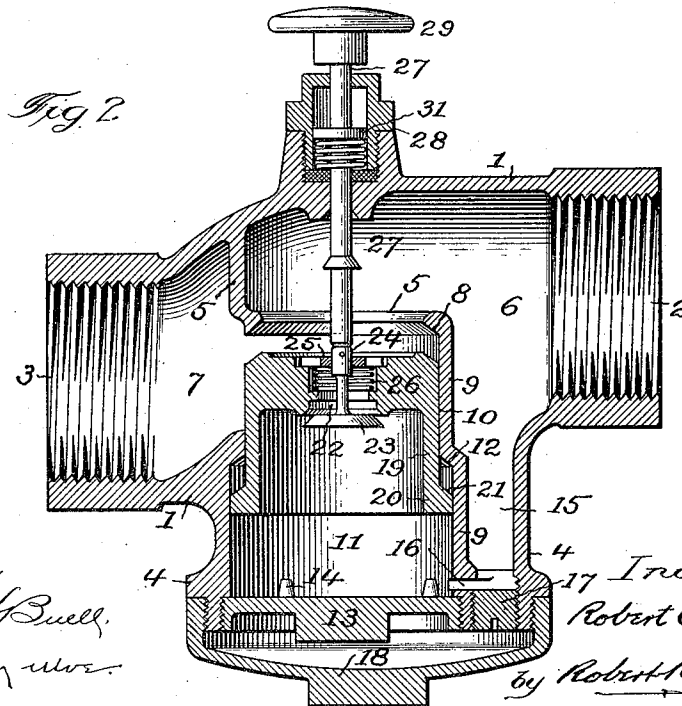
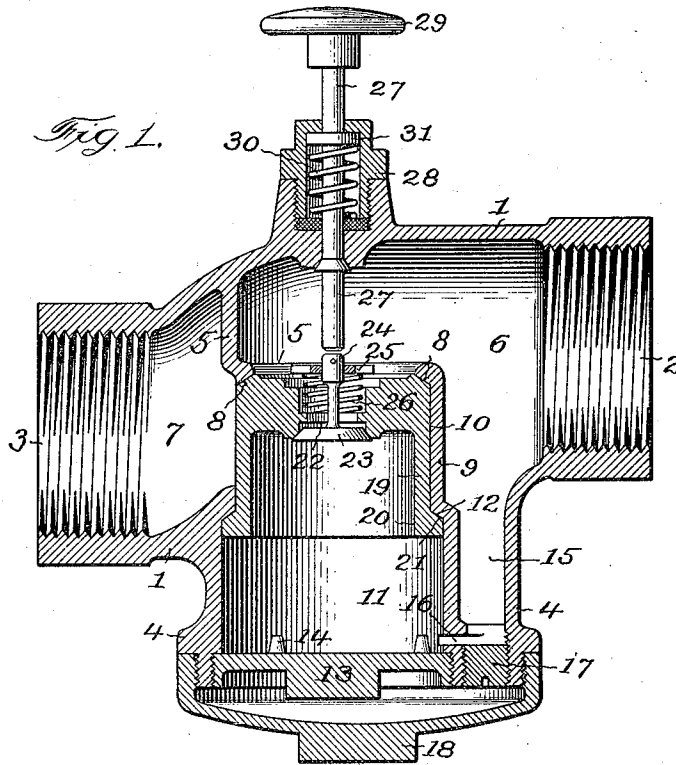


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FLUSH VALVE.

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UNITED STATES PATENT OFFICE.

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FLUSH-VALVE.

1,132,570.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ROBERT E. FIVEY, a citizen of the United States of America, and a resident of Chicago, in the county of Cook, State of Illinois, have invented certain new and useful Improvements in Flush-Valves, of which the following is a specification.

This invention relates to that class of automatic valves in which an automatic return of the movable valve member to a closure position is retarded to permit a predetermined flow of fluid through the valve between the manual opening and automatic closing of the same. And the present improvement has for its object to provide a simple and efficient structural formation and arrangement of the valve parts, whereby a certain and efficient opening movement of the movable valve member is initially attained in a manual manner and completed automatically by the pressure prevailing in the inlet chamber of the valve, and with which the return of said movable valve member to a closure position is attained in an automatic and certain manner, while permitting a predetermined flow of fluid through the valve in the interim between the aforesaid opening and closing operations of the same.

A further object is to provide a simple and efficient structural arrangement of the means by which the closing period of the movable valve member is regulated, and the same safely housed with ready access afforded thereto when required. All as will hereinafter more fully appear.

In the accompanying drawings:—Figure 1, is a central longitudinal section of a valve embodying the preferred form of the present invention, the parts being shown in their normal closed position. Fig. 2, is a similar view showing the parts in a partially open condition and moving to a fully open position.

