J. S. JUDELL.

FLUSHING VALVE.

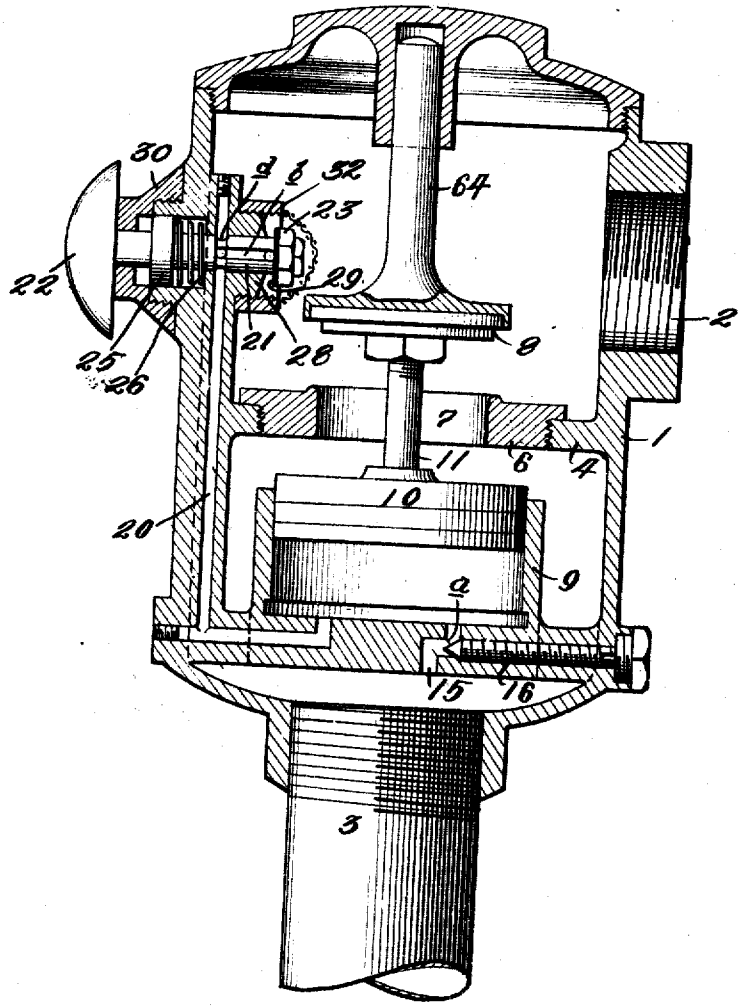
APPLICATION FILED JAN. 13, 1911.

1,005,117.

