E. G. WATROUS.

VALVE.

APPLICATION FILED SEPT. 20, 1912.

1,143,669.

Patented June 22, 1915.

Fig. 1.

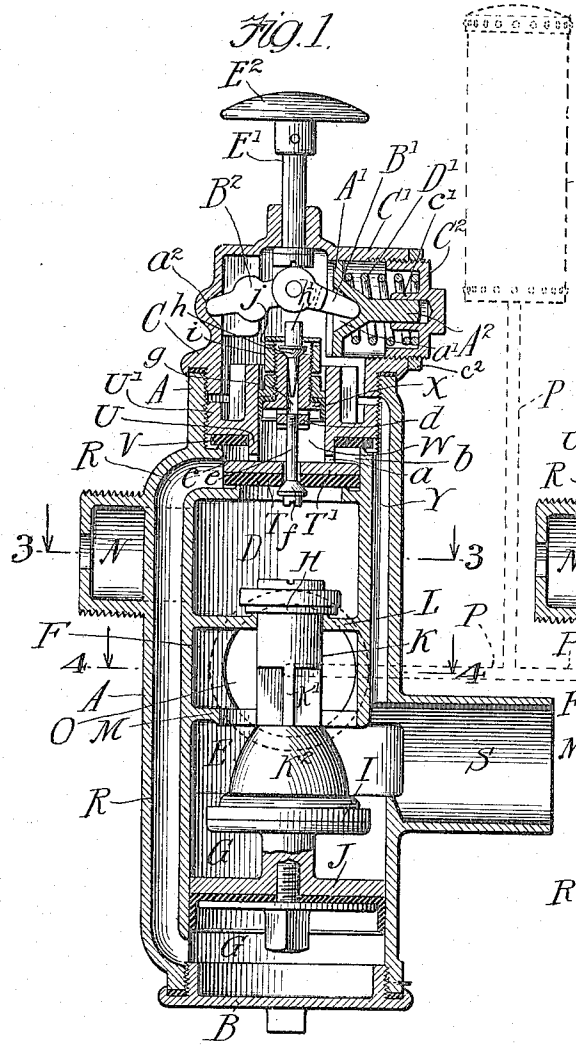


Fig. 2.

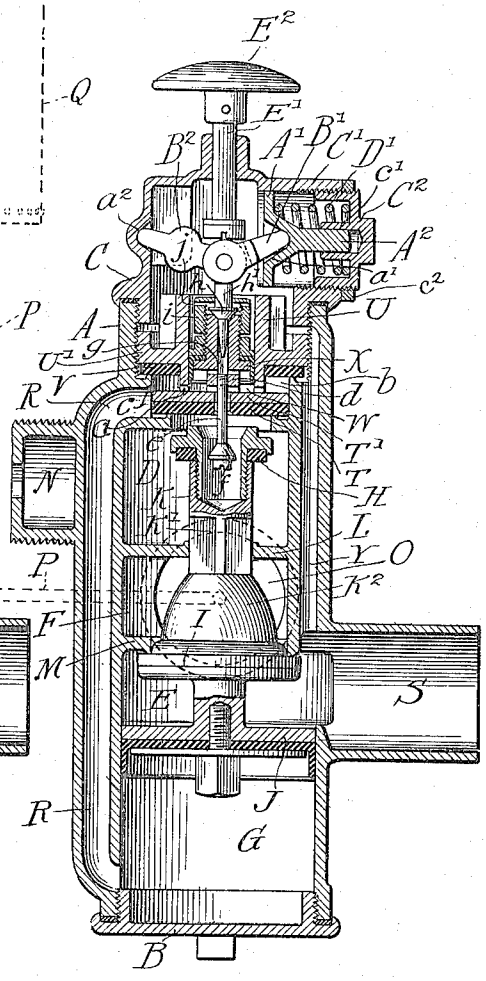


Fig. 3.

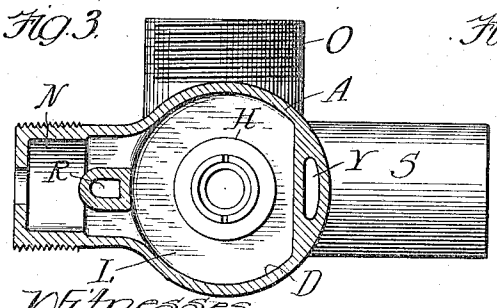
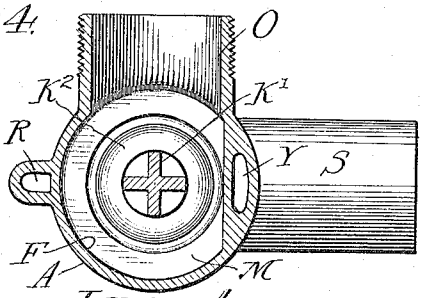


Fig. 4.



