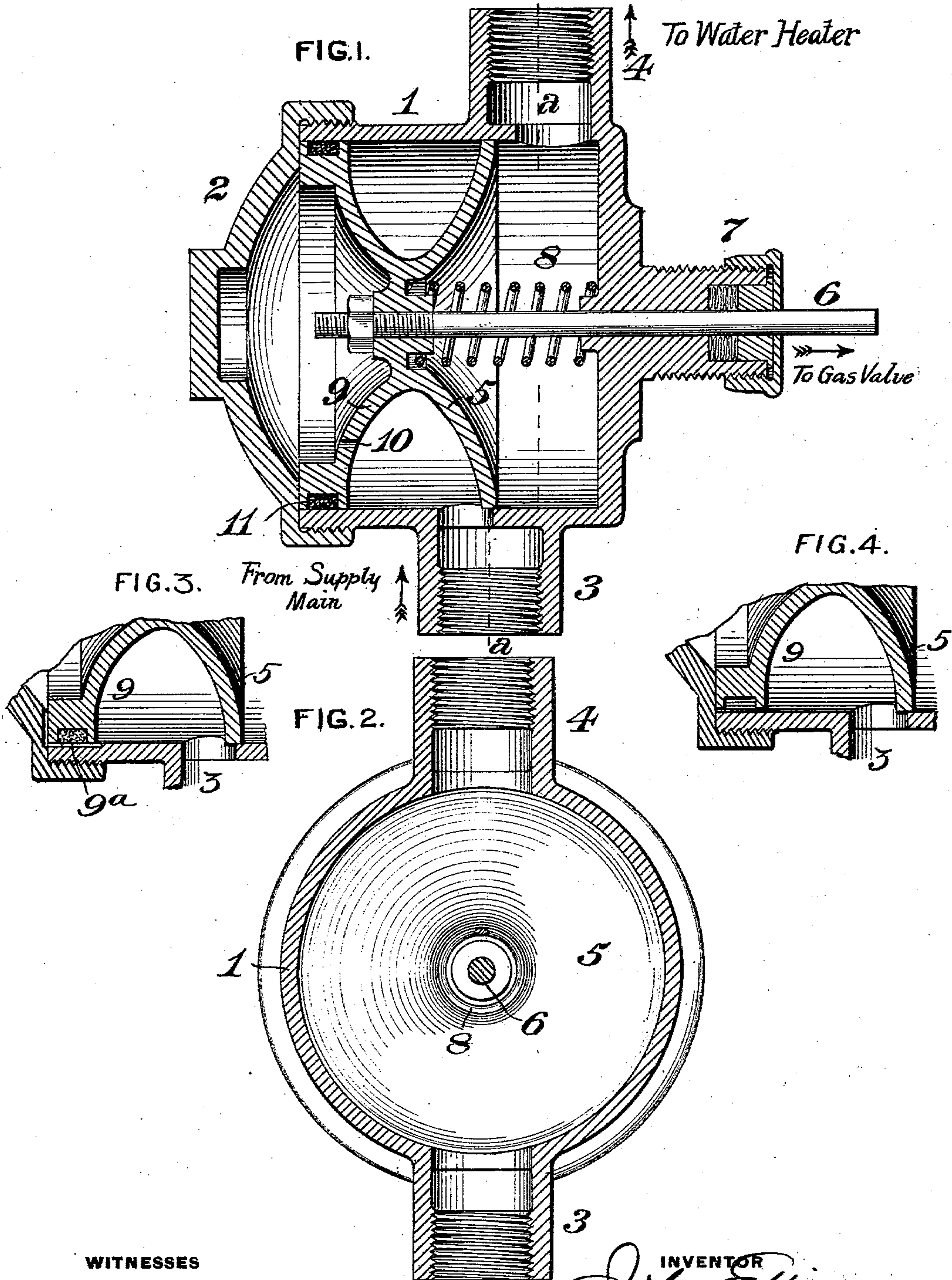


No. 753,195.

PATENTED FEB. 23, 1904.

J. ELLIS.  
VALVE FOR WATER HEATERS.  
APPLICATION FILED MAY 15, 1903.

NO MODEL.



WITNESSES

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# UNITED STATES PATENT OFFICE.

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## VALVE FOR WATER-HEATERS.

SPECIFICATION forming part of Letters Patent No. 753,195, dated February 23, 1904.

Application filed May 15, 1903. Serial No. 157,247. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN ELLIS, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Valves for Water-Heaters, of which improvement the following is a specification.

My invention relates to valves for automatically controlling the flow of water to water-heaters of the class known as "instantaneous;" and its object is to provide means whereby the accidental and unintended opening of the water-valve and the resultant opening of the gas-supply valve, which with valves of the construction heretofore employed are frequently caused by the closure of a valve in the water-supply line, may be effectually prevented.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a vertical longitudinal central section through a water-valve and its case, illustrating an embodiment of my invention; Fig. 2, a transverse section through the same on the line *a a* of Fig. 1, and Figs. 3 and 4 partial transverse sections illustrating equivalents of the leakage-port in the piston.