Patented Oct. 3, 1911.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

P. L. Farrington

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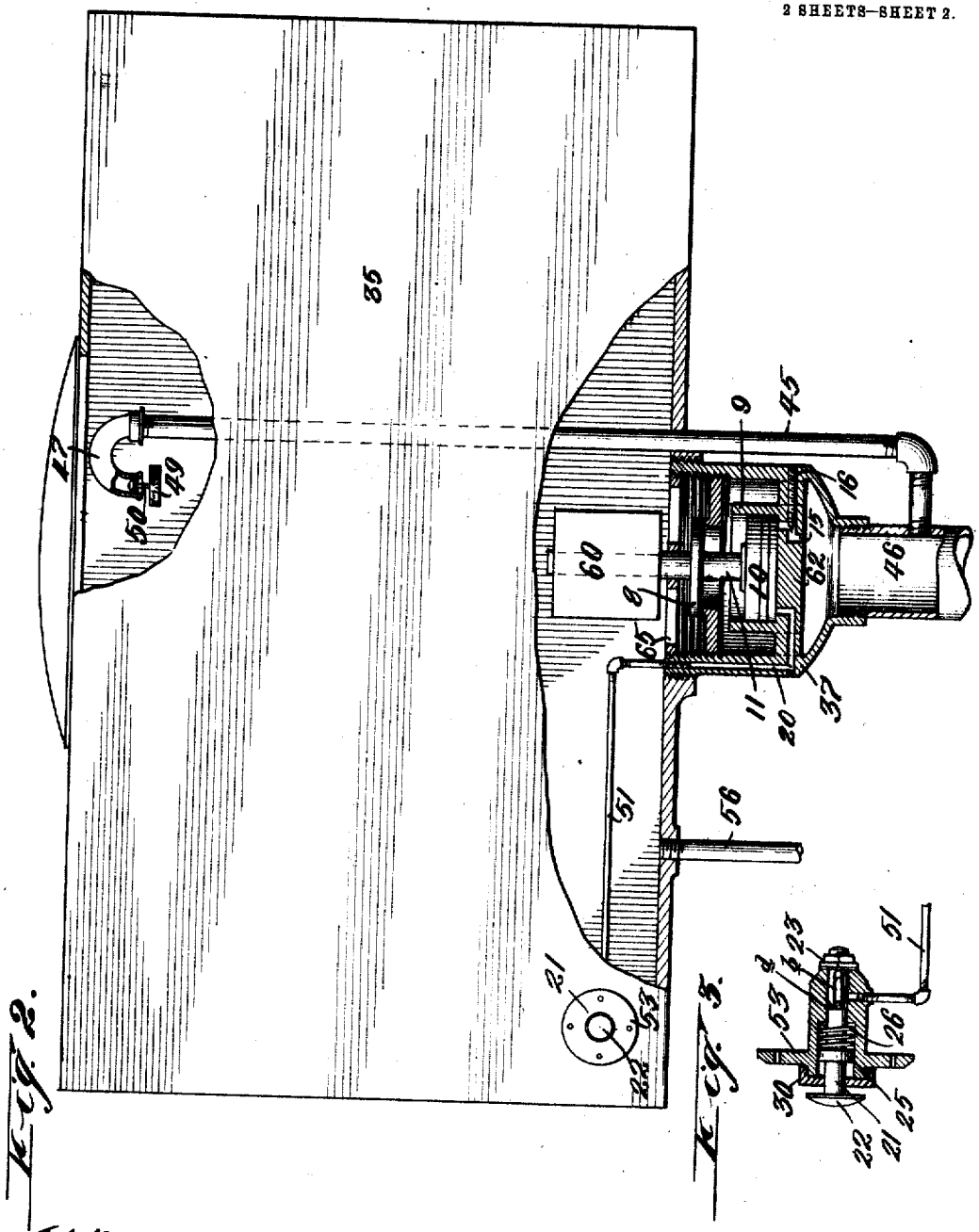

Fig. 2.

Fig. 3.

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UNITED STATES PATENT OFFICE.

JULIUS S. JUDELL, OF MILWAUKEE, WISCONSIN.

FLUSHING-VALVE.

1,005,117. Specification of Letters Patent. Patented Oct. 3, 1911.

Application filed January 13, 1911. Serial No. 602,434.

To all whom it may concern:

Be it known that I, JULIUS S. JUDELL, a citizen of the United States, residing at Milwaukee, county of Milwaukee, and State of Wisconsin, have invented new and useful Improvements in Flushing-Valves, of which the following is a specification.

My invention relates to improvements in flushing valves.

The objects of my invention are to provide simple and reliable mechanism which will require no special form of packing for the actuating and regulating elements and which may be employed in connection with storage tanks and operated successfully without reference to the size of the supply pipe.

In the following description, reference is had to the accompanying drawings in which,—

Figure 1 is a vertical sectional view of a flushing valve embodying one form of my invention. Fig. 2 is a side view, part in section, showing another embodiment of my invention, and illustrating it as used in connection with a storage tank. Fig. 3 is a detail view of the manually actuated starting valve employed in Fig. 2.

Like parts are identified by the same reference characters throughout the several views.

In Fig. 1 the valve casing 1 is provided with an inlet 2 and outlet 3, and is subdivided interiorly by a partition 4. The partition 4 has a removable member 6 provided with an opening 7 which is normally closed by a valve 8.

Below the partition, I provide a cup shaped member 9 which receives a piston 10, and this piston is connected with the valve 8 by a stem 11. A duct 15 connects the cup space below piston 10 with the outlet 3, and a set screw 16 is employed to regulate the flow of liquid from the cup to the outlet. This duct and set screw are of the ordinary type employed in flushing valves to establish a closing interval, except that I have provided an elbow at *a* into which the point of the set screw enters, on the axis of one arm of the elbow. With this arrangement the set screw may serve as a needle valve, providing efficient means for regulating the time interval.

