

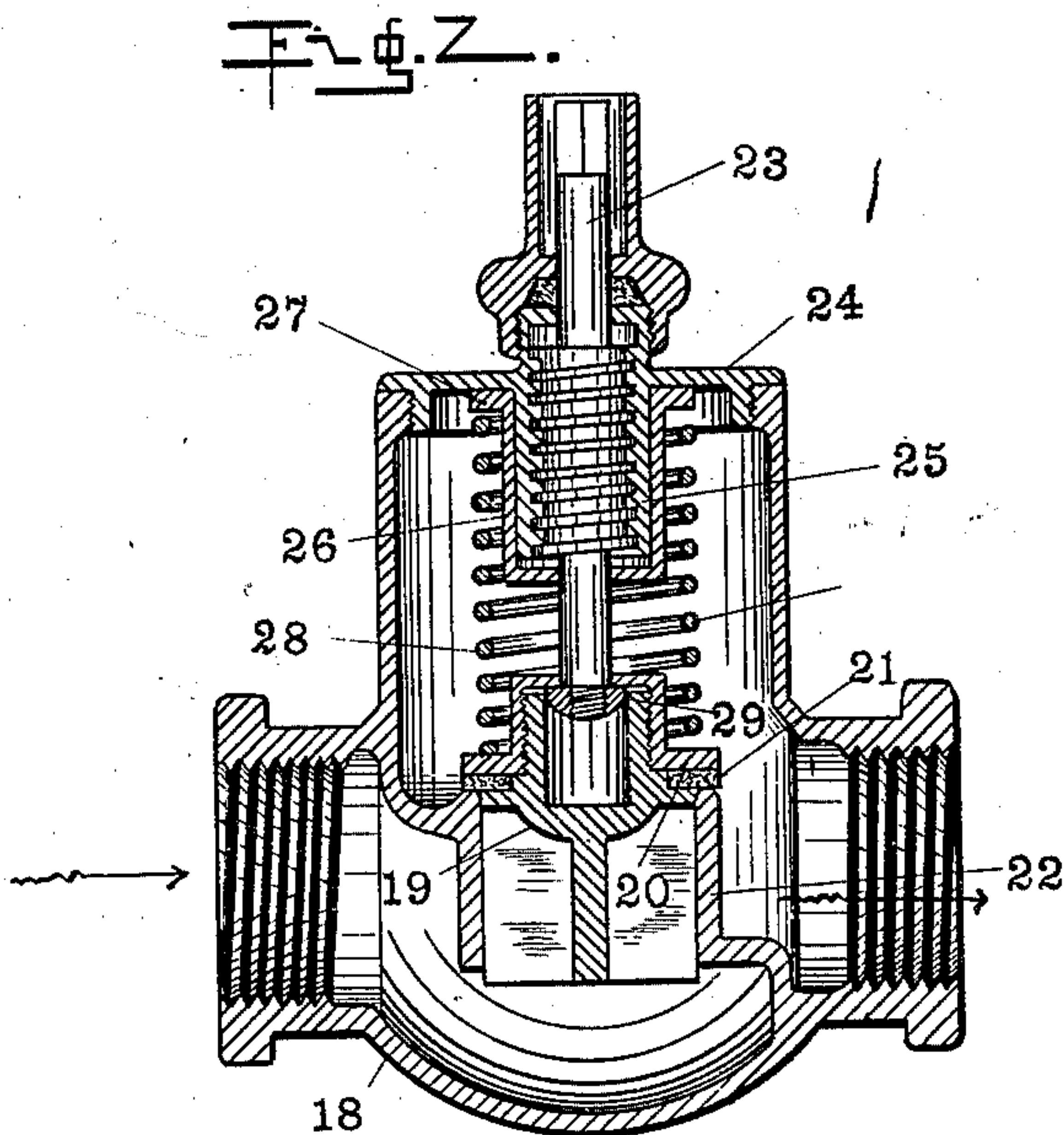
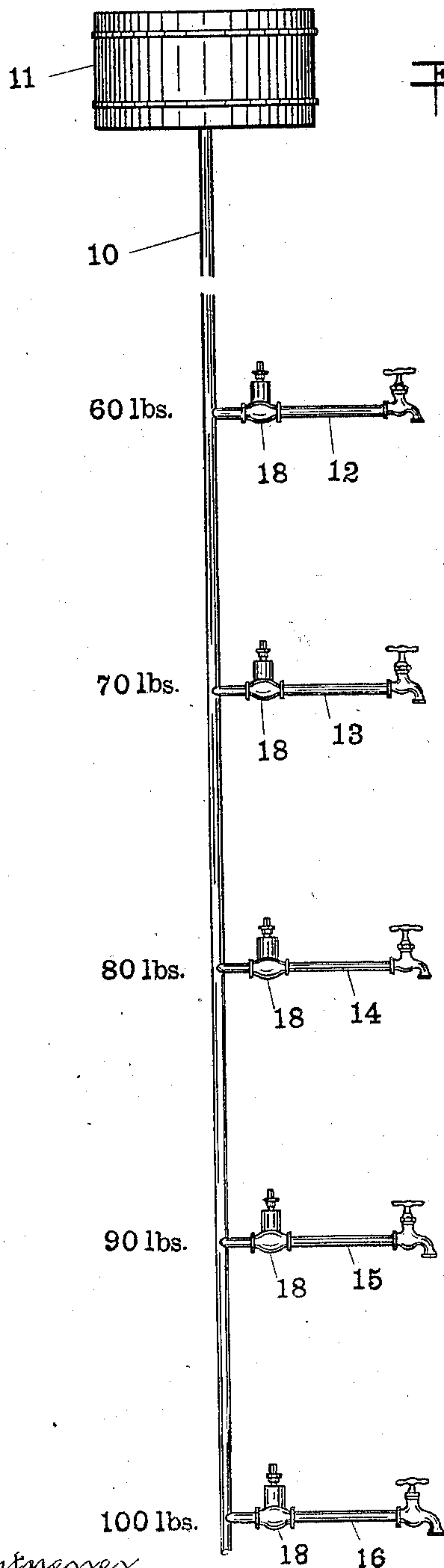
No. 748,091.

