

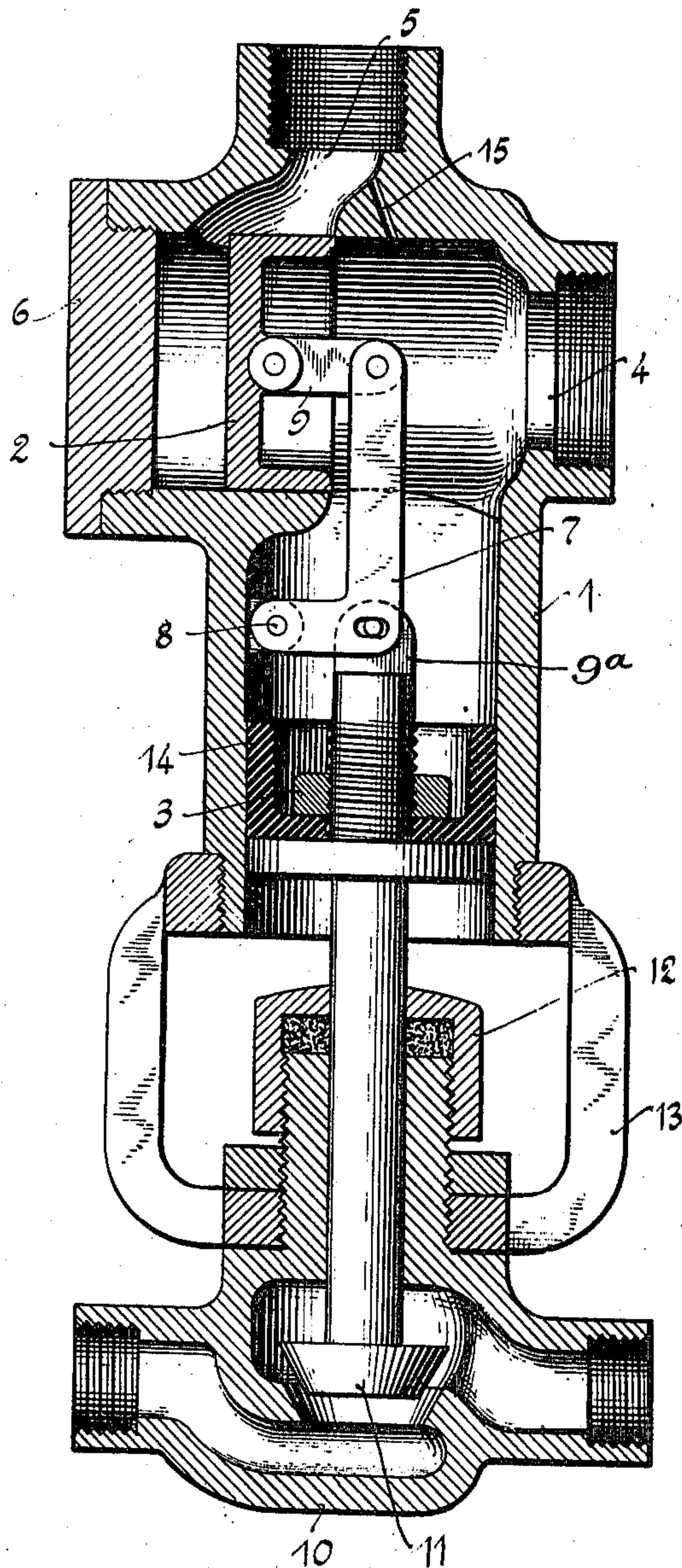
J. H. FREEMAN.

WATER HEATER.

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989,959.

Patented Apr. 18, 1911.



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WATER-HEATER.

989,959.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOSEPH H. FREEMAN, a citizen of the United States, and a resident of the city of New York, in the State of New York, have invented certain new and useful Improvements in Water-Heaters, of which the following is a specification.

My invention relates to water heaters and particularly to valve mechanism for automatically controlling the supply of fuel to water heaters by the flow of water there-through.

The object of the invention is to provide a compact, simple mechanism by which the fuel valve may be automatically controlled, and reliably so, by the pressure of the water supplied to the heater or by slight differences in pressure produced by the flow of water through the heater. These and other objects of the invention will more fully appear from the following description.

The invention consists in the novel parts, improvements, and combinations herein shown and described.

The accompanying drawing, which is referred to herein and forms a part hereof, illustrates one embodiment of the invention and serves in connection with the description herein to explain the principles thereof.

The drawing represents a vertical central section of a valve mechanism constructed in accordance with the invention.

