May 29, 1923.

1,456,854

T. McGHEE ET AL

FILLING VALVE

Filed Sept. 29, 1920

2 Sheets-Sheet 1

Fig. 1.

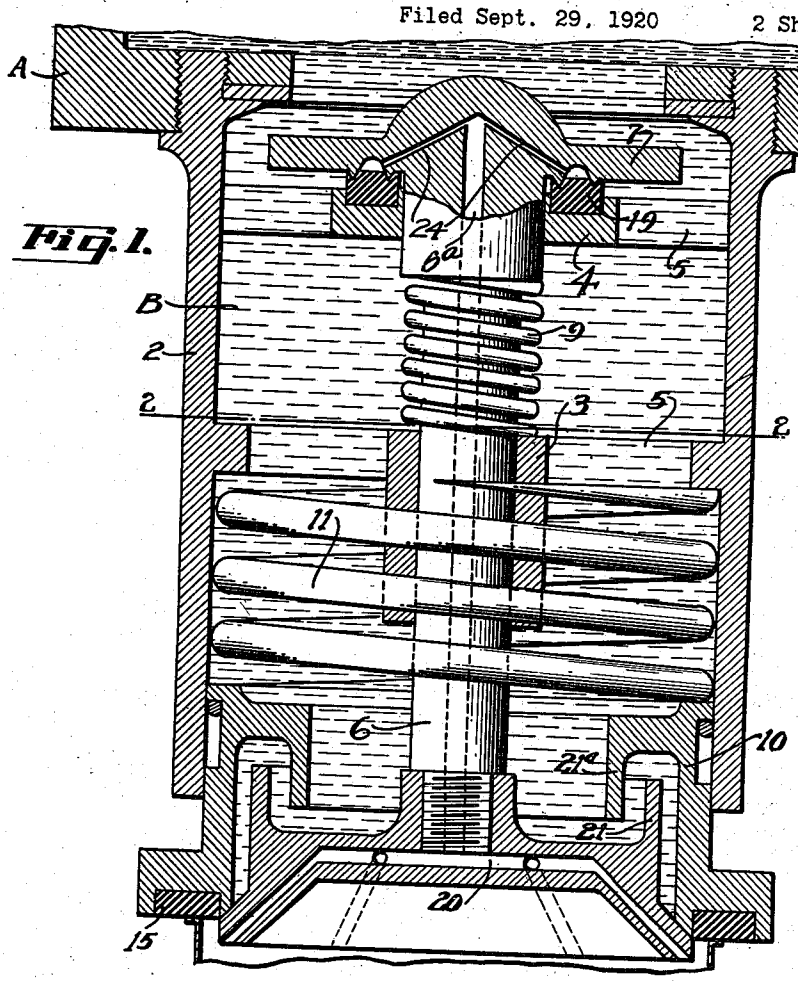
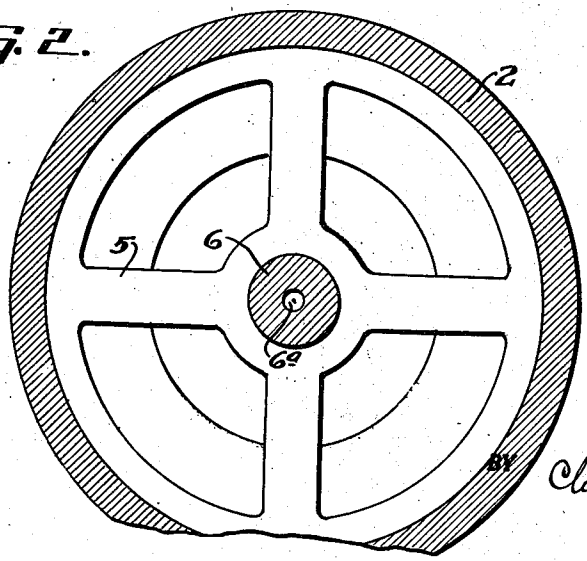


Fig. 2.



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2 Sheets-Sheet 2

Fig. 3.

