(No Model.) 2 Sheets—Sheet 1.

E. O. THOMPSON.

HYDRAULIC PRESSURE REGULATING VALVE.

No. 564,167. Patented July 14, 1896.

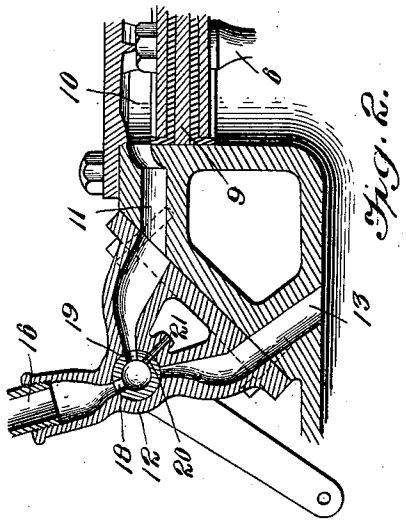


Fig. 2.

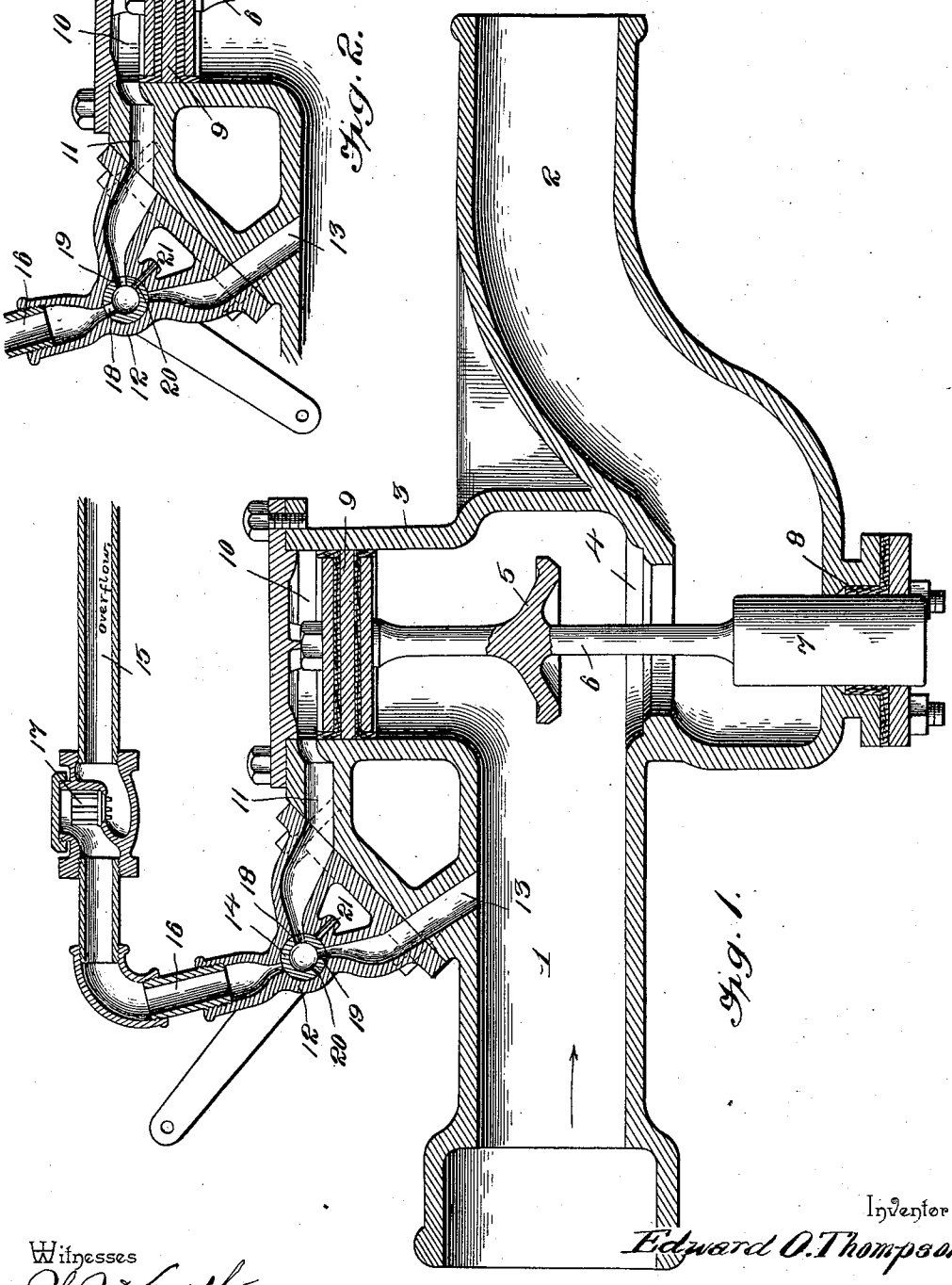


Fig. 1.