Witnesses
Martin Hedsen.
Robert Dobbenman.

Inventor
Earl G. Watrous
By Rector Hibben Davis & Macauley
his Attys.

UNITED STATES PATENT OFFICE.

EARL G. WATROUS, OF CHICAGO, ILLINOIS.

VALVE.

1,143,669. Specification of Letters Patent. Patented June 22, 1915.

Application filed September 20, 1912. Serial No. 721,370.

To all whom it may concern:

Be it known that I, EARL G. WATROUS, a citizen of the United States, residing at Chicago, in the State of Illinois, have invented certain new and useful Improvements in Valves, of which the following is a description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates more particularly to flushing valves which operate to control the admission of a supply of water under pressure to a closed tank, and its subsequent discharge from said tank to a water-closet to flush the latter, and has for its principal object the provision of such a controlling valve which may be operated, or set in operation, manually, to admit the supply of water under pressure to the closed tank, and which shall be subsequently operated automatically by the pressure of such water, to discharge the water from the tank to the closet.

My invention may be embodied in various forms, and contemplates broadly such a manually operated and automatically operating valve adapted to be combined with a closed tank and water-closet for the purpose described.

One form of embodiment of my invention is illustrated in the accompanying drawings, in which—

Figure 1 represents a middle vertical section of the valve with the parts in their normal position of rest; Fig. 2 a corresponding view of the parts in the position which they occupy after having been manually set in operation and moved to admit the water under pressure to the closed tank; Fig. 3 a horizontal section on the line 3—3 of Fig. 1, and Fig. 4 a similar view on the line 4—4.

The same letters of reference are used to indicate corresponding parts in the several views.

The main portion or body of the valve casing, A, is of general cylindrical form, and is provided at its upper and lower ends with internal screw-threads, those at the lower end to receive the screw cap B by which the lower end of the casing is closed, and those at the upper end to receive the top cap C of the casing and other parts hereinafter described. The interior of the valve casing is divided into what may be termed an inlet chamber D, an outlet or discharge chamber E, an intermediate chamber F and a piston chamber G. Communication between the inlet chamber D and intermediate chamber F is controlled by a valve H, and communication between the intermediate chamber F and outlet chamber E by a valve I, said valves and the piston J working in the piston chamber G being carried by a single stem K. The valve H closes against an annular seat formed for it on the upper side of the diaphragm or partition L which separates the inlet chamber D from the intermediate chamber F, around the opening in said diaphragm through which the valve stem K passes, while the valve I closes upwardly against a seat provided for it upon the under side of the partition M which separates the intermediate chamber F from the outlet or discharge chamber E.

The inlet chamber D is in communication with the water supply by the pipe-connection N, and is therefore constantly filled with water under pressure; while the intermediate chamber F is in communication, through the pipe connection O and pipe P, with the closed tank Q, as indicated in dotted lines in the drawings.

The valve is set in operation by admitting water under pressure from the inlet chamber D to the bottom of the piston chamber G through a passage R, such water pressure admitted to the under side of the piston J serving to lift the latter and the valves H and I to the position shown in Fig. 2, the valve I closing against the seat upon the under side of the partition M and cutting off communication between the intermediate chamber F and outlet chamber E, while the valve H is lifted away from its seat on the partition L, placing the inlet chamber D and intermediate chamber F in communication with each other by the bringing of a cut-away or winged portion K′ of the valve stem K into the opening in the partition L. Water under pressure will then pass from the inlet chamber D to the intermediate chamber F, and thence to the closed tank Q and fill the latter to the extent permitted by the air trapped in its upper end.

I will now describe the means for admitting the water pressure from the inlet cham-

ber D to the under side of the piston J through the passage R, to lift the piston and valves to the position shown in Fig. 2, and the means for subsequently causing the water pressure to automatically return them to normal position and discharge the contents of the tank Q through the valve to the closet. The otherwise open upper end of the inlet chamber D is closed by a leather disk T upon which rests a metal disk T′ of corresponding size and shape, said disks being held in place by a cylinder U, whose lower end bears against the upper face of the disk T′. This cylinder is surrounded near its lower end with an integral annular flange U′ whose vertically extended outer edge is screw-threaded to engage the internal threads in the upper end of the main valve shell or casing A. A packing ring V is confined between the under side of the flange U′ and a seat formed for it within the valve casing, above the disks T T′, to effect a tight joint between said flange and casing. Ports *a* formed by notches cut in the lower end of the cylinder U afford communication between the interior of said cylinder and the shallow annular chamber *b* surrounding it between the upper surface of the disk T′ and the under surface of the packing ring V, such annular chamber *b* being in open communication, at *c*, with the passage R leading to the under side of the piston J at the lower end of the casing A. As shown in Fig. 3, the passage R consists of a tube or inclosed duct independent of the side walls of the inlet chamber D where it crosses the latter, leaving said chamber in free and open communication, around passage R, with the inlet N; while below the bottom of the chamber D, as shown in Fig. 4, the passage R is formed in the wall of the casing A, outside the chambers F, E and G therein.

