

No. 702,326.

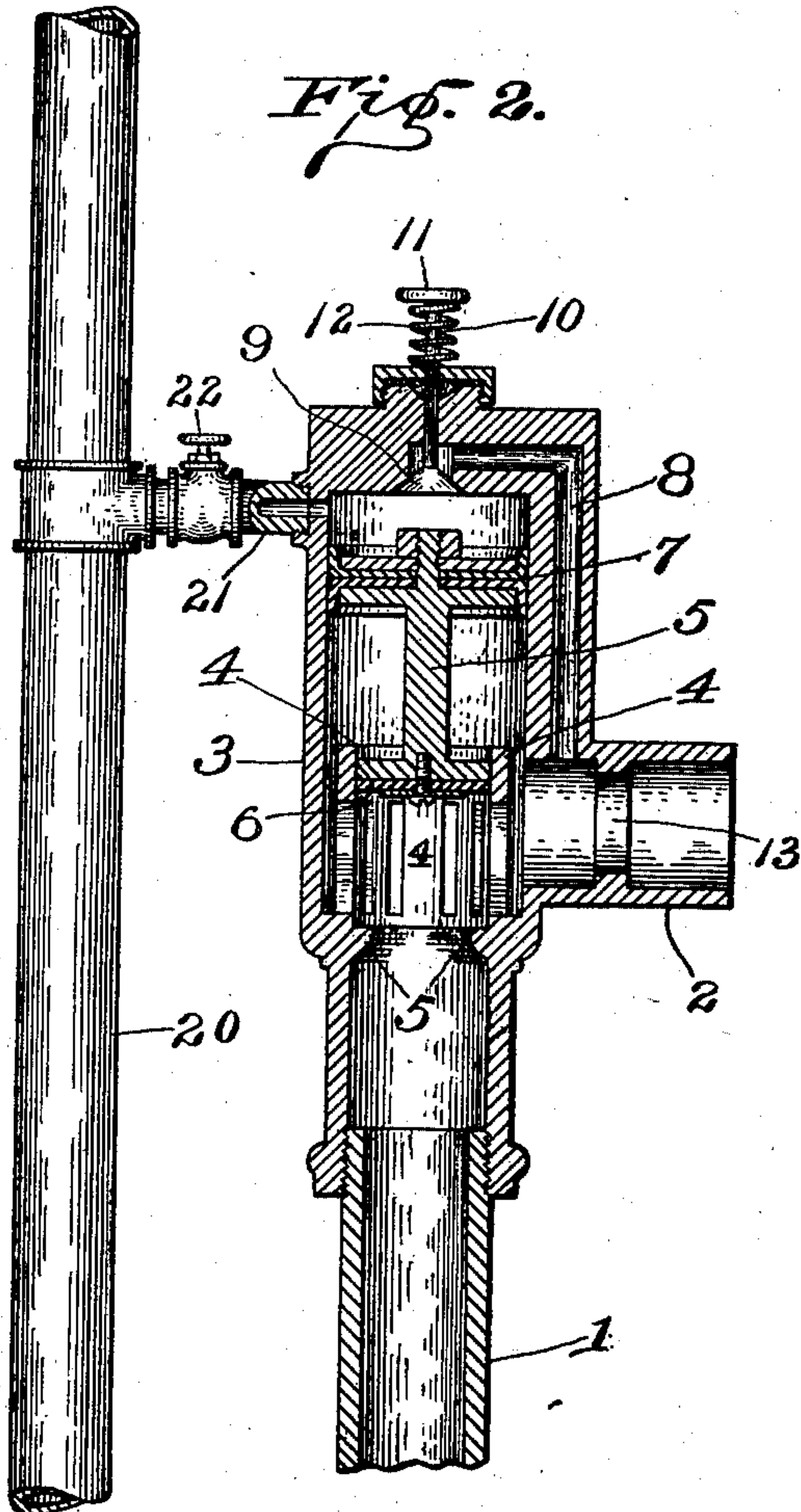
