H. ACKROYD.

BRINE VALVE.

APPLICATION FILED AUG. 3, 1917.

1,343,072.

Patented June 8, 1920.

2 SHEETS—SHEET 1.

Fig. 1.

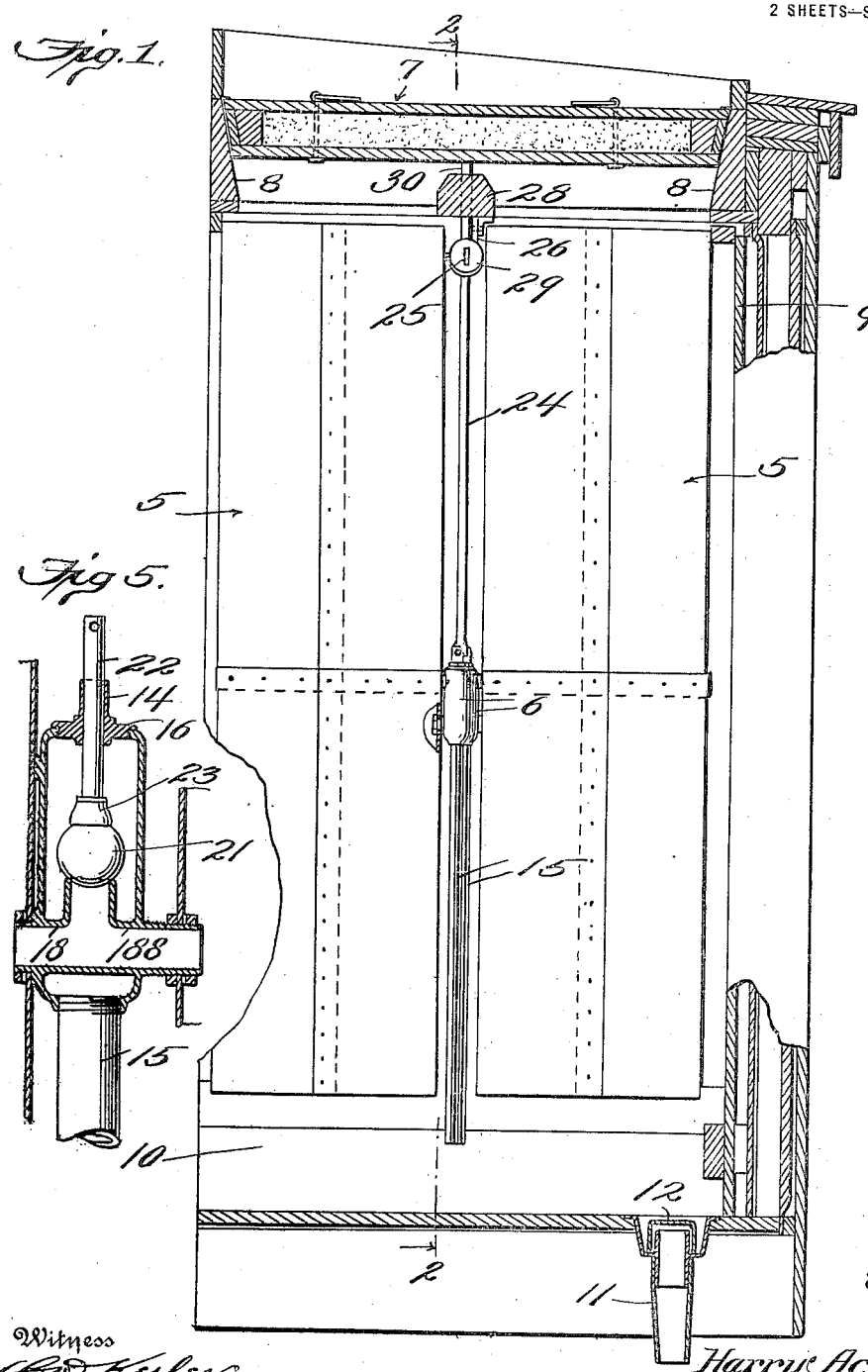


Fig 5.

Witness

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2 SHEETS—SHEET 2.

Fig. 2.