The interior of the cylinder U constitutes a piston chamber W in which fits and travels a piston X. Screwed into the lower end of this piston, or into a boss *d* formed upon its lower end, is the upper end of a valve stem *e* whose lower end passes through a central opening (somewhat larger than the stem) in the disks T T′ and carries a conical valve *f* which seats against the under side of the disk T and normally cuts off communication between the inlet chamber D and the interior of the cylinder U, or piston chamber W, above the disks T T′. When the piston X and valve stem *e* are depressed the valve *f* is unseated and the inlet chamber D thereby placed in communication with the interior of the cylinder U, and thence through the ports *a* and annular chamber *b* with the passage R leading to the under side of the piston J at the bottom of the valve casing, and water under pressure is permitted to pass to the under side of the piston J, to lift the latter and the valves H and I to the position shown in Fig. 2. The piston X and valve stem *e* and valve *f* are manually depressed, for this purpose, by means which may be now described.

The piston X is provided with an axial bore or passage *g* which communicates at its lower end, by lateral ports through the boss *d* on the under side of the piston, with the interior of the piston chamber W beneath the piston. The upper end of this axial passage through the piston is controlled by a relief valve *h* formed upon a valve stem *h′* extending both above and below the valve, the portion below the valve being reduced in size and tapered in form and extending downward into the passage *g* in the piston, and the portion above the valve being enlarged and projecting upward some distance above the top of the piston X. The valve *h* and its stem *h′* have limited vertical play with respect to the piston, so that the valve may be seated and unseated, and are held in place by a screw cap *i* surrounding and screwed upon the upper end of the piston, the interior of said cap, surrounding the valve *h* above the upper end of the piston, constituting a small chamber whose communication with the chamber W beneath the piston (through the axial passage *g* and ports in the boss *d*) is controlled by the valve *h*. This chamber within the screw cap *i* communicates by the ports *j* with the exterior space surrounding said cap, and thence with an escape or drainage passage Y formed in the wall of the valve casing A and communicating at its lower end with the discharge S.

The top cap C of the valve casing, which screws at its lower end into the internally threaded upper end of the body A of the casing and is provided with an annular flange between which and the upper end of the body of the casing is confined a packing ring, is provided with a laterally projecting internally threaded tubular or cylindrical portion C′ whose open outer end is closed by a screw cap C^2. Fitting within the inner end of such cylindrical portion C′ of the cap C is a disk A′ which is provided with an outwardly extending hub or stem A^2 which fits in a guide-way formed for it within an inwardly projecting sleeve *c′* on the screw cap C^2. The disk A′ is provided upon its inner side with a central conical recess *a′* in which fits the outer end of one arm B′ of a toggle-lever, the outer end of whose other arm B^2 fits in a similar conical or concave recess a^2 formed for it in the wall of the cap C. A spring D′ confined within the cylindrical portion C′ of the cap C, and surrounding the stem or hub A^2 of the disk A′, presses the latter inward

and serves to yieldingly hold the toggle-lever in either of its opposite positions to which it may be moved. In the position of parts shown in Fig. 1 the toggle-lever is bent upward and its joint immediately underlies the lower end of the stem E′ of a push-button E², by depressing which button and stem the joint of the toggle may be forced downward, against the resistance of the spring D′, to its opposite position, shown in Fig. 2. Now, when the joint of the toggle is thus forced downward by depressing the push-button E² it contacts with the upper end of the valve stem *h′* and forces the piston X downward to the position shown in Fig. 2. This serves to unseat the valve *f* and place the inlet chamber D in communication, through the central openings in the disks T T′, chambers W and *b*, and passage R, with the piston chamber G beneath the piston J, so that water under pressure will be admitted to the under side of the latter; and inasmuch as its area is very much larger than the effective area of the upper side of the valve H, which is exposed to the pressure of the water in the chamber D, said piston and the valves H and I will be quickly lifted to the position shown in Fig. 2, where the valve I will operate to cut-off communication between the intermediate chamber F and discharge chamber E, while the inlet chamber D will be placed in communication with the intermediate chamber F around the cut-away or winged portion K′ of the valve stem K. Inasmuch as the intermediate chamber F is in open communication, through the pipe connection O and pipe P, with the closed tank Q, the latter will be at once filled with water under pressure to the extent permitted by the air within said tank, which will be confined and compressed in the upper end of it.

