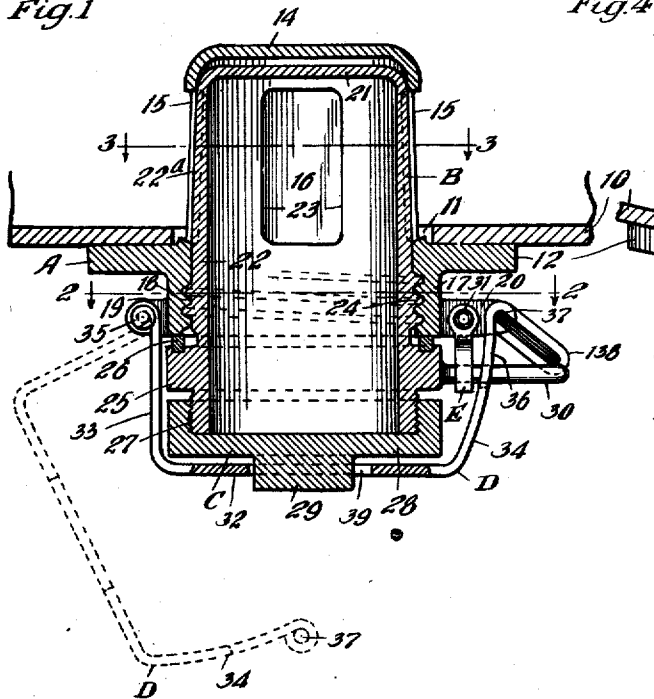


Fig. 4

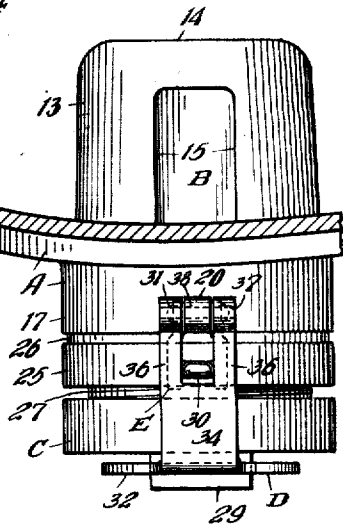


Fig. 2

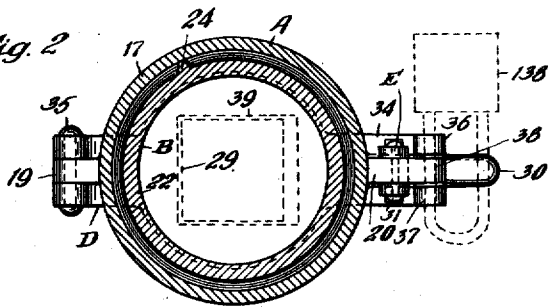


Fig. 3

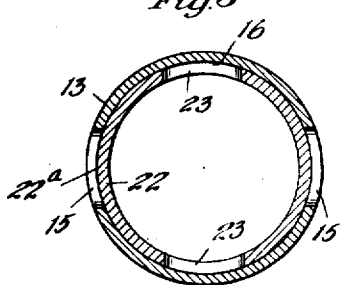
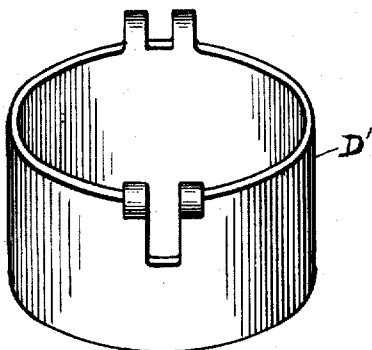


Fig. 5



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UNITED STATES PATENT OFFICE.

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TANK-VALVE MECHANISM.

Application filed April 6, 1921. Serial No. 458,958.

To all whom it may concern:

Be it known that I, ARGYLE CAMPBELL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Tank-Valve Mechanism, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to improvements in tank valve mechanism.