Witnesses
C. J. Koerth.
C. E. Hoyt

Inventor
Edward O. Thompson,

By his Attorneys,
C. A. Snow & Co.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

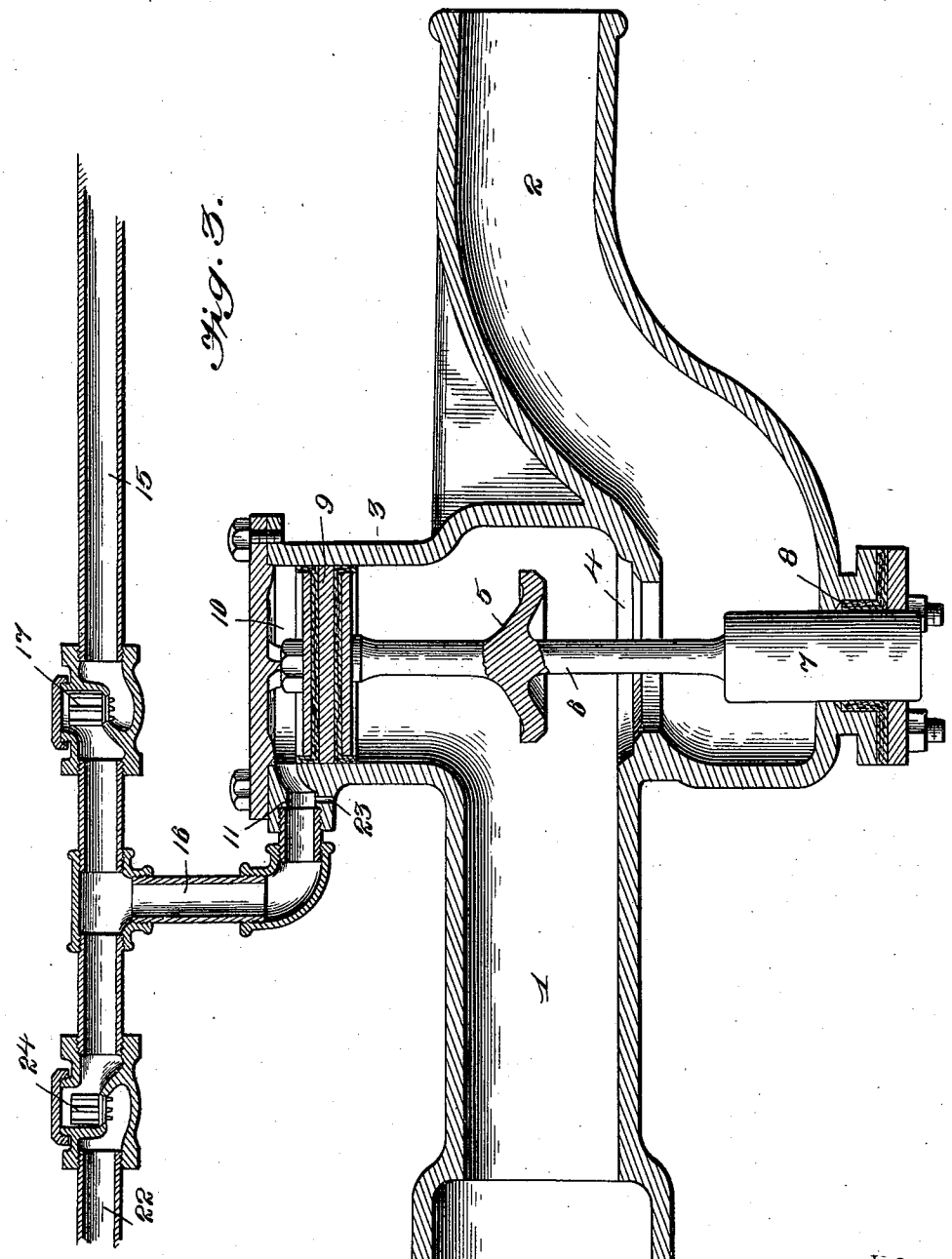
(No Model.) 2 Sheets—Sheet 2.

