Feb. 18, 1930. J. L. HUTCHINGS 1,747,442

DRAIN VALVE

Filed April 7, 1927

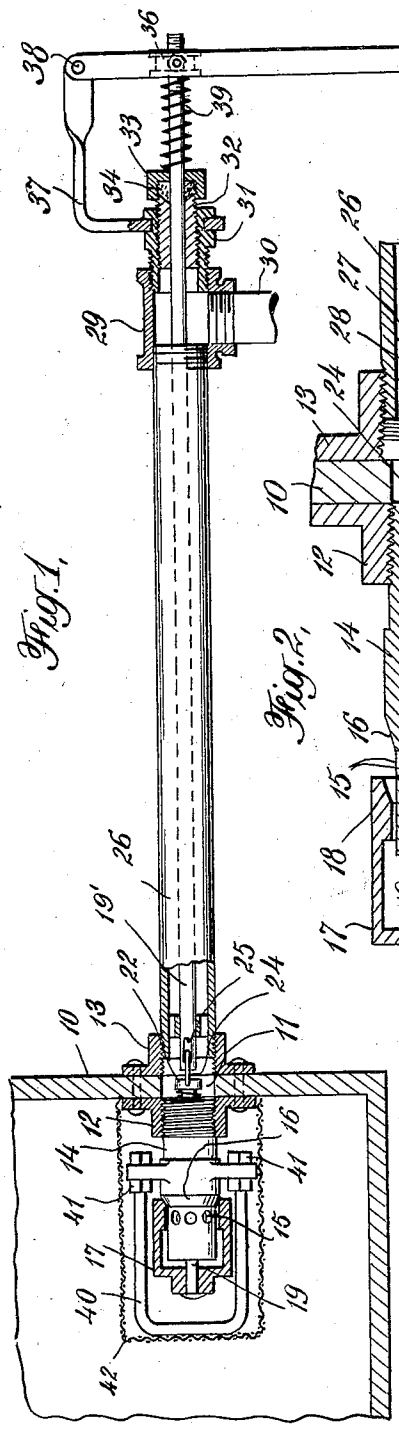


Fig. 1.

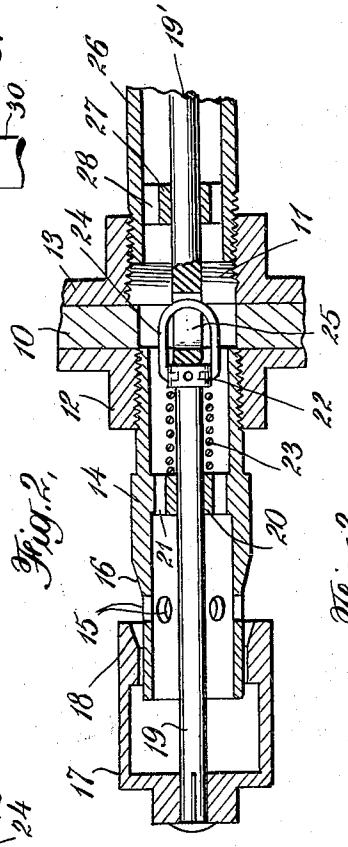


Fig. 2.

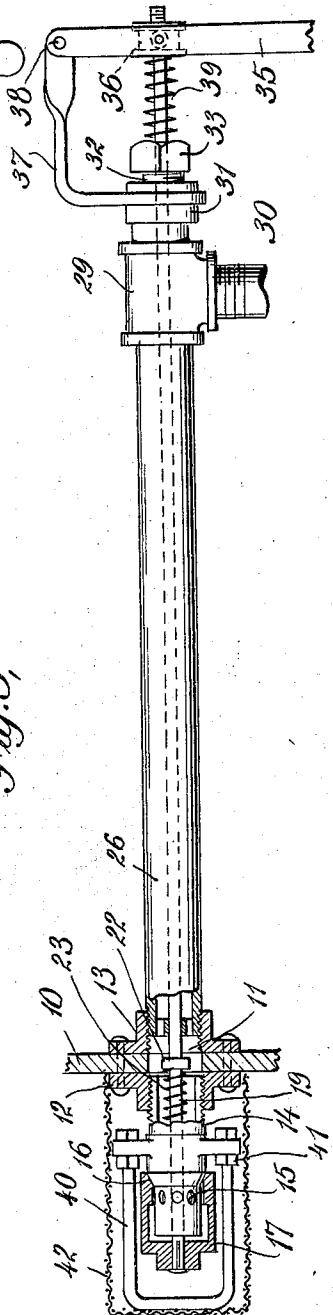


Fig. 3.