The pressure of the water within the chamber D will be somewhat reduced by the opening of the valves *f* and H and the flow of water from said chamber to the piston chamber G in the bottom of the casing and to the closed tank Q, but as the latter becomes filled with water (to the extent permitted by the air within it) the normal water pressure will be restored in the inlet chamber D and in the passages and chambers in communication with it at such time, including the chamber W beneath the piston X, which latter has been depressed to the position shown in Fig. 2 by depression of the push-button E²; and the strength and adjustment of the spring D′, which yieldingly holds the toggle-lever in its opposite positions, are such that when the water pressure within the chamber W beneath the piston X is restored to approximately its normal degree it will lift the piston X against the resistance of the spring D′, and restore it to the position shown in Fig. 1, thereby again seating the valve *f* and cutting off any further communication of the inlet chamber D and water supply with the piston chamber W and likewise with the piston chamber G in the bottom of the casing, and the water under pressure in those chambers will thereupon slowly escape through the piston X (by the ports formed in its boss *d*, its axial passage *g*, and the ports *j* in the cap *i*) to the interior of the cap C surrounding the piston X and upper end of the cylinder U, and thence through the drain passage Y to the outlet S. Such escape of the water from the chamber W and passages and chambers in communication with it is prevented, during the time the parts are in the position shown in Fig. 2, by the closed position of the valve *h*, which is maintained in its closed position by the pressure of the spring D′ exerted upon it through the toggle-lever; but when the piston X is lifted by the water pressure beneath it, as heretofore explained, the toggle-lever will be first straightened out, and then, as soon as its joint passes upward beyond its dead center, it will be instantly sprung upward by the pressure of the spring D′ to its normal position, shown in Fig. 1, and its joint be thereby carried away from the valve stem *h′*, leaving the valve *h* free to be lifted by the water pressure exerted against its under side through the axial passage *g* in the piston X.

The escape of the water under pressure from the piston chamber G beneath the piston J, when the parts which have been depressed by the push-button E² are restored to normal position in the manner above explained, will relieve the pressure beneath the piston J and permit the then preponderating pressure upon the upper side of the valve I to force said valve and the parts moving with it downward to normal position again, thereby placing the intermediate chamber F and the closed tank Q in communication with the discharge outlet S of the valve casing, so that the water in the tank may flow through the valve to the closet to flush the latter. This flow of water from the closed tank to the closet will be supplemented by a greater or less amount from the inlet chamber D and direct source of supply during the time the valves H and I and piston J are returning to normal position. This return movement of such parts may be regulated as desired by controlling the rate of escape of the water from the piston chamber G through the passages provided for such escape, and during such return movement of them water will flow from the inlet chamber D to the intermediate chamber F and discharge passage S, around the cut-away or winged portion K′ of the

valve stem K, until the parts have moved downward far enough for the cylindrical portion of the valve stem K, above such cut-away portion, to enter and substantially close the valve opening in the partition L. The valve stem K is provided with a tapered enlargement K^2 above the valve I, the purpose of which is to somewhat restrict the escape of water from the chamber F at the beginning of the opening movement of the valve I, and to increase the freedom of its escape as the valve moves downward, and as the pressure of the water flowing through the chamber consequently diminishes, so as to produce a more even flow of water to the closet and a more uniform flushing of it.

Inasmuch as the piston X must be held in its depressed position, Fig. 2, against the resistance of the water pressure in the chamber W beneath it, during the time the closed tank is being filled with water, and inasmuch as it must be again lifted to normal position by the water pressure in the chamber W when such pressure has been restored to its normal degree, the pressure of the spring D′, which operates to hold the piston in depressed position when the parts are in the position of Fig. 2, may have to be varied with differing water pressures, and provision for such variation or adjustment is made in the construction illustrated by means of the screw cap C^2 against which the outer end of the spring D′ bears and by which it is confined within the cylindrical portion C′ of the cap C. By screwing this cap C^2 inward the pressure of the spring D′ may be increased, to adapt the valve for use with a higher water pressure, and by screwing it outward the pressure may be decreased to adapt the valve for use with a lower water pressure. By means of such adjustment or variation of the tension of the spring D′ the valve may also be set for operation at any desired pressure below the maximum water pressure and the flushing action of the valve be thereby regulated as desired. A lock-nut c^2 is provided for locking the cap C^2 in its various adjusted positions.