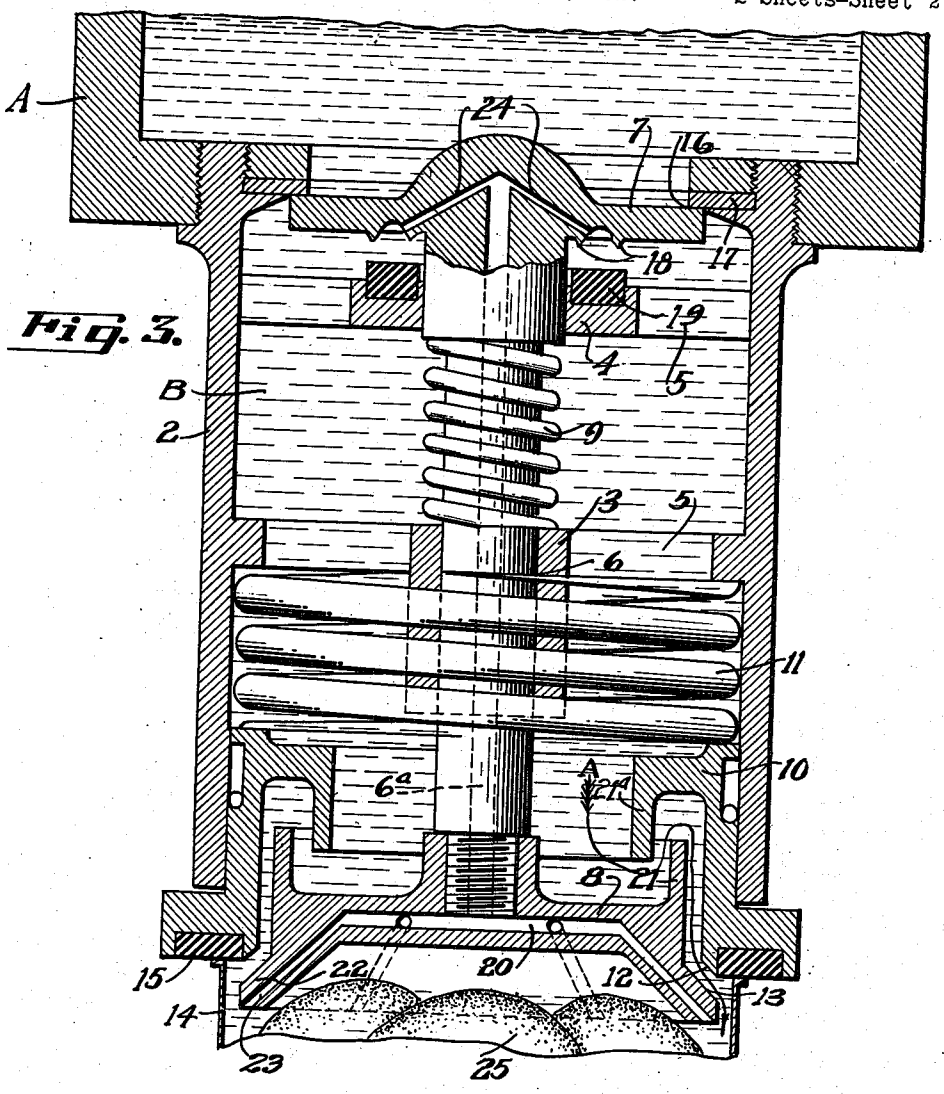
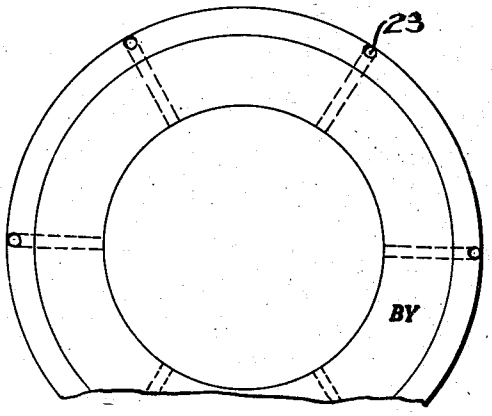


Fig. 4.



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UNITED STATES PATENT OFFICE.

THURMAN McGHEE AND PETER WOODHEAD, OF HAYWARD, CALIFORNIA.

FILLING VALVE.

Application filed September 29, 1920. Serial No. 413,514.

To all whom it may concern:

Be it known that we, THURMAN McGHEE and PETER WOODHEAD, citizens of the United States, residing at Hayward, in the county of Alameda and State of California, have invented a new and useful Improvement in Filling Valves, of which the following is a specification.

