

H. M. ADAMS.
WATER CIRCULATING SYSTEM.
APPLICATION FILED MAR. 6, 1916.

1,206,789.

Patented Dec. 5, 1916.
2 SHEETS—SHEET 1.

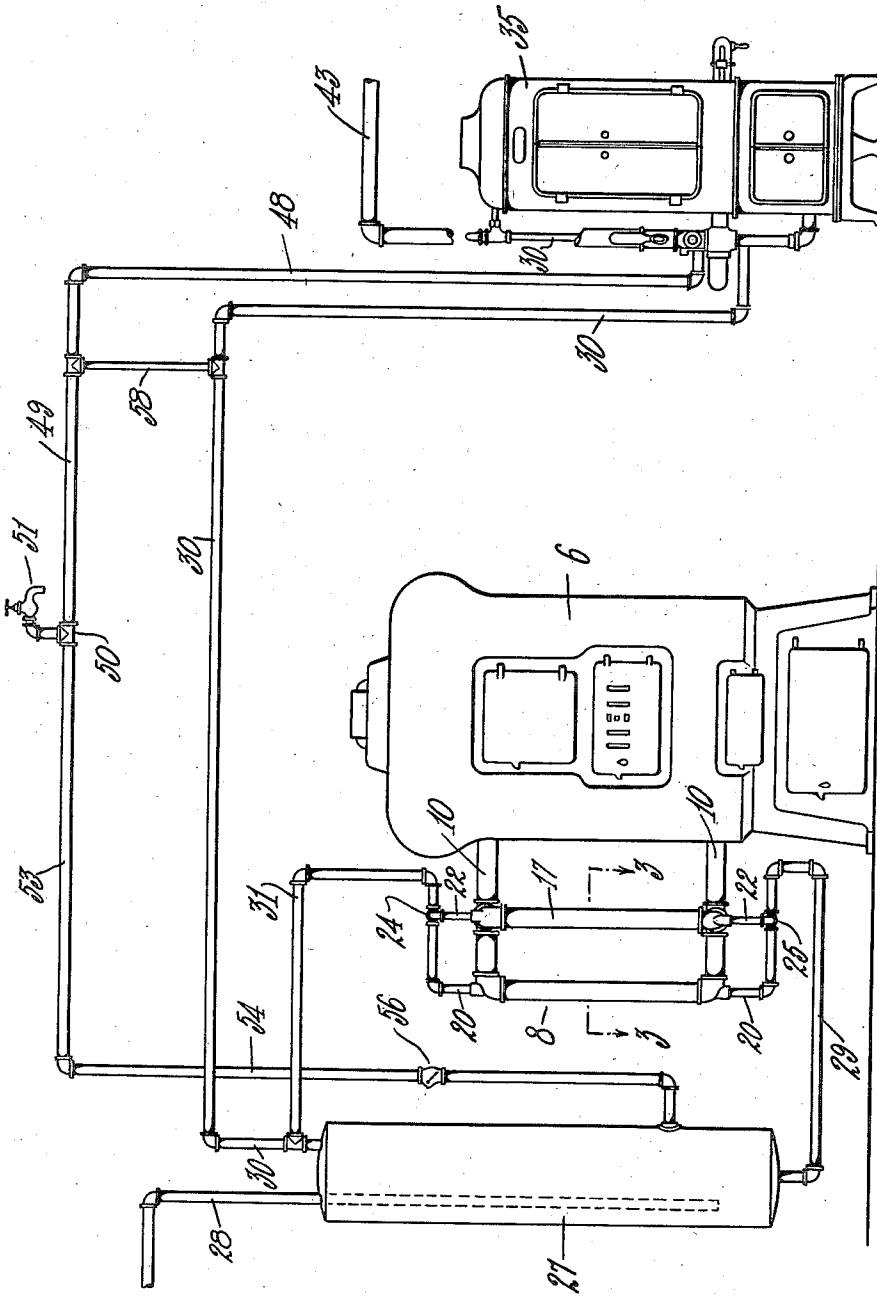


Fig. 1.