As will be understood from the foregoing description, I have provided a flushing valve, for use in connection with closed tanks and water-closets, which may be set in operation by the simple depression of a push-button, and which will thereafter operate automatically to admit water from the source of supply to the closed tank until the latter has become filled to the extent permitted by the air confined within it, and which will then further operate automatically to discharge the contents of the closed tank through the valve casing to the closet to flush the latter. So far as I am aware I am the first to produce a valve, of any construction, having this mode of operation or capable of producing the results described, or a valve of any kind controlling the admission of water from the source of supply to a closed tank and operating automatically to discharge the contents of the tank to the closet when the pressure in the tank has reached a predetermined degree; and I desire to claim as my invention a valve having such mode of operation and such capacity, as broadly as may be done.

Having thus fully described my invention, I claim:

1. A valve device for controlling the admission of water under pressure to a closed tank and its subsequent discharge therefrom, comprising an inlet valve for controlling the admission of the water to the tank and an outlet valve controlling its discharge therefrom and opening in the direction of such discharge, said valves being moved in both directions by water pressure, manually-operated means for causing the water pressure to move said valves in a direction to admit the water under pressure to the closed tank and prevent its escape therefrom, and means operated automatically by the pressure of the water in the tank to cause the water pressure acting upon the outlet valve to move the valves in the opposite direction to release and discharge the contents of the tank; substantially as described.

2. A valve device for controlling the admission of water under pressure to a closed tank and its subsequent discharge therefrom, comprising two valves moving in unison with each other and controlling, respectively, the admission of the water under pressure to the tank and its escape therefrom, said valves being moved in both directions by water pressure and the outlet valve opening in the direction of the discharge from the tank, manually-operated means for causing the water pressure to move the valves in a direction to admit the water under pressure to the closed tank and prevent its escape therefrom, and automatic means controlled by the pressure in the tank for causing the water pressure acting upon the outlet valve to move the valves in the opposite direction to release and discharge the contents of the tank; substantially as described.

3. A valve device for controlling the admission of water under pressure to a closed tank and its subsequent discharge therefrom, comprising two valves moving in unison with each other and controlling, respectively, the admission of the water under pressure to the tank and its escape therefrom, said valves being moved in both directions by water pressure, manually-operated means for causing the water pressure to move the valves in a direction to admit the water under pressure to the closed tank and prevent its escape therefrom, automatic means

controlled by the pressure in the tank for causing the water pressure to move the valves in the opposite direction to release and discharge the contents of the tank, and means for varying the pressure at which the valves shall be so moved to discharge the contents of the tank; substantially as described.

4. A valve device for controlling the admission of water under pressure to a closed tank and its subsequent discharge therefrom, comprising two valves moving in unison with each other and controlling, respectively, the admission of the water under pressure to the tank and its escape therefrom, said valves being moved in both directions by the water pressure, manually-operated means for causing the water pressure to move the valves in a direction to admit the water under pressure to the closed tank and prevent its escape therefrom, means automatically operated by the pressure of the water in the tank, against the resistance of a spring, for causing the water pressure to move the valves in the opposite direction to release and discharge the contents of the tank, and means for varying the tension of said spring; substantially as described.

5. A valve device for controlling the admission of water under pressure to a closed tank and its subsequent discharge therefrom, comprising an inlet valve for controlling the admission of the water to the tank, an outlet valve controlling the discharge therefrom and opening in the direction of the discharge, a piston for moving said valves, means for causing the water pressure to be admitted to one side of said piston, to move the valves in a direction to admit the water under pressure to the closed tank and prevent its escape therefrom, and means operated automatically by the pressure of the water in the tank for relieving the piston of the pressure by which it has been moved and permitting the tank pressure acting upon the outlet valve and close the inlet valve; substantially as described.

6. A valve device for controlling the admission of water under pressure to a closed tank and its subsequent discharge therefrom, comprising an inlet valve and an outlet valve and a piston carried by a single stem, said valves controlling, respectively, the admission of the water under pressure to the tank and its escape therefrom, the outlet valve opening in the direction of the discharge from the tank, means for admitting the water pressure to one side of the piston to cause it to move the valves in a direction to admit the water under pressure to the closed tank and prevent its escape therefrom, and means operated automatically by the pressure of the water in the tank for relieving the piston of the pressure by which it has been moved and permitting the tank pressure acting upon the outlet valve to open said valve and close the inlet valve returned to normal position; substantially as described.