This invention relates to a filling valve and especially to a valve of this character which is adapted for use in connection with fruit cans, bottles and like receptacles.

One of the objects of the present invention is to provide a simple, substantial, and easily operated filling valve which is liquid sealed and which permits a large flow and consequent quick filling of the cans or the receptacles handled; further a valve which will not have a tendency to leak or drip during the time interval required when the cans are being delivered and removed.

Another object of the invention is to provide a valve which is adapted to operate in conjunction with a supply tank or reservoir, said valve having a receiving chamber formed therein to which the liquid is delivered from the supply tank, and from which it is discharged during the filling operation.

Another object of the invention is to provide a pair of valves secured on a common stem and so arranged as to function in unison and to alternately close one valve controlling the flow of liquid from the supply tank to the receiving chamber, and the second valve the discharge of the liquid from the receiving chamber.

Another object of the invention is to provide a valve which is provided with vents so arranged that the intermediate receiving chamber may be barometrically actuated; further a valve by which the final liquid level obtained in the receptacles filled will be automatically regulated and a uniform filling obtained.

Another object of the invention is to provide a valve which is especially adapted for supplying fruit cans with a syrup and which will positively avoid any tendency of crushing the fruit contained therein during the filling operation.

Further objects will hereinafter appear.

The invention consists of the parts and the construction, combination and arrangement of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Fig. 1 is a central vertical longitudinal section through the valve showing the main discharge valve in closed position.

Fig. 2 is a cross section on line 2—2, Fig. 1.

Fig. 3 is a sectional view similar to Fig. 1, but showing the discharge valve in open position.

Fig. 4 is a bottom view of the discharge valve.

Referring to the drawings in detail, A indicates a main supply tank or reservoir, and B a filling valve forming the subject matter of the present invention. The valve proper consists of a cylindrical casing 2, interior of which is formed a pair of bearing members 3 and 4; said bearing members being centrally disposed and supported by web-like arms 5. Slidably mounted in the bearings is a stem 6, and secured thereon is a pair of valve members 7 and 8. Interposed between the upper valve and the lower bearing 3 is a spring 9, and interposed between the web-like arms 5 of the lower member and a piston 10 is a large spring 11. Both springs are of the helical type and their function will later be described.

The piston 10 is slidably mounted in the lower end of the cylinder valve housing 2. It serves three main functions, first that of a valve seat for the lower valve 8 which will hereinafter be termed the discharge valve; the seat formed on the piston being indicated at 12, and the seat on the discharge valve at 13. Its second function is that of a liquid seal, and its third function is that of a closure for the receptacle to be filled, and in this instance represented by the upper end of a fruit can as indicated at 14. The lower end of the piston is provided with an annular channel for the reception of a gasket 15. This gasket engages the upper end of the can 14 and thereby forms a seal and a closure for the same when in register with the valve and while filling is taking place. The upper valve is provided with two seats, an upper peripheral seat 16, engageable with a gasket 17, and a lower seat 18 consisting of a pair of interspaced downwardly projecting annular ridges. The seat 16 cooperates with the seat 17, while the seat 18 cooperates with a gasket or seat member 19; the respective seats having the function of alternate engagement. The dis-

charge valve is large in diameter and therefore permits a large flow and consequent quick filling of the can or receptacle to be filled during the filling operation. This discharge valve consists of a head member 8, interior of which is formed a chamber 20. The valve further consists of an annular upwardly turned flange 21 and an annular inclined downwardly turned flange 22. This flange has the seat 13 formed on its exterior surface, which cooperates with the annular seat 12 formed on the piston 10. The annular flange 22 is otherwise cored or drilled as indicated at 23 to form a plurality of venting passages which communicate with the central chamber 20. The stem 6 is also cored or drilled as indicated at 6^a, and it constitutes a duct and communicates at its lower end with the chamber 20 and at its upper end with a series of passages 24, which terminate between the annular ridges of the valve seat 18.

