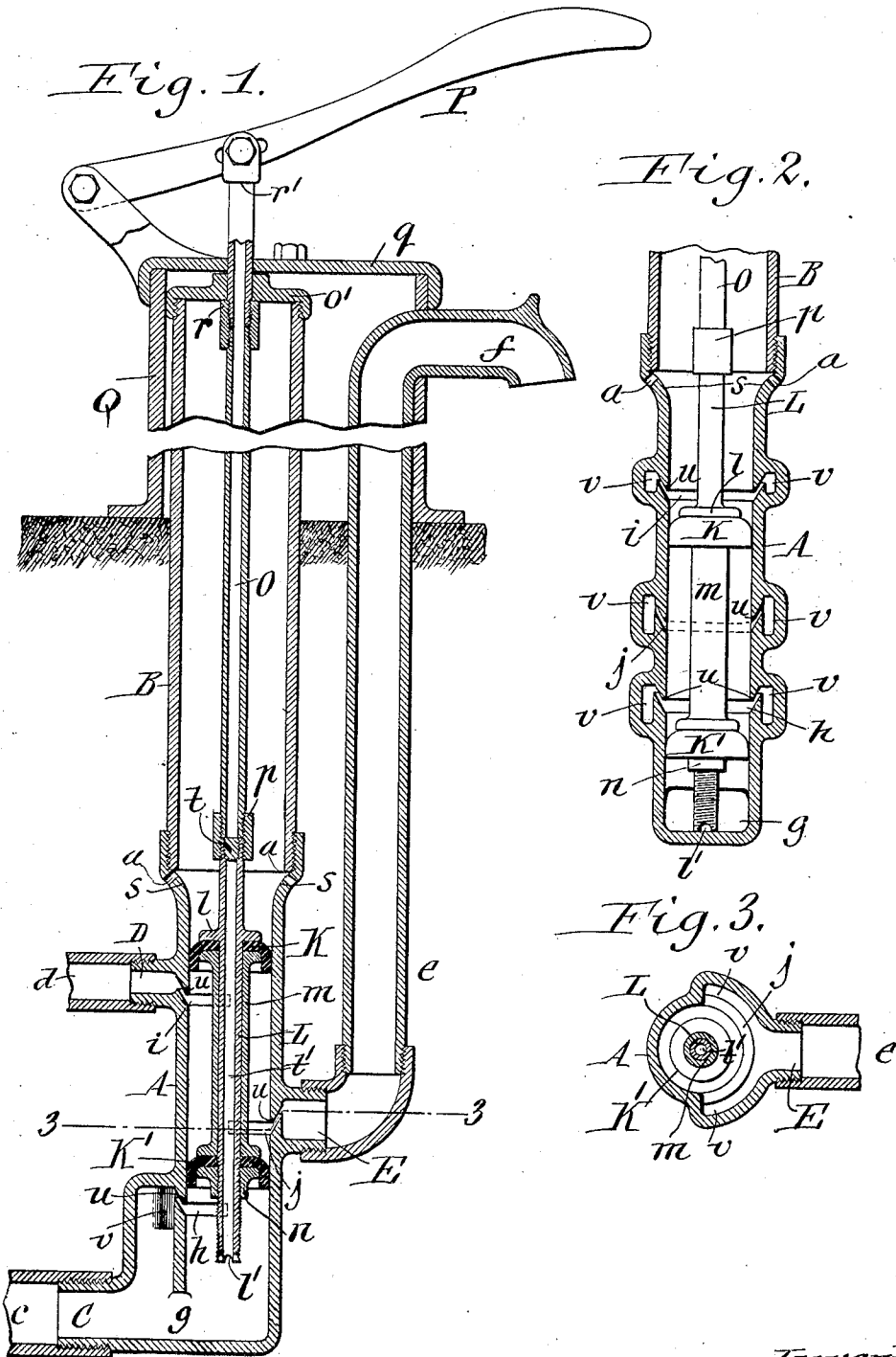


No. 856,552.

PATENTED JUNE 11, 1907.

B. F. SIEGRIST.
VALVE.

APPLICATION FILED DEC. 19, 1906.



