

C. F. SIEGRIST.
VALVE.

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967,845.

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Fig. 1

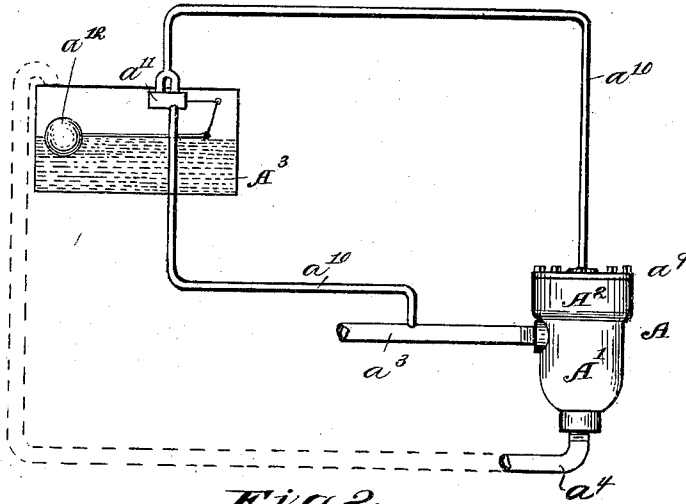
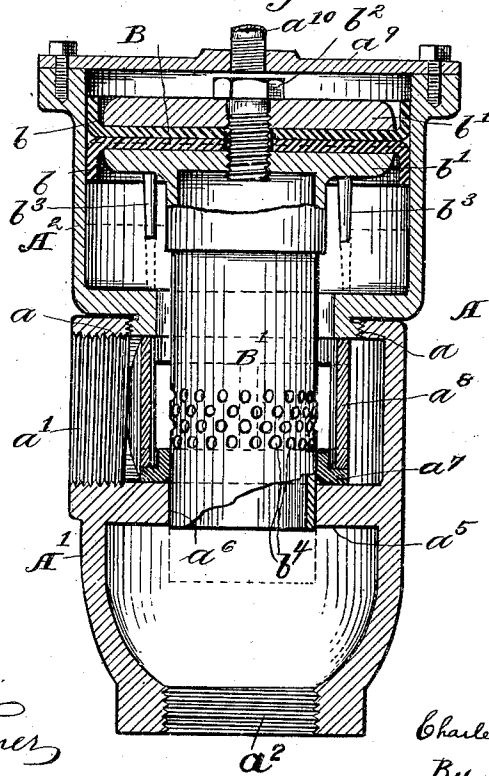


Fig. 2



Witnesses:
J. C. Turner
Jno. T. Obelin

Inventor:
Charles F. Siegrist,
By J. B. Fay
Attorney.

UNITED STATES PATENT OFFICE.

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

VALVE.

967,845.

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To all whom it may concern:

Be it known that I, CHARLES F. SIEGRIST, a citizen of the United States, resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement 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.

My invention relates to valves and valve controlling mechanism, the object of the invention being the provision of means for automatically controlling the supply of a fluid under pressure, as for example the supply of water to a boiler, reservoir, or the like.

A further object is to provide means of the character described that will combine with such automatic operation, such simplicity of construction as will render the device relatively inexpensive of manufacture, easy of installation, and durable in use.

To the accomplishment of the above and related objects, said invention, then, consists of the means hereinafter fully described and 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, an installation illustrative of the use to which my improved valve controlling device may be put; and Fig. 2 is a central vertical section of such device by itself.

Having regard first of all to Fig. 2, as more particularly illustrating the construction of the device, the latter will be seen to comprise a casing A made up of two separable parts, screw-threaded together at *a*, within which parts the several operative elements of the device are contained. Of such parts, the lower one A' is provided with inlet and outlet openings *a'* *a''* in its side and lower end respectively, with which are designed to be connected a supply pipe *a'''* and discharge pipe *a''''*, respectively, Fig. 1. Such lower part A' is furthermore provided, intermediate between the two openings *a'* *a''* just referred to, with a trans-

verse partition *a⁵* formed with a central port *a⁶*, such port being surrounded by a washer in the form of a flanged cup *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 cylinder 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 a pressure fluid against the upper face of a piston B reciprocable in such cylinder part. In preferred construction this piston consists simply of two opposed washers of leather *b b*, or like material, clamped between two circular metal plates *b' b'* held together by a screw *b²* or the like. The lowermost of plates *b'*, in addition to being provided with projections or lugs *b³* adapted to limit the downward movement of the piston in the cylinder, as will be readily understood, 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'* *a''* 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*, in the lower position of such piston lie below such partition, or, what is the equivalent, below the upper edge of the washer *a⁶*. Such lower position of the valve, and of 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 lower position of the valve, this communication is effectually cut off.

