Sept. 29. 1931. C. F. WRAY 1,825,568

VALVE STRUCTURE

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Fig. 1

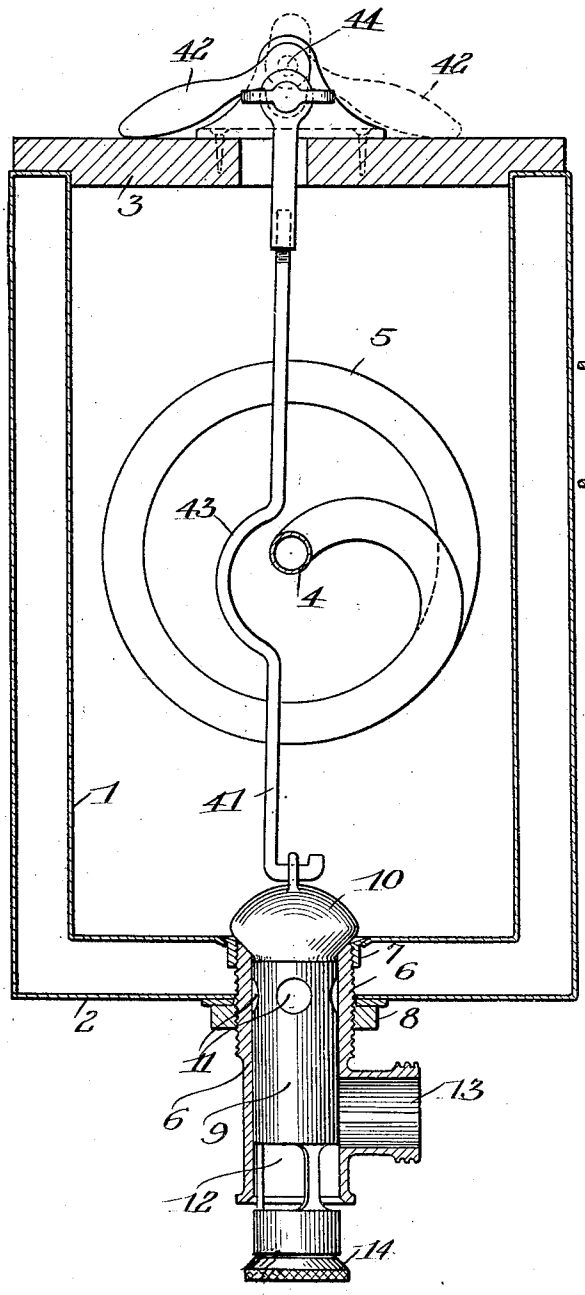


Fig. 2

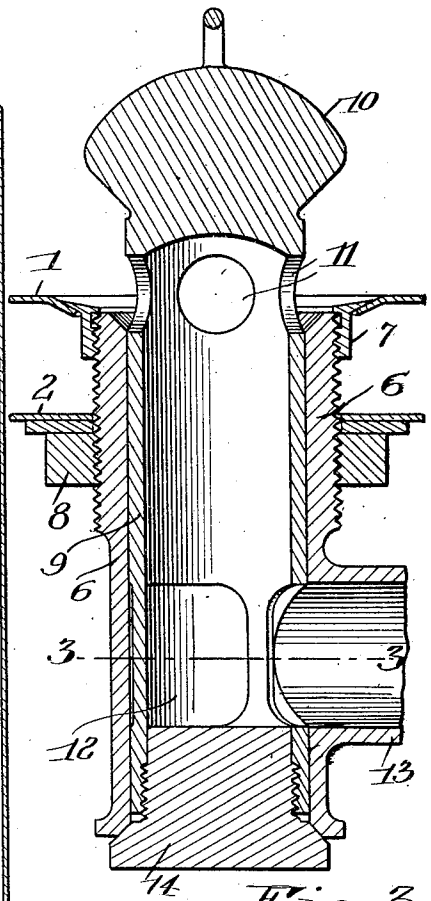
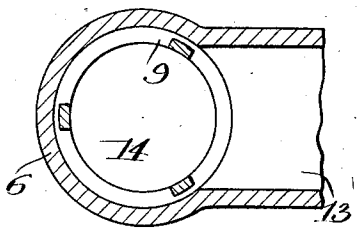