My invention is herein exemplified as applied in connection with a water-valve and case of a class heretofore known in instantaneous water-heaters, the case 1 being of cylindrical form closed at one end by a removable head 2 and provided with an inlet-nozzle or pipe connection 3, to which a supply-pipe for water under pressure is attached, and a delivery-nozzle or pipe connection 4 for the attachment of a water-delivery pipe leading to a heater. Communication between the inlet and delivery nozzles is controlled by a valve 5 of the piston type, which is fitted to traverse longitudinally in the case and is fixed upon a stem 6, passing through a properly-packed stuffing-box 7 in the case. The valve 5 is normally held closed or in position to cut off communication between the inlet and delivery nozzles by a helical spring 8 and is automatically opened from time to time, as re-

quired, by the preponderance of pressure upon its supply side, which is instituted by drawing off water from the heater to which the delivery-nozzle is connected.

So far as above described the mechanism herein set forth accords substantially with that heretofore known, for the improved operation of which my present invention is readily and inexpensively applicable.

In the practice of my invention I provide a balance-piston 9, which is fixed to the valve 5, preferably, as shown, by being formed integral therewith, and is located on the supply side of the valve or that adjoining that side of the valve which in the operation of the heater is continuously exposed to the pressure of water in the supply-line and inlet-nozzle 3. The piston 9 is fitted with a suitable packing 11 in order that it may traverse freely in the case while maintaining a properly tight joint therewith and is provided with means for permitting the comparatively slow traverse of water from one of its sides to the other. In the instance shown, this function is performed by a leakage-port 10 of small diameter, formed in the piston; but it will be obvious to those skilled in the art that, if preferred, the well-known mechanical equivalents of a leakage-groove 9<sup>a</sup> in the piston or case, as shown in Fig. 3, or a comparatively loose fit of the piston in the case, as shown in Fig. 4, may be substituted.

In the operation of a valve mechanism embodying the essential and characteristic feature above described water from the supply-nozzle 3 passes into the space between the valve 5 and piston 9 and thence through the port 10 into the space on the opposite side of the piston instituting a substantial equilibrium of pressure on opposite sides of the piston and exerting pressure on the valve in direction to move it to the right, and thereby open an avenue for the traverse of water from the inlet to the delivery nozzle, such pressure being opposed by the equal pressure in the delivery-nozzle and pipe and the tension of the spring. Upon the relief of pressure in the delivery-nozzle by the opening of a cock to draw off



water from the heater the then preponderant pressure on the supply side of the valve moves it to the right and water is supplied to the delivery-nozzle, as in existing constructions,

5 When pressure in the supply-line is reduced by opening a cock for drawing off water therefrom and is suddenly reinstated by closing the cock, the resultant reaction will in the ordinary constructions frequently have the objectionable result of opening the water-valve 10 when a supply of water to the delivery-nozzle is not desired and of thereby opening the gas-supply valve and wasting gas. Under my improved construction this result is prevented, 15 for the reason that the first result of drawing off water from the supply-line is to reduce the pressure on the right hand or delivery side of the valve 5 by leakage between the valve and the casing and to reduce pressure on both sides 20 of the balance-piston 9 by leakage through the port 10 and from the space between the piston and valve into the supply-nozzle 3 and connected supply-pipe. Upon the temporary excess of pressure induced by reaction when the 25 cock in the supply-line is closed the valve 5 will be moved, if at all, only a slight distance, which is not sufficient to cause the opening of the gas-valve, as the water will leak more slowly through the port 10 to the left-hand 30 side of the piston than past the valve 5 to the delivery-nozzle, and an equilization of pressures will be gradually attained without substantial or objectionable movement, if any, of the valve.

35 I claim as my invention and desire to secure by Letters Patent—

1. The combination of a valve-case, provided with water inlet and delivery passages, a piston-valve fitted to traverse in the case, and, 40 when in normal position therein, interposed between, and having its opposite faces exposed to the pressures in, the inlet and the delivery passage, respectively, a piston fixed to the valve, and fitting in the case on the side of the 45 inlet-passage which is farther from the valve, and means for permitting slow traverse of water from one side of the piston to the other.

2. The combination of a valve-case, provided with water inlet and delivery passages, a piston-valve fitted to traverse in the case, and, 50

when in normal position therein, interposed between, and having its opposite faces exposed to the pressures in, the inlet and the delivery passage, respectively, a piston fixed to the valve, and fitting in the case on the side of the 55 inlet-passage which is farther from the valve, means for permitting slow traverse of water from one side of the piston to the other, and a spring bearing on the valve in direction to effect its closure. 60

3. The combination of a valve-case, provided with water inlet and delivery passages, a piston-valve fitted to traverse in the case, and, when in normal position therein, interposed 65 between, and having its opposite faces exposed to the pressure in, the inlet and the delivery passage, respectively, a piston fixed to the valve, and fitting in the case on the side of the inlet-passage which is farther from the valve, and a restricted port or passage leading from 70 one side of the piston to the other.

4. The combination of a valve-case provided with water inlet and delivery passages, a piston-valve fitted to traverse in the case, and, when in normal position therein, interposed 75 between, and having its opposite faces exposed to the pressures in, the inlet and the delivery passage respectively, a piston fixed to said valve, and fitting in the case, said piston being continuously exposed, on its face adjoining 80 the valve, to the pressure in the inlet-passage, and a restricted port or passage leading from one side of the piston to the other.

5. The combination of a valve-case provided with water inlet and delivery passages, a piston-valve and a connected balance-piston fitted 85 to traverse in the case and separated by a space which is continuously open to the inlet-passage, the valve, when in normal position being interposed, and closing communication, 90 between the inlet and delivery passages, and opening such communication by its movement with the balance-piston, and means for permitting slow traverse of water from one side of the balance-piston to the other.

JOHN ELLIS.

Witnesses:

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