

C. F. SIEGRIST.
VALVE.
APPLICATION FILED FEB. 25, 1909

971,934.

Patented Oct. 4, 1910.

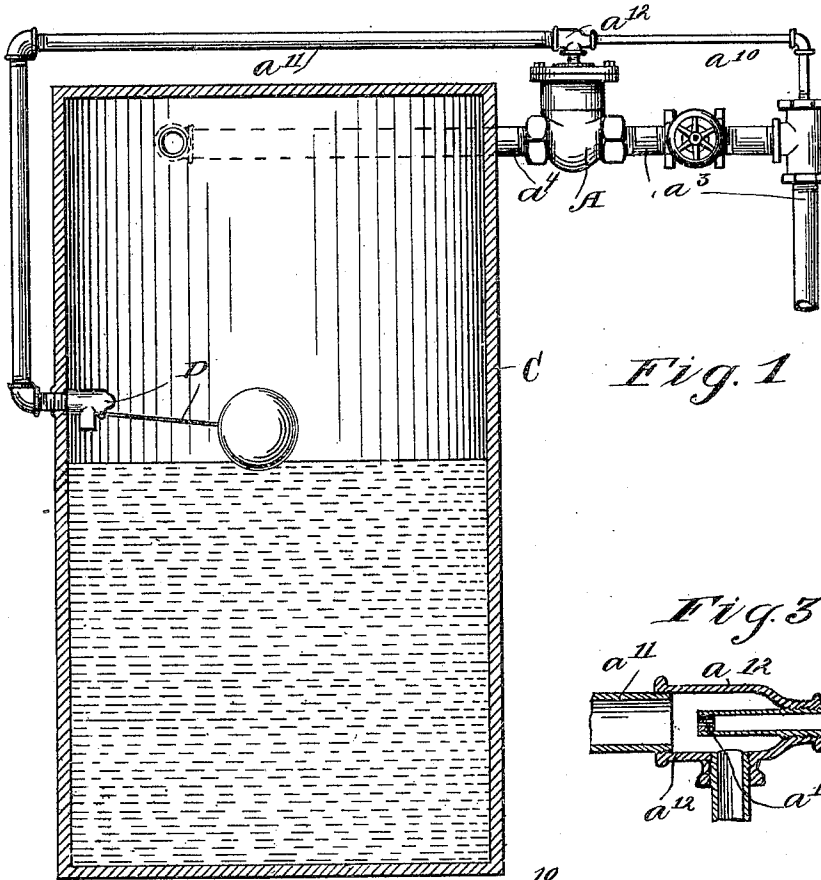


Fig. 1

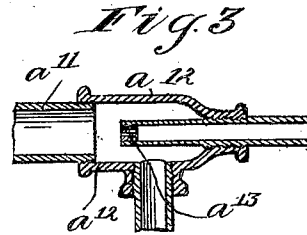


Fig. 3

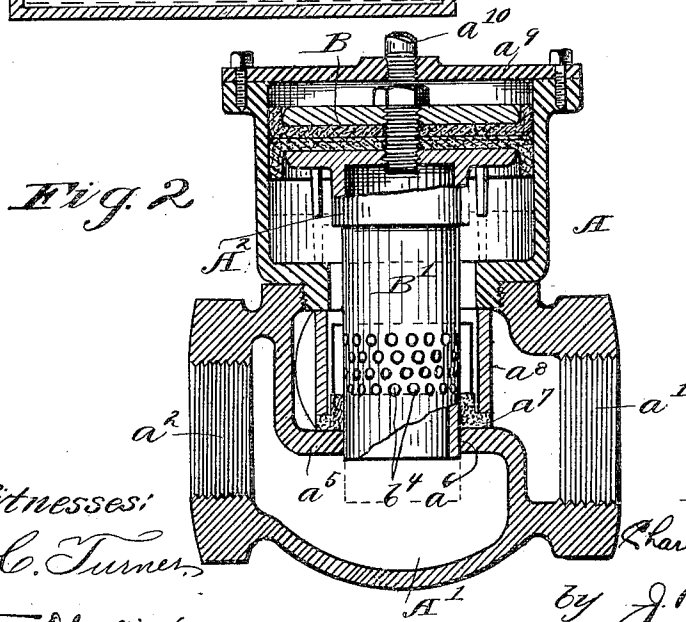


Fig. 2

Witnesses:
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UNITED STATES PATENT OFFICE.

CHARLES F. SIEGRIST, OF CLEVELAND, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE CLEVELAND STEEL TOOL COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

VALVE.

971,934.

Specification of Letters Patent.

Patented Oct. 4, 1910.

Application filed February 25, 1909. Serial No. 480,032.

To all whom it may concern:

Be it known that I, CHARLES F. SIEGRIST, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented new and useful Improvements in Valves, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle so as to distinguish it from other inventions.

