(No Model.) 2 Sheets—Sheet 1.

J. B. WHITE.

RAILWAY WATER TANK VALVE.

No. 550,737. Patented Dec. 3, 1895.

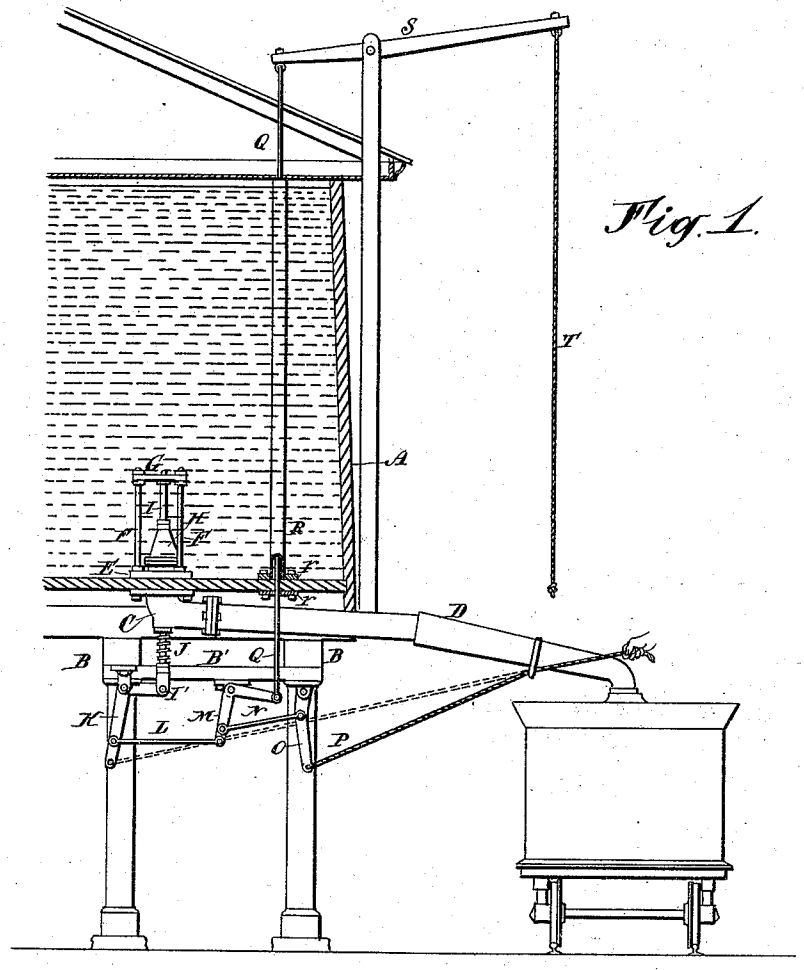

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

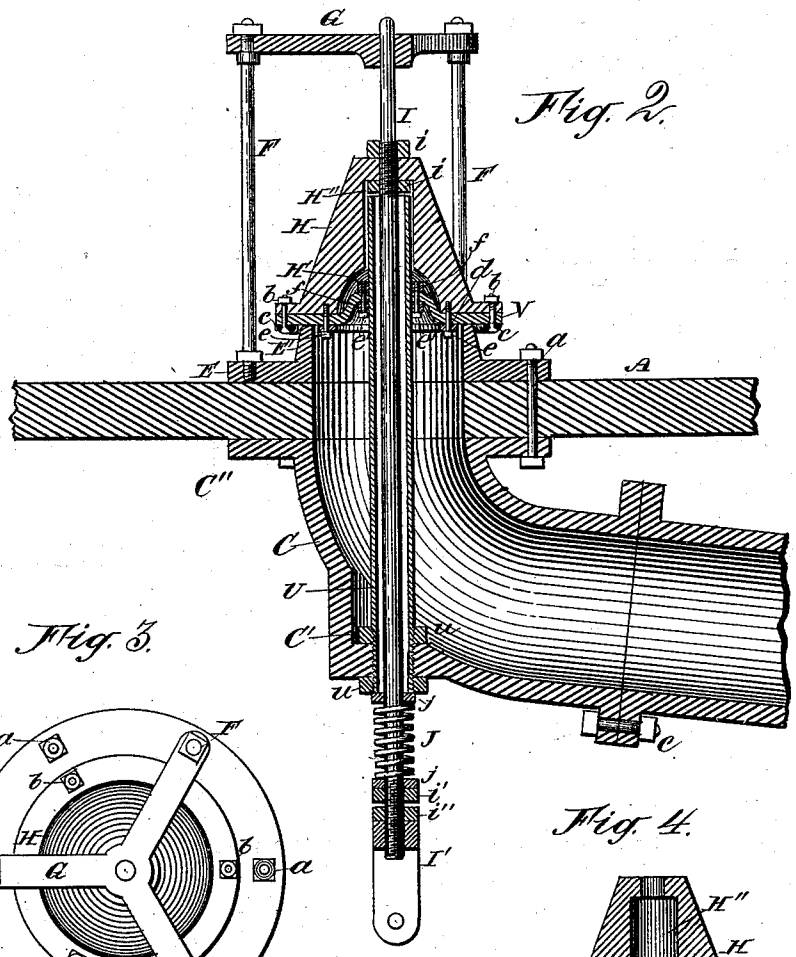
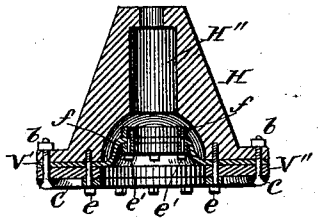


Fig. 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN B. WHITE, OF CEDAR RAPIDS, IOWA, ASSIGNOR OF ONE-HALF TO JOSIAH WHITE, OF SAME PLACE.