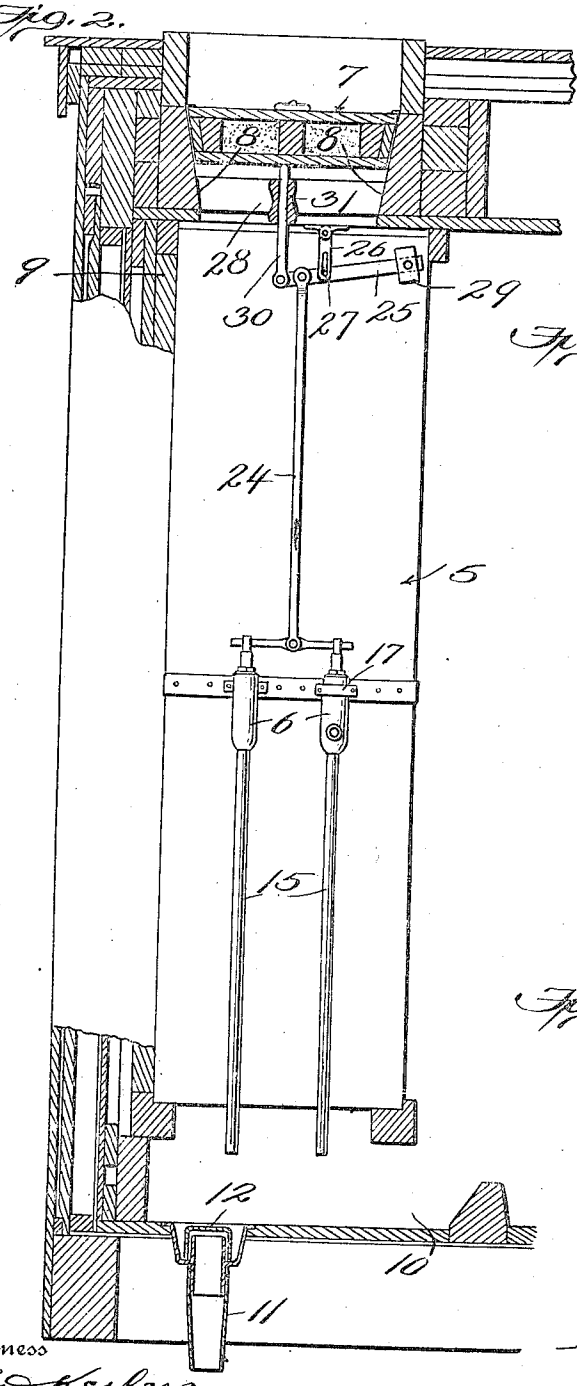


Fig. 3.

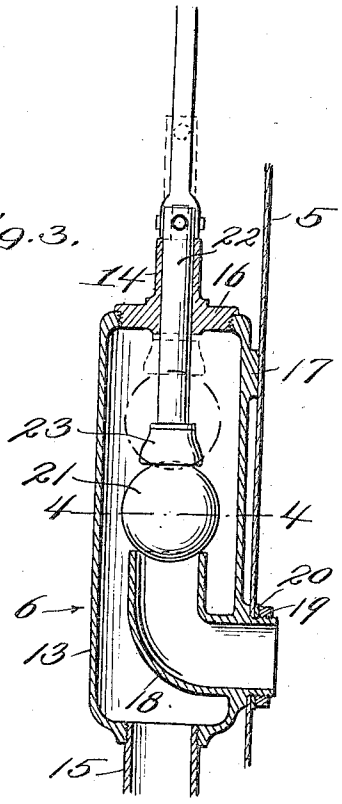
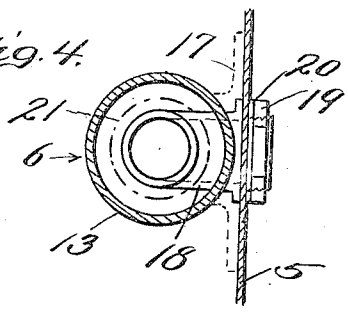


Fig. 4.



Witness

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BRINE-VALVE.

1,343,072. Specification of Letters Patent. Patented June 8, 1920.

Application filed August 3, 1917. Serial No. 184,298.

To all whom it may concern:

Be it known that I, HARRY ACKROYD, a citizen of the United States, residing at East Chicago, in the county of Lake and State of Indiana, have invented new and useful Improvements in Brine-Valves, of which the following is a specification.

This invention relates to brine valves for refrigerator cars; and it proposes, briefly, a device of the general class or character specified which is designed as an attachment for the ice tanks with which said cars are ordinarily equipped, the arrangement being such that the valve is normally closed, so as to prevent the escape of the brine from the tank, but is automatically opened when the tank itself is opened for refilling.