The cup member 9 may receive water through a duct 20, connected with the supply water of the casing inlet 2 at any suitable point. In the construction shown in Fig. 1, I extend this duct horizontally to the side wall of the casing 1 and then upwardly in a rib or thickened portion of the side wall to a point above the partition 4. The upper end of the duct 20 is closed, but a slide valve 21 is mounted in an aperture in the side wall of the casing in a position crossing the duct. This slide valve is one of the important features of my invention in that its construction, as well as its relation to the duct 20, provides effective means for preventing leakage, when the valve becomes worn or the packing defective. The valve 21 forms a portion of a member having, in general, the form of an ordinary bolt extending through the casing wall with a head 22 on the outer end, forming an actuating knob, and a nut 23 on the inner end, which is preferably locked by any suitable means after being properly adjusted. The portion of the member which constitutes the valve is provided with a longitudinal groove *b*, preferably terminating, at its outer end, in an annular groove *d*. A collar 25 on the valve member is socketed in the casing wall, with a coiled spring 26 bearing upon its inner face, which tends to hold the valve in closed position. When pushed inwardly to the position illustrated in Fig. 1, the valve groove *b* will receive water from the interior of the casing 1 and deliver it through the groove *d* to the duct 20. When released, the valve member is moved outwardly by the reaction of spring 26, until groove *d* is covered by the casing wall and the inner end of groove *b* is covered by the projection 28 on such wall. As an additional security against leakage, the inner surface of projection 28 is faced off to receive the nut 23 which serves as a valve, and is preferably provided with a non-metallic covering 29 preferably rubber or leather to seat against said projection 28. Notwithstanding these features, there is still a possibility that, with continued use, a slight leakage may result, but it will be observed that the arrangement is such that the leakage water will be received by the duct 20 and pass to outlet through duct 15, thus doing no material damage. It will therefore not be found essential to pack the valve member either in the casing wall or in the removable cap 30 which affords access to the spring socket. A screw cup 32 covers the inner end of the valve.

The operation of the device will be appar-

ent from the above description. When the knob is pushed inwardly, water under the supply pressure, passes downwardly to the cup 9 under piston 10, and as the outlet through duct 15 is restricted, the piston will move upwardly and open valve 8, (which is of smaller area), against the pressure of the supply water. Water from the upper chamber above partition 4, will then pass downwardly to the outlet 3 around the cup 9. The actuating pressure on the valve knob having been relieved, and the valve having moved to closing position, the water in cup 9 is slowly delivered through duct 15, and the piston and valve 8 move downwardly by gravity, and under the pressure of the flowing water until valve 8 closes. During this downward movement of the main or piston actuated valve, considerable pressure is exerted upon the water underneath the piston, but by arranging the starting valve member 21 so that it will cut off communication between the duct 20 and the inner face of the valve nut 23, said back pressure is exerted merely against the cylindrical side of the starting valve member 21, instead of being permitted to enter the groove *b* in said valve, which would convey it to the nut valve 23. It will be understood that this result is secured by having member 21 closely fit the walls through which the duct 20 passes, said valve 21 serving as a slide valve, which, under ordinary conditions, would be effective for the accomplishment of my purposes, independently of the nut valve 23. This slide valve not only fits the walls of the opening occupied by it on the inner side of the duct 20, but also fits said walls closely on the outer side of said duct, and when the valve is closed, the annular groove *d* does not register with the duct 20 (or duct 51 in Fig. 3).

Referring to Fig. 2, it will be observed that a closed reservoir 35 is provided with a valve 8, cup 9 and piston 10 connected to the valve by a stem 11, all like the corresponding parts shown in Fig. 1, and located in a casing 37 depending from the reservoir 35. The casing 37 corresponds with the lower portion of the casing 1, in Fig. 1, and the reservoir 35 corresponds with the upper portion of the casing 1 above partition 4 in Fig. 1, said reservoir 35 being employed to store water when the supply pipe is small. In this construction it is necessary to provide for air admission to the reservoir in order to allow the water to discharge. This is accomplished by a duct or pipe 45 extending from the outlet pipe 46 to the upper portion of the reservoir, at which point the pipe 45 is provided with a U-shaped bend 47, and the down-turned extremity carries a float valve 49 which, when the water level drops, hangs suspended from the pipe 45 by a headed stem 50. The piston 10 is actuated, in the construction shown in Fig. 2, in the same manner as in Fig. 1, but the starting valve 21 is located at a greater distance from the cup 9, and the duct 20 is extended to the valve 21, preferably in the form of a pipe 51 within the reservoir. The valve 21 is shown in section in Fig. 3 and is the same in structure as in Fig. 1, but is located in a removable fitting 53, which takes the place of the casing wall in Fig. 1, and with which fitting, pipe 51 connects. The valve 21 is shown in closed position in Fig. 3.

