

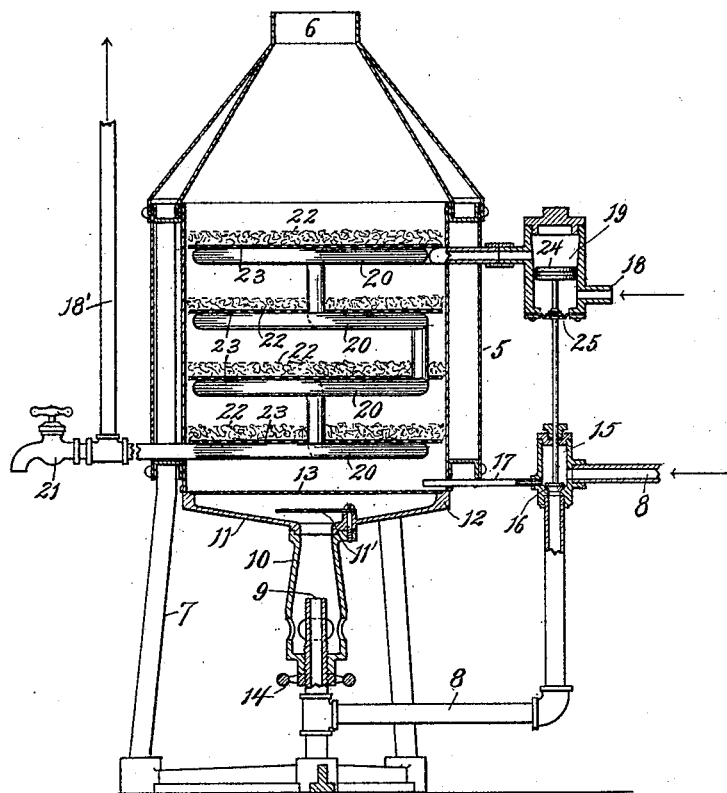
No. 646,445.

Patented Apr. 3, 1900.

A. G. MATHER.  
WATER SUPPLY AND HEATING APPARATUS.

(Application filed May 6, 1899.)

(No Model.)



Witnesses:  
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# UNITED STATES PATENT OFFICE.

ALLAN G. MATHER, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO JOHN S. BLAKNEY AND WILLIAM W. McCALLUM, OF SAME PLACE.

## WATER SUPPLY AND HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 646,445, dated April 3, 1900.

Application filed May 6, 1899. Serial No. 715,836. (No model.)

*To all whom it may concern:*

Be it known that I, ALLAN G. MATHER, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and  
5 useful Improvement in Water Supply and Heating Apparatus, of which the following is a description, reference being had to the accompanying drawing, which is a part of this specification.

10 My invention relates to improved apparatus to be employed in connection with the supply-pipe of a water-service system and in connection with the burner of a supply-pipe of a gas-service system, in and by which apparatus the opening of a faucet in the water-  
15 supply pipe will also let on a supply of gas to the burner, cause it to be lighted, and thereby heat the water in the water-service pipe, from which the thus-heated water will be dis-  
20 charged at any faucet thus opened in the building provided with the water-service system.

My invention consists of the apparatus, its parts and combination of parts, as herein  
25 described and claimed, or the equivalents thereof.

In the drawing the figure is a vertical section of my improved apparatus in connection with fragments of a gas-service system and  
30 a water-service system, parts being shown in elevation for convenience of illustration.

In my improved apparatus the principal water-supply pipe, directly after entering the building and preferably in the cellar, is taken  
35 through a heater arranged to be heated by means of gas combustion, and thence the supply-pipe runs through the building, extending to various rooms therein, in which it is provided with faucets.

40 In the drawing, 5 is the case of a heater, which is preferably made double, containing an air-space or a space that may be filled with any material that is adapted to prevent the radiation or conduction of heat. This heater  
45 5 is preferably made with a comparatively-small opening 6 at the top and is entirely open at the bottom, resting on a suitable frame 7 therefor. A gas-supply pipe 8 terminates below the heater in an upwardly-discharging  
50 nozzle 9. About the nozzle 9 and secured thereto, conveniently by a screw-thread, at a

distance below its upper open end, there is a mixer-tube 10, which at its upper end terminates in an outwardly-flaring plate 11, which  
plate at its lateral edges terminates in an up- 55  
wardly-turned edge or flange 12, adapted to fit against the lower edge of the heater 5 and thus close it, except for the gas-mixer aperture upwardly through the mixer-tube 10. A  
60 little above the mouth of the mixer-tube 10 a deflector 11' is secured detachably and movably, normally directly over the upwardly-opening mouth of the mixer-tube, which deflector is adapted for deflecting or distributing the gas being discharged through the  
65 mixer-tube radially over the surface of the plate 11. Above the deflector 11' there is a fine-wire screen 13, resting on the top edge of the plate 11 and preferably fitted in a recess therefor in the top of the flange. This screen  
70 13 is intended and adapted for a gas-burner surface, so that the gas being discharged upwardly from the tube 10 will when lighted burn freely on and above the wire burner-screen 13. The tube 10 at its lower extremity  
75 turns by screw-thread on the upturned nozzle 9 of the gas-supply pipe, and the burner, including the tube 10, the plate 11, and the screen 13, may be raised or lowered on the  
80 nozzle by its screw-thread, thereby adapting the burner to be lowered away from the heater 5 for the purpose of removing the screen 13 for cleaning it readily. A jam-nut 14, turning on the nozzle 9 below the tube 10, is adapted to be turned against the tube, and thus lock  
85 it in place.