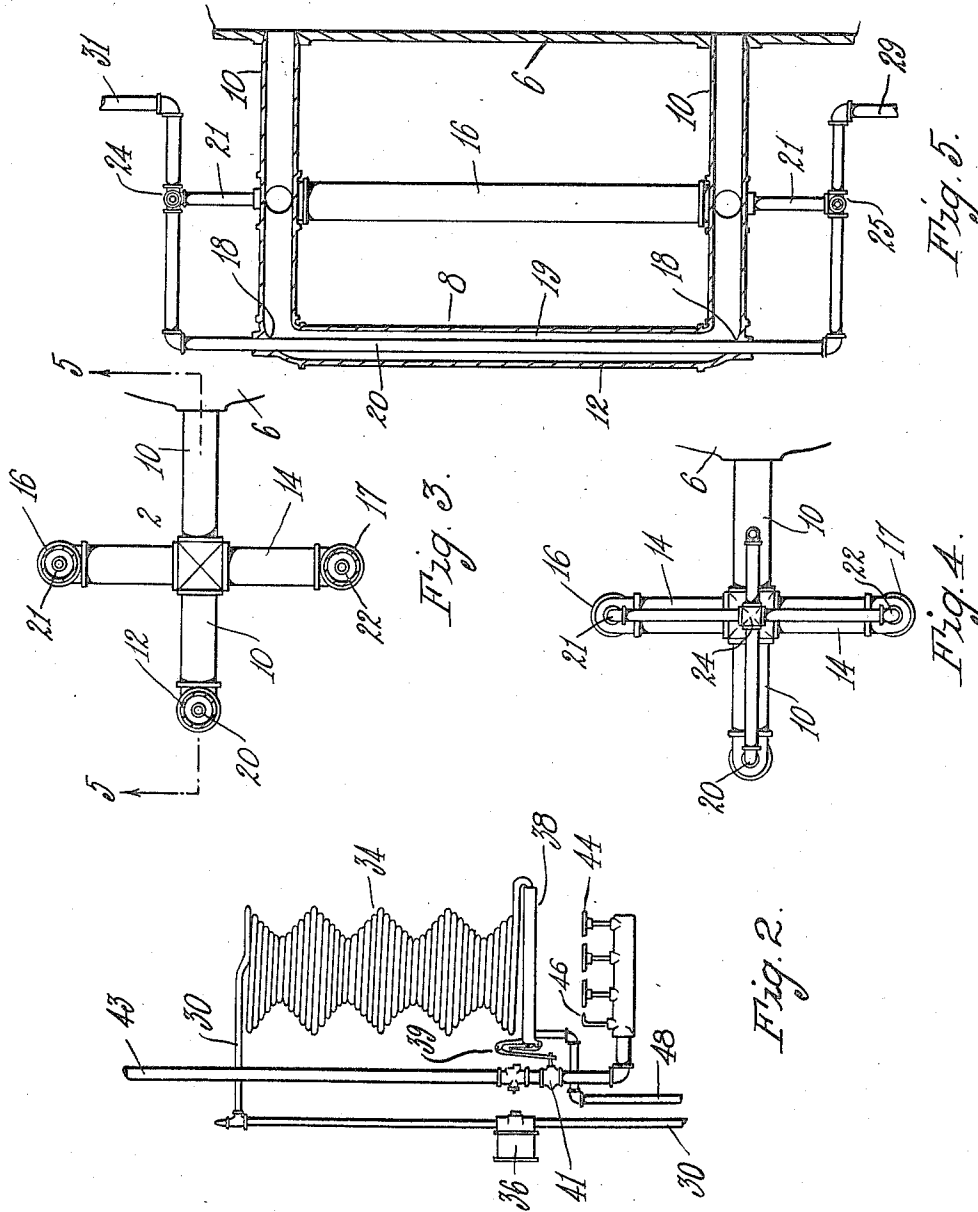
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UNITED STATES PATENT OFFICE.

HERBERT M. ADAMS, OF PAWTUCKET, RHODE ISLAND.

WATER-CIRCULATING SYSTEM.

1,206,789.

Specification of Letters Patent.

Patented Dec. 5, 1916.

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To all whom it may concern:

Be it known that I, HERBERT M. ADAMS, a citizen of the United States, residing at Pawtucket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Water-Circulating Systems, of which the following is a specification.

My invention relates to a water heating system adapted for use with an instantaneous heater.

The essential objects of my invention are to combine in a single water circulating system a main heater, such as a boiler, an auxiliary heater, such as an instantaneous heater, and a hot water tank; to insure against the operation of the relatively more expensive secondary heater so long as an amply high temperature is maintained in the system by the main heater; and to insure this result automatically; to provide a novel means for automatically directing the flow of the water through whichever of a plurality of circuits the circumstances demand; to build up the circulation by utilizing and continuing in circulation the heat already generated and thus avoid the expense and delay involved in initially completely heating the water adjacent a faucet each time the auxiliary heater is operated; to enable a diminished size of auxiliary heater to be employed, thereby reducing the cost of installation and maintenance; and to effect these ends in a simple and inexpensive structure readily adaptable to incorporation into various existing heating plants.

To the above ends essentially my invention consists in such parts and combinations of parts as fall within the scope of the appended claims.

In the accompanying drawings which show the embodiment of my invention in its preferred form, Figure 1 is a front elevation of the novel system, Fig. 2, a diagrammatic elevation of the auxiliary or instantaneous heater, Fig. 3, a section on line 3—3 of Fig. 1, Fig. 4, a plan view of the bottle, and Fig. 5, a section on line 5—5 of Fig. 3.

Like reference characters indicate like parts throughout the views.