7. A valve device for controlling the admission of water under pressure to a closed tank and its subsequent discharge therefrom, comprising two valves controlling, respectively, the admission of the water under pressure to the tank and its escape therefrom, a piston for moving said valves in a direction to admit the water under pressure to the tank and prevent its escape therefrom, means for admitting the water pressure to the piston to so move it, means operated automatically by the pressure in the tank for relieving the piston of the pressure by which it has been moved and permitting it and the valves to be returned to normal position, and means for varying the pressure at which the piston is so relieved of the water pressure by which it has been moved; substantially as described.

8. A valve device for controlling the admission of water under pressure to a closed tank and its subsequent discharge therefrom, comprising two valves controlling, respectively, the admission of the water under pressure to the tank and its escape therefrom, a piston for moving said valves in a direction to admit the water under pressure to the tank and prevent its escape therefrom, means for admitting water pressure to said piston to so move it, means operated automatically by the pressure of the water in the tank, against the resistance of a spring, to relieve the piston of the pressure by which it has been moved and permit it and the valves to be returned to normal position, and means for varying the tension of said spring; substantially as described.

9. A valve device for controlling the admission of water under pressure to a closed tank and its subsequent discharge therefrom, comprising two valves controlling, respectively, the admission of the water under pressure to the tank and its escape therefrom, a piston for moving said valves in a direction to admit the water under pressure to the tank and prevent its escape therefrom, manually-operated means for causing the water pressure to be admitted to the piston to so move it, and means operated automatically by the water pressure in the tank for relieving the piston of the pressure by which it has been moved and permitting it and the valves to be returned to normal position; substantially as described.

10. A valve device for controlling the admission of water under pressure to a closed tank and its subsequent discharge therefrom, comprising two valves and a piston carried by a single stem, said valves controlling, respectively, the admission of the water un-

der pressure to the tank and its escape therefrom, manually-operated means for admitting water pressure to one side of the piston to cause it to move the valves in a direction to admit the water under pressure to the closed tank and prevent its escape therefrom, and means operated automatically by the water pressure in the tank for relieving the piston of the pressure by which it has been moved and permitting it and the valves to be returned to normal position; substantially as described.

11. A valve device for controlling the admission of water under pressure to a closed tank and its subsequent discharge therefrom, comprising two valves and a piston carried by a single stem, said valves controlling, respectively, the admission of water under pressure to the tank and its escape therefrom, manually-operated means for admitting water pressure to one side of the piston to cause it to move the valves in a direction to admit the water under pressure to the closed tank and prevent its escape therefrom, means operated automatically by the pressure in the tank, against the resistance of a spring, for relieving the piston of the pressure by which it has been moved and permitting it and the valves to be returned to normal position, and means for varying the tension of said spring; substantially as described.

12. A valve device for controlling the admission of water under pressure to a closed tank and its subsequent discharge therefrom, comprising a casing containing an inlet chamber, an outlet chamber, an intermediate chamber and a piston chamber, a valve controlling communication between the inlet chamber and the intermediate chamber, a second valve controlling communication between the intermediate chamber and the outlet chamber, a piston for moving said valves in a direction to open communication betweent the inlet chamber and intermediate chamber and close communication between the intermediate chamber and the outlet chamber, said intermediate chamber being adapted to be connected with a closed tank, means for admitting water under pressure to one side of the piston to cause it to move the valves in a direction to open communication between the inlet chamber and the intermediate chamber and closed tank and to close communication between the intermediate chamber and outlet chamber, and means operated automatically by the pressure in the tank for relieving the piston of the pressure by which it has been moved and permitting it and the valves to be returned to normal position, to close communication between the inlet chamber and intermediate chamber and open communication between the intermediate chamber and outlet chamber; substantially as described.

13. A valve device for controlling the admission of water under pressure to a closed tank and its subsequent discharge therefrom, comprising a casing containing an inlet chamber, an outlet chamber, an intermediate chamber, and a piston chamber, a valve for controlling communication between the inlet chamber and intermediate chamber, a second valve for controlling communication between the intermediate chamber and the outlet chamber, a piston in the piston chamber, said valves and piston being carried by a single stem, and said intermediate chamber being adapted for connection with a closed tank, means for admitting water under pressure to one side of the piston to cause it to move the valves in a direction to open communication between the inlet chamber and the intermediate chamber and tank and to close communication between the intermediate chamber and outlet chamber, and means operated automatically by the pressure in the tank for relieving the piston of the pressure by which it has been moved and permitting it and the valves to be returned to normal position; substantially as described.