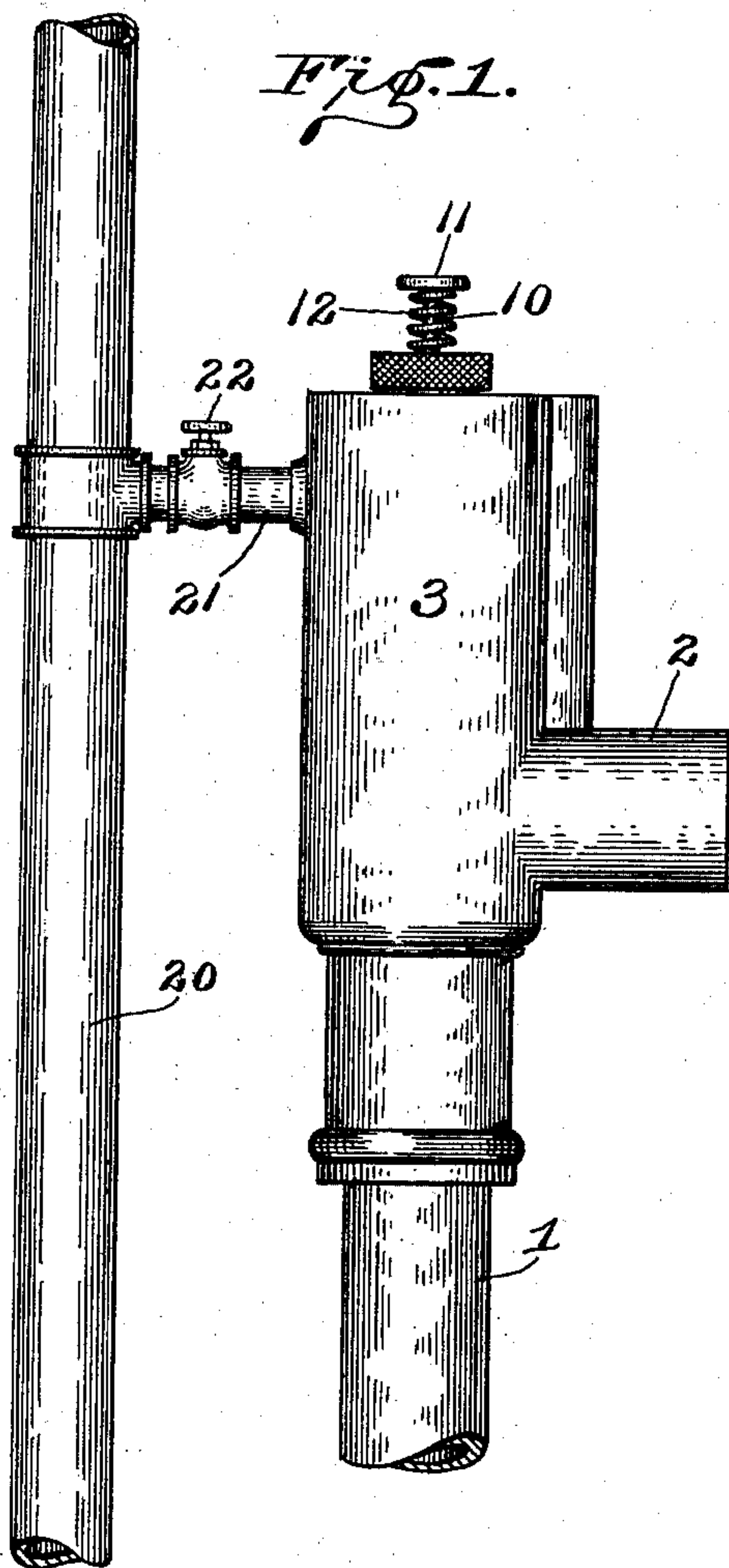
Patented June 10, 1902.