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DRAIN VALVE

Application filed April 7, 1927. Serial No. 181,691.

This invention relates to drain valves, and it has for its object more particularly the provision of an improved safety drain valve.

In my co-pending application (Serial No. 81,595, filed January 15, 1926), of which this application is a continuation in part, I have disclosed a drain valve of the safety type in which are employed actuating means divided into two cooperating stems. One stem fits into the inner stationary member (which is to be attached to the inside of a container); and the other stem fits into the outer stationary member (which is to be attached to the outside of the container). The adjacent ends of these two stems are adapted to push against one another as the valve (inside the container) is opened or closed. Since a set of springs is operatively associated with the inner stem to keep the valve closed in its normal position, the outer stationary member and its outer stem may be broken away from the container and the contents of the container will still be safely intact.

If the container's contents, such as a liquid or gas, contains granular substances, these are sometimes liable to settle in the ground seats of the valve. This means that the ground seats cannot easily be non-leakably drawn together, unless such granular substances can be removed. If the parts of the valve attached to the outside of the container are broken off, and granular substances have settled in the ground seats, the valve may continue to leak and it is difficult to stop the same.

In accordance with the present invention, a continuous stem is employed throughout the inner and outer stationary member parts. If granular substances should settle in the ground seats, or if the ground seats should not go together non-leakably for some other reason, the part of the stem outside of the container may be grasped and pulled and turned (giving a grinding effect on the ground seats) in such manner as to remove or grind down the objectionable granular substance. This continuous actuating means may consist of one whole member, or it may comprise two or more separate stems which are operatively connected to one another as by links. The stem or stems may be slotted to receive, and give play for, the links.

These and other features of my invention will be better understood by reference to the accompanying drawings, taken in conjunction with the following description, in which:

Fig. 1 is a sectional elevation in part of a drain valve (with linked stems) attached to a container, showing the valve in the "closed" position;

Fig. 2 is an enlarged sectional plan of the valve shown in Fig. 1, showing the valve in the "open" position; and

Fig. 3 is a sectional elevation in part of a modified drain valve (with a single stem) attached to a container, showing the valve in the "closed" position.

The liquid or gaseous container 10 has a suitable hole 11 through the walls thereof at a point from which it is desired to withdraw the contents. Pipe flanges 12 and 13 are securely and non-leakably attached to the tank about the hole.

That part of the valve which fits on the inside of the container comprises a stationary member 14, having an axial passage therethrough, which screws into the inside flange 12. This inner stationary member part contains the hole or holes 15 placed between the ground seat 16 and the remote end of the member.

A cap 17 fits slidably about, and over, the end of the inner stationary member 14. This cap is provided with a ground seat 18, which is adapted to fit non-leakably on the ground seat 16 when the valve is in the "closed" position.

A continuous actuating means 19 (see Fig. 3), which may be made up of a whole rod, or two or more stem parts which are connected (see Figs. 1 and 2), fits within the inner stationary member 14 and is securely attached to the movable cap 17. The inner member 14 has a disc guide 20 appropriately spaced therein. This disc has a hole or holes 21 through which the contents of the container may be conducted, and a suitable hole through which the stem 19 may be freely moved during the opening and closing operations of the valve. The stem 19 has a shoul-

der 22 located at or near the wall of the container. This shoulder acts as a wall against which springs 23 are confined, the springs being at all times held between the disc 20 and the shoulder 22. This spring is adapted to keep the valve closed in its normal position.

In the case of a continuous actuating means comprising two or more operatively connected stems (Figs. 1 and 2), a link 24 is properly attached to the shoulder 22 and extends through stem 19′. It is preferred that the stem 19′ contain a slot 25, through, and in, which the link 24 may be freely moved.

That part of the valve which fits on the outside of the container comprises a stationary member 26, having an axial passage therethrough, which is in substantial alignment with the inner stationary member 14. This outer stationary member also has a disc guide 27 appropriately fitted therein. A hole or holes 28 are provided in the disc for the passage of the contents of the container. This disc also has a hole in the center thereof, through which the stem 19 (or 19′) may be freely moved during the opening and closing operations of the valve.

A T 29 is fitted at the other end of the stationary member 26. A nipple 30 fits into this T and is adapted to convey away the contents of the container. A bushing-sleeve 31 fits into the extreme end of the T. A bushing 32 in turn fits into the bushing sleeve. The bushing-cap 33 fits over the packing material 34 and the end of the bushing 32.