Louis W. Gratz.
Richard Sommer.

Witnesses.

Benj. F. Siegrist
by *Leiper & Popp*
Inventor
Attorneys

UNITED STATES PATENT OFFICE.

BENJAMIN F. SIEGRIST, OF BUFFALO, NEW YORK, ASSIGNOR OF ONE-HALF
TO JOSEPH G. MORITH, OF BUFFALO, NEW YORK.

VALVE.

No. 856,552.

Specification of Letters Patent.

Patented June 11, 1907.

Application filed December 19, 1906. Serial No. 348,568.

To all whom it may concern:

Be it known that I, BENJAMIN F. SIEGRIST, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Valves, of which the following is a specification.

This invention relates to a valve which is more particularly designed for use underground in controlling the discharge of water from an out door hydrant or water closet although some features are applicable to self closing faucets and other valves.

Valves of this character are usually placed underground below the freezing line and provided with means whereby the water in the service pipe after being shut off from the main or supply pipe is conducted to a drain so as to prevent the same from freezing in the service pipe and thus render the hydrant or water closet inoperative.

Heretofore valves of this kind have been so constructed as to render it necessary to dig them up for repairing when out of order which is attended with considerable expense and labor particularly in the winter when the ground is frozen.

It is one of the objects of this invention to provide a valve for this purpose which can be repaired or repacked from above ground when the same becomes leaky without necessitating digging up the valve casing and connecting parts.

The further object of this invention is to improve this class of valves so as to simplify the construction, increase the efficiency thereof and to enable the same to be operated more easily.

In the accompanying drawings: Figure 1 is a vertical section of a valve constructed in accordance with my invention and embodied in a hydrant. Fig. 2 is a fragmentary vertical section of the lower part of the valve taken at right angles to Fig. 1 and showing the valve plungers or pistons in a different position from that shown in Fig. 1. Fig. 3 is a horizontal section taken in line 3—3, Fig. 1.

Similar letters of reference indicate corresponding parts throughout the several views.

A represents the cylindrical body or casing of the valve which is placed in a vertical position underground and has its upper end connected by a screw joint with the lower end of an upright tube B extending with its upper

end above the ground and forming practically a part or continuation of the valve casing. At its lower end the valve casing is provided with a water inlet nipple C which connects with a water supply pipe or main *c*, at or near its upper end the same is provided with a waste nipple D which is connected with a waste pipe *d* leading to a sewer or other means of draining, and between said supply and waste nipples the casing is provided with a service nipple E which connects with a service pipe *e* leading above the ground and terminating in a discharge spout *f*. The water supply nipple is connected by a lifting port *g* in the casing with the lower end of its bore or interior and also by an upper supply port *h* in the casing with the bore or interior thereof at a point above its lower end. The waste nipple is connected by a port *i* in the casing with the upper part of its bore or interior and the service nipple is connected with the interior of the casing by a port *j* in the casing located at a point between the waste port and the supply port.

K, K¹ represent upper and lower valve piston heads or plungers which are arranged in the upper and lower parts of the casing and adapted to reciprocate vertically therein for connecting the service pipe with the supply pipe and disconnecting the same from the waste pipe when it is desired to draw water from the spout and to shut off the service pipe from the supply pipe and connect the same with the waste pipe for stopping the discharge of water at the spout and draining any water contained in the service pipe above the port *i* to the sewer or other place provided for that purpose. These valve pistons are preferably constructed of leather or other suitable flexible material in the form of cups or dish-shaped washers having downwardly projecting flanges which fit closely against the bore or inner sides of the casing and form a tight joint between the same to prevent water passing the valve pistons. These two valve pistons may be operated so as to move in unison by any suitable means but preferably by the means shown in the drawings which are constructed as follows:

L represents an upright valve stem or rod arranged centrally in the valve casing and provided near its upper end with a collar or shoulder *l* and having its lower end provided with an external screw thread. The upper

valve piston bears with its upper side against the under side of the collar and is provided with a central opening which receives the adjacent portion of the valve stem.