At the present time, the cars employed for the transportation of beef and other food products which require for their refrigeration the use of salt with ice are furnished, each, with a battery of ice tanks, arranged at each end of the car. These tanks are constructed to retain about 30 inches of brine, which drains off, as the ice melts, through a pipe into a drip pan located beneath the tanks, and thence through a water trap and drip pipes outside of the car, so that a constant dripping of brine along the tracks is produced, which is objected to. As a result, the M. C. B. rules now require that the cars shall be provided with devices for retaining the brine in the tanks between icing stations; and it is to comply with this requirement that the invention has been devised.

According to the invention, there is associated with each tank or pair of tanks a valve casing having leading into it a short supply pipe whose inlet end is disposed within the tank below the low level of the brine, so that the latter will always flow into the aforesaid casing from a point below its surface. The outlet end of this pipe is turned upward to provide a seat, which is normally occupied by a valve, thus shutting off the passage of the brine into the casing until such time as the valve is raised; the operation of the valve being controlled automatically by the movements of the usual lid or cover, which serves to open and close the tank, through the intermediary of specially-constructed mechanism. The mechanism in question may be employed to open and close solely one valve, or it may, if preferred, be connected up to actuate a set or series of valves in unison.

An embodiment of the invention is illustrated in the accompanying drawing, whereof:—

Figure 1 is a transverse vertical sectional view taken through one end of a refrigerator car of the character above specified, and showing the tanks equipped with the improved brine valves, the left-hand marginal line of the figure indicating the center line of the car.

Fig. 2 is a longitudinal, vertical section taken substantially on line 2—2, Fig. 1.

Fig. 3 is an enlarged, longitudinal, vertical sectional view of the valve.

Fig. 4 is a horizontal section, taken on line 4—4, Fig. 3.

Fig. 5 is a fragmental view, in vertical section, of a modification of the invention.

Referring more particularly to said drawing, there is arranged at each end of the car a battery of vertical brine tanks 5, as previously stated, each tank having attached to it, in the manner subsequently explained, one of the improved valves 6 and its necessary adjuncts. These tanks may be made as usual, or may be of any desired construction; and they are preferably arranged in sets of two at opposite sides of the center line of the car, the number and dimensions of the tanks employed in actual practice being more or less arbitrary. In the construction illustrated, which may be regarded for all present purposes as preferred, each pair of tanks is opened and closed by a cover 7, or "hatch plug" as it is more generally termed, which is removed at the icing station to replenish the supply of ice and salt contained in the tanks; and these covers may likewise be of any suitable construction, as will be understood, their arrangement being such, however, as to fit tightly in the space between the inclined walls 8 at the top of the frame work 9 of the car which partially incases the tanks. The tanks are spaced slightly apart, to provide room for the valve-operating devices, and are supported in any desired manner in the car, their lower ends being arranged sufficiently far above the floor of the car to permit the latter to be equipped with the usual drain chamber or pan 10, which, however, may be omitted if preferred. When utilized, as in the present instance, the drain pan is fur-

nished with one or more drip pipes 11 of suitable construction, each fitted with a trap 12.

The brine valves 6 are arranged in the spaces between adjacent tanks, approximately midway between the upper and lower ends of the latter, each pair of tanks having their valves located comparatively close together, so that if desired each pair of valves may be operated by a single device; such disposition being preferable for obvious reasons, although, if necessary an individual operating device may be provided for each valve. All of the valves have the same construction so that a description of one will answer for all. Referring to Figs. 3 and 4, the valve therein represented is shown as comprising an elongated, cylindrical casing 13, provided at its top with an axial throat 14, and having connected to its bottom the upper end of a vertical drain pipe 15, which may extend into the drip pan 10, or may, if preferred, extend through the floor of the car, the former construction being illustrated. The throat 14 forms part of a cap 16, which is threaded into the open upper end of the casing, so that it may be removed to permit access to the interior of said casing; the connection between the drain pipe and the lower end of the casing being of a similar character. The upper portion of the casing is formed with a strap-like boss 17, which projects transversely therebeyond and is provided with holes through which rivets are passed to fasten the casing to the tank.