14. A valve device for controlling the admission of water under pressure to a closed tank and its subsequent discharge therefrom, comprising a casing containing an inlet chamber, an outlet chamber, an intermediate chamber and a piston chamber, said intermediate chamber being adapted for connection with the closed tank, a valve controlling communication between the inlet chamber and intermediate chamber, a second valve controlling communication between the intermediate chamber and the outlet chamber, a piston in the piston chamber for moving said valves in a direction to open communication between the inlet chamber and intermediate chamber, and close communication between the intermediate chamber and outlet chamber, means for admitting water under pressure to one side of said piston to so move said valves, means operated automatically by the pressure in the tank, against the resistance of a spring, for relieving the pressure which has moved the piston and permitting it and the valves to be returned to normal position, and means for varying the tension of said spring; substantially as described.

15. A valve device for controlling the admission of water under pressure to a closed tank and its subsequent discharge therefrom, comprising manually-operated means for setting the valve in operation to admit the water to the tank, said manually-operated means including a toggle lever, a spring for yieldingly holding the toggle in its opposite positions, means for manually moving the toggle from normal position to its opposite position, and means operated automatically

by the pressure of the water in the tank, against the resistance of the spring, for returning the toggle to normal position and causing the valve to release and discharge the contents of the tank; substantially as described.

16. A valve for controlling the admission of water under pressure to a closed tank and its subsequent discharge therefrom, comprising manually-operated means for setting the valve in operation to admit the water to the tank, said manually-operated means including a toggle lever, a spring for yieldingly holding it in its opposite positions, and a push button for moving it from normal position to its opposite position, and means operated automatically by the pressure of the water in the tank, against the resistance of the spring, for returning the toggle to normal position and causing the valve to release and discharge the contents of the tank; substantially as described.

17. A valve device for controlling the admission of water under pressure to a closed tank and its subsequent discharge therefrom, comprising two valves controlling, respectively, the admission of the water to the tank and its escape therefrom, a piston for moving said valves in a direction to admit the water to the tank and prevent its escape therefrom, a supplemental valve controlling the admission of water pressure to the piston, a relief valve controlling its escape therefrom, manually-operated means for opening the supplemental valve and maintaining the relief valve closed, and means operated by the water pressure in the tank for closing the supplemental valve and permitting the relief valve to open; substantially as described.

18. A valve device for controlling the admission of water under pressure to a closed tank and its subsequent discharge therefrom, comprising two valves controlling, respectively, the admission of the water to the tank and its escape therefrom, a piston for moving said valves in a direction to admit the water to the tank and prevent its escape therefrom, a supplemental piston, a supplemental valve moved thereby and controlling the admission of water pressure to the main piston, a relief valve controlling the escape of water pressure from the main piston, manually-operated means for moving the supplemental piston in a direction to open the supplemental valve and maintain the relief valve closed, and a spring opposing the return movement of the supplemental piston and the opening of the relief valve under the pressure of the water in the tank exerted upon the supplemental piston; substantially as described.

19. A valve device for controlling the admission of water under pressure to a closed tank and its subsequent discharge therefrom, comprising two valves controlling, respectively, the admission of the water to the tank and its escape therefrom, a main piston for moving said valves in a direction to admit the water to the tank and prevent its escape therefrom, a supplemental piston, a supplemental valve moved thereby and controlling the admission of the water pressure to the main piston, a relief valve moving with the piston and controlling the escape of water pressure from the main piston through the supplemental piston, a toggle lever, a spring for yieldingly holding it in its opposite positions, a push button for moving said toggle from normal position to its opposite position and thereby moving the supplemental piston in a direction to open the supplemental valve, said toggle lever operating to yieldingly hold the supplemental piston in moved position and the relief valve in closed position against the pressure of the water in the tank exerted against the supplemental piston and relief valve; substantially as described.

20. A valve device for controlling the admission of water under pressure to a closed tank, comprising a casing containing an inlet chamber, an outlet chamber, an intermediate chamber and a piston chamber, said intermediate chamber being adapted for connection with the closed tank, a valve controlling communication between the inlet chamber and intermediate chamber, a second valve controlling communication between the intermediate chamber and outlet chamber, a piston in the piston chamber for moving said valves in a direction to admit the water under pressure to the closed tank and prevent its escape therefrom, a supplemental piston chamber communicating with the main piston chamber and containing a supplemental piston, a supplemental valve carried by said supplemental piston and controlling communication between the inlet chamber and supplemental piston chamber, a relief valve carried by the piston and controlling the escape of the water pressure from the main piston chamber through the supplemental piston chamber and piston, manually-operated means for moving the supplemental piston to open the supplemental valve, and a spring operating to yieldingly hold the supplemental piston in moved position and the relief valve in closed position against the water pressure in the tank exerted against the supplemental piston; substantially as described.