In the present art of operating railway tank cars, it is the general custom to provide operating mechanism for the usual discharge valve which operating mechanism is accessible only within the usual dome of the tank. When the tank car is being discharged, it is necessary for the discharge pipe or hose to be connected at the bottom of the tank and thereafter for the same man or another man to open the valve by going to the top of the car. It also frequently happens that the man operating the valve is subject to obnoxious and occasionally dangerous fumes while taking off the man-hole cover to obtain access to the valve operating mechanism. Furthermore, in the event of repairs or replacements to the valve mechanism, it is necessary to enter the tank and work from the interior thereof.

The object of my invention is to provide a valve mechanism especially adapted for railway tank cars which overcomes the objections to present practice and particularly to provide a valve mechanism which is applied from the exterior of the tank at the bottom thereof and which is accessible for manipulation from the exterior of the tank at the bottom.

More specifically, an object of the invention is to provide an outlet valve mechanism so arranged that the attaching of the discharge pipe or hose to the tank car and the opening of the valve may be performed substantially simultaneously by the same individual, thereby saving labor and time.

Other objects of the invention will more clearly appear from the description and claims hereinafter following.

In the drawing forming a part of this specification, Figure 1 is a vertical, sectional view taken lengthwise of a tank car at the bottom thereof showing my improvements in connection therewith. Figure 2 is a horizontal, sectional view corresponding substantially to the line 2—2 of Figure 1. Figure 3 is another horizontal, sectional view corresponding substantially to the line 3—3 of Figure 1. Figure 4 is a part elevational view, part vertical, sectional view of the arrangement shown in Figure 1, the view corresponding to a plane extending at right angles to the section plane of Figure 1. And Figure 5 is a perspective of a cap detached.

And Figure 5 is a perspective of a cap detached.

In said drawing, 10 denotes the bottom sheet of the tank, the same having an opening 11 therein to provide for the valve mechanism. In carrying out my invention, I employ what may be termed an outlet member A; a valve member B; a closure C; a locking or clamping hasp D; and a latch E.

The outlet member A is preferably in the form of a casting of suitable material and has an arcuate flange 12 adapted to fit the under side of the tank sheet 10 and be rigidly secured thereto as by spot welding or riveting or other suitable means. Said member A is provided with an inverted cup-shaped section 13 of cylindrical form which is extended inwardly through the opening 11 of the tank sheet within the tank itself. Said cup-like section 13 has the top wall 14 thereof closed and the side walls provided with diametrically opposed outlet ports 15—15. The inner side of the section 13 is preferably machined and provides a slightly upwardly tapered conical valve seat 16. Below the flange 12 is a downwardly extended annular flange 17 which is provided on the interior thereof with coarse relatively steep threads 18. On diametrically opposite sides, the cylindrical flange 17 is provided with radially extended lugs 19 and 20 for the purpose hereinafter described.

The valve member B is of hollow cylindrical form having a closed top wall 21 and side wall 22, the latter being tapered as indicated at 22^a to form a valve and cooperate with the correspondingly tapered valve seat 16. The section 22^a is also provided with diametrically opposed ports 23—23 which, when the valve is closed, are out of alignment with the ports 15 as shown in Figure 3, but are adapted to be brought into register with the ports 15 by rotating the member B, as will be understood.

The member B is provided on its exterior with threads 24 cooperable with the threads

18 so that the member B is supported by the outlet member A but is adapted to rotate therein. By employing the threads 18 and 24, it is evident that the member B will not
 5 only be rotated but advanced inwardly relatively to the member A so as to effect a tight closure when the member B is in closed position as shown in the drawing.

Below the threaded section 24, the member B is formed with an annular enlargement 25 on the upper side of which is preferably carried a ring 26 of suitable more or less soft material such as lead or bronze which is adapted to cooperate with the under edge of the depending annular flange 17 and effect a seal therewith when the member B is in closed position. Below the annular enlargement 25, the member B is exteriorly threaded as indicated at 27 so as to
 10 accommodate a closure cap 28, the latter having a depending squared section 29 adapted to receive a wrench or other suitable tool for applying and removing it. The threaded section 27 of the member B is also adapted to have coupled thereto the end of a hose or other discharge pipe as will be understood.