Similar reference numerals indicate like parts in the several views.

Referring to the drawings, 1 represents the outer or inclosing casing of the valve mechanism, and which in the present construction is preferably of the ordinary globular shape provided at its respective sides with inlet and outlet necks 2 and 3,

and at its lower end with a cylindrical neck 4 of the special construction hereinafter described.

5 is an L shaped partition disposed within the casing 1, and dividing the same into inlet and outlet chambers 6 and 7, individual to the respective necks 2 and 3 above described. Said chambers are connected together by a circular passage in the horizontal portion of the partition 5, and the under margin of said passage formed into an annular and preferably conical seat 8 for the reciprocating piston valve hereinafter described.

9 is a circular depending skirt or partition formed integrally with the horizontal portion of the aforesaid partition 5, and in connection with said partition 5 and with the adjacent portion of the casing 1, is adapted to provide a piston chamber, having differential areas, for the reciprocating piston valve above referred to. Said skirt or partition 9 is also provided with a vertical passage communicating with the outlet chamber 7 and adapted to be closed by the side of the piston valve aforesaid, and said passage in conjunction with the heretofore described passage in the partition 5 constitutes the means of communication between the inlet and outlet chambers 6 and 7 of the valve, as shown.

The piston chamber above referred to is formed with upper and lower portions 10 and 11 of differential areas, the lower portion being the one of greater area, and in connection with such formation a material feature of the present invention involves the provision of an annular and preferably conical valve seat 12 at the point of juncture of the aforesaid differential piston chambers 10 and 11.

13, is a screw head or disk screwing into the lower end of the piston chamber 11 to provide a removable closure therefor, and said head is preferably formed with a plurality of stop lugs 14 on its upper surface to limit the downward movement of the piston valve in the normal use of the valve.

15 is a vertical passage formed between one side of the aforesaid circular skirt 9 and an adjacent portion of the cylindrical neck 4 of the main valve casing.

16 is a lateral branch passage connecting

the aforesaid vertical passage 13 with the lower piston chamber 11 at a point preferably below the top of the stop lugs 14 above described.

17 is a screw plug arranged in the screw-threaded lower portion of the passage 15, and adapted by its adjustment therein to vary the area of the opening of the branch passage 16 above described.

18 is a cap screwing upon the lower end of the cylindrical neck 4 of the main valve casing, and adapted to inclose the closure head 13 and the screw plug 17 after the proper assembly of the parts, and capable of ready removal when access to said parts is required for adjustment or replacement.

The piston valve heretofore referred to, is of the cylindrical type and preferably of the hollow or shell form shown, and consists of an upper reduced portion 19 fitting the piston chamber 10, and a larger lower portion 20 fitting the lower piston chamber 11, as shown.

At its upper end said valve is formed with an annular and preferably conical rim adapted to fit the correspondingly formed seat 8 and close the circular passage which connects the inlet and outlet chambers 6 and 7 of the valve. At the point of juncture of the upper and lower portions 19 and 20, the said valve is formed with an annular and preferably conical valve rim 21 adapted to fit the correspondingly formed seat 12 of the skirt or partition 9, before described, to prevent any leakage of fluid from the lower piston chamber 11 into the upper piston chamber 10, when the valve is in a closed condition.

22 is a vertical passage, which in the preferred form of the present invention shown in Figs. 1 and 2, is formed centrally in the aforesaid piston valve 19—20, and adapted to provide a communication between the upper portion of the main inlet chamber 6, and the lower piston chamber 11, for the functions hereinafter stated.

23 is a vent valve, preferably of the cone type shown, which is adapted to seat itself on a valve seat formed therefor at the lower end of the vertical passage 22, above described.

24 is the upwardly extending stem of the valve 23, provided near its upper end with a spider 25.

26 is a spring disposed between the spider 25, and a bearing ledge within the passage 22, and adapted by its resiliency to maintain the vent valve 23 in place upon the seat above described.

27 is a vertical operating stem disposed in axial alinement with the valve stem 24 aforesaid, and adapted for operative engagement therewith. Said stem 27 extends through a guide or stuffing box 28 on the top of the main casing 1 of the valve, and

is provided at its upper end with a suitable operating knob or handle 29, for convenient manual actuation.

30 is a spring disposed within the guide box 28, and having bearing at its lower end against a lower part of said box, and at its upper end against a peripheral collar 31 on the operating stem 27, so as to exert an upward stress upon said stem and normally maintain the same in a raised position.