Fig. 3



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Fig. 4

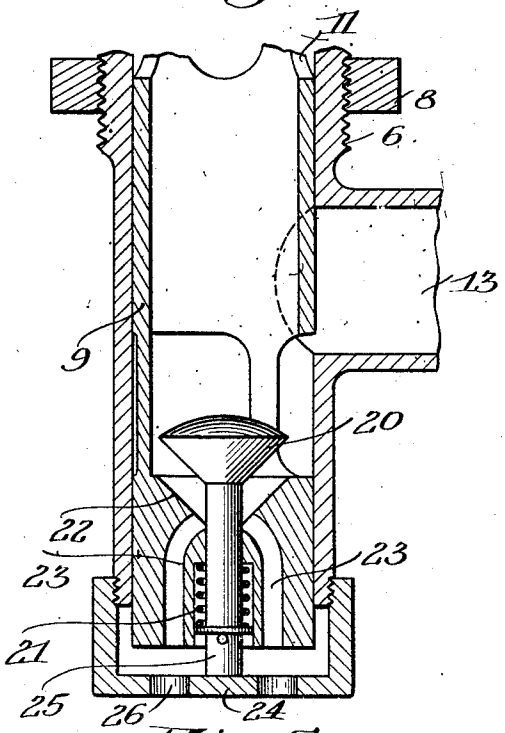


Fig. 5

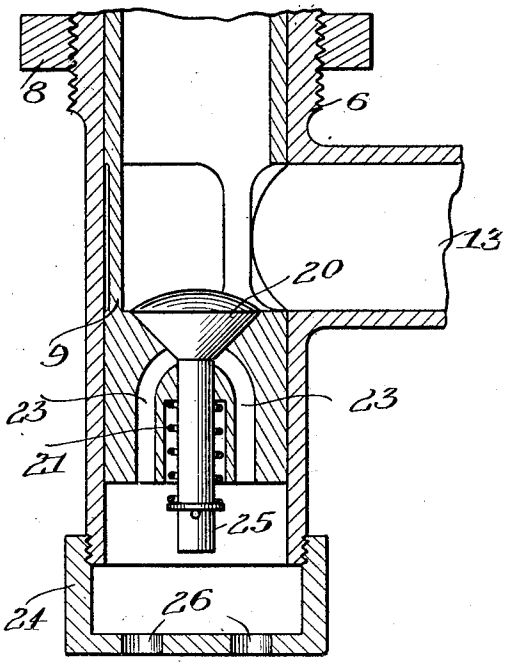


Fig. 6

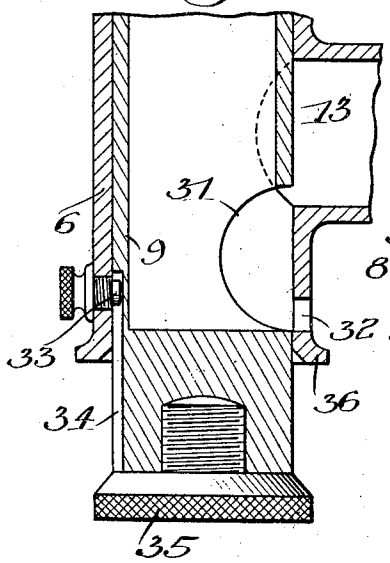


Fig. 7

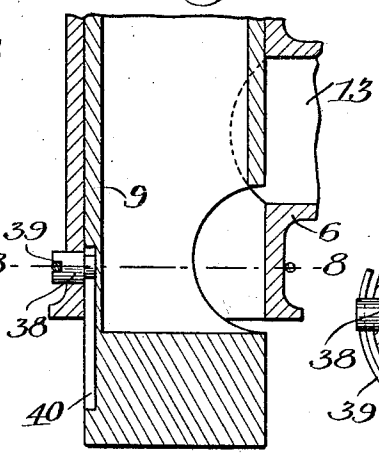
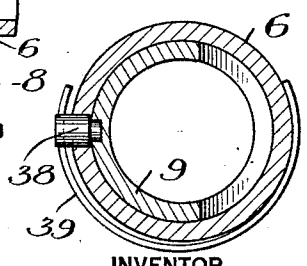


Fig. 8



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UNITED STATES PATENT OFFICE

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VALVE STRUCTURE

Application filed May 14, 1926. Serial No. 109,197.

This invention relates to a valve structure, more particularly of the type adapted for use with milk pasteurizing vats, and has for its purpose to afford a simple and practical construction that lends itself readily to this class of containers and permits easy cleaning of the parts.

Another purpose of the improvement is to afford an arrangement that will automatically drain the outlet pipe when the inlet leading from the tank is cut off, so as to prevent any milk that may leak past the inlet valve and has not been held in the pasteurizer a proper length of time, from getting into the pipe line.