In a co-pending application filed January 23, 1908, Serial No. 412,254, I have described and claimed an improved construction of valve and valve controlling mechanism of the type designed for automatically controlling the supply of a fluid under pressure, as for example, the supply of water to a heater, reservoir or the like. In the illustrative installation of my improved valve there shown, I provide for such control, a pilot valve operated through a float by variations in the level of water in the tank or other receptacle to which such liquid is supplied by the main valve, such float actuating the pilot valve alternately to admit pressure against the upper face of an actuating piston forming a feature of such main valve, and to cut off such supply and relieve the pressure against such piston face. In the present invention, while employing substantially the same construction of automatic supply valve proper, I provide means of a simpler character than the pilot valve just referred to for controlling the pressure on the upper face of the piston.

The means thus constituting such present invention will now be fully described, and then particularly pointed out in the claims.

The annexed drawing, and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawing:—Figure 1 represents in more or less diagrammatic fashion the manner of installing my valve according to the present invention; Fig. 2 is a central vertical section of the valve by itself; and Fig. 3 is a similar section of an accessory part.

In construction such valve differs from that just referred to as forming the subject matter of my co-pending application merely

in that it is a straight-away instead of an angle valve. Referring to Fig. 2, it will be seen to comprise a casing A made up of two separable parts A', A² screw-threaded together and containing the several operative elements of the device. Of such parts, the lower one A' is provided with inlet and outlet openings a' a², with which are designed to be connected a supply pipe a³ and a discharge pipe a⁴ respectively, Fig. 1. Such lower part A' is provided intermediate between the two openings just referred to, with a transverse partition a⁵ formed with a central port a⁶, such port being surrounded by a washer a⁷ adapted to make a close fit with a valve presently to be described. Washer a⁷ rests upon the upper face of the partition a⁵ and is firmly secured in place thereon by means of an open annular member, or cage a⁸, clamped between the same and the upper part A² of the casing. This upper part A² constitutes a piston chamber and is closed by a plate a⁹ bolted or screwed down upon its end, a fluid pressure supply pipe a¹⁰ being connected with such end so as to admit pressure fluid against the upper face of a piston B reciprocable in such cylinder part. This piston bears, centrally disposed on its under face, a tubular valve B' that extends into the lower part A' of the casing and is fitted into the port a⁶ in the partition a⁵ above described as being located between the inlet and outlet openings a' a² of such part.

The lower end of valve B' is open, and encircling the same between its ends is a series of perforations b⁴ that in the upper position of the piston lie above the partition a⁵, and in the lower position of such piston lie below such partition, or, what is the equivalent, below the upper edge of the washer a⁷. Such lower position of the valve, and of the piston whereby it is actuated, is shown in dotted outline in Fig. 2 of the drawing. In the upper position of the valve, the perforations therein obviously afford free and open communication between the inlet and outlet openings of the casing, but in the latter position of the valve, this communication is effectually cut off.

Where installed, as illustrated in Fig. 1, the valve is designed to automatically operate to control the supply of water, as from the city mains, to a reservoir or tank C wherein it is desired to maintain approxi-

mately a constant level, or head. The inlet opening of the casing is accordingly connected by supply pipe a^3 to the main (not shown) and the discharge pipe a^4 with such tank. For the pressure supply to the upper end of piston chamber A^2 , connection is directly had with the supply pipe a^3 , by means of the pipe a^{10} , which connection is at all times open. Leading likewise from such upper end of the piston chamber, and forming in effect a continuation of the line a^{10} , is another relief pipe a^{11} , that being normally open, affords an escape for the fluid thus supplied by pipe a^{10} . Preferably pipe a^{11} is larger than pipe a^{10} so that there will be no tendency for the latter to build up a pressure within the piston chamber save only when such relief pipe is closed. Closure of relief pipe a^{11} is effected by the operation of a float D, the only function of which, it will thus be seen, is to stop the escape of the liquid from the piston chamber, when the level of water in the tank reaches the desired altitude. As soon as such escape is thus stopped, the disparity between the areas of the two faces of the piston results in the downward actuation of the latter, and the closure of the valve, thereby stopping a further supply of liquid to the tank. This condition will continue until the level in the tank again falls sufficiently to permit of the escape of the pressure fluid from the upper end of the piston chamber by the restoration of pipe a^{11} to its normal open state.

From the foregoing description, it will be seen that a very simple, and at the same time effective arrangement is thus provided for the control of the main supply valve A. All need for a valve to cut off the supply of pressure fluid to the upper face of the valve actuating member B is avoided, while the control of the relief line is effected at a point close to its discharge end and within the tank, so that the float device D can be brought in close proximity thereto.

The part shown in Fig. 3 is the casing a^{12} (a modified T-coupling in form), whereby pipe a^{10} is connected with the upper end of the piston chamber in the valve. It has already been explained that such line a^{11} is preferably of larger bore than pipe a^{10} . The body of casing a^{12} , accordingly, is larger than such pipe and I am hence enabled to extend the end of the latter into the casing interior well past the opening leading to the piston chamber. A nozzle being formed of this pipe and, as by inserting a perforated plug, an injector effect is secured, that as is obvious will positively assist in reducing the pressure within said piston chamber whenever relief pipe a^{11} is opened. A prompter response of the valve A is thus secured than would otherwise be the case.