The general operation of the valve mechanism is as follows:—The normally closed condition of the piston valve 19—20, is maintained by water pressure introduced into the lower piston chamber 11 through passage 16, and which pressure acting against the greater area of the lower portion 20 of the piston valve, as compared with the lesser area of the upper portion 19 of said valve, tends to raise and hold the valve to its closure position. The movement of said piston valve to a closure position is necessarily slow, owing to the slow inlet of fluid into the piston chamber 11 through the restricted passage 16 aforesaid. Accordingly all liability to pounding of the valve in a closing movement of the same is very effectively avoided.

When an opening of the valve is required, the operator manually depresses the vertical operating stem 27, which in its downward movement contacts with the valve stem 24 and unseats the valve 23. With the unseating of said valve, the normal pressure exerted against the underside of the piston valve 19—20 is relieved through the vent passage 22, and the said valve moves downward under the impulse imparted thereto by the operating stem 27 aided by gravity and the impact of the flowing water against the upper end of the said valve, and such downward movement continues until the vent valve 23 is released and returned to its seat.

With the described downward movement of the piston valve 19—20 the heretofore described passages in the partition 5 are uncovered and fluid is permitted to flow from the inlet chamber 6 to the outlet chamber 7, and thence to the point of distribution.

Immediately succeeding the downward movement of the piston valve 19—20, above described, the vent valve 23 is returned to its seat by the spring 26, to close the passage 22 aforesaid. And with such closure of the vent passage 22, the normal overpressure within the lower piston chamber is re-established through the passage 16, with the result that the piston valve 19—20 is slowly forced upward to a closure position to stop the further flow of fluid through the valve. The slowness of said closing movement of said piston valve is dependent on the size of the restricted branch passage 16, and as the size of the same is capable of ready adjustment by means of the screw-plug 17, the

period during which the valve will remain open can be accordingly regulated, to afford a predetermined quantity of fluid at each operation of the mechanism.

5 Having thus fully described my said invention, what I claim as new and desire to claim as my invention, is:—

1. In a valve of the type herein described, the combination of a valve casing provided with a partition dividing its interior into an inlet chamber, an outlet chamber and a piston chamber, the piston chamber having a lower portion of greater area than its upper portion, the said partition having a passage connecting the inlet and outlet chambers, the undermargin of said passage being formed into a valve seat, a restricted passage in the aforesaid partition connecting the inlet chamber with the lower end of the piston chamber, a piston valve disposed in said piston chamber and having upper and lower portions corresponding in diameter to that of the upper and lower portions of the piston chamber and moving therein, said piston valve having an upper end formed to engage and close the aforesaid passage between the inlet and outlet chambers, and a central passage connecting the piston chamber with the inlet chamber aforesaid, a valve controlling said passage of the piston valve, and provided with a vertical stem, and a manually operated actuating means disposed in operative relation to said valve stem and adapted in its movement to open said valve, substantially as set forth.

2. In a valve of the type herein described, the combination of a valve casing provided with a partition dividing its interior into an inlet chamber, an outlet chamber and a piston chamber, the piston chamber having a lower portion of greater area than its upper portion, the said partition having a passage connecting the inlet and outlet chambers, the under margin of said passage being formed into a valve seat, a restricted passage in the aforesaid partition connecting the inlet chamber with the lower end of the piston chamber, a piston valve disposed in said piston chamber and having upper and lower portions corresponding in diameter to that of the upper and lower portions of

the piston chamber and moving therein, the said piston valve having an upper end formed to engage and close the aforesaid passage between the inlet and outlet chambers, and a central passage connecting the piston chamber with the inlet chamber aforesaid, the piston chamber and piston valve being formed with a valve seat and face at the juncture of their greater and lesser diameters, a valve controlling said passage of the piston valve and provided with a vertical stem, and a manually operated actuating means disposed in operative relation to said valve stem and adapted in its movement to open said valve, substantially as set forth.

3. In a valve of the type herein described, the combination of a valve casing provided with a partition dividing its interior into an inlet chamber, an outlet chamber and a piston chamber, the piston chamber having a lower portion of greater area than its upper portion, the said partition having a passage connecting the inlet and outlet chambers, the under margin of said passage being formed into a valve seat, a restricted passage in the aforesaid partition connecting the inlet chamber with the lower end of the piston chamber, means for regulating the opening of said restricted passage, a piston valve disposed in said piston chamber and having upper and lower portions corresponding in diameter to that of the upper and lower portions of the piston chamber and moving therein, said piston valve having an upper end formed to engage and close the aforesaid passage between the inlet and outlet chambers, and a central passage connecting the piston chamber with the inlet chamber aforesaid, a valve controlling said passage of the piston valve and provided with a vertical stem, and a manually operated actuating means disposed in operative relation to said valve stem and adapted in its movement to open said valve, substantially as set forth.

Signed at Chicago, Illinois, this 28th day of May, 1912.

ROBERT E. FIVEY.

Witnesses:

BENJAMIN P. HINMAN, Jr.,
ROBERT BURNS.