J. W. NETHERY.  
VALVE.

(Application filed Oct. 11, 1900.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:

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INVENTOR

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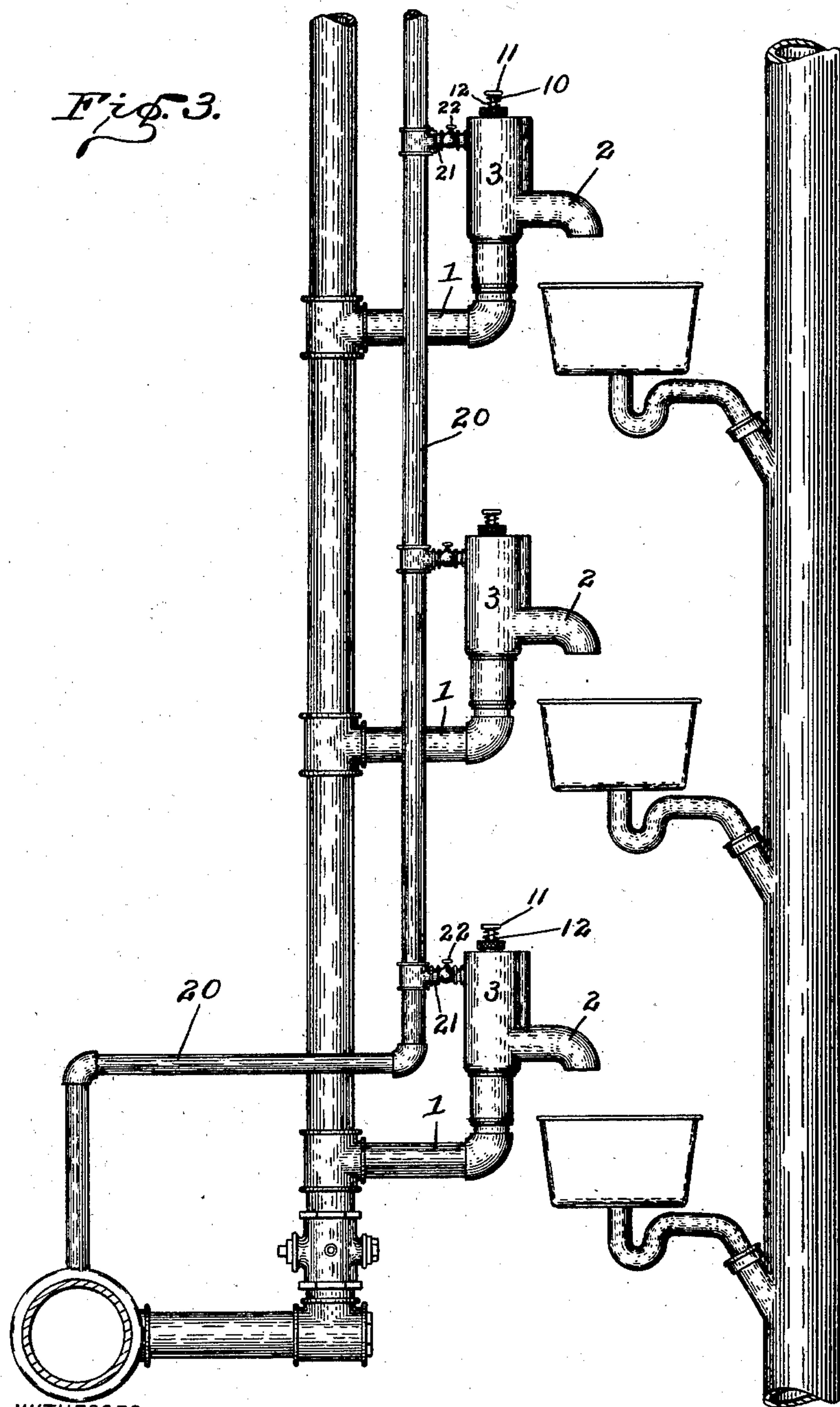
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WITNESSES:

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# UNITED STATES PATENT OFFICE.

JOSEPH W. NETHERY, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO THE NETHERY HYDRAULIC VALVE COMPANY, OF INDIANAPOLIS, INDIANA, NEW YORK, N. Y., AND JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

## VALVE.

SPECIFICATION forming part of Letters Patent No. 702,326, dated June 10, 1902.

Application filed October 11, 1900. Serial No. 32,720. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH W. NETHERY, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Valves, of which the following is a specification.