The gas-supply pipe 8 is provided with a valve-chamber 15 and a valve 16, adapted to be seated at the end of the valve-chamber, thus normally closing the pipe against the in- 90  
flow of gas. A very small gas-pipe 17 leads from the gas-chamber 15 into the chamber of the heater 5, just above the screen-burner 13, and this small gas-pipe terminates in a gas-discharging orifice that is adapted to con- 95  
tinuously discharge a small stream of gas, which is kept constantly lighted, being thereby adapted to ignite the larger supply of gas when the valve 16 is opened, permitting the gas to flow through the mixer-tube 10 and  
100 through the screen-burner 13.

The supply-pipe 18 of the water-service sys-

tem, preferably just after entering the building and conveniently in the basement or cellar, leads through a piston-chamber 19 and into the chamber of the heater 5, where it is  
 5 preferably disposed in one or more coils 20, located above the burner-screen 13 and preferably in such order that the first coil will be at the greatest distance above the burner and the last coil will be nearest the burner, the  
 10 pipe leading from the last coil through the side of the heater and continuing in a pipe 18' through the building, being provided in the several rooms with a faucet like the one shown at 21.

15 I find it advantageous, both for the purpose of absorbing any water of condensation or percolation from the water-supply pipe and as a means of retaining and conserving the heat of the combustion of gas in the heater 5, to  
 20 provide a layer or covering of asbestos 22 or analogous loose non-combustible material above each coil 20, and this may be suitably and conveniently supported on sheets of woven-wire cloth or screen 23, resting on the  
 25 coils.

In the piston-chamber 19 there is a very loosely fitted piston 24, located between the point at which the pipe 18 enters the chamber and the point at which the corresponding  
 30 pipe leads therefrom, which piston is connected by a stem directly to the valve 16 in the gas-chamber 15. The piston-stem is reciprocable gas-tight through the end of the gas-chamber 15, and a flexible diaphragm 25, secured to the stem of the piston, is also secured  
 35 to the lower head of the chamber 19, thus providing for a limited amount of reciprocable movement of the piston 24 in its chamber. The aperture through the head of the chamber 19, which is thus closed by the stem and the diaphragm 25, is of less superficial area than the area of the surface of the piston 24, thus providing for a differential action of the  
 40 water in the chamber 19 on the piston as against the pressure on the diaphragm 25. It will be noted that the piston-chamber 19 enlarges upwardly gradually from the horizontal plane at which the piston 24 is located when the valve 16 is on its seat.  
 45

50 In operation the continuous supply of gas

discharged by the small pipe 17 is constantly burning just above the screen-burner 13. The water in the service supply-pipe 18 fills the chamber 19, leaking past or otherwise  
 55 limitedly passing the piston 24 and filling the coils and the discharge-pipe 18', and in this condition when a faucet in the discharge-pipe 18' is opened the discharge of water therefrom at once causes such a pressure of the  
 60 water-supply on the under side of the piston 24 as to lift it and the valve 16, thereby permitting gas to flow through the nozzle 9, whereupon the gas filtering through the screen 13 will be ignited and, burning thereon freely,  
 65 will quickly heat the water in the coils 20, which, running therefrom to the open faucet, will be promptly supplied for use. When the faucet is again closed, the greater pressure of the water on the entire upper surface of the  
 70 piston 24 as compared with the pressure on the under surface of the piston, which has a less area than the upper surface has to the extent of the cross-section of the stem of the piston, will force the piston downwardly and close the gas-valve 16. In a small heater only  
 75 one coil would be required, and such number of coils may be employed as is desirable. In fact, any arrangement of the water-pipe within the heater 5 whereby it is exposed to the heat of the combustion of the gas will comply with the spirit of my invention.  
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What I claim as my invention is—

In apparatus for heating water in a water-service system, the combination of a piston-chamber in the water-supply pipe, a leaking  
 85 piston in the chamber in the course of the water, a flexible diaphragm of less area than the piston closing the chamber at one side of the piston, a pipe for conducting gas to a water-heater, a valve in the gas-pipe, and a stem  
 90 connecting the piston the diaphragm and the valve compelling concurrent movement thereof.

In testimony whereof I affix my signature in presence of two witnesses.

ALLAN G. MATHER.

Witnesses:

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