

No. 707,758.

Patented Aug. 26, 1902.

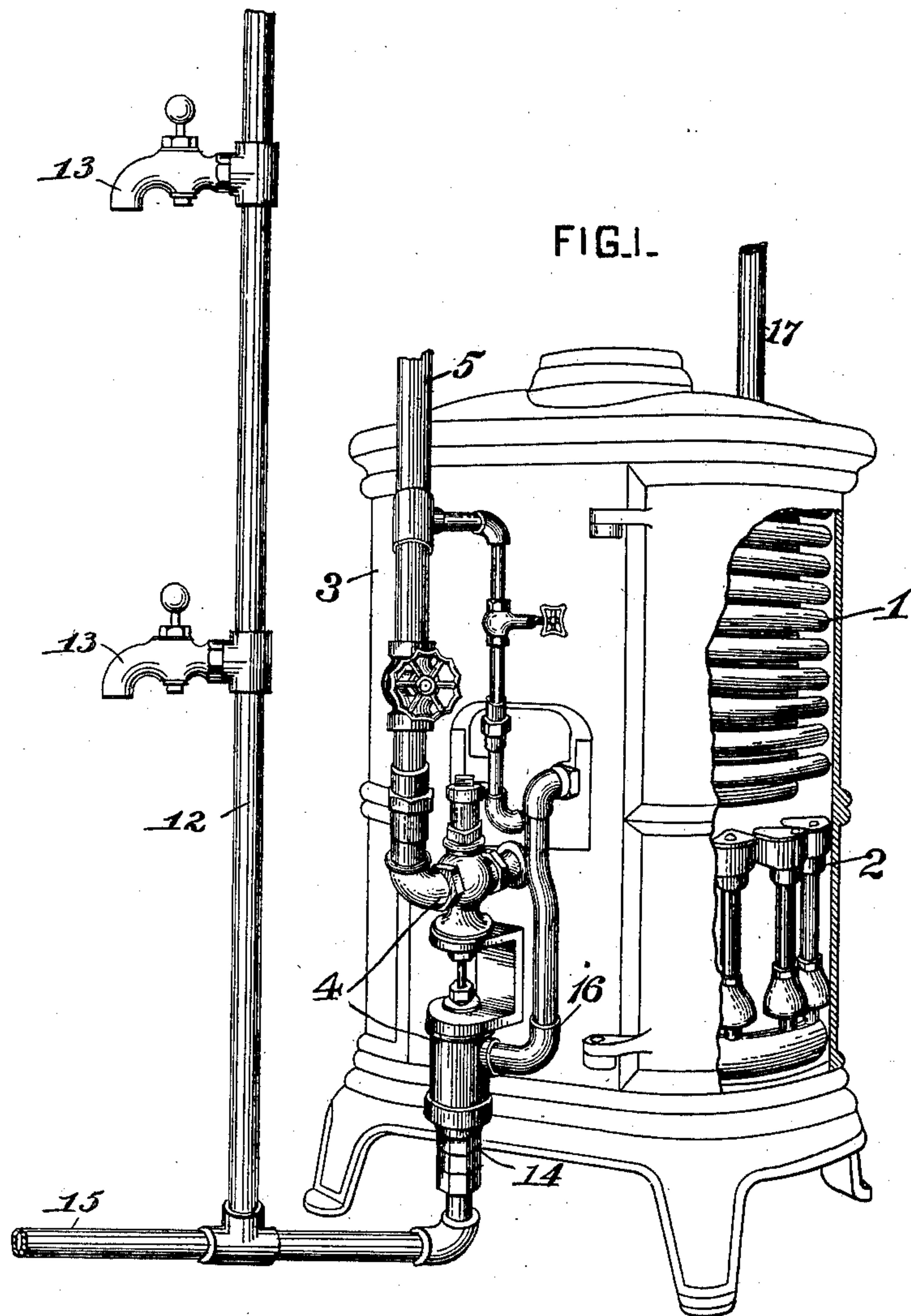
A. BUERKLE.

VALVE MECHANISM FOR WATER HEATERS.

(Application filed Jan. 28, 1901.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:

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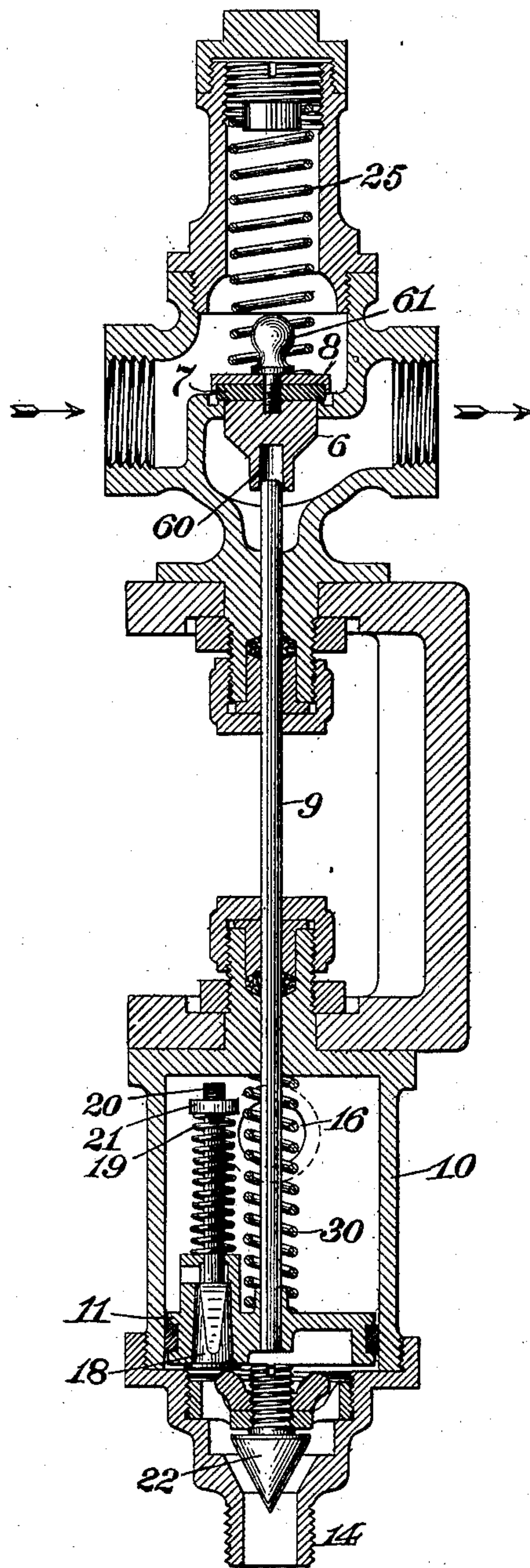
VALVE MECHANISM FOR WATER HEATERS.

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(No Model.)

2 Sheets—Sheet 2.

FIG. 2.



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UNITED STATES PATENT OFFICE.

AUGUST BUEKLE, OF ALLEGHENY, PENNSYLVANIA.

VALVE MECHANISM FOR WATER-HEATERS.

SPECIFICATION forming part of Letters Patent No. 707,758, dated August 26, 1902.

Application filed January 26, 1901. Serial No. 44,831. (No model.)

To all whom it may concern:

Be it known that I, AUGUST BUEKLE, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Valve Mechanism for Water-Heaters, of which improvements the following is a specification.

My invention relates to improvements in valve mechanism.

My improvements are particularly applicable to the valve mechanism which forms a part of domestic water-heaters.

The object of my invention is to provide against the momentary opening of the gas-valve in response to the action of what is known as "water-hammering" in the cold-water-distributing pipes, due to the sudden closing of the faucets in such pipes. Certain incidental advantages due to modifications in construction will be noted below.

In the accompanying drawings, forming part of this specification, Figure 1 is a perspective view of an automatic water-heater, showing the valve mechanism to which my improvement is applicable and the water-distributing pipes connected thereto, a portion of the case or shell being broken away. Fig. 2 is a vertical section, on an enlarged scale, of the valve mechanism, and in it my improvements are shown.

In the practical application of my invention to water-heaters I provide a heater which is in other respects of any suitable construction. I preferably employ a heater which consists, in addition to the valve mechanism, of a coil of pipe, burners, and a case or shell. The coil and burners are so arranged within the case or shell that when the gas flowing from the burners is ignited the flame will play upon the coil and heat the water flowing through it. Such a heater is shown and described in United States Letters Patent No. 583,276, granted to John C. Beckfield May 25, 1897. In Fig. 1 of the accompanying drawings such a heater is shown also.

1 indicates the coil, 2 the burners, and 3 the case or shell. The water-supply pipe 12 is connected to the inlet-nozzle 14 of the valve-motor, and one or more branch pipes 13 extend therefrom through the building in which the heater is located. The branch pipe or pipes are provided with faucets 13, regulating the flow of cold water from the pipes 12.

The coil 1 of the heater is connected with a distributing-pipe 17, extending through the building and having, as is customary, suitable regulating-faucets.

The valve mechanism, which, together with the parts enumerated, constitutes a water-heater, consists, essentially, of a valve placed in the line of flow of gas to the burners and a motor placed in the line of flow of water to or from the coil. The motor contains an element which is moved by the flow of water through the apparatus and which through suitable mechanism imparts motion to the gas-valve. Such valve mechanism is shown and described in United States Letters Patent No. 591,588, granted to me October 12, 1897.

In Fig. 1 of the accompanying drawings, 4 indicates the valve mechanism, and in Fig. 2 the valve mechanism is shown in detail.

Heretofore it has been the practice to mount the gas-valve and the movable element of the motor in the water-pipe rigidly upon a common stem. It has also been the practice to have the stem extend through a perforation in the gas-valve and to secure the latter in place by a nut screwed upon the end of the stem. I have found in the practical use of these heaters, especially where the water-pressure is high, that a sudden closing of a cold-water faucet will produce a sudden back pressure or water-hammer in the distributing-pipes sufficient to raise the movable element of the motor. As the gas-valve is rigidly connected with the movable element of the motor it will be opened by the back pressure or water-hammer, permitting a flow of gas through and a momentary ignition at the burners. I have found also that it is difficult to prevent leakage of gas around the stem when the latter extends through the gas-valve. By the changes in construction which constitute my present invention I overcome these defects.