My present invention relates to a valve which upon being opened will discharge a predetermined quantity of fluid and then close. Such valves are adapted, among other things, to serve in places where tanks have heretofore been used, as in the case of water-closets and the like, so that such tanks become unnecessary and may therefore be dispensed with.

A valve and the pipes and passages connected therewith embodying my said invention will be first fully described and the novel features thereof then pointed out in the claims.

Referring to the accompanying drawings, which are made a part hereof and on which similar reference characters indicate similar parts, Figure 1 is a view of a valve and fragments of the connected pipes embodying my said invention; Fig. 2, a central vertical sectional view of the same, except one pipe, which is, as before, shown in elevation; Fig. 3, a view showing a portion of a plumbing system employing several of my improved valves.

The water or other fluid reaches the valve through the main ingress or supply pipe 1 and is discharged through the branch pipe or nozzle 2, the same being connected to or formed in piece with the main-valve casing 3. In the construction illustrated in the drawings a slitted cage 4 extends up for a suitable distance above the valve-seat 5 and contains the lower end of the valve proper. Said slitted cage serves not only as a guide to the valve, but also to restrict the water-passage and provide a gradually-increasing area to such passage as the valve rises and a gradually-decreasing area as it closes. The main chamber in the valve-casing continues on above this cage and is of a larger diameter. The valve is a double valve and is composed of a body 5, having on the lower end a suitable washer or gasket 6, forming an elastic

seat, and upon the upper end suitable washers or cup-leathers 7, the same being secured thereto by any appropriate means, as screws and nuts, as illustrated. The lower end of the valve upon which the washer 6 is secured travels vertically in the cage 4, while the upper end carrying the washers or cup-leathers 7 travels in the upper main cylindrical chamber of the valve-casing. Leading from the upper end of this chamber around into or to a point communicating with the outlet or nozzle 2 is a by-pass 8, which is closed by a valve 9, the valve-stem 10 of which extends up through the top of the valve structure and terminates in a suitable finger-knob 11, beneath which I provide a spring 12, which serves, as will be readily understood, to hold the valve 9 up to its seat except when forcibly depressed.

Within the outlet or nozzle 2 is an annular flange 13, which reduces the effective discharge-orifice of said outlet and in case of excessive pressure transmits a portion of the pressure back through the by-pass 8 into the chamber above the main valve, thus aiding in pushing said main valve downwardly, and so reducing the flow through the slits in the cage 4, the result being to equalize the pressure at all points except within the pipe 1 and below the main valve. In thus acting the back pressure in question will operate to retard the closing of the valve 9 until a suitable pressure is reached in the chamber below said valve through the inflow of water from the pipe 20 through the branch 21. After the valve 9 has become seated or closed the back pressure in question will of course have no further effect; but by this time the main valve will have descended sufficiently to partially shut off the main flow of water from below, and the object will have been thus accomplished. The flange 13 also serves an additional purpose. The space immediately behind it, into which the by-pass 8 discharges, causes the water at that point to form a sort of eddy, into which the by-pass may discharge freely, the flow of water under full force being of course limited to the size of the opening within the flange.

A second pipe 20 leads from the same



original source of supply as the supply-pipe 1. A branch 21 extends therefrom, and a fine perforation leads into the extreme upper end of the main chamber within the main-valve casing 3, said perforation being smaller than the by-pass 8. As the upper end of the valve is larger in diameter than the lower end, the pressure of water in this chamber is sufficient when the valve 9 is closed to gradually force the main valve down and eventually shut it tight, thus stopping the flow. The time which this operation occupies is governed by the size of the opening, and this may be made as small as desired by means of the valve 22 in said branch pipe 21. The operation is (when the valve 9 is forced open by a pressure on the finger-knob 11) that the water will flow out of that portion of the chamber above the main valve through the by-pass 8, said by-pass being so much larger than the perforation which leads in from the pipe 20 that the pressure in said chamber is immediately reduced to a point which enables the pressure of the water in the pipe 1 to force the main valve open, and this in rising from its closed to its open position will drive the contents of said chamber out through said by-pass. The spring 12 will then close the valve 9, and the fine stream coming in through the orifice in the branch pipe 21 under a high pressure will, as before stated, in a certain period force down and close the main valve.