E. O. THOMPSON.

HYDRAULIC PRESSURE REGULATING VALVE.

No. 564,167. Patented July 14, 1896.

Fig. 5.



Witnesses
H. M. Worth.
C. E. Hoyt

Inventor
Edward O. Thompson

By his Attorneys,
C. A. Snow & Co.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

EDWARD ORLANDO THOMPSON, OF THOMASVILLE, GEORGIA, ASSIGNOR OF ONE-HALF TO ELI M. MALLETTE, OF SAME PLACE.

HYDRAULIC-PRESSURE-REGULATING VALVE.

SPECIFICATION forming part of Letters Patent No. 564,167, dated July 14, 1896.

Application filed February 24, 1896. Serial No. 580,470. (No model.)

To all whom it may concern:

Be it known that I, EDWARD ORLANDO THOMPSON, a citizen of the United States, residing at Thomasville, in the county of Thomas and State of Georgia, have invented a new and useful Hydraulic-Pressure-Regulating Valve, of which the following is a specification.

My invention relates to pressure-regulating devices particularly adapted to control hydraulic pressure, as in city water-service, and has for its object to provide a simple and efficient construction and arrangement of parts whereby the position of a controlling-valve is regulated by variations of pressure applied to one side of a piston carried by the valve-stem, the other side of the piston being exposed to stand-pipe and supply or street main pressure, and variable pressure being applied by overflow from the stand-pipe or tank or through a special line in connection with the pumping-station.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a sectional view of a valve constructed in accordance with my invention. Fig. 2 is a partial sectional view of the same, showing the operating-valve in a different position. Fig. 3 is a similar view showing a slightly-modified arrangement of parts whereby retaining pressure is applied to the regulating-valve through a special line or conductor running to the pumping-station.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

1 designates a supply or street main which is in communication with a service-pipe 2, leading to a stand-pipe or tank, (not shown,) said communication between the main and service-pipe being through a valve-casing 3, having a valve-seat 4. The valve 5 is provided with a stem 6, extending downwardly through the valve-seat and enlarged, as at 7, to form a guide operating in a stuffing-box 8. Said valve-stem also extends above the plane of the valve and carries a piston 9, which operates in a cylinder 10, formed as a part of the casing 3, and it is obvious that the surface of the enlargement 7 of the valve-stem reduces the efficient area of the lower surface of the piston and proportionately increases the efficient area of the upper surface of the piston, whereby, with an equal pressure upon both sides of the piston, the valve will be closed.

In communication with the cylinder above the plane of the piston is a passage 11, which, in the construction illustrated in Fig. 1, is in communication with an operating-valve casing 12, said operating-valve casing being also in communication by means of a passage 13 with the supply-main, whereby when the operating-valve 14 is in the position illustrated in Fig. 1 uniform pressure will be applied to both sides of the piston, and hence the latter will be depressed to close the valve. In Fig. 1 the parts are shown in the positions which they occupy just after the operating-valve has been moved to the position shown in said figure, and the piston is in the act of descending to close the valve.

The overflow-pipe 15, which communicates with the overflow-vents of the stand-pipe or tank, (not shown,) communicates with the valve-casing 12 by means of a passage 16, said overflow-pipe being provided with a check-valve 17 of the ordinary or any preferred construction, and it is obvious that when the operating-valve is turned to the position illustrated in Fig. 2, with the ports 18 and 19 thereof respectively in communication with the passages 16 and 11, any overflow pressure from the stand-pipe or tank will be communicated to the upper surface of the piston 9 and will close the valve 5. In order to allow the valve to open when the overflow ceases or when the operating-valve is turned to the position shown in Fig. 2 after the controlling-valve has been retained in its closed position by the arrangement of said operating-valve, as shown in Fig. 1, the operating-valve is provided with a port 20 for communication with a vent 21. Hence when the operating-valve is in the position illustrated in Fig. 2 and communication is thereby established between the cylinder and said vent 21, the contents of the cylinder escape through the vent and the piston is raised to