21. A valve device for controlling the admission of water under pressure to a closed tank, comprising a casing containing an inlet chamber, an outlet chamber, an intermediate chamber and a piston chamber, said intermediate chamber being adapted for connection with the closed tank, a valve controlling communication between the inlet

chamber and intermediate chamber, a second valve controlling communication between the intermediate chamber and outlet chamber, a piston in the piston chamber for moving said valves in a direction to admit the water under pressure to the closed tank and prevent its escape therefrom, a supplemental piston chamber communicating with the main piston chamber and containing a supplemental piston, a supplemental valve carried by said supplemental piston and controlling communication between the inlet chamber and supplemental piston chamber, a relief valve carried by the piston and controlling the escape of the water pressure from the main piston chamber through the supplemental piston chamber and piston, a toggle lever adapted when moved from its normal position to its opposite position to move the supplemental piston in a direction to open the supplemental valve and hold the relief valve closed, and a spring for yieldingly holding the toggle lever in its opposite positions; substantially as described.

22. In a valve device, the combination, with a piston adapted to be moved in one direction manually and in the opposite direction by water pressure, of a toggle lever adapted to be moved from normal position to its opposite position and move the piston with it, and a spring for yieldingly holding the toggle in its opposite positions; substantially as described.

23. In a valve device, the combination, with a piston adapted to be moved in one direction manually and in the opposite direction by water pressure, a push button for manually moving said piston in the one direction, a toggle lever interposed between the push button and piston, and a spring for yieldingly holding the toggle in its opposite positions; substantially as described.

24. In a valve device, the combination, with a piston adapted to be moved manually in one direction and by water pressure in the other, a valve carried by the piston and adapted to be opened by the movement of the piston manually in the one direction, a relief valve carried by the piston and controlling an escape passage leading through the same, a push button for manually moving the piston in the one direction, a toggle lever interposed between the push button and the relief valve carried by the piston and operating to hold said valve closed when the piston is manually moved by the push button, and a spring for yieldingly holding the toggle in its opposite positions; substantially as described.

25. In a valve device, the combination of a piston chamber and piston, a valve carried by the piston and operating to control the admission of water pressure to the piston chamber, means for manually moving the piston in one direction to open the valve to admit the water pressure to the piston chamber, and a spring operating to resist the return of the piston to normal position by the water pressure so admitted to the piston chamber; substantially as described.

26. In a valve device, the combination of a piston chamber and piston, a valve carried by the piston and controlling the admission of pressure to the piston chamber, manually-operated means, including a toggle lever, for moving the piston in a direction to open the valve and admit pressure to the piston chamber, and a spring operating through said toggle lever to oppose the return of the piston to normal position by the pressure admitted to the piston chamber; substantially as described.

27. In a valve device, the combination of a piston chamber and piston, a valve carried by the piston and controlling the admission of pressure to the piston chamber, a push button for manually moving the piston in a direction to open said valve and admit pressure to the piston chamber, a toggle lever interposed between the push button and piston, and a spring operated to yieldingly hold the toggle in its opposite positions and resist the return of the piston to normal position by the pressure admitted to the piston chamber; substantially as described.

28. In a valve device, the combination of a piston chamber and piston, an admission valve carried by the piston and controlling the admission of pressure to the piston chamber, a relief valve carried by the piston and controlling the escape of pressure from the piston chamber through the piston, means for manually moving the piston in a direction to open the admission valve and admit pressure to the piston chamber, and a spring operating to yieldingly hold the piston in its moved position, and the relief valve in its closed position, against the pressure admitted to the piston chamber; substantially as described.

29. In a valve device, the combination of a piston chamber and piston, an admission valve carried by the piston and controlling the admission of pressure to the piston chamber, a relief valve carried by the piston and controlling the escape of pressure from the piston chamber through the piston, manually - operated means, including a toggle lever, for moving the piston in a direction to open the admission valve, and a spring operating through said toggle to yieldingly hold the piston in its moved position and the relief valve its closed position against the pressure admitted to the piston chamber; substantially as described.

30. In a valve device, the combination of a piston chamber and piston, an admission valve carried by the piston and controlling the admission of pressure to the piston

chamber, a relief valve also carried by the piston and controlling the escape of pressure from the piston chamber through the piston, a push button for manually moving the piston in a direction to open the admission valve, a toggle lever interposed between the push button and the relief valve carried by the piston, and a spring operating through said toggle to yieldingly hold the piston in its moved position and the relief valve in closed position against the pressure admitted to the piston chamber; substantially as described.

EARL G. WATROUS.

Witnesses:
L. DARROCH,
ROBERT DOBBERMAN.