From one side, the member B has extended laterally from the enlargement 25, an integral arm 30 which, when the member B is in closed position, is adapted to align with the lug 20 of the member A. Cooperable with the arm 30 is the forked latch E which is pivotally mounted on the lug 20
 35 as indicated at 31. When the latch E is in the position shown best in Figure 1, it is evident that the member B cannot be rotated with respect to the outlet member A but, by merely lifting the latch E when the hasp D is dropped down as hereinafter described, the member B may be operated to open position by grasping the handle 30 and similarly the handle 30 may be employed to rotate the member B back to closed position.

The hasp D, as shown, is in the form of a plate having a horizontal bottom section 32, upwardly extended arm 33 on the lefthand side as viewed in Figure 1, and an upwardly extended arm 34 on the right-hand end as viewed in the same figure. The arm 33 is pivotally connected to the lug 19 permanently as by a rivet 35 so that the plate or hasp D is adapted to swing from its closed position shown by full lines to the dotted line position in Figure 1 and vice versa. The arm 34, at its upper end, is notched or forked so as to provide two
 55 tines 36—36 which straddle the arm 30 and the lug 20 as shown in Figure 4. The upper ends of the tines 36 are provided with aligned openings 37, which are adapted to be aligned with an opening 38 in the lug 20 so that all three openings are adapted to accommodate a padlock 138 or other suitable sealing device.

As shown in Figures 1 and 4, the plate D extends over the closure cap C and is centrally perforated as indicated at 39 so as to fit over the squared section 29 thereof. The opening 39 is so proportioned that, while it permits swinging of the plate D without interference, it nevertheless is such as to prevent turning of the cap C when the plate D is in closed or locking position as shown in Figure 1.

From the preceding, it will be seen that malicious tampering with the valve is positively prevented so long as the plate or hasp D is in operative position and sealed there by the padlock or other suitable device. In actual practice, when it is desired to discharge the contents from the tank car, the operator releases the hasp D; removes the cap C; couples the hose or discharge pipe to the member B; and is then ready to open the valve which is done merely by lifting the latch E and then turning the valve B a quarter turn. By this arrangement it is evident that a minimum of time and effort is required in attaching the discharge pipe and operating the valve and, furthermore, that the operator is not subject to any fumes that may have collected within the tank. In the matter of repairs, all parts are readily accessible from the exterior of the tank and, in the event any foreign matter lodges in the valve ports, it is a comparatively easy matter to remove the same without the necessity of entering the tank.

In some instances it may be preferable to employ a cap or closure such as indicated at D' in Figure 5, instead of the hasp D shown in the other figures, in order to fully enclose and protect the depending portions of the outlet mechanism. With a cap such as shown at D' and which is of hollow cylindrical form with a bottom wall, any glancing blow would be warded off thereby without danger of injuring or breaking off the parts of the outlet pipe. As will be understood, the cap D' will be hinged permanently on one side and adapted to be detachably located on its other side the same as the hasp D.

I have herein shown and described what I now consider the preferred manner of carrying out the invention, but the same is merely illustrative and I contemplate all changes and modifications that come within the scope of the claims appended hereto.

I claim:

1. In a valve mechanism for tanks having an opening, the combination with an outlet member arranged to be applied from the outer side of the tank and having a portion extended inwardly of the tank through said opening, said portion being provided with a valve seat and a discharge port; of a valve member operable from the exterior of the tank and having a portion extended in-

wardly of the tank within said portion of the outlet member, said portion being provided with a valve cooperable with said seat, said valve member having its outer end projecting outwardly beyond the tank and threaded and thereby adapted to have a pipe coupled thereto; a removable closure for said outer end of the valve member; and means, accessible from the exterior of the tank, for preventing removal of said closure from the valve member.