PATENTED DEC. 29, 1903.

J. W. NETHERY.  
PRESSURE REGULATING VALVE.

APPLICATION FILED OCT. 11, 1902.

NO MODEL.



Witnesses  
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# UNITED STATES PATENT OFFICE.

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NETHERY HYDRAULIC VALVE COMPANY, OF INDIANAPOLIS, INDI-  
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## PRESSURE-REGULATING VALVE.

**SPECIFICATION** forming part of Letters Patent No. 748,091, dated December 29, 1903.

Application filed October 11, 1902. Serial No. 126,830. (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 Pressure-Regulating Valves, of which the following is a specification.

The valve of my present invention is designed to be used on the various stories of tall buildings to regulate the pressure which may come upon the valves at the various fixtures on the several stories, so that a predetermined uniform pressure can be maintained at the various points of discharge.

Said invention consists in a construction whereby a valve of an otherwise ordinary character (and which may be used in the ordinary way to completely shut off the flow when desired) may also be adjusted to automatically open under a certain predetermined incoming pressure and to close when said pressure is diminished below the predetermined point or when the pressure on the discharging side added to the force provided by the valve itself equals the pressure upon the receiving side.

Referring to the accompanying drawings, which are made a part hereof and on which similar reference characters indicate similar parts, Figure 1 is a diagrammatic view illustrating a system in which my valves are to be employed, and Fig. 2 a central vertical sectional view of a preferred form of one of said valves on a much enlarged scale.

In Fig. 1 the pipe 10 leads from a tank 11 at a high elevation down through the building and has numerous branches, as 12, 13, 14, 15, and 16, leading off at various levels to the fixtures on the floors which said levels represent. For purposes of illustration we will assume that at the branch 16 the pressure is one hundred pounds to the square inch, at the branch 15 ninety pounds, at the branch 14 eighty pounds, at the branch 13 seventy pounds, and at the branch 12 sixty pounds, while it is desired that the pressure at the discharging-points shall be uniformly fifteen pounds. In such a case the valves embodying my invention for the use contemplated would be set to resist pressures, as

follows: that in the branch 16 eighty-five pounds, that in branch 15 seventy-five pounds, that in branch 14 sixty-five pounds, that in branch 13 fifty-five pounds, and that in branch 12 forty-five pounds.

The purpose and arrangement being thus understood, I will proceed to describe the construction of the valve in detail.

Said valve has an ordinary shell or casing 18, with ingress and egress points substantially as usual, the direction of flow being indicated by the arrows at said points. The valve proper may be of any appropriate construction, but is preferably formed of two parts 19 and 20, which are cup-shaped where they come together and are adapted to be connected together by an interior and exterior screw-thread connection, as shown, and to hold a packing 21 between them. In the preferred form the part 19 has also a cup-shaped opening in its upper end to receive the lower end of the valve-stem and is provided with guide-wings to guide the course of the valve. Said valve rests upon an ordinary valve-seat 22. This valve-seat in the preferred form is shown as having a cylindrical extension into which the wings on the valve enter and whereby said valve is guided in its course. The valve-stem 23 extends up to the outside of the valve and is shown with a square upper end, upon which an ordinary valve-key is to be placed for manipulating the valve. Upon the cap 24 to the valve-shell is the stuffing-box and shield for the valve-stem, and extending down below the under side of said cap is a cylindrical interiorly-threaded downward extension 25, with which the threads on the valve-stem engage. The valve-stem is provided with a shoulder against which the spring rests, and this in structure 26, engaging the primary shoulder the preferred form is embodied in a cylindrical on the valve-stem and surrounding this cylindrical portion 25 and having a flange at its upper end against which one end of the spiral spring 28 immediately rests when the parts are assembled, thus enabling a longer spring to be used, the other end of said spring resting against the shoulder forming the upper side of the rim or flange of the cup-shaped part 20, thus holding the valve down