open the controlling-valve by the pressure in the supply-main. Hence, with the operating-valve in the position illustrated in Fig. 2, the position of the regulating-valve is controlled by the pressure in the stand-pipe, inasmuch as said valve will be held open as long as there is no overflow from the stand-pipe or tank, and will be closed by the excess of pressure upon the upper side of the piston when the stand-pipe supplies the overflow-pipe 15. When it is desired to close and retain the regulating-valve in its closed position, the operating-valve is turned to the position illustrated in Fig. 1, when the pressure in the supply-main is applied to the upper or enlarged surface of the piston, and hence counterbalances the pressure also in the supply-main, which is applied to the lower or reduced surface of the piston. The drip or escape through the vent 21 is designed to be so slow as to allow the pressure in the overflow-pipe 15 to be communicated to the upper surface of the piston with but slight reduction, whereby the efficent closing of the regulating-valve is secured when the stand-pipe or tank has become filled.

In the form of my invention which is illustrated in Fig. 3 the operating-valve is dispensed with, and instead of communication being established between the supply-main and the cylinder above the plane of the piston, to provide means for retaining the valve in its closed position, connection is made between the passage 16 and a conductor or line 22, extending to the pump. (Not shown.) When it is desired to close and retain the valve, sufficient pressure is applied through the conductor or line 22 to counterbalance the pressure in the supply-main. In this form of the pressure-regulator a vent 23 is provided in communication with the passage 11. Said vent, as above described in connection with the vent used in the form of my invention shown in Figs. 1 and 2, is of small capacity, whereby the escape therethrough while pressure is maintained in the conductor or line 22 is insufficient to release the piston and allow the regulating-valve to open. A check-valve 24 is preferably employed in the conductor or line 22.

While I have described my invention as particularly applicable to street water-service, it will be understood that its utility is not limited to this application, as it may be used for steam, compressed air, ammonia, and other liquids and gases under pressure, the only difference in construction being in the packing of the piston and valve-seats to suit the different materials.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having described my invention, what I claim is—

1. The combination with a regulating-valve, of a piston carried by the valve-stem and operating in a pressure-cylinder, an overflow-pipe in communication with the pressure-cylinder and adapted to communicate pressure thereto to close the regulating-valve, a vent in communication with the cylinder to relieve the pressure therein, and means for communicating a constant pressure to the cylinder to retain the regulating-valve in its closed position, substantially as specified.

2. The combination with a regulating-valve having its casing in communication with a supply-main, of a piston carried by the stem of said valve and operating in a pressure-cylinder, said piston having a reduced surface exposed to supply-main pressure, connection between the supply-main and said pressure-cylinder to apply pressure to the opposite or increased surface of said piston, an overflow-pipe for connection with a stand-pipe or tank in communication with said pressure-cylinder, and an operating-valve for establishing communication between the pressure-cylinder and either the overflow-pipe or the supply-main, said valve having a vent which is opened when the pressure-cylinder is in communication with the overflow-pipe, substantially as specified.

3. A pressure-regulating device having a regulating-valve the casing of which is in communication with a supply-main, a piston carried by the valve-stem and operating in a pressure-cylinder in communication with the supply-main, whereby the reduced lower surface of the piston is exposed to supply-main pressure, an operating-valve having a casing in communication by means of independent passages 11 and 13, respectively, with the pressure-cylinder and the supply-main, whereby supply-main pressure may be admitted to the pressure-cylinder to operate upon the enlarged upper surface of the piston to close the regulating-valve, an overflow-pipe in communication with said operating-valve casing and adapted to be arranged, by means of the operating-valve in communication with the passage 11 which connects with the pressure-cylinder, and a vent in communication with the operating-valve casing adapted to be arranged in communication with the pressure-cylinder when the operating-valve is adjusted to open communication between the overflow-pipe and said pressure-cylinder, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

EDWARD ORLANDO THOMPSON.

Witnesses:

RALPH S. JENNINGS,

W. H. ROCKWELL.