2. In a valve mechanism for tanks having an opening, the combination with an outlet member arranged to be applied from the outer side of the tank and having a portion extended inwardly of the tank through said opening, said portion being provided with a valve seat and a discharge port; of a valve member operable from the exterior of the tank and having a portion extended inwardly of the tank within said portion of the outlet member, said portion being provided with a valve cooperable with said seat, said valve member having its outer end projecting outwardly beyond the tank and threaded and thereby adapted to have a pipe coupled thereto; a removable closure for said outer end of the valve member; and means, accessible from the exterior of the tank, for preventing removal of said closure from the valve member, said means including, a plate attached to said outlet member arranged to extend over said closure, said valve member having a projection held by said plate against movement when the plate is in operative position.

3. In a valve mechanism for tanks having an opening, the combination with a ported outlet member adapted to be applied to the tank from the outer side thereof and having a portion extended inwardly of the tank through said opening; of a cooperating ported valve member rotatably mounted in said outlet member and having its lower end extended below said outlet member, said lower end being threaded to thereby adapt it for coupling to a discharge pipe; a closure cap cooperable with said threaded portion of the valve member to thereby close the lower end of said valve member; and means, disposed exteriorly of the tank, arranged to hold said valve member in its closed position, said means including, a hasp permanently pivotally attached at one end to said outlet member and detachably attached at its other end to said outlet member, said hasp extending over said cap and having shouldered engagement with said valve member to prevent rotation of the latter when the hasp is in operative position.

4. In a mechanism of the character described, the combination with a tank having an opening in the bottom thereof; of an outlet member secured to said tank and having a valve seat casing extending in-

wardly of the tank through said opening, said valve seat casing being tapered and ported; a valve member rotatably and longitudinally adjustably mounted in said outlet member and having a ported tapered valve member having its lower portion extended below said outlet member; a locking arm extended radially from said valve member; a removable closure cap mounted on the lower end of said valve member; and means for preventing removal of said closure cap and rotation of said valve member, said means cooperating with said arm of the valve member.

5. In a valve mechanism of the character described, the combination with a tank having an opening in the bottom thereof; of an outlet member secured to said tank and having a valve seat sleeve extended inwardly of the tank through said opening; a valve member disposed within said outlet member, said valve member and outlet member having threaded engagement and both provided with cooperating ports; a closure cap removably threaded on the lower end of said valve member, said cap having a depending nut section; an arm extending radially from said valve member; a latch pivotally supported on said outlet member, adapted to engage said arm to prevent rotation of the valve member; and a hasp permanently pivotally attached at one end to said outlet member and detachably attached at its other end thereto, said hasp being recessed to fit over said nut section of the closure cap and slotted to straddle said arm.

6. In a discharge valve mechanism for tanks having an opening; the combination with cooperating valve members, one of said members being relatively immovable and secured to the tank adjacent said opening, the other valve member being rotatably mounted on said immovable member and having a downwardly extended section to which a discharge pipe is adapted to be connected; of a removable closure for the lower end of said movable valve member; and common means, supported from said immovable valve member, cooperable with both said closure and movable valve members to prevent removal of the closure and rotation of said movable valve member.

7. In a discharge valve mechanism for tanks having an opening, the combination with a ported valve casing extending within the tank; of a hollow valve plug rotatably mounted within said valve casing, said valve plug having a portion extending downwardly below the tank and exteriorly threaded and to which a discharge pipe is adapted to be attached; means on said downwardly extended portion of the valve plug by which the latter may be rotated; and

means, supported from the tank, cooperable with said valve plug turning means for locking said valve plug against rotation.

8. In a discharge valve mechanism for
5 tanks having an opening, the combination with a ported valve casing extending within the tank; of a hollow valve plug rotatably mounted within said valve casing, said valve
plug having a portion thereof extended
10 downwardly below the tank, said portion being exteriorly threaded to thereby provide for the attachment of a discharge pipe there-

to; a closure cap detachably threaded to said threaded portion of the valve plug; and means, supported from the tank, cooperable 15 with said closure cap for locking it and the valve plug against rotation.

In witness that I claim the foregoing, I have hereunto subscribed my name this 18th day of March, A. D. 1921.

ARGYLE CAMPBELL.

Witnesses:

W. GUNNISON,
WILLIAM F. BATHO.