In actual operation we will suppose that the present valve is employed for the purpose of delivering a syrup solution to fruit cans in which the fruit to be preserved has already been placed as indicated at 25. If this is the case it will be obvious that the supply tank A will be filled with a syrup solution and that said solution will necessarily have to pass the respective valves before it can enter the can and fill the same. Such flow is intermittent due to the functioning of the valves 7 and 8, and it may further be stated that it must enter the valve casing B before it can finally enter the can. The interior of the casing B is hollow and it serves the function of an intermediate receiving chamber. The liquid delivered thereto is furthermore barometrically actuated and this is accomplished in the following manner:

Referring to Fig. 1, it will be seen that the lower discharge valve is closed and that the upper valve 7 is opened with respect to the seat 17. This permits the liquid from the supply tank to flow by the upper valve 7 and to fill the intermediate receiving chamber formed within the valve. If a can is delivered to the valve and brought into register therewith, it will only be necessary to impart a slight upward movement to the can; such movement will force the piston 10 upwardly away from the discharge valve to assume the position shown in Fig. 3, and it will at the same time permit the upper spring 9 to exert its pressure and raise the stem to a position where the valve 7 will engage the seat 17 and thereby close communication between the supply tank and the intermediate receiving chamber. It will simultaneously permit the liquid in the receiving chamber to escape downwardly and pass by the discharge valve into the can. During this downward flow, it is caused to pass through what may be termed an annular trap chamber. This trap chamber is formed by the annular flange 21 on the discharge valve, and by a second annular flange 21^a formed on the piston 10, that is the liquid flows in the direction of arrow *a* under the annular flange 21^a and over the annular flange 21, and is then finally permitted to escape between the valve seats 12 and 13. The valve members 7 and 8 form an outlet between them and the member 8 has a cup shaped upper portion formed by the said flange 21 and the valve 7 is partially submerged in the cup shaped portion of the said valve member 8 to form the said seal. The flow of liquid into the can displaces the air contained therein and this air escapes, first, through the vent openings 23, and secondly, through the central passages in the valve stem and the communicating passages 24. The air displaced in the can is thus delivered to the intermediate receiving chamber and cannot escape therefrom as long as the valve 7 is in engagement with the upper seat. It may further be stated that no liquid would escape from the intermediate receiving chamber unless air was supplied thereto, and it may also be stated that the flow of liquid from the intermediate receiving chamber will cease practically the moment the vent openings 23 in the discharge valve are closed when the liquid delivered to the can reaches their level. The rise of the liquid in the vent formed by the passages 6^a, 23 and 24 is practically instantaneous, there being no appreciable period of time consumed in such rise of the liquid to balance the column of liquid in the intermediate receiving chamber. In other words the discharge or escape of liquid from the intermediate receiving chamber is barometrically controlled as the air in the can is displaced during the filling operation and delivered to the intermediate chamber, and as this transfer or replacement of air is stopped practically the moment the liquid in the can reaches the lower end of the passages 23, it can readily be seen that the action is barometric and that a uniform liquid level will be obtained in each can.

The trap chamber formed by the annular flanges 21 and 21^a is essential when the barometric control is considered as it prevents the air displaced during the filling of the can from escaping upwardly around the valve and directly into the intermediate chamber. The moment the filling operation has been completed the fruit can 14 is lowered and consequently the piston 10 as this is forced downwardly by the tension of the large helical spring 11. The moment the piston engages the discharge valve 8, this will also move downwardly and this movement is transmitted through the stem 6 to close the valve 7 with relation to the lower

seat 19. In moving away from the seat 17, it again opens communication between the main supply tank and the intermediate chamber and it will thus permit the air transferred from the chamber to escape upwardly through the supply tank, and it will simultaneously permit liquid to flow downwardly from the supply tank to refill or replenish the quantity discharged during the filling operation.

A valve constructed and operated as here shown has many advantages when comparison is made with valves used for a similar purpose, first, the fruit is in no instance crushed or damaged due to the fact that the lower side of the discharge valve is concave or hollow as shown, and mainly because a displacement member or plunger is not required; secondly a uniform liquid level is obtained in each can due to the barometric control provided, and it may further be stated that such liquid level is obtained without the use of a displacement member; third, a large flow and consequent quick filling of the cans is permitted due to the large passages provided for the downward flow of the liquid and dripping or leakage is prevented as the valve closes against the seat formed at the lowermost end of the valve housing. Fourth, the danger of wasting the syrup or liquid handled is eliminated, for instance, if the discharge valve for some reason or another should remain open, the upper valve would remain closed and the only liquid that could escape would be that contained in the intermediate receiving chamber and danger of the liquid in the main tank escaping is thus avoided. Cans or receptacles of practically any shape, whether square, round, oval, etc., may be handled as it is only necessary to shape the lower end of the piston member 10 accordingly, similarly, receptacles of varying size and form, heighth, etc., may be equally and as readily handled.