A further object of the invention is to provide a simple and economical valve structure that controls both an inlet and outlet, and will automatically drain the outlet when the inlet is closed.

Still a further purpose of the improvement is to provide an effective controlling means for the valve, in order to insure positive and tight closing of the inlet.

To these ends, the invention comprises the construction that will appear clearly from the following description when read in conjunction with the accompanying drawings, the novel features being pointed out in the claims following the description.

In the drawings:

Figure 1 is a vertical sectional view of a milk pasteurizing tank, showing one embodiment of the invention applied thereto, the valve being shown in the position of closing the inlet and draining the outlet;

Figure 2 is an enlarged sectional view of the valve structure of Figure 1, with the valve in position to open and establish communication between the inlet and outlet;

Figure 3 is a horizontal sectional view on the line 3—3 of Figure 2;

Figure 4 is an enlarged sectional view of a modified form of valve member, employing a supplemental drain valve which is shown in open position, as when the inlet is closed;

Figure 5 is a view similar to Figure 4, with the parts in position as when the inlet and outlet are open and the drain valve is closed;

Figure 6 is a sectional view of another modification of valve;

Figure 7 is a similar view of a still further modified construction, and

Figure 8 is a sectional view on line 8—8 of Figure 7.

Referring more particularly to the drawings, in which like reference numerals refer to corresponding parts throughout the several views, 1 and 2 designate respectively the inner and outer containers of a milk pasteurizing tank, 3 is a cover, and 4 is a pipe or steam conductor extending through the tank and terminating in a coil 5 used for heating and agitating the milk.

At the bottom of the containers 1 and 2, openings are provided to receive a valve housing 6 held in place by a fitting 7, which may be soldered or otherwise fixedly secured to the inner container 1, and a collar 8 threaded on the housing 6 and abutting the outer container 2.

Arranged within the valve housing 6 is a valve member comprising a tubular body 9 terminating at its inner end in a head 10 that is adapted to close the inlet from the tank, as shown in Figure 1. 11 designates a series of openings adjacent to the head 10 to permit discharge of the contents of the tank when the inlet is open, as shown in Figure 2, while 12 are cutaway portions in the tubular valve body adapted to register with the outlet 13 as shown in Figure 2, and permit discharge of the contents of the tank into the outlet conductor, which it will be understood is connected with a suitable pipe to lead the milk to any desired point.

It is important that the outlet 13 be kept in as sterile condition as possible, and that no seepage of milk be permitted to collect in the outlet when the inlet is closed, because otherwise, the outlet might contain milk that has not been pasteurized and has a high bacteria count. This is accomplished by automatically draining the outlet 13. One method of accomplishing this is illustrated by the construction of Figures 1 and 2 in which the cut-away portions 12 are of such extent and so related to the outlet 13 that when the head 10 closes the inlet, the portions 12 are par-

tially in communication with the outlet 13 and partially below the valve housing, so as to permit any milk that has not been pasteurized and may get past the inlet valve to drain downwardly through the housing and thence to the outside. With this arrangement, the lower end of the tubular valve body is preferably closed by a plug 14 threaded therein, and cooperating with the lower end of the valve housing 6, as illustrated in Figure 2, to limit inward movement of the valve, and to serve as a valve in closing said housing at the bottom.

In Figures 4 and 5, a modified arrangement is illustrated for accomplishing draining of the outlet, in which a supplemental drain valve 20 is employed, the same being held normally in closed position by a spring 21. The valve 20 cooperates with a seat 22 to close passages 23, while 24 is a cap threaded on the end of the valve housing and acting to limit outward movement of the drain valve. As the valve is moved outwardly to close the inlet and outlet, the latter is left partially uncovered, as shown in Figure 4, and at the same time the valve 20 is opened by contact of its stem 25 with the cap 24. This uncovers the passages 23 and permits any seepage of milk that leaks past the inlet valve to drain therethrough and thence through openings 26 to a point outside the valve housing.

In Figure 6, a somewhat different arrangement is illustrated in which the port 31 in the tubular valve body establishes communication between the outlet 13 and a drain port 32 when the main valve is in its outermost position. The valve is guided by a stop pin 33 cooperating with a slot 34 formed in the side of the valve body, while 35 is an end piece secured to the outer end of the valve body and cooperating with the outer end of the housing 36 to limit inward movement of the valve. The stop pin 33 may be threaded into the valve housing as shown in Figure 6, while in Figure 7, a simpler arrangement is illustrated, in which a pin 38 is held in place by a spiral spring 39 having one end secured to the pin 38 and its opposite end secured to the valve housing. The pin 38 engages a slot 40 in the valve body, guiding the latter and limiting its movement in both directions. In other respects, the operation of Figure 7 is similar to that described for Figure 6.