A lever 35 is pivotally connected to the extreme outer end of the stem 19 (or 19′) by means of the fitting 36. This lever is in turn attached to the fulcrum member 37 at the point 38. The fulcrum member is in turn attached to the bushing-sleeve 31. A spring surrounds the extreme end of the stem 19 (or 19′) and is interposed between the bushing-cap 33 and the fitting 36. It may be well to point out that it would, of course, be possible to operate this valve with only one set of springs. That is to say, either springs 23 or 39 could be dispensed with, and good results are possible. However, in my present preferred practice, I make use of both sets of springs.

In order that the movable and slidable cap 17 may not be completely removed from the inner stationary member 14, a guard 40 may be attached to the stationary member by means of the nuts 41. The length of the guard is such that the cap 17 may not be completely pushed away from the end of the inner stationary member. If desired, a screen 42 may be placed about the inner valve parts. This screen may be conveniently attached to the container 10. It will, of course, be evident that the guard 40 may be dispensed with, if either or both of the springs 23 and 39 are of such length and/or strength that it will be impossible to push the cap 17 beyond the end of the inner stationary member.

The operation of the above described valves is as follows:

The valves are closed in their normal position. When it is desired to drain the contents of the container 10, the lever 35 is pulled or pushed toward the container. As this movement takes place the stem 19 (or 19 and 19′) is moved within the outer and inner stationary member parts 26 and 14 to such an extent that the movable and slidable cap 17 is moved partly away from the remote end of the inner member 14. During this operation the springs 39 and 23 are compressed. In the case of the actuating means illustrated in Figs. 1 and 2, employing a link, the outer stem 19′ is pushed up against the inner stem 19, so that one can move the other. As the cap 17 uncovers the hole or holes 15, the contents of the container 10 rush into the axial passageway of the inner and outer stationary members and are ultimately withdrawn through the nipple 30.

When it is desired to close the valve, the force applied to the lever 35 is removed. Since the springs 23 and 39 are under compression, as soon as the pressure on them is relieved, the stems 19 (or 19 and 19′) are forced outwardly, and the cap 17 is again brought back in its normal position over the inner stationary member 14. When in this position the ground seats 16 and 18 tightly and non-leakably engage one another.

Should any granular substance settle in the ground seats after the valve closing operation, the lever may be pulled and turned in such manner as to remove or grind down the objectionable foreign particles,—thus making it possible for the ground seats to engage each other non-leakably.

If for any reason the valve parts outside of the container should be injured, as when a heavy falling object strikes the same and bends them out of alignment with the valve parts on the inside of the container, the action of the springs in cooperation with the stem or stems would still keep the valve from leaking.

I claim:

1. An improved valve which comprises, a stationary member divided into two main parts having an axial passage therethrough, one part of which is adapted to be attached to the inside of a container, said part having a ground seat on the outside thereof, the other part of which is adapted to be attached to the outside of the container and in axial alignment with the first part, a hole in said inner stationary member part leading to the axial passage, a ground seated slidable cap member fitting over that part of the stationary member which is attached to the inside of the container, said ground seats being

adapted to engage each other non-leakably, and continuous actuating means within said main stationary members attached to said slidable member adapted to cause the engagement and disengagement of the ground seats, so that the contents within the container may be caused to pass through said hole when desired.

2. An improved valve which comprises, a stationary member divided into two main parts having an axial passage therethrough one part of which is adapted to be attached to the inside of a container, said part having a ground seat on the outside thereof, the other part of which is adapted to be attached to the outside of the container and in axial alignment with the first part, a hole in said inner stationary member part leading to the axial passage, a ground seated slidable cap member fitting over that part of the stationary member which is attached to the inside of the container, said ground seats being adapted to engage each other non-leakably, and linked actuating means within said main stationary members attached to said slidable member adapted to cause the engagement and disengagement of the ground seats, so that the contents within the container may be caused to pass through said hole when desired.

3. An improved valve comprising a stationary member divided into two main parts having an axial passage therethrough, one part of which is ground seated and adapted to be attached to the inside of a container, said part having associated therewith a ground seated, slidable member adapted to conduct the contents of the container to the axial passage thereof, the other part of which is adapted to be attached to the outside of the container, in axial alignment with the first part aud actuating means within said stationary member parts attached to said slidable member adapted to cause the engagement and dis-engagement of the ground seats.

In testimony whereof I affix my signature.

JOSEPH L. HUTCHINGS.