Other modes of applying the principle of my invention may be employed instead of

the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. In a device of the character described, the combination of a casing having inlet and outlet openings; a member movably secured in said casing, said member being operable outwardly by the pressure of fluid in said casing against the member; a valve, carried by said member, controlling connection between such inlet and outlet openings; an open connection for supplying pressure fluid against the outer face of said member; and a normally open escape exteriorly of the casing for the fluid thus supplied.

2. In a device of the character described, the combination of a casing having inlet and outlet openings; a member movably secured in said casing, said member being operable outwardly by the pressure of fluid in said casing against the member; a valve, carried by said member, controlling connection between such inlet and outlet openings; an open connection for supplying pressure fluid against the outer face of said member; a normally open escape exteriorly of the casing for the fluid thus supplied; and automatically operated means for closing said escape.

3. In a device of the character described, the combination with a receiving tank; of a casing having inlet and outlet openings; supply and discharge pipes connected with said openings, respectively, said discharge pipe leading to said tank; a member movably secured in said casing, said member being operable outwardly by the pressure of fluid in said casing against the member; a valve, carried by said member, controlling connection between such inlet and outlet openings; an open connection for supplying pressure fluid against the outer face of said member; a normally open escape exteriorly of the casing for the fluid thus supplied; and means adapted to close such escape, operation of said means being dependent on the level of fluid in said receiving tank.

4. In a device of the character described, the combination of a casing having inlet and outlet openings; a piston reciprocable in said casing, said piston being operable outwardly by the pressure of fluid in said casing against the piston; a valve, carried by said piston, controlling connection between such inlet and outlet openings; an open connection for supplying pressure fluid against the outer face of said piston; and a normally open escape exteriorly of the casing for the fluid thus supplied.

5. In a device of the character described, the combination of a casing having inlet and

outlet openings; a differential piston reciprocable in said casing, said piston having its face of smaller area directed inwardly and being operable outwardly by the pressure of fluid in said casing against such face; a valve, carried by said piston, controlling connection between such inlet and outlet openings; an open connection for supplying such pressure fluid against the outer face of said piston; and a normally open escape exteriorly of the casing for the fluid thus supplied.

6. In a device of the character described, the combination of a casing having inlet and outlet openings; a piston reciprocable in said casing, said piston being operable outwardly by the pressure of fluid in said casing against the piston; a valve, carried by said piston, controlling connection between such inlet and outlet openings; an open connection for supplying pressure fluid against the outer face of said piston; a normally open escape exteriorly of the casing for the fluid thus supplied; and automatically operated means for closing said escape.

7. In a device of the character described, the combination of a casing having inlet and outlet openings; a differential piston reciprocable in said casing, said piston having its face of smaller area directed inwardly and being operable outwardly by the pressure of fluid in said casing against such face; a valve, carried by said piston, controlling connection between such inlet and outlet openings; an open connection for supplying such pressure fluid against the outer face of said piston; a normally open escape exteriorly of the casing for the fluid thus supplied; and exteriorly located, automatically operated means for closing said escape.

8. In a device of the character described, the combination of a casing having inlet and outlet openings; a member movably secured in said casing, said member being operable outwardly by the pressure of fluid in said casing against the member; a valve, carried by said member, controlling connection between such inlet and outlet openings; an open connection for supplying pressure fluid against the outer face of said member; a normally open escape for the fluid thus supplied; and means for positively assisting such escape.

9. In a device of the character described, the combination of a casing having inlet and outlet openings; a member movably secured in said casing, said member being operable outwardly by the pressure of fluid in said casing against the member; a valve, carried by said member, controlling connection between such inlet and outlet openings; an open connection for supplying pressure fluid against the outer face of said member; and a normally open escape for the fluid thus supplied; said fluid supply connection being provided with injector means for positively assisting such escape.

10. A fluid pressure actuated motor comprising a casing; a member movably secured in said casing, pressure of the fluid in the casing against said member being adapted to move said member in one direction; an open connection for supplying pressure fluid against a face of said member to move the same in the opposite direction; and a normally open escape exteriorly of the casing for the fluid thus supplied.

11. A fluid pressure actuated motor comprising a casing; a member movably secured in said casing, pressure of the fluid in the casing against said member being adapted to move said member in one direction; an open connection for supplying pressure fluid against a face of said member to move the same in the opposite direction; a normally open escape for the fluid thus supplied; and means for positively assisting such escape.

12. A fluid pressure actuated motor comprising a casing; a member movably secured in said casing, pressure of the fluid in the casing against said member being adapted to move said member in one direction; an open connection for supplying pressure fluid against a face of said member to move the same in the opposite direction; and a normally open escape for the fluid thus supplied, said fluid supply connection being provided with injector means for positively assisting such escape.

Signed by me this 20th day of February, 1909.

CHARLES F. SIEGRIST.

Attested by—

CHRISTINE E. ARUS,
JNO. F. OBERLIN.