The valve member of the various forms heretofore described may be operated in different ways and by suitable actuating means, one such being illustrated herein and consisting of a rod 41 extending vertically through the tank and being connected to a cam lever 42 arranged on the cover 3. The lever 42 is thown in one direction to open the valve and in the opposite direction to close the same. It is desirable to impart a certain amount of pressure to the valve 10 when in its closed and open positions to effect as tight engagement with the seat as possible. To this end, the rod 41 is provided with a U-shaped or bowed portion 43 where it extends around the pipe 4, such bowed portion imparting a certain amount of yieldability to the rod 41 and permitting slight endwise compression or tension thereof. When the lever is operated to close valve 10, it moves rod 41 and link 43 slightly past the center 44, causing the rod 41 as a whole to spring slightly under compression and bringing valve 10 into positive and tight engagement with its seat, and when the valve 10 is opened, the rod 41 is put under tension, which acts to hold the plug or valve 14 tightly against its seat and thus close the housing at the bottom.

While the invention has been described with reference to certain details of construction, it is not limited to the precise arrangements herein shown, and this application is intended to cover such other modifications or departures as come within the purposes of the improvement or the scope of the following claims.

I claim:

1. The combination with a container, of a valve housing at the bottom thereof, a valve in the housing, a pipe extending through the container, a rod extending vertically of the container and connected at its lower end to the valve, and operating means at the top of the container connected with said rod for opening and closing the valve, the rod including a U-shaped portion surrounding said pipe and imparting yieldability to the rod whereby tight closing of the valves is effected upon movement in either direction.

2. The combination with a container, of a valve housing at the bottom thereof said valve housing having seats at its top and bottom, a valve body movable in the housing and including valves engaging said seats alternately, a rod extending vertically of the container and connected at its lower end to said valve body, and operating means at the top of the container connected with said rod for opening and closing the valves alternately, said rod being resilient and thereby yielding to exert pressure upon the valve body when moved downwardly to close the upper valve.

3. The combination with a container, of a valve housing at the bottom thereof, a valve in said housing, a rod extending vertically of the container and connected at its lower end to the valve, and operating means at the top of the container connected with said rod for opening and closing the valve, the rod including a U-shaped portion imparting yieldability to the rod and acting to exert pressure on said valve when the latter is closed.

4. A valve structure comprising an inlet, an outlet, and an open end, a tubular valve

member within said housing having a head cooperating with said inlet and a bottom portion for closing the open end of the housing, the valve member being interiorly unobstructed between the head and bottom portion and having ports adjacent said head and cut-away portions adjacent said bottom portion, the parts being so related that when the valve member is elevated to its uppermost position to open the inlet, the cut-away portions register with the outlet and the top of the bottom portion of the valve member lies flush with the bottom of the outlet in the same plane therewith and when the valve member is at it lowermost position to close the inlet, the cut-away portions establish communication between the outlet and an opening in the housing below the outlet in order to drain the outlet.

5. A valve structure comprising a housing having axial openings at its ends and a lateral outlet intermediate its ends, a tubular valve member movable therein to engage alternately opposite ends of the housing to close the openings therein and having an opening communicating with said outlet when in either of said positions, and means for operating said valve member.

6. A valve structure comprising a housing having an axial inlet at one end, an axial opening at its other end, and an outlet between its ends, a tubular valve member movable in said housing, an inlet port adjacent one end of said valve member, a portion of the wall adjacent the other end of said valve member being cut away to form an opening therein, the arrangement of said port and opening being such that when the tubular valve member is in a position in which its inlet port registers with said inlet, said cut-away portion registers with said outlet, and when moved to a position in which the inlet port is out of register with said inlet, said cut-away portion affords a communication through said valve member between said outlet and the open end of said housing, and means for moving said valve member.

7. A valve structure comprising a housing having an inlet opening at one end, a drain opening at its opposite end and a lateral outlet intermediate its ends, a tubular valve member therein movable to close and open the inlet opening and having an outlet opening communicating with said lateral outlet in either of said positions and a passage communicating with said drain opening, a valve in said valve member for closing said passage, means for moving said valve to open said passage when the valve member is moved to close the inlet opening, and means for operating said valve member.

In witness whereof, I have hereunto signed my name.

CHARLES F. WRAY.