In the suggestive installation illustrated in Fig. 1, one mode of use of the device is shown, by reference to which its operation can be most conveniently explained. As there installed, the device is designed to control the supply of water, as from the city mains, to a reservoir or tank A³ wherein it is desired to maintain approximately a con-

stant level, or head. The inlet opening of the casing is accordingly connected by supply pipe a^3 to the mains (not shown), and the discharge pipe a^4 with such tank. For the pressure supply to the upper end of piston-cylinder A^2 connection is directly had with the supply pipe by means of pipe a^{10} in which, however, there is inserted a pilot valve a^{11} operated by the height of the water in the tank or reservoir through a float a^{12} or like suitable mechanism. Assuming the piston to be raised as shown in full lines in Fig. 2, water will accordingly be admitted to the tank through the casing until the level of the tank's contents becomes such that the pilot valve is actuated to connect the upper face of the piston with the source of pressure supply. Owing to the greater area of such upper face compared with the lower face of the piston, the result of this will be the downward actuation of the piston and the cutting off of communication between the inlet and outlet openings of the casing. Upon the contents of the tank again falling to the predetermined level the pilot valve connection is closed and the pressure on the upper face of the piston at the same time relieved; the connection through the casing is accordingly opened by the opening of the valve.

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 one 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 and a piston chamber freely communicating at its inner end with such inlet opening; a piston reciprocable in said chamber, said piston being operable outwardly by the direct pressure of fluid in said chamber against said piston's inner face; a valve, carried by said piston, controlling connection between such inlet and outlet openings; connections for supplying pressure fluid to the outer end of said chamber and thus against the outer face of said piston, said connections being disposed exteriorly of said casing; and automatically operated means located in said exterior connections controlling the fluid thus supplied, whereby the pressure on such outer face may be relieved.

2. 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, a tubular valve on the inner face of said piston controlling connection between

such inlet and outlet openings, said valve diminishing the area of such inner face, connections for supplying such pressure fluid against the outer face of said piston, said connections being disposed exteriorly of said casing and automatically operated means located in said exterior connections controlling the fluid thus supplied, whereby the pressure on such outer face may be relieved.

3. In a device of the character described, the combination of a casing having inlet and outlet openings, supply and discharge pipes connected with such openings, respectively, a piston reciprocable in said casing, said piston being operable outwardly by the pressure of fluid therein, a tubular valve borne on the inner face of said piston and controlling connection between such inlet and outlet openings, said valve diminishing the area of such inner face, connection between said supply pipe and the end of said casing to supply pressure on the outer face of said piston, said connection being disposed exteriorly of said casing, and an automatically operated valve located in such exterior connection and adapted to control the same.

4. In a device of the character described, the combination with a receiving tank; of a casing having inlet and outlet openings and a chamber freely communicating at its inner end with such inlet opening; supply and discharge pipes connected with such openings respectively, said discharge pipe leading to said receiving tank; a pressure actuated member movably secured in said chamber, said member being operable outwardly by the direct pressure of fluid in said chamber but having its inner face of less area than its outer face; a valve connected with said member and controlling connection between such inlet and outlet openings; connections between said supply pipe and the outer end of said chamber to supply pressure fluid on the outer face of said member, said connections being disposed exteriorly of said casing; and means located in said exterior connections adapted to control the fluid thus supplied, whereby the pressure on such outer face may be relieved, operation of said means being dependent on the fluid level in said receiving tank.

5. 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 such openings, respectively, said discharge pipe leading to said receiving tank; a piston reciprocable in said casing, said piston being operable outwardly by the pressure of fluid in said casing; a tubular valve borne on the inner face of said piston and controlling connection between such inlet and

outlet openings, said valve diminishing the area of such inner face, connections between said supply pipe and the end of said casing to supply pressure fluid on the outer face of said piston, said connections being disposed exteriorly of said casing; and a pilot valve located in said exterior connection controlling such connections, operation of said valve being dependent on the fluid level in said receiving tank.