RAILWAY-WATER-TANK VALVE.

SPECIFICATION forming part of Letters Patent No. 550,737, dated December 3, 1895.

Application filed March 25, 1895. Serial No. 543,033. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. WHITE, a citizen of the United States, residing at Cedar Rapids, in the county of Linn and State of Iowa, have invented certain new and useful Improvements in Railway-Water-Tank Valves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of this invention is to provide a railway water-tank with a valve operated from below, thereby avoiding the freezing up of the valve-rod, which is a common source of delay and annoyance.

My object is also to improve the construction of the valve with a view to greater durability and efficiency, as will hereinafter more clearly appear.

The invention consists in the construction, combination, and arrangement of parts, as will be hereinafter fully set forth and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1, Sheet 1, is an elevation of a device embodying my invention as applied to a tank, the tank being in section. Fig. 2, Sheet 2, is a longitudinal section of the valve and its connections in a vertical plane, but without the operating mechanism. Fig 3 is a plan view of the valve as seen from above. Fig. 4 is a central vertical section of a valve with a modified form of packing.

Similar letters of reference indicate corresponding parts.

In the practical operation of railway-tank valves much difficulty arises through the breakage of parts, the freezing up of the valve-rod and other disabling causes. As ordinarily constructed the valve is connected with a hinged lever operated by a rod extending upwardly and connected with a lever at the top of the tank. It is very common for the valve connections to break, leaving the valve closed. It then becomes necessary to tap the tank and let out the water before the damage can be repaired, entailing more or less expense and delay. A still more common difficulty is the freezing fast of the valve-rod, making it necessary to climb up into the tank and chop it loose. These difficulties I seek to avoid by the apparatus hereinafter to be described. I further aim to make the valve more reliable in its action by giving it a considerable weight and providing for a direct vertical movement of the same.

Referring now to the drawings, A designates an ordinary water-tank, mounted on suitable supports B B. Below the floor is the outlet C, communicating with the usual swing-pipe D. The outlet-elbow C′ is secured to the floor of the tank by bolts *a a a* passing through its flange C″ and also through the flange of the valve-seat E directly above and on the inside of the tank. This valve-seat has an annular upwardly-extending portion E′, forming the valve-seat proper.

In the flange of the valve-seat are secured two or more posts, preferably three, supporting a spider G, the hub of which has a central hole therein serving as a guide for the upper end of the valve-rod I. To this rod is secured, as by nuts *i i*, the valve H. This is a heavy conical body, of iron, with a flange at the lower end extending somewhat outside the valve-seat. In the center, below, is a large cavity H′, adapted to give room for a dome-shaped elevation in the center of the packing-diaphragm V, which will be more fully described hereinafter. The cavity terminates in quite a deep recess H″ to receive the upper end of the pipe U, through which the valve-rod passes. In the upper end of the valve is a suitable hole for the rod.

The pipe U is secured in an angular projection C‴ of the elbow C by a pair of nuts *u u*. The joint is preferably water-tight. The upper end of this pipe passes through a hole in the center of the diaphragm V, which fits snugly thereon, and is held in close contact therewith by a pair of rings *f f*, connected by suitable screws *e′ e′*.

The diaphragm V is made with a dome-like central portion, which is secured to the pipe U, as described, but admits of a limited vertical movement of the valve H, to which its outer portion is secured. It is fastened to the valve by a pair of rings *c* and *d*, attached by bolts *b* and *e*. The outer ring *c*, being at

all times exposed to contact with the water, is preferably made of non-corrosive metal, as brass. The inner one may be of iron.

To the lower end of the valve-rod is connected, as by screwing thereon, a suitable coupling I′ for connection with a bell-crank lever K. A spring J, mounted on the rod between two washers *j j′*, acts in connection with the gravity of the valve to seat the valve as soon as released. The pressure of this spring may be regulated by a nut *i′*. A jam-nut *i″* serves to secure the coupling I′ firmly in place.

