

UNITED STATES PATENT OFFICE.

JOHN R. WILLIAMS, OF SEATTLE, WASHINGTON.

AUXILIARY HEATING SYSTEM.

1,112,583.

Specification of Letters Patent.

Patented Oct. 6, 1914.

Application filed May 15, 1913. Serial No. 767,841.

To all whom it may concern:

Be it known that I, JOHN R. WILLIAMS, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Auxiliary Heating Systems, of which the following is a specification.

This invention relates to water heating systems. Its object is the provision of devices whereby the production of hot water for house heating through the medium of radiators as well as hot water for culinary or other domestic purposes, may be greatly improved to render the performance of either or both of such functions in a more efficient manner and with a saving in the consumption of fuel.

With these ends in view, the invention consists in the novel construction and adaptation of devices, as will be hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a view of a water heater, shown partly in side elevation and partly in vertical section with apparatus embodying the present invention applied thereto. Figs. 2 and 3 represent sectional views of the pairs of three-way controlling valves of the heating pipes illustrated in different operative positions.

Referring to Fig. 1, the numeral 5 represents a water-heating boiler of ordinary or suitable type provided with flues 6, 7 and 8 which connect the furnace compartment 9 with the flue extension 10 to which the chimney pipe 11 is attached. The boiler is provided with "riser" pipes 12 for the flow of the hot water to the radiator system of a house, and 13 are the return or down-flow pipes of said system. 14 represents a storage tank for hot water, the same being drawn off through a pipe 15 to supply the hot water bath cocks, sinks, etc. As illustrated, a service pipe 16 for cold water from a pressure-main is tapped directly into the tank. The tank is further connected by pipes 17 and 18 with a heating coil, indicated by 19, provided within the furnace of the boiler. All of the aforementioned parts are or may be constructed and arranged as hitherto in a domestic house-heating installation.

According to the present invention, I provide a pipe-coil or coils 20 within the boiler constructed so that the members thereof are distributed among the various flues so as to

be subjected to the hot gases which traverse the flues in escaping to the chimney pipe. An advantageous arrangement of the coil members is to have the lower inlet pipe 21 thereof enter the boiler furnace, thence pass by a succession of pipe elements through the various flues and finally have the outlet pipe 22 pass outwardly through the flue extension 10, as indicated.

23 and 24 represent the casings or bodies of valves which are respectively connected by pipes 25 and 26 with the inlet and outlet terminals of the coils 20. The casing 23 is moreover connected by a pipe 27 with one of the return-flow pipes 13 of the boiler, as at 13¹, and also by a pipe 28 with the inflow end of the coil 19 and the tank 14 as, for example, by being joined to the pipe 17 which leads to the coil from said tank. The other casing 24 in addition to being connected, as above mentioned, with the outlet of the coil 20 is connected by a pipe 29 with the tank and also with the outlet end of the coil 19 by joining such pipe with the pipe 18, as shown. A third connection is made by a pipe 30 between the casing 24 and a coupling pipe 31 which, as illustrated, is connected with both of the risers 12.

The valve casings 23 and 24 are each bored to provide a cylindrical chamber having in the periphery of one, ports 25¹, 27¹ and 28¹ and in the other casing similarly disposed ports 26¹, 29¹ and 30¹ through which communication is had with the respective pipes. Positioned within the casing 23 is a rotary valve 32 of the "three-way" type, and a like valve 33 is provided in casing 24. These valves are provided with stems 32¹ and 33¹ extending axially through an end of each casing. Arms 34 and 35 are provided on said stems and are connected by a link 36 whereby the valves are caused to be moved in unison when actuated by suitable means such as a handle-arm 37 secured to one of the valve stems.

The valves 32 and 33 are regulated and coupled by the link 36 so that they may be moved in unison to occupy the relative positions in which they are represented in Fig. 2 or as in Fig. 3 and are prevented from being moved into positions which will afford communication between the tank 14 and the pipes 27 and 30 by the provision of stops 38 which serve to limit the travel of the arm 34. In Fig. 2, the valve 32 is adjusted to uncover the ports 25¹ and 28¹ to

establish communication by pipes 25 and 28 between the tank 14 and the inlet end of the main coil 20; while the port 27¹ is closed with a consequent shutting off of any flow of water between the referred to coil and a return flow pipe 13. The other valve 24 in Fig. 2 is shown to cover the port 30¹ of pipe 30 which connects with the coupling pipe 31; but the other ports 26¹ and 29¹ which are connected by pipes 26 and 29 with the outlet end of coil 20 and the tank 14 are open. By such an adjustment of the valves, it is evident that the tank 14 is caused to be in circuit with the coil 20 and not with the radiator system. When, however, the valves are adjusted to assume the positions in which they are represented in Fig. 3, then the coil 20 is connected from its opposite ends with the radiator system to act supplementary to the effective heating capacity afforded by the boiler proper, and coincidentally the tank connections with the coil 20 are closed. Coming into intimate contact with the hottest flue gases and containing a relatively small quantity of water, a circulation is readily established in coils 20 which flows into the riser pipes 12 and sensibly affects the radiators before the temperature of the larger body of water in the boiler is raised sufficiently to furnish heat.