In the embodiment of my invention herein shown the primary heater is a furnace boiler 6 provided with a bottle 8. The form and location of the bottle is not essential, but superior results are attained by one comprising parallel horizontal tubes 10 opening into

the boiler 6 and connected at their outer ends by a tube 12. Branching from the tubes 10 at right angles thereto are tubes 14 connected at their ends by tubes 16 and 17 respectively. The described tubes receive the hot water from the boiler and are preferably jacketed with asbestos or otherwise to prevent dissipation of the heat from the water within the tubes. The vertical tubes of the bottle may number one or more, and each has passing longitudinally thereof and projecting through openings 18 in its end a water pipe of less external diameter than the internal diameter of the inclosing tube, so that there is an area of hot water 19 surrounding the pipe. These pipes 20, 21, and 22 pass through the tubes 12, 16, and 17 respectively. The upper projecting ends of the water pipes are horizontally disposed and converge at a joint 24; while their lower projecting ends converge in a connection 25.

Adjacent the boiler is a water tank 27 which receives cold water through a pipe 28 entering its top. A water pipe 29 leads from the bottom of the tank to the connection 25; and a pipe 30 extends from the top of the tank and has a branch 31 extending to the connection 24. The pipe 30 leads to a terminal of the heating coil 34 of any usual preferred instantaneous heater 35. 36 is the automatic water valve thereof, and 38 is the thermostat placed in circuit with the heating coil which operates, through the usual thermal actuating mechanism 39, the valve 41 in the gas supply pipe 43 which controls the burner 44 ignitable by pilot burner 46. Extending from the hot water or discharge terminal of the coil 34 is a vertical pipe 48 and horizontal pipe 49 leading to a connection 50 in which is a faucet 51 or other delivery device. From this connection extends horizontally a pipe 53 connected with a downwardly directed pipe 54 which enters an intermediate portion of the hot water tank 27. In the pipe 54 is an upright inverted check valve 56. Between the faucet and heater the pipes 30 and 49 are connected by a pipe 58 of less diameter than the connected pipes, constituting a by pass.

The operation of my system when the faucet is closed is as follows: The water supply initially enters the tank 27 through the pipe 28, and passes from the tank through pipe 29 to the bottle. In passing upwardly through the bottle pipe or pipes 20, 21, and 22 the hot or boiling water from

the boiler 6 in the tubes surrounding said pipes raises the temperature of the water in the latter. The flow of liquid from the tank to the point of discharge, when liquid is being drawn from the system, is through the pipe 30 to the by-pass 58, then part through the by-pass 58 and part through the pipes 30 and 48 to the pipe 49 and faucet 51 and is independent of the temperatures in the system. If the temperature of the water in pipe 30 is sufficiently high it does not, in traversing the thermostat 38, operate the burners 44 of the heater 35, and expense is thus saved. If, however, the temperature in the pipe 30 is lower than the adjustment of the thermostat the burners are automatically lighted in the usual manner, and the water from the pipe 30 passing through the coil 34 is raised in temperature. When the faucet is open it will be observed that the downwardly directed check valve 56 operates to prevent the water being siphoned from the hot water tank through pipes 54 and 53. The circulation keeps the temperature of all the pipes of the system relatively high at all times thus lessening the work and consequent expense of the auxiliary heater.

What is claimed as new is:—

30 1. In a water circulating system, a main heater, an auxiliary heater connected therewith, a hot water tank, a connection between the upper end of the tank and the auxiliary heater, a connection between the lower portion of the tank and the auxiliary heater, a by-pass of reduced area between said connections, tubes connected with the main heater, and pipes extended through said tubes and connected with the tank at the top and bottom thereof.

40 2. In a water circulating system, a main heater, an auxiliary heater connected therewith, a hot water tank, a connection between the upper end of the tank and the auxiliary heater, a connection between the lower portion of the tank and the auxiliary heater, a by-pass of reduced area between said con-

nections, tubes connected with the main heater, pipes extended through said tubes and connected with the tank at the top and bottom thereof, and means in one of said connections between the tank and the auxiliary heater for withdrawing the water without its traversing the by-pass.

3. In a hot water circulating system, a main heater, an auxiliary heater, a hot water tank, two independent connections between said tank and auxiliary heater, a bottle embodying tubes in direct communication with each other and with the main heater, water circulating pipes extended through said tubes and connected with opposite ends of said tank, and a by-pass of reduced area between the two connections between the tank and auxiliary heater.

4. In a hot water circulating system, a main heater, an auxiliary heater, a hot water tank, two independent connections between said tank and auxiliary heater, a bottle embodying tubes in direct communication with each other and with the main heater, water circulating pipes extended through said tubes and connected with opposite ends of said tank, a by-pass of reduced area between the two connections between the tank and auxiliary heater, and a spigot in one of said connections.

5. In a hot water circulating system, a main heater, an auxiliary heater, a hot water tank, two independent connections between said tank and auxiliary heater, a bottle embodying tubes in direct communication with each other and with the main heater, water circulating pipes extended through said tubes and connected with opposite ends of said tank, a by-pass of reduced area between the two connections between the tank and auxiliary heater, a spigot in one of said connections, and a check valve in said connection between said spigot and the tank.

In testimony whereof I have affixed my signature.

HERBERT M. ADAMS.