A valve mechanism constructed in accordance with this invention comprises a casing having water inlet and outlet passages; a fuel valve opening member arranged to establish communication between the inlet and outlet passages, when in one position, and to interrupt said communication, when in another position; a fuel valve closing member subject to water pressure on one side only and having an effective area as large as that of the fuel valve opening member; a fuel valve; and connections between said members and the fuel valve, said connections being such that the movement of the fuel valve opening member is greater than the movement of the fuel valve closing member for a given movement of the fuel valve.

In accordance with the best embodiment of the invention, the fuel valve operating members consist of pistons suitably mounted in an inclosing casing and so connected to each other and to the fuel valve that the piston located between the water inlet and

outlet passages has sufficient power to overcome the pressure exerted by the water on the other piston and to open the fuel valve notwithstanding the fact that the area of the first mentioned piston is no greater than that of the second piston.

In accordance with the embodiment of the invention illustrated, 1 represents a casing having, formed out of alinement with each other, two parts or branches in which pistons 2 and 3 are fitted. The water inlet passage 4 communicates with the casing 1 between the pistons 2 and 3, and a water outlet passage 5 communicates with the chamber in the casing on the opposite side of the piston 2 from the inlet passage 4. As shown, the two branches of the casing 1 are arranged at substantially right angles, the upper branch in which the piston 2 is located being horizontal and closed at the end opposite the inlet passage 4 by a removable plug 6. The connection between the pistons in the construction shown consists of a lever 7 which is fulcrumed at 8 on a lug projecting from the inner wall of the lower branch of the casing, and is pivotally connected at its upper end by means of a link 9 with the piston 2. Lever 7 is pivoted by a suitable pin and slot to the upper end of the valve rod 9^a to which the piston 3 is connected. The valve rod 9^a projects through the lower open end of the casing 1 and into the casing 10, where it is provided with a fuel controlling valve 11, a stuffing box 12 being provided to prevent the escape of gas around the rod 9^a. To hold the parts in alinement the casing 1 is connected to the casing 10 by a suitable spider connection 13. To prevent leakage of water through the lower open end of the casing 1, the piston 3 is preferably provided with a cup-leather packing 14. The pressure on the opposite sides of the piston 2 is balanced in a suitable manner, as by a loose fit of the piston 2 or by a restricted passage 15 formed by a perforation in the casing.

The operation of the device is as follows: The inlet passage 4 being connected with the water main, and the outlet passage 5 with the heater, the pressure of the water acting on the piston 3 will draw the piston 2 forward, and force the fuel valve 11 to its seat, the pressure on opposite sides of piston 2 being balanced as aforesaid through the restricted passage 15 in the casing or

by a loose fit of the piston 2. When water is drawn through the heater, the pressure on the rear of the piston 2 will be reduced and the pressure of water on the forward surface of said piston acting through the long arm of the lever 7 will raise the piston 3 and the fuel valve 11 and permit a flow of fuel to the heater, and the flow of fuel will be maintained so long as a flow of water is maintained which is greater than can be supplied through the restricted passage by a difference in pressure sufficient to move the piston 2 against the force acting on the piston 3.

If desired, of course, the valve may be connected between the heater and the delivery faucets instead of between the heater and the water main.

My invention in its broader aspects is not limited to the particular construction shown, as many changes may be made in the construction without departing from the main principles of the invention and without sacrificing its chief advantages.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In an automatic valve mechanism for water heaters, the combination with a fuel controlling valve of a casing provided with water inlet and outlet passages and a piston chamber having two branches arranged out of alinement with each other, one of said branches being located between the water inlet and outlet passages, and the other communicating with the atmosphere; a piston in each chamber; and connections between said pistons and the fuel valve, said connections

being such that the movement of the piston between the inlet and outlet passages is greater than the movement of the other piston for a given movement of the fuel valve.

2. In an automatic valve mechanism for water heaters, the combination with a fuel controlling valve of a casing provided with water inlet and outlet passages and a piston chamber having two branches arranged out of alinement with each other, one of said branches being located between the water inlet and outlet passages, and the other communicating with the atmosphere; and a piston in each chamber and connections between the piston and the fuel valve, said pistons having equal effective areas.

3. In an automatic valve mechanism for water heaters, the combination with a fuel controlling valve of a casing provided with water inlet and outlet passages and a piston chamber having two branches arranged out of alinement with each other, one of said branches being located between the water inlet and outlet passages, and the other communicating with the atmosphere; a piston in each chamber; a lever having unequal arms connecting said pistons, the longer arm being connected to the piston between the inlet and outlet passages; and connections between one of said pistons and the fuel valve.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

JOSEPH H. FREEMAN.

Witnesses:

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