Referring to Fig. 2 of the drawings, the valve mechanism there shown will be seen to consist of a gas-valve 6, a motor (which is in this instance a cylinder) 10, in which moves a piston 11, and a rod 9, extending from the motor to operate the valve. Valve 6 is adapted to control the effective area of an orifice through which gas flows in the direction indicated by arrows from the gas-supply pipe 5 to the burners 2. Piston 11 is arranged in cylinder 10 between the water-inlet 14 and

its discharge 16. Water passes the piston through an opening closed by the tapered plug 18. This plug 18 closes in the direction of the flow of water through the opening. It is provided with an upwardly-extending stem 20, adapted to bear against the head of cylinder 10 as piston 11 rises, and thus gradually increase the effective area of the opening. A spring 19, disposed between piston 11 and a shoulder 21 on stem 20, tends to hold plug 18 in the opening. Stem 9 in passing through the walls of the gas and water conduits is provided with suitable stuffing-boxes. A spring 25, properly disposed, serves to hold the valve in closed position. 22 is a manually-adjustable conical block which throttles to a greater or less extent the water-inlet. The apparatus is thereby adaptable to varying conditions of water-pressure.

My invention consists in modifying the parts enumerated above, all of which are shown and described in my said prior patent, in the following particulars: first, in mounting gas-valve 6 loosely upon stem 9; second, in forming valve 6 imperforate, and, third, in placing a spring 30 between piston 11 and the end of its cylinder. Stem 9, instead of being carried through valve 6 and having valve 6 rigidly attached to it, is so disposed that it will, after a certain initial movement, shift valve 6 from its seat. A convenient construction to this end consists in so arranging the parts that the end of stem 9 will abut against the valve after a certain initial movement of the piston has been made, and as the piston continues to move valve 6 will be opened thereby against the tension of spring 25. In order that the parts may be properly guided, a socket 60 is formed in valve 6 for the reception of stem 9. The length of stem 9 is such that when the parts are at rest the end of stem 9 is separated from or does not abut against valve 6. Thus piston 11 is capable of a limited traverse without raising valve 6 from its seat. The body of valve 6 is imperforate. Washer 7 is secured between washer 8 and the body of the valve by a thumb-screw 61, which extends but part way through valve 6. Spring 30 is adapted to shift piston 11 to the lower limit of its traverse beyond the action of spring 25 when water ceases to flow and to hold it there when the parts are at rest. Springs 25 and 30 may act independently of one another or they may act together in shifting the piston during that portion of the traverse of the piston when valve 6 is open.

It is characteristic of the improvements described herein that the accidental opening of the valve due to back pressure or water-hammer in the cold-water pipes is avoided and also all liability of leakage, and, further, by the construction shown and described it is possible to remove the motor or the gas-valve independent of each other.

I claim herein as my invention—

1. In an automatic water-heater, the com-

bination of a water-receptacle having supply and discharge pipes, burners for applying heat to the receptacle, a valve controlling the flow of gas to the burners, a valve-motor arranged in the line of flow of water to and from the receptacle and adapted to be operated by variations of pressure in the distributing-pipes and mechanism interposed between the valve and motor whereby after a certain initial movement of the motor independent of the valve, a movement is imparted to the valve by the motor, substantially as set forth.

2. In an automatic water-heater, the combination of a water-receptacle having supply and discharge pipes, burners for applying heat to the receptacle, a valve controlling the flow of gas to the burners, means for shifting the valve to a closed position, a motor for opening the valve arranged in the line of flow of water to and from the receptacle, and adapted to be operated by variations of pressure in the distributing-pipes, means for shifting the motor in opposition to the pressure in the distributing-pipes, and means whereby after a certain initial movement the movement of the motor is imparted to the valve, substantially as set forth.

3. In an automatic water-heater, the combination of a water-receptacle having supply and discharge pipes, burners for applying heat, to the receptacle, a valve controlling the flow of gas to the burners, means for shifting the valves to closed position, a piston operating in a cylinder arranged in the line of flow of water to and from the receptacle, said piston being operated in one direction by a flow of water through the cylinder, means for shifting the piston in the opposite direction against the pressure of water in the distributing-pipes and a rod extending from the piston to open the valve, said rod being constructed to permit an initial movement of the piston independent of the valve, substantially as set forth.

4. A water-distributing system for houses, &c., having in combination, a supply-pipe, a cold-water pipe provided with faucets connected to the supply-pipe, a water-receptacle connected to the supply-pipe, a pipe provided with faucets extending from the receptacle, burners for applying heat to the receptacle, a valve controlling the flow of gas to the burners, a valve-motor arranged in the line of flow of water to or from the receptacle and adapted to be operated by variations of pressure in the distributing-pipes, and mechanism interposed between the valve and motor whereby after a certain initial movement of the motor independent of the valve a movement is imparted to the valve by the motor, substantially as set forth.

In testimony whereof I have hereunto set my hand.

AUGUST BUERKLE.

Witnesses:

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F. E. GAITHER.