In the lower portion of the casing there is aranged a small, elbow-shaped pipe 18, whose vertical arm is disposed axially of said casing, and whose horizontal arm projects outwardly therethrough and is externally threaded at its end; the said projecting part being introduced through an opening in the tank wall and fastened in place by means of a nut 19 and washer 20, both of which are located internally of the tank and are utilized to form a water-tight joint between the tank wall and the pipe arm. The pipe is thus enabled to deliver the brine from the tank to the interior of the valve casing; and its position is so chosen with respect to the tank that its aforesaid horizontal arm lies about two inches below the low level line of the brine in the tank, so that the brine will always be drawn from a point well below its surface, thus avoiding clogging of the pipe, and incidentally of the drain pipe 15 as well, by straw, saw-dust and other floating refuse of like character common to brine in ice tanks of refrigerator cars.

The flow of brine from the tank to the valve casing is, however, normally cut off by means of a valve 21, here shown as a ball, which seats upon the rounded upper edge of the vertical arm of the supply pipe 18 and is preferably constructed of rubber. As the ball is loose on its seat, and would tend to be constantly removed therefrom by the in-coming brine, means is provided for holding said valve against displacement during the time that the car is traveling from one icing station to the next. Accordingly, a vertical stem 22 is slidably fitted in the neck 14 and is furnished at its lower end with an enlargement or head 23 having a dished or concave under face. This stem is disposed in axial alinement with the vertical arm of the elbow pipe, so that its downward movement through said neck will cause its head to engage the ball and center it directly on the seat provided by the rounded edge of said arm, as will be understood.

To effect the movements of the valve stem, there is preferably employed a vertical rod 24, with which said stem is connected, so that when said rod is shifted in one direction or the other, it will carry the valve stem with it; the operation of the rod itself being controlled by a lever 25, to which the upper end of the rod is pivoted, having a floating fulcrum provided by a longitudinally-slotted link or hanger 26 which receives a pin or trunnion 27 on said lever and is pivotally fastened to the under side of a bridge 28 that spans the lower portion of the opening wherein the plug or cover 7 is fitted. The controlling lever 25 has connected to one end thereof a device which tends to constantly swing it in a direction to pull the rod 24 upward and, consequently, withdraw the valve stem 22 from engagement with valve 21, said device being here shown as in the form of a weight 29 adjustably mounted on said lever. The pivotal connection between the rod 24 and the lever 25 is located between the fulcrum pin 27 and the other end of said lever, as will be understood; and the latter end of the lever is equipped with a device 30 which coöperates with the tank cover or plug 7 to rock said lever in a direction opposite to that in which it tends to move under the influence of its weight 29, so that the closing of said cover will automatically bring about the seating of the valve and resultant closing of the passage through the supply pipe 18. This device 30 preferably takes the form of a plunger rod, which reciprocates through a vertical guide opening 31 in the bridge 28 and is pivotally connected at its lower end to the terminal of the lever 25; the arrangement being such that when the aforesaid cover 7 is closed, it will bear upon and depress the plunger, which latter will be automatically elevated when the cover is raised, due to the action of weight 29.

Where a complete operating device is provided for each individual valve, the rod 24 and valve stem 22 will be directly connected together and may, in fact, be formed by a single element; but where, as in the present

construction, the rod 24 is designed to operate the valves for both tanks, the two valve stems 22 are connected by a cross-piece, which has its ends passed through openings in said stems, and the lower end of the rod 24 is pivoted to said cross-piece midway between the ends thereof.

In the construction above described, an individual valve casing and valve are provided for each tank. This construction may, however, be materially simplified, and the costs of manufacture and installation correspondingly decreased, by utilizing a single valve mechanism for each pair of oppositely located tanks, so that the discharge of brine from both tanks will be controlled thereby. Referring to Fig. 5, the object sought may be accomplished by merely adding a delivery or inlet arm 188 to the pipe 18, and connecting this auxiliary arm to the other tank in the same way that the other inlet arm of said pipe is connected to the tank to which the valve casing is fastened. In such instance, the modified form of pipe will have the shape of a double elbow or inverted T, instead of that of a single elbow, so that the brine from both tanks will pass through the two horizontal inlet arms of the pipe and be discharged through the vertical outlet arm when the ball 21 is raised from its seat. The added inlet arm 188 will have a somewhat greater length than the other inlet arm, as will be understood.

I claim as my invention:—

1. The combination, with a tank, and a movable cover therefor; of a valve mechanism for controlling the discharge of the liquid contents of the tank, comprising a casing having an inlet and an outlet, the former communicating with said tank, a valve in said casing for opening and closing said inlet, and connections between said cover and said valve arranged to automatically force the valve into closed position during and consequent upon the movement of the cover in one direction, and to permit the automatic opening of said valve under the action of the liquid when said cover is moved in the opposite direction.

