

No. 620,888.

Patented Mar. 14, 1899.

W. C. CLARKE.
WATER HEATER.

(Application filed Apr. 3, 1896.)

(No Model.)

Fig. 2

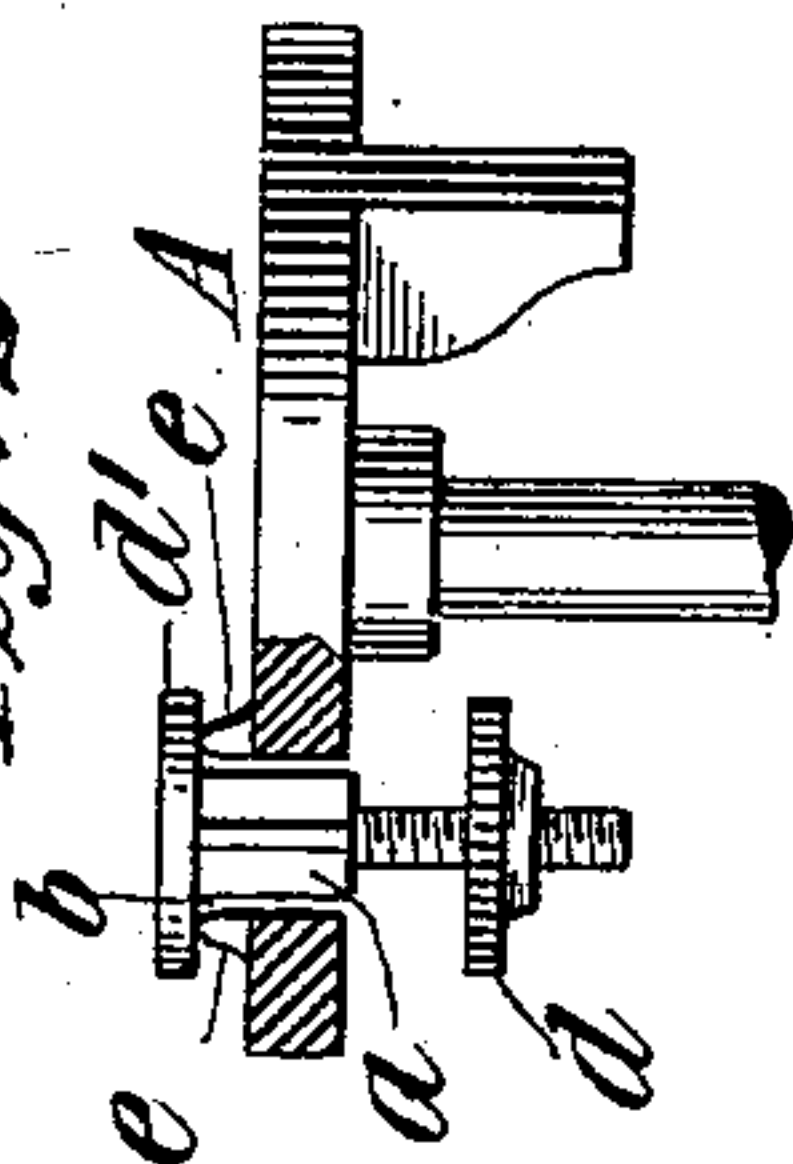


Fig. 3

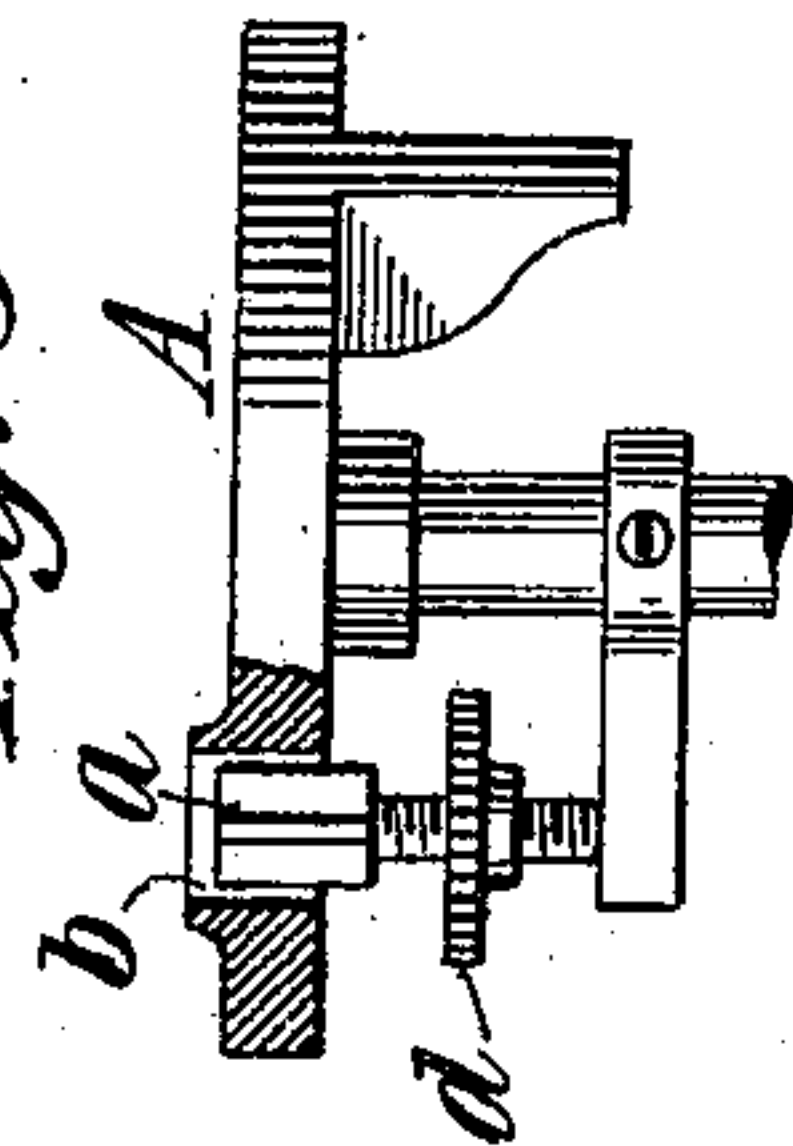
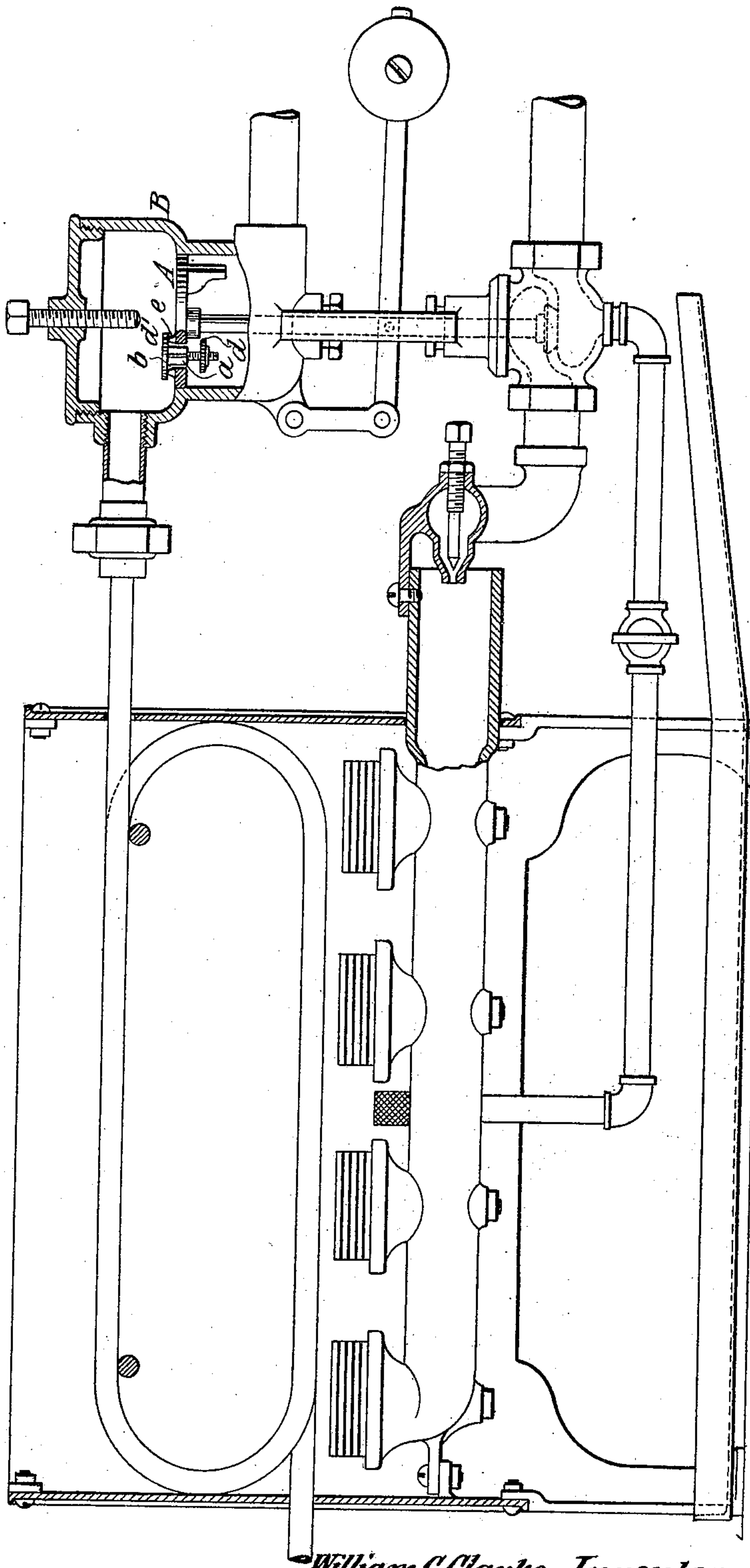