In an ordinary plumbing system, where a number of valves are commonly connected to a single-supply pipe, as shown in Fig. 3, the second pipe 20, leading from the primary source of supply, is of great advantage in carrying out my invention, as the initial pressure will always be maintained in this pipe, whereas in an ordinary supply-pipe it varies greatly at times, as varying numbers of valves are liable to be open, so that water is drawn from the pipe and the pressure reduced thereby unequally.

As will be readily understood, any desired amount of water may be drawn out in operation by simply adjusting the size of the inlet-opening leading from the pipe 20 to the chamber above the main valve. This inlet-opening, however, must always be smaller than the outlet-opening from said chamber formed by the by-pass 8, for reasons which have already been explained. When desired, the flow may be prolonged by holding the valve 9 open by suitable pressure on its stem.

Having thus fully described my said invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in a valve, of a casing having an inlet and outlet with a valve-seat between them, a cage with restricted openings in its sides extending up from said seat, a piston-valve mounted to operate in the casing above said seat with the valve in said cage and adapted to seat on said valve-seat, a by-pass extending from the chamber above the

valve around to the outlet, an automatically-closing valve to said by-pass, and a separate fluid-supply pipe leading into said chamber the inlet whereof is smaller than said by-pass, substantially as set forth.

2. The combination, in a valve, of a valve-casing containing a cage having openings in its sides in which the lower end of the valve travels, and a chamber larger in diameter than said cage and located above the same, the valve-seat being located below said cage, a piston-valve having two heads the lower one of which is adapted to travel within the cage and seat itself on the valve-seat and the upper one of which is adapted to travel within the cylindrical chamber above the cage, and suitable means for operating said main valve, substantially as set forth.

3. The combination, in a fluid-supply system, of the valves in said system connected with a supply-pipe, each of said valves comprising a casing having a valve-seat, a chamber above said seat, a valve therein connected to a piston operating in said chamber, a discharge-opening below said piston, a by-pass leading from above said piston around into said discharge-opening, and a separate fluid-supply pipe leading from the primary source of supply connected with each of said chambers above the piston by an orifice smaller than said by-pass, substantially as set forth.

4. The combination, in a valve, of the main-valve casing, the main valve contained and operating therein, a chamber above said main valve larger in area than the valve-seat, a second supply-pipe leading directly from the primary source of supply communicating through a small passage with said chamber, a discharge-opening leading from said chamber, and a suitable valve to said discharge-opening, said discharge-passage leading into the main outlet to the valve, said main outlet being provided with a reducing-flange outside the point where the said passage discharges thereinto, substantially as and for the purposes set forth.

5. The combination, in a valve, of a casing having a valve-seat, inlet and outlet openings on opposite sides thereof, a chamber above said seat, a valve adapted to open a larger area for the discharge of the fluid as it rises from said seat, a piston operating in said chamber and connected to said valve, a by-pass leading around into the discharge-pipe, and a restriction formed in said discharge-pipe adapted to partially close or restrict its area at a point beyond the point where said by-pass discharges thereinto, a valve to said by-pass, and a separate fluid-supply leading directly from the primary source of supply into said chamber above said piston, substantially as set forth.

6. The combination, in a fluid-supply system, of a main source of fluid-supply, a pipe leading therefrom, a valve-casing connected to said pipe having a suitable chamber therein with a valve-seat of smaller diameter than



the large portion of said chamber at one end thereof, a main-valve structure situated in said chamber having a valve at one end of suitable form to rest upon said valve-seat and  
5 a piston-head of larger diameter within the chamber, ingress and egress openings to said valve, a separate pipe leading directly from the source of supply to said valve and communicating with the portion of the chamber  
10 above the piston by a passage of small diameter, a by-pass of larger diameter leading

from the portion of the chamber above the piston around and communicating with the egress-opening to the main valve, and a valve to said by-pass.

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In witness whereof I have hereunto set my hand and seal, at Indianapolis, Indiana, this 9th day of October, A. D. 1900.

JOSEPH W. NETHERY. [L. S.]

Witnesses:

CHESTER BRADFORD,  
JAMES A. WALSH.