5 *m* represents a spacing sleeve mounted loosely upon the valve rod and bearing at its upper end against the under side of the upper valve piston within the flange thereof. The lower valve piston bears centrally on its upper side against the lower end of the spacing sleeve and is provided with a central opening which receives the adjacent part of the valve stem.

10 *n* represents a clamping screw nut engaging with the screw thread at the lower end of the valve stem and bearing against the under side of the lower valve piston within the flange thereof.

In assembling the two valves on the stem, 20 the upper valve is first slipped upwardly from the lower end of the stem until it bears against the collar *l* thereof, then the spacing sleeve is slipped in like manner over the stem until it bears at its upper end against the upper valve piston, then the lower valve piston is slipped upwardly on the stem into engagement with the lower end of the spacing sleeve and then the clamping nut is applied to the stem with its upper side in engagement with 30 the lower valve piston. Upon tightening this clamping nut, the upper valve piston is clamped between the spacing sleeve and collar of the valve stem and the lower valve piston is clamped between said sleeve and the nut. This means of fastening the two piston 35 valves on the valve stem is very simple and inexpensive and also permits of taking the valve apart and reassembling the same quickly when it becomes necessary to renew or repair the valve pistons.

40 The means shown in the drawings, as an example, for raising and lowering the valve stem and its pistons consists of an upright shifting rod *o* passing through an opening in a head *o'* which closes the upper end of the extension tube *B* and is connected at its lower end by a screw threaded coupling sleeve *p* with the upper end of the valve stem while its upper end is connected outside of 50 the tubular extension with an operating handle or lever *P* which is pivoted on the top or cover *q* of a housing *Q* which incloses those portions of the casing extension and service pipe which are above ground.

55 In the position of the parts shown in Fig. 1, the valve pistons are arranged in their uppermost position in the valve casing in which position the lower valve piston is arranged between the supply port and the service port and cuts off the discharge of water from the 60 supply pipe through the service pipe while the upper valve piston is arranged above the waste port and permits any water in the service pipe above this waste port to escape to the sewer or drainage. Upon depressing

the valve pistons into their lower-most position, as shown in Fig. 2, the lower valve piston is arranged between the supply and lifting ports and the upper valve piston is arranged between the service and waste ports, 70 thereby permitting the water to flow from the supply pipe out through the service pipe but preventing any water at this time from escaping through the waste pipe. This reciprocating movement of the valve pistons and the parts connected therewith may be limited in any suitable manner, for instance, as shown in the drawings, by means of a stop sleeve or collar *r* arranged on the shifting rod 75 within the casing extension and adapted to bear against the underside of the head *o'* thereof for limiting the upper movement of the valve pistons, and a shoulder or head *r'* arranged at the upper end of the shifting rod and adapted to bear against the top *q* of the housing *Q* for limiting the downward movement of the valve pistons. Instead of limiting the downward movement of the valve rod, valve pistons and connecting parts by the head *r'* engaging with the top *q*, this may 85 be effected solely by engaging the lower end of the valve stem with the bottom of the valve casing, as shown in Fig. 2. When the last mentioned construction is used the lower end of the valve stem is notched, as shown at 90 *l'*, to maintain communication between the interior of the valve stem and the valve casing when the stem is depressed.

If the valve pistons become worn and permit leakage of water so as to necessitate renewal thereof, the head and cover at the upper ends of the housing and tubular extension of the valve casing are removed after which the shifting rod may be withdrawn upwardly together with the valve stem and 105 the valve pistons connected therewith. After the worn valve pistons have been replaced by new ones they are again lowered through the tubular extension and into their proper position within the valve casing and then the head of the tubular extension and the top of the housing are replaced, thereby restoring the valve to its working condition. It will be noted that the valve pistons may thus be renewed from above ground very 110 quickly and without the necessity of digging up the valve casing, thereby saving not only expense and labor but also avoiding prolonged interruption in the use of the hydrant.

The removal of the valve pistons from the casing without necessitating digging the latter out of the ground for this purpose is made possible by effecting the cut off between the service pipe and the supply and waste pipes solely by engagement of the periphery of the 115 valve pistons with the bore of the valve casing and avoiding the use of internal shoulders as seats in the valve casing to be engaged by the valve pistons during their upward movement, inasmuch as such shoulders 120 125 130

would prevent the withdrawal of the valve pistons in the manner described.