It will be noted that valves 33 and 32 working in unison control the circulation of the water predeterminately, the heated water ascending through the pipes 30 or 29 to the radiators or to the tank and correspondingly causing the return of the water to said coils through the down-flow pipes 13 or by the return-pipe 17.

It will also be noted that the valve connections between the auxiliary heating coils and the tank heating apparatus are so arranged as to preclude all danger of flooding the boiler through the auxiliary coils from the city main.

While I have described the illustrated embodiment of my invention with some detail, I do not wish to be understood as confining myself to the exact construction shown, as obviously changes may be made within the scope of the claims and within the spirit of the invention, such as adapting the same to the use of steam as a radiating medium.

What I claim as my invention, is—

1. An auxiliary heating system for heating boilers, comprising an auxiliary heating coil positioned in the flues of said boiler having up-flow and return-flow pipes communicating, respectively, with the up-flow and return-flow pipes of the boiler, a heating circuit under pressure having a portion extending within the furnace of the boiler and having an up-flow pipe and a return-flow pipe communicatively connected to the up-flow and return-flow pipes of the

coil, respectively, and valve members controlling said connections whereby communication from the coil is selectively established with said up-flow and return-flow pipes of the boiler or with the heating circuit.

2. In an auxiliary heating system for heating boilers, an auxiliary heating coil positioned in the flues of said boiler having an up-flow pipe and a return-flow pipe connected with the up-flow and return-flow pipes of the boiler, respectively, a heating circuit under pressure having an up-flow pipe and a return-flow pipe and having a portion extending within the furnace of the boiler, a pipe connecting the up-flow pipes of both said coil and said circuit, and a valve in the junction of said coil with each of said connective pipes whereby communication therewith is selectively established with either the up-flow and return-flow pipes of the boiler or said heating circuit.

3. In an auxiliary heating system for heating boilers, an auxiliary heating coil positioned in the flues of said boiler having an up-flow pipe and a return-flow pipe connected with the up-flow and return-flow pipes of the boiler, respectively, a heating circuit under pressure having an up-flow pipe and a return-flow pipe and having a portion extending within the furnace of the boiler, a pipe connecting the up-flow pipes of both said coil and said circuit, a three-way valve in the junction of said coil with each of said connective pipes making selective communication with either the up-flow and return-flow pipes of the boiler or the heating circuit, and connections between said valves whereby they may be regulated in unison.

4. In an auxiliary heating system for heating boilers, an auxiliary heating coil traversing the flues of the boiler, and communicatively connected at its opposite ends with the circulating pipes of the boiler, a water-heating service circuit including a tank connected with a pressure main and including a return-flow pipe and an up-flow pipe; a pipe connecting said return-flow pipe with the lower end of said coil, a valve in the connection between said connecting pipe and coil adapted to convey water to the latter selectively from the circulating pipes of said boiler or from the tank, a pipe connecting said up-flow pipe with the upper end of said coil, a valve in the connection between said up-flow pipe and coil adapted to convey the circulating fluid from the coil selectively to the circulating pipes of the boiler or to said circuit.

5. In an auxiliary heating system for heating boilers, an auxiliary heating coil

traversing the flues of the boiler, and communicatively connected at its opposite ends with the circulating pipes of the boiler, a water-heating service circuit including a tank connected with a pressure main and including a return-flow pipe and an up-flow pipe; a pipe connecting said return-flow pipe with the lower end of said coil, a valve in the connection between said connecting pipe and coil adapted to convey water to the latter selectively from the circulating pipes of said boiler or from the tank, a pipe connecting said up-flow pipe with the upper end of said coil, a valve in the connection between said up-flow pipe and coil adapted to convey the circulating fluid from the coil selectively to the circulating pipes of the boiler or to said circuit, and connections between said valves whereby both valves may be adjusted in unison to predeterminately circulate said fluid through said circuit or through the boiler.

6. In an auxiliary heating system for heating boilers, an auxiliary heating coil traversing the flues of the boiler and communicatively connected at its opposite ends with the circulating pipes of the boiler, a

water-heating service circuit including a tank connected with a pressure main and including a return-flow pipe and an up-flow pipe; a pipe connecting said return-flow pipe with the lower end of said coil, a three-way valve in the connection between said connecting pipe and coil adapted to convey water to the latter selectively from the circulating pipes of said boiler or from the tank, a pipe connecting said upflow pipe with the upper end of said coil, a three-way valve in the connection between said up-flow pipe and coil adapted to convey the circulating fluid from the coil selectively to the circulating pipes of the boiler or to said circuit, and connections between said valves whereby both valves may be adjusted in unison to predeterminately circulate said fluid through said circuit or through the boiler.

Signed at Seattle, Wash., this 25th day of April, 1913.

JOHN R. WILLIAMS.

Witnesses:

E. PETERSON,
H. L. OPSAHL.