Fig. 1



Witnesses:
W. H. Birchnore
Saml. T. Randall

William C. Clarke, Inventor
by Clarkson A. Collins Atty.

UNITED STATES PATENT OFFICE.

WILLIAM C. CLARKE, OF NEW YORK, N. Y., ASSIGNOR TO THE GILBERT & BARKER MANUFACTURING COMPANY, OF MASSACHUSETTS.

WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 620,888, dated March 14, 1899.

Application filed April 3, 1896. Serial No. 586,055. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. CLARKE, a citizen of the United States, residing in the city of New York, in the county and State of New York, have invented certain new and useful Improvements in Water-Heaters, of which the following is a specification.

My invention relates particularly to that class of devices for heating water by gas in which a valve in a gas-pipe leading to the burners of the heater is automatically operated by the movements of a piston head or disk in a valve-chamber forming a part of the water-circuit through the heater, such disk being forced upward by the water-pressure when a cock connected with the heater is opened, so that the gas-valve is opened and the gas turned on when water is drawn, and falling again, so that the gas-valve is closed, when the water is turned off and the pressure equalized on both sides of the disk. As such heaters have been heretofore made the piston-head or movable element in the waterway, whereby the gas-valve is opened, has been so constructed that when it is at its lowest point or that point at which the gas-valve is completely closed the waterway is completely closed or substantially closed thereby, so that no water can pass through the waterway until such piston-head is lifted. The results of this are that the piston-head in falling approaches its lowest point very slowly or after a series of rebounds, because of the resistance of the confined water below it, and the gas continues to burn for some time after water ceases to be drawn, and also that in case of any slight leakage from the faucets by which water is drawn from above the piston-head it will from time to time be slightly raised with a consequent escape of gas. To the end of obviating this difficulty my invention broadly consists in so constructing the piston-head or movable element in the waterway that the waterway is not entirely closed thereby, but a slight flow of water is permitted at all times. The best means known to me for accomplishing this is to make a small perforation or orifice in the piston-head, whereby the water in the waterway may be rapidly transferred from one side of the piston-head to the other, or, in other words, the piston-

head is enabled to fall rapidly through the water, so as to promptly seat the gas-valve, and also any leakage from the faucets is supplied without moving the valve.