In order to facilitate the removal and insertion of the valve pistons, the tubular extension B has its bore made of somewhat larger diameter than that of the valve casing. By this means the valve pistons after clearing the bore of the valve casing may be easily lifted through the tubular extension and also lowered in the same until they engage the bore of the valve casing without encountering frictional resistance in the tubular extension which would be considerable when the valve casing is located at a great depth below the surface of the ground.

The upper part of the bore of the valve casing is flared upwardly or beveled toward the bore of the tubular extension as shown at *s*, whereby the flanges of the valve pistons upon engaging this flaring surface while replacing the valve pistons are guided inwardly or toward the bore of the valve casing, thereby avoiding turning said flanges backwardly and interfering with the replacing of these pistons which would be liable to occur if an abrupt internal shoulder were present at the junction between the small bore of the valve casing and the large bore of the tubular extension.

Upon releasing the pressure on the valve pistons which holds the same in their lower position the same are automatically raised into their elevated position by the water entering the lower end of the valve casing through the lifting port *g* and pressing upwardly against the under side of the lower valve piston. The valves are thus raised solely by the water entering the lower end of the casing through the lifting port until the lower valve piston has passed above the supply port *h* after which the water entering the casing through the last mentioned port aids the upward movement of the valve pistons until they reach their upper most position.

For the purpose of overcoming or reducing the resistance of the water in the supply pipe which presses against the lower valve piston and permit of depressing the valve piston more easily, means are provided whereby a body of air may be compressed during the downward movement of the valve pistons instead of displacing the practically non-compressible body of water. The preferred means for carrying this into effect consists in making the valve stem hollow and closing its upper end by means of a plug *t* while its lower end opens into the lower end of the valve casing. By this means an air chamber *t'* is formed in the valve stem in which a body of air is imprisoned, which upon the depression of the valve pistons is compressed during the downward movement of the valve pistons and thus serves as a cushion medium which yields more readily and under less pressure than would be necessary to displace

the water below the lower valve piston, thereby enabling the valve pistons to be lowered more easily when it is desired to draw off water from the hydrant. Furthermore, by providing an air cushion in the manner described, hammering or jarring of the valve is prevented when the same closes.

In order to permit the escape of any water which may get into the upper part of the valve casing and the tubular extension owing to condensation or possible leakage past the upper valve piston, an exit is provided for such water which preferably consists of relief openings or perforations *a* formed in the casing above the highest position of the upper valve piston and adjacent to the lower end of the tubular extension, as shown in Figs. 1 and 2. The water escaping through the openings *a* may be conducted to a sewer or waste into the ground which may be left loose for this purpose. By this means water is prevented from accumulating in the casing and extension above the valve pistons and interfering with the operation of the latter.

As the valve pistons move up and down in the valve casing, it is necessary to prevent the flanges thereof from becoming caught in the ports of the casing which would cause said flanges to be either turned over or worn unduly thereby, while at the same time these ports should be of ample area to permit the ready flow of water through the same. For this purpose each of these ports is constructed in the form of a downwardly inclining or oblique slot which extends circumferentially around the bore of the casing and which has the obtuse corner at the inner end of its upper side rounded, as shown at *u*. Each of these slot-shaped ports extends preferably half way round the casing and the nipple communicating with the outer end of the same is provided with lateral enlargements, branches or extensions *v* which extend to opposite ends of the slot-shaped port, as shown in Figs. 2 and 3, for placing the entire area of the port in communication with the respective nipple.

Upon moving the valve pistons downwardly in the valve casing past the ports, the flange of each piston upon engaging the lower inwardly inclined side of a port is deflected inwardly thereby, while upon moving this valve piston upwardly past a port its flange is deflected inwardly by the rounded inner edge of the upper side of said port, thereby insuring a free passage of the valve piston past the port and preventing the same from being caught or injured thereby which would be apt to occur if the inner end of the port presented abrupt shoulders or edges for engagement with the valve piston.