While certain features of the present invention are more or less specifically illustrated, we wish it understood that various changes in form and proportion may be resorted to within the scope of the appended claims, similarly that the materials and finish of the several parts employed may be such as the experience and judgment of the manufacturer may dictate or varying uses may demand.

Having thus described our invention, what we claim and desire to secure by Letters Patent is—

1. A valve of the character described, comprising a liquid receptacle having a liquid inlet opening at the upper end and a liquid discharge opening at the lower end, a liquid sealing member surrounding the discharge end and maintaining the discharge end partially submerged, a venting member extending below the discharge end and also communicating with the upper and interior end of the receptacle, and means for opening and closing the upper end of the venting member and for closing the inlet of the receptacle when the vent is closed.

2. A valve of the character described, comprising a liquid receptacle having a liquid inlet opening at the upper end and a liquid discharge opening at the lower end, a liquid sealing member surrounding the discharge end and maintaining the discharge end partially submerged, a venting member extending below the discharge end and also communicating with the upper and interior end of the receptacle, an extension on the receptacle adjacent the liquid sealing discharge end, and a valve for forming a closure therefor.

3. A valve of the character described, comprising a casing having a receiving chamber therein, a source of liquid supply connected with the receiving chamber, a pair of valves in the casing, one controlling the discharge of liquid from the receiving chamber and one controlling the delivery of liquid from the source of supply, said valves being opposed and adapted to open and close in opposition to each other, a liquid seal for the discharge end of the receiving chamber, and a venting member extending below the discharge end of the chamber and communicating with the upper end of the chamber interiorly thereof.

4. In a device of the character described, a casing having a receiving chamber formed therein, a source of liquid supply connected with the receiving chamber, a pair of valves in the casing, one controlling the discharge of liquid from the receiving chamber and one controlling the delivery of liquid from the source of supply, the valve for controlling the discharge of liquid from the receiving chamber being provided with means for forming a liquid seal at the outlet of the chamber, a stem slidably supported within the casing and carrying the valves and provided with a vent passage extending below the outlet of the chamber and communicating with the interior of the chamber at the upper portion thereof, and means for closing the vent passage when the inlet valve is opened and for opening the vent passage when the discharge valve is opened.

5. A valve of the character described, comprising a casing having a receiving chamber formed therein, means for connecting said receiving chamber with the source of liquid supply, a pair of valves, one for each end of the casing, said valves operating in unison and one assuming an open position when the other assumes a closed position to intermittently admit liquid and to intermittently discharge the liquid, a flange within the casing at the discharge

end thereof, a liquid sealing member into which the said flange is partially submerged, and a venting member extending below the discharge end of the chamber and also communicating with the interior of the chamber at the upper end thereof.

6. A valve of the character described, comprising a cylindrical casing having an upper inlet end and a lower discharge end, a stem centrally disposed within the casing and guided therein, a valve on the upper end of the stem, a pair of seat members with which said valve alternately engages, a discharge valve on the lower end of the stem having a liquid sealing portion, a piston member slidably mounted in the lower end of the casing and partially submerged in the liquid sealing portion of the discharge valve, and a valve seat on said piston member with which the discharge member is adapted to engage, a vent passage being formed in the stem and communicating at its upper end with the interior of the casing, and a series of vent passages being formed in the discharge valve and communicating with the said vent passage and extending below the discharge end of the casing.

7. A valve of the character described, comprising a liquid receptacle having a liquid inlet opening at the upper end, a hollow stem extending through the receptacle and having upper and lower valves controlling the inlet of liquid into and the discharge of liquid from the receptacle, said hollow stem and valves having a vent passage communicating at the upper end with the interior of the receptacle and extending at the lower end below the discharge end of the receptacle, the lower valve being provided with a liquid sealing portion, and a piston fitted within the lower end of the receptacle and cooperating with the lower valve and arranged to close the top of a can, said piston having a portion partially submerged in the liquid sealing portion of the lower valve.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

THURMAN McGHEE.
PETER WOODHEAD.

Witnesses:
HENRY GREENWOOD,
H. G. KORTS.