The bell-crank lever K has a hinged connection with one of the timbers under the tank and serves to lift the valve when the lower end of the lever is drawn outwardly. This may be done by a rope or chain running directly to the swing-pipe D, as shown by the dotted lines, in case only a lateral pull is required. Where, however, it is desired to provide for a downpull, one or more intermediate levers are introduced. A bell-crank lever M has a hinged connection with the timber B′ and connects with the lever K by a suitable rod L. A rod Q connects with the other arm of the bell-crank and extends up through a pipe R in the tank to a connection with the usual lever S at the top of the tank, operated by the rope T. The lower end of the pipe R screws into one of a pair of flanges *r r*, by which a tight connection is made with the floor of the tank.

In order to provide suitable leverage for the lateral pull, I use another lever O near the front side of the tank and connected with the lever M by a rod N. To the lower end of this is connected a rope or chain P, passing through the usual ring on the swing-pipe.

In practice I prefer to use the lateral pull entirely, dispensing with the apparatus necessary for the downpull. This is not only on the ground of a decrease in expense, but also to avoid the use of the pipe R, which permits a current of cold air to pass up through the water, tending more or less to the freezing of the contents of the tank in extreme cold weather. It will be seen, however, that with either construction there is no possibility of the valve-rod becoming frozen fast unless the water in the tank is very low, which need not ever take place. A very common source of trouble and delay is thus entirely removed. It is to be observed, further, that the connections of the valve-rod with the actuating mechanism are below the tank and external thereto, so that in the event of the breakage of a lever, pin, or other part repairs may be easily and quickly made.

As the packing portion of the valve is exposed to more wear than the diaphragm, it may be desirable to make it separate from the diaphragm, as shown in Fig. 4. In this case the diaphragm V′ may be comparatively thin and of uniform thickness throughout. The packing V″ is a simple ring or gasket, rubber being preferred in the construction of both.

In the operation of the valve, as will be readily understood, the valve and rod lift straight up to open the outlet. The central portion of the diaphragm being fastened to the pipe U does not move, of course, and folds downwardly until the dome is reversed and becomes a cup. This prevents the water from coming in contact with the rod except above the valve, so that there is no possibility of freezing it fast. The direct vertical lift of the valve and positive position of the same also insure a seating of the same with a uniformly tight joint, as heretofore mentioned.

One of the most serious difficulties connected with the freezing of the valve-rod is due to the fact that after fastening the rod in the ice the expansion due to further freezing lifts the rod and opens the valve, thus flooding the track and sometimes causing disastrous casualties to trains.

It is to be noted that the washer *j* is a flexible-packing washer, and one of its chief objects is to exclude cold air from the interior of the pipe U. The spring J seats it firmly against the nut *u*.

Having thus described my invention, I claim—

1. The combination with a tank, of an outlet pipe, a valve-seat above the inlet end thereof, a valve mounted above said seat, a rod connecting therewith, and extending down through said outlet pipe, with suitable provision for connecting the same with an actuating lever, a pipe inclosing said rod inside said outlet pipe, and a flexible diaphragm connecting centrally with said pipe near the upper end, and near the margin with the lower face of the valve, and forming a packing therefor, substantially as and for the purpose set forth.

2. The combination with a water-tank, of an outlet-pipe, a valve-seat mounted above the upper end thereof, a valve-rod extending upwardly through said outlet pipe, and connecting with a valve near the upper end, a guide for the upper end of said rod, a pipe inclosing said rod within the outlet pipe, and a flexible diaphragm connecting centrally with said pipe near the upper end, and near the margin with the lower face of the valve, and forming a packing therefor, substantially as and for the purpose set forth.

3. The combination with a water-tank, of an outlet-pipe secured to the bottom of the tank and below the same, a valve-seat mounted above the inlet end thereof, a vertical pipe secured in the elbow of said outlet-pipe, a valve with a cavity in the under side to receive the upper end of said vertical pipe, a flexible diaphragm with a concave in the center thereof, connecting the valve and the pipe, and a valve-rod connecting with the valve

near the upper end, and passing out through said vertical pipe below the outlet-pipe, substantially as and for the purpose set forth.

4. The herein described valve for water-tanks, composed of the block H, having a cavity on the under side to receive the upper end of a pipe and connected diaphragm, the said pipe, a flexible diaphragm connected to the lower face of said valve and concaved in the center, and a rod connected with said valve, substantially as and for the purpose set forth.

5. In a valve for water-tanks, the combination of the conical block H, having cavities H′ H″, the diaphragm having a concave central portion adapted to connect with a vertical pipe, the said pipe, the holding rings *c* and *d*, and means substantially as specified for lifting said valve.

6. In a valve for water-tanks, the combination of the conical block H, having cavities H′ H″, the flexible diaphragm V′, the packing-ring or gasket V″, and rings *c*, *d* and *f f*, substantially as and for the purpose set forth.

7. In a valve for water-tanks, the combination of the valve H, the flexible diaphragm V connected marginally therewith, the pipe U passing through and connected with the center of the diaphragm, the rod I passing through said pipe and valve, and having a portion extending above the valve, the valve-seat E, posts F F F extending upwardly therefrom, and a guide G connected with their upper ends, and through which the rod I passes, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN B. WHITE.

Witnesses:
JOSIAH WHITE,
J. M. ST. JOHN.