The invention is illustrated in the drawings, in which—

Figure 1 shows it applied in combination with an automatic water-heater, and Figs. 2 and 3 are enlarged views in detail of different forms of valves for controlling the effective orifice of the perforation through the piston-head.

In the drawings, A indicates the piston-head working in the valve-chamber B, forming a part of the supply-pipe to the water-heating vessel, and *b* the perforation or opening therethrough. The size of the perforation *b*, while large enough to facilitate the falling of the piston-head, must not be so great that enough water may pass therethrough to interfere with the prompt opening of the valve when water begins to be drawn, and it may be adjusted by reaming out or boring to the water-pressure of the locality when the apparatus is set up with good results. I prefer, however, to employ a valve for the adjustment and regulation of the orifice, which may be of either of the forms shown in detail in Figs. 2 and 3 of the drawings. As here shown, it consists of a stem or rod *a*, which passes through the perforation *b* in the piston-head A. The stem *a* is provided with a head or disk *d* below the piston-head, or, if desired, with a second disk *d'* above the piston-head, as shown in Fig. 2, in which case the piston-head is provided with ribs or teats *e*, whereby the head *d'* is prevented from entirely closing the orifice *b* when it falls. The stem *a* is screw-threaded, so as to permit of movement of the disk or disks thereon to the end of adjusting the effective size of the orifice *b*. Other forms of valve or other means whereby the orifice can be closed or its effective capacity controlled and adjusted may, however, be employed.

When a hot-water cock is opened, the pressure from below forces up the disk, closing the orifice *b*, and the whole of the water-pressure is effectively exerted in raising the piston-head. When, on the other hand, the pressure on the two sides of the piston-head is

equalized upon closing the cock, the disk and stem fall before the piston-head can reach the narrower part of the chamber B, thus opening the orifice *b* and permitting a free transfer of water from one side of the piston-head to the other, so that the piston-head falls into place and the gas-valve is closed without delay and before any generation of steam can take place.

By setting the disk *d* on the threaded stem *a* the effective size of the orifice *b* is increased or decreased, according as the disk is moved from or toward the piston-head, and is thus adjusted with reference to the water-pressure of the locality, so that the piston-head will always be promptly lifted when required.

What I claim as new, and desire to secure by Letters Patent, is—

1. In an automatic water-heater the combination of a water-heating vessel, gas-burners contiguous thereto, a piston-head in the water-supply pipe for controlling the flow of gas to the burners and having a perforation there-through, a threaded stem passing through such perforation and a valve-disk adjustable on such stem and adapted to be forced upward by the water-pressure and to close such perforation when water is flowing through the pipe and to fall away therefrom when water ceases to flow, substantially as and for the purposes set forth.

2. In an automatic water-heater the combination of a water-heating vessel, gas-burners contiguous thereto, a perforated piston-head in the water-supply pipe for controlling the flow of gas to the burners, a stem passing

through the perforation in the piston-head and a valve-disk thereon, substantially as and for the purposes set forth.

3. In an automatic water-heater the combination of a water-heating vessel, gas-burners contiguous thereto, a piston-head located in the water-supply pipe for controlling the flow of gas to said burners and having a perforation therethrough and means for controlling the effective aperture of such perforation substantially as and for the purposes set forth.

4. In an automatic water-heater the combination of a water-heating vessel, gas-burners contiguous thereto, a gas-pipe leading to said burners, a valve in the gas-pipe and a perforated piston-head located in the water-supply pipe and operating to control the movements of the gas-valve substantially as and for the purposes set forth.

5. In an automatic water-heater the combination of a water-receptacle having a supply-pipe, a gas-burner contiguous to said receptacle, a gas-pipe leading to said burner, a valve in the gas-pipe and a motor in the water-supply pipe, said motor including a movable element adapted to operate the gas-valve and to permit the flow of a limited amount of water through the motor-chamber at all times.

In testimony whereof I have hereunto subscribed my name this 20th day of March, A. D. 1896.

WM. C. CLARKE.

Witnesses:

HARRIET L. THOMPSON,
M. W. HECKMAN.