onto the valve-seat 22, all as is clearly shown in Fig. 2 of the drawings. In the preferred form the valve part 19 contains a hollow space or depression, into which the lower end of the valve-stem 23 extends, and this bears a small head 29, which engages with the cap-like upper end of the valve part 20. The valve can, therefore, if desired, be forcibly raised off its seat in opposition to the force of the spring 28. The use of the cylindrical structure 26 enables the parts to operate without turning the spring, the revolving bearings being at the points of contact between the stem and the contacting parts.

The operation of this valve may be stated as follows: It may be opened to act as an ordinary valve in the manner above described, so that, no difference how low the pressure, fluid will flow through it. By turning the valve-stem down until its head 29 strikes the bottom of the depression in the valve part 19 it can be tightly closed, so that no practicable amount of pressure will open it. For its designed use, however, the custom is to turn the valve-stem down until the spring is compressed to just such an extent as that it will require the predetermined pressure to force the valve open in opposition to the pressure of the spring. The spring, as will be readily understood, is compressed from the shoulder on the valve-stem through the cup-shaped part 27, against which said valve-stem should directly bear. Assuming now that the valves are to be set at the level indicated by the pipe branch 14, where the pressure in the pipe is assumed to be eighty pounds, and that, as above stated, it is desired to draw the fluid at a pressure of fifteen pounds, the valve will be screwed down until the spring will resist a pressure of sixty-five pounds. Then in the case of the opening of a valve or faucet leading out on the branch 14 the fluid will run off at a pressure of fifteen pounds. When these valves or faucets are closed, fluid will flow through my improved valve until a pressure of fifteen pounds in the branch pipe 14 is reached, when the said pressure being added to the force of the spring 28, (sixty-five pounds,) equaling the pressure in the main line 10 at the said point, the valve will close, and no more fluid will pass until the pressure beyond the valve is released or the valve is opened by manipulation of the valve-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 structure, of the shell and valve-seat, said valve-seat having a cylindrical prolongation, the valve proper seated on said valve-seat and bearing guiding-wings and containing a longitudinal opening in its upper portion, a valve-stem having a head on its lower end loosely engaged in said opening and held from escaping therefrom by a cap-like portion, said valve-stem being also provided with a shoulder, a

cylindrical downward extension on the under side of the cap of the valve-shell through which the valve-stem passes, a cylindrical structure surrounding said downward extension and having a flange at its upper end and a cap-like plate at its lower end closely surrounding the valve-stem below the shoulder, and a spring interposed between the upper surface of the valve and the flange at the upper end of said cylindrical structure.

2. The combination in a valve structure, of the shell and valve-seat, the valve seated on said valve-seat, a valve-stem connected thereto but having a limited longitudinal movement relative thereto, a spring engaging the valve at one end, and a separable connection between the valve-stem and the opposite end of the spring whereby the valve-stem may be moved into and out of engagement with the spring, for the purpose set forth.

3. The combination in a valve structure, of the shell and valve-seat, the valve seated on said valve-seat and having a suitable shoulder, a valve-stem having a sliding connection with said valve, a collar 27 having a sliding engagement with the valve-stem, and a spring mounted between the valve and the collar.

4. In a system for liquid distribution, the combination with means for maintaining a head of liquid, of a plurality of discharge-pipes at varying head-points, and a valve structure mounted in each of said discharge-pipes each of said valve structures consisting of a shell and valve-seat the valve seated on said valve-seat, a valve-stem connected thereto but having a limited longitudinal movement relative thereto, a spring engaging the valve at one end, and a separable connection between the valve-stem and the opposite end of the spring, so that the valve-stem may be moved into and out of engagement with the spring, whereby each valve may be yieldingly held to its seat in accordance with its position relative to the maintained head.

4. In a system for liquid distribution, the combination with means for maintaining a head of liquid, of a plurality of discharge-pipes at varying head-points, and a valve structure mounted in each of said discharge-pipes, each of said valve structures consisting of the shell and valve-seat, the valve seated on said valve-seat and having a suitable shoulder, a valve-stem having a sliding connection with said valve, a collar 27 having a sliding engagement with the valve-stem, and a spring mounted between the valve and the collar, whereby each valve may be yieldingly held to its seat in accordance with its position relative to the maintained head.

In witness whereof I have hereunto set my hand and seal at Indianapolis, Indiana, this 26th day of September, A. D. 1902.

JOSEPH W. NETHERY. [L. S.]

Witnesses:

CHESTER BRADFORD,  
JAMES A. WALSH.