2. The combination, with a tank, and a movable cover therefor; of a valve mechanism for controlling the discharge of the liquid contents of the tank, comprising a casing having an inlet and an outlet, the former communicating with said tank, a valve in said casing for opening and closing said inlet, and connections between said cover and said valve arranged to automatically force the valve into closed position when said cover is closed, and to bring about the automatic opening of said valve when said cover is opened.

3. The combination, with a tank, and a movable cover therefor; of a valve mechanism for controlling the discharge of the liquid contents of the tank, comprising a casing having an outlet, a supply pipe disposed within said casing and projecting through the wall of said casing into said tank, the delivery end of said pipe being provided with a valve seat, a valve adapted to occupy said seat to shut off the flow of liquid through said pipe, and connections between said cover and said valve arranged to force said valve into closed position on said seat during and consequent upon the movement of the cover in one direction, and to bring about the automatic displacement of said valve from said seat when said cover is moved in the opposite direction.

4. The combination with a tank and a movable cover therefor, of a valve mechanism for controlling the discharge of the liquid contents of the tank, the valve mechanism comprising a casing having an inlet communicating with a tank and also provided with an outlet, a valve disposed to operate with said outlet, and connections between said cover and valve including a rod operable automatically by the cover, during its movement in one direction, to engage the valve and force it into closed position relatively to the outlet and to automatically withdraw from engagement with the valve by the movement of the cover so as to permit opening of the valve.

5. The combination with a tank and a movable cover therefor, of a valve mechanism for controlling the discharge of the liquid contents of the tank, said valve mechanism comprising a casing having an inlet communicating with the tank and also provided with an outlet, a ball valve disposed to operate with said outlet, and a headed valve stem movable through the casing into and out of engagement with the valve to alternately force the latter into closed position relatively to the outlet and also to release the valve for opening movement thereof, said valve stem connected to be operated by the cover during and consequent upon the movements of said cover.

6. The combination, with a tank, and a movable cover therefor; of a valve mechanism for controlling the discharge of the liquid contents of the tank, comprising a casing having an inlet communicating with said tank and an outlet, a valve for opening and closing said inlet, and a valve-operating device embodying a lever system operable automatically by said cover during and consequent upon its movements and a valve stem connected to be operated by said lever system and movable into and out of engagement with the valve.

7. The combination, with a tank, and a movable cover therefor; of a valve mechanism for controlling the discharge of the liquid contents of the tank, comprising a

casing having an inlet communicating with said tank and an outlet, a valve for opening and closing said inlet, and a valve-operating device embodying a rocking lever having means tending to move it in one direction, a member carried by said lever and adapted to be operated by said cover so as to rock said lever in the opposite direction, and a valve stem connected to be shifted by said lever into and out of engagement with the valve.

8. The combination, with a tank, and a movable cover therefor; of a valve mechanism for controlling the discharge of the liquid contents of the tank, comprising a casing having an inlet communicating with the tank and an outlet, a valve for opening and closing said inlet, and a valve-operating device embodying a rocking lever fulcrumed intermediate its ends and having means at one end tending to move it in one direction, a plunger at the other end of said lever adapted to be depressed by said cover when the latter is closed so as to rock said lever in the opposite direction, and a valve stem connected to be shifted by said lever into and out of engagement with said valve.

9. The combination, with a tank, and a movable cover therefor; of a valve mechanism for controlling the discharge of the liquid contents of the tank, operatively associated with said cover to be automatically opened when the cover is moved in one direction, and automatically closed when the cover is moved in the other direction.

10. The combination, with a tank, and a movable cover therefor; of a valve mechanism for controlling the discharge of the liquid contents of the tank, operatively associated with said cover to be automatically closed when the cover is closed, and automatically opened when said cover is opened.

11. The combination, with a pair of juxtaposed tanks, and a single movable cover for opening and closing both of them; of a valve individual to each tank for controlling the discharge of its liquid contents; and a valve-operating device common to both valves, associated with said cover to automatically open both valves when the cover is moved in one direction, and to automatically close both valves when said cover is moved in the other direction.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

HARRY ACKROYD.

Witnesses:
WILLIAM HOGARTH,
H. E. POWELL.