In the operation of this device, valve 21 is opened and piston 10 lifted by water pressure from the reservoir to open valve 8. As the water in the reservoir drops, the float valve opens and air enters from the outlet, thus permitting a delivery of all the water from the reservoir if valve 8 remains open long enough. When valve 8 closes, the reservoir refills from inlet pipe 56 until the water strikes the float valve 49, the reservoir air passing to the outlet pipe 46. Float valve 49 is then lifted by the water to close the pipe 45, after which the remaining air in the reservoir will be compressed until its resistance prevents a further entry of water. This residual air re-expands when valve 8 is again opened, thus preventing a vacuum until the water level has dropped sufficiently to permit float valve 49 to again open. A weight 60 is preferably employed for the valve 8. In most cases this will not be found essential, although desirable for small valves. It will be observed that the cup, or cup shaped socket 9 is supported in the casing by a transverse member 62 in which the duct 15 and the lower portion of the duct 20 extend, and in which also the screw 16 is mounted, the water passing downwardly on each side of this member through openings indicated in Fig. 1, by dotted lines. In Fig. 1, the valve has an upwardly extending guide stem 64, and in Fig. 2 a spider frame 65 serves as a guide. The valved duct 45 may of course be employed in the structure shown in Fig. 1, if desired.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is,—

1. In a device of the described class, the combination with a chambered casing, provided with an inlet and an outlet, a piston actuated main valve controlling the delivery of fluid through the casing from the inlet to the outlet, a cylinder below the valve, a piston in the cylinder connected with the valve, a cylinder supply duct leading to the cylinder from above the valve, and an exhaust duct leading from the cylinder to said outlet,—of a starting valve, comprising a slide valve member extending across the end of the cylinder supply duct to the interior of said casing and provided with a passage,

adapted, when said member is in open position, to connect the supply end of the casing with said duct, and a head on the inner end of said member, seating, when the valve member is in closing position, against the interior wall of the casing,—the ends of said valve passage being also closed, in such position, by the casing wall; whereby the duct is closed by said sliding member against back pressure from below the piston to prevent such back pressure from being applied to the valve head and opening the starting valve when the main valve and piston are moving to closing position.

2. In a device of the described class, the combination with a chambered casing, provided with an inlet and an outlet, a piston actuated main valve controlling the delivery of fluid through the casing from the inlet to the outlet, a cylinder below the valve, a piston in the cylinder connected with the valve, a cylinder supply duct leading to the cylinder from above the valve, and an exhaust duct leading from the cylinder to said outlet,—of a starting valve, comprising a slide valve member extending across the end of the cylinder supply duct to the interior of said casing and provided with a passage, covered by the walls of the duct and having an angular extension, adapted, when the starting valve is in open position to register with said duct and allow fluid to pass from the interior of the casing through said passage and its extension into the duct, and a head on the inner end of said member, seating, when the valve member is in closing position, against the interior wall of the casing,—the ends of said valve passage being also closed, in such position, by the casing wall, whereby the duct is closed by said sliding member against back pressure from below the piston to prevent such back pressure from being applied to the valve head and opening the starting valve when the main valve and piston are moving to closing position.

3. In a device of the described class, the combination with a chambered casing provided with an inlet and an outlet, an intermediate main valve controlling the delivery of fluid from the inlet to the outlet, a cylindrical member below said valve provided with a piston rigidly connected with the valve, said casing having a duct leading from the inlet portion of the casing to said cylindrical member below the piston, and a starting valve controlling the delivery of power fluid through said duct, said starting valve comprising a slide valve member provided with a passage, normally out of communication with said duct, and a disk valve member seated against the wall within which said duct is located, said starting valve when open, having said passage in communication with the duct and with the inlet portion of said chambered casing, whereby the starting valve when open, is adapted to deliver the supply fluid to the space below the piston and when closed, to cut off communication between such space and the supply chamber at a plurality of points, substantially as described.

4. In a device of the described class, the combination with a chambered casing provided with an inlet and an outlet, an intermediate main valve controlling the delivery of fluid from the inlet to the outlet, a cylindrical member below said valve provided with a piston rigidly connected with the valve, said casing having a duct leading from the inlet portion of the casing to said cylindrical member below the piston, and a starting valve controlling the delivery of power fluid through said duct, said starting valve comprising a slide valve member provided with a passage, normally out of communication with said duct, and a disk valve member seated against the wall within which said duct is located, said starting valve when opened, having said passage in communication with the duct and with the inlet portion of said chambered casing, whereby the starting valve when opened, is adapted to deliver the supply fluid to the space below the piston, and when closed, is adapted to cut off communication between such space and the supply chamber at a plurality of points, together with a screen covering said disk valve, adapted to prevent sediment from the supply chamber from interfering with the operation of said valve.

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

JULIUS S. JUDELL.

Witnesses:
LEVERETT C. WHEELER,
OTTILIA WEBER.