6. In a device of the character described, the combination of a casing having inlet and outlet openings; a transverse partition, formed with a port, intermediate of such openings; a piston reciprocable in said casing above said partition, said piston being operable outwardly by the direct pressure of fluid in said casing against the piston's inner face; a tubular valve borne on the inner face of said piston and fitting the port in said partition, said valve being provided with perforations disposed so as to lie above said partition in the upper, and below said partition in the lower, position of said valve, thereby affording communication between such inlet and outlet openings and cutting off such communication, respectively; connections disposed exteriorly to said casing for supplying pressure fluid to the outer end of said casing and thus against the outer face of said piston; and automatically operated means controlling the fluid thus supplied, said means being located in said exterior connections.

7. In a device of the character described, the combination with a receiving tank; of a casing having inlet and outlet openings, said outlet opening being connected with said receiving tank; a transverse partition, formed with a port, intermediate of such openings; a piston reciprocable in said casing above said partition, said piston being operable outwardly by the direct pressure of fluid in said casing against the piston's inner face; a tubular valve borne on the inner face of said piston and fitting the port in said partition, said valve being provided with perforations disposed so as to lie above said partition in the upper, and below said partition in the lower position of said valve, thereby affording communication between such inlet and outlet openings and cutting off such communication, respectively; connections disposed exteriorly to said casing for supplying pressure fluid to the outer end of casing and thus against the outer face of said piston; and means located in said exterior connections adapted to control the fluid thus supplied, operation of said means being dependent on the fluid level in said receiving tank.

8. In a device of the character described, the combination of a casing having inlet and outlet openings; a transverse partition, formed with a port, intermediate between

such openings; a washer on the upper face of said partition surrounding the port therein; an open sleeve secured in said casing so as to clamp said washer in place; and a tubular valve fitting the port in said partition, said valve being provided with perforations so disposed as to lie above said partition in the upper, and below said partition in the lower, position of said valve, thereby affording communication between such inlet and outlet openings and cutting off such communication, respectively.

9. In a device of the character described, the combination of a casing having inlet and outlet openings; a transverse partition, formed with a port, intermediate between such openings; a washer on the upper face of said partition surrounding the port therein; an open sleeve secured in said casing so as to clamp said washer in place; a tubular valve fitting the port in said partition, said valve being provided with a series of perforations encircling the same between its ends so as to lie above said partition in the upper, and below said partition in the lower, position of said valve, thereby affording communication between such inlet and outlet openings and cutting off such communication, respectively; and fluid-pressure actuated means for positioning said valve.

10. In a device of the character described, the combination of a casing having inlet and outlet openings; a transverse partition, formed with a port, intermediate between such openings; a washer on the upper face of said partition surrounding the port therein; an open sleeve secured in said casing so as to clamp said washer in place; a piston reciprocable in said casing above said partition, said piston being operable outwardly by the pressure of fluid in said casing, a tubular valve borne on the inner face of said piston and fitting the port in said partition, said valve being provided with a series of perforations encircling the same between its ends so as to lie above said partition in the upper, and below said partition in the lower, position of said valve, thereby affording communication between such inlet and outlet openings and cutting off such communication, respectively; and connections for supplying pressure fluid against the outer face of said piston to actuate the same inwardly.

11. In a device of the character described, the combination of a casing comprising two separable parts, one of said parts being provided with inlet and outlet openings, and the other part constituting a piston-cylinder; a transverse partition, formed with a port, intermediate between the openings in such first part; a washer on the upper face of said partition surrounding the port therein; an open sleeve clamped between said washer and the piston-cylinder for holding the former in place; a piston reciprocable in

said cylinder, said piston being operable outwardly by the pressure of fluid in said casing against its inner face; a tubular valve borne on such inner piston face and fitting
5 the port in said partition, said valve being provided with a series of perforations encircling the same between its ends so as to lie above said partition in the upper, and below said partition in the lower, position of
10 said valve, thereby affording communication between such inlet and outlet openings and

cutting off such communication respectively; and a fluid-pressure supply connected with the piston end of said casing for actuating said piston inwardly.

Signed by me, this 20th day of January, 1908.

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CHARLES F. SIEGRIST.

Attested by:

MARY ISRAEL,
JNO. F. OBERLIN.