When my improved valve is applied to a water closet or other purpose it is obvious that the connection with the service pipe

and the means for operating the valve pistons will be modified to suit the particular use to which the valve is put.

I claim as my invention:

- 5 1. A valve comprising a casing having a lower supply port, an upper waste port and an intermediate service port, upper and lower valve pistons arranged in said casing and engaging the bore thereof only at their peripheries, and means for reciprocating said
10 pistons so that when raised the lower piston is arranged between the lower and intermediate ports and the upper piston is arranged above the upper port and when depressed
15 the lower piston is arranged below the supply port and the upper piston is arranged between the upper and intermediate ports, substantially as set forth.
2. A valve comprising a casing having a
20 lower supply port, an upper waste port and an intermediate service port, upper and lower valve pistons arranged in said casing and engaging the bore thereof only at their peripheries, means for reciprocating said pistons so
25 that when raised the lower piston is arranged between the lower and intermediate ports and the upper piston is arranged above the upper port and when depressed the lower piston is arranged below the supply port and the upper
30 piston is arranged between the upper and intermediate ports, and a tube which extends upwardly from the valve casing and through which the valve pistons are adapted to be inserted or removed from the valve
35 casing, substantially as set forth.
3. A valve comprising a casing having a lower supply port, an upper waste port and an intermediate service port, upper and lower valve pistons arranged in said casing
40 and engaging the bore thereof only at their peripheries, means for reciprocating said pistons so that when raised the lower piston is arranged between the lower and intermediate ports and the upper piston is arranged above
45 the upper port and when depressed the lower piston is arranged below the supply port and the upper piston is arranged between the upper and intermediate ports, and a tube which extends upwardly from the upper end of the
50 valve casing and has a bore of larger diameter than said casing and through which said valve pistons are adapted to be inserted and removed from said casing, substantially as set forth.
- 55 4. A valve comprising a casing having its bore flaring or beveled upwardly at its upper end, a lower supply port, an upper waste port and an intermediate service port, upper and lower valve pistons arranged in said casing
60 and engaging the bore thereof only at their peripheries, means for reciprocating said pistons so that when raised the lower piston is

arranged between the lower and intermediate ports and the upper piston is arranged above the upper port and when depressed the
65 lower piston is arranged below the supply port and the upper piston is arranged between the upper and intermediate ports, a tube which extends upwardly from the upper flaring end of the valve casing and has a bore
70 of larger diameter than said casing and through which said valve pistons are adapted to be inserted or removed from said casing, substantially as set forth.

5. A valve comprising a casing having an
75 inlet port and an outlet port, a piston arranged in said casing and controlling said ports, and means for compressing a body of air during the opening movement of said piston, substantially as set forth. 80

6. A valve comprising a casing having a lower supply port, an upper waste port and an intermediate service port, upper and lower pistons arranged in said casing and controlling said ports, and a hollow stem connecting said pistons and having its upper end
85 closed and its lower end opening into the lower end of the casing, whereby a body of air is imprisoned in said stem and compressed upon depressing said stem and pistons, substantially as set forth. 90

7. A valve comprising a casing having a lower supply port, an upper waste port and an intermediate service port, upper and lower cup-shaped pistons arranged in said
95 casing and controlling said ports, and means for connecting and operating said pistons consisting of a reciprocating stem arranged in central openings in said pistons, a collar arranged on the stem and engaging the upper
100 side of the upper piston, a spacing sleeve mounted on the stem and engaging its upper end with the under side of the upper piston and its lower end with the upper side of the lower piston, and a screw nut arranged on the
105 lower end of the stem and engaging with the under side of the lower piston, substantially as set forth.

8. A valve comprising a casing having a lower supply port, an upper waste port, a
110 service port between the supply and waste ports and a relief port above the waste port, an upper valve piston movable past said waste port, a lower valve piston movable past said supply port, and means for operating
115 said valve pistons, substantially as set forth.

Witness my hand this 15th day of December, 1906.

BENJAMIN F. SIEGRIST.

Witnesses:

JOSEPH G. MORITIE,
THEO. L. POPP.