

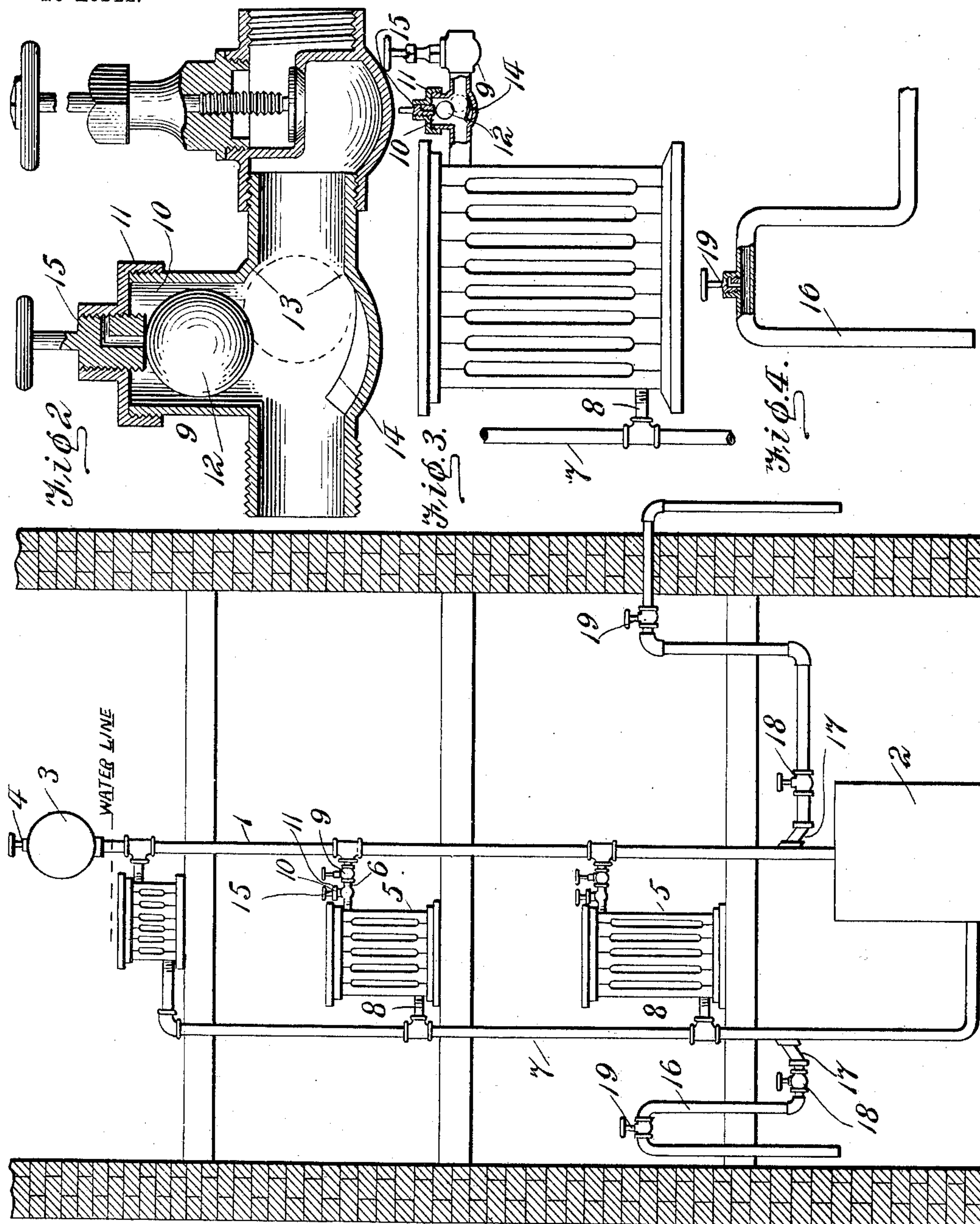
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PATENTED APR. 5, 1904.

G. L. RANKIN.
HOT WATER HEATING SYSTEM.

APPLICATION FILED FEB. 26, 1903.

NO MODEL.



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HOT-WATER HEATING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 756,282, dated April 5, 1904.

Application filed February 26, 1903. Serial No. 145,269. (No model.)

To all whom it may concern:

Be it known that I, GEORGE L. RANKIN, a citizen of the United States, residing at Greenville, in the county of Mercer and State of Pennsylvania, have invented certain new and useful Improvements in Hot-Water Heating Systems; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in hot-water heating systems; and it consists in the peculiar construction and combination of devices hereinafter described and claimed.

One object of my invention is to accelerate the circulation of the hot water through the riser and return pipes and the radiators.

A further object of my invention is to lessen the necessary boiler-pressure to keep the water in circulation.

A further object of my invention is to provide siphonically-operating means to empty the riser or return pipes or the affected radiator in the event of the bursting or leaking of either of them, and thus avoid injury to the interior of the building in which the system is installed or the contents of said building.

In the accompanying drawings, Figure 1 is a diagrammatic elevation of a hot-water heating system embodying my improvements. Fig. 2 is a detail sectional view of the connection between the riser-pipe and one of the radiators, showing an automatic back-acting valve in said connection. Fig. 3 is a similar view showing a preferred form of radiator and its connections. Fig. 4 is a similar view of one of the emptying-siphons.

The riser-pipe 1 leads upwardly from the boiler 2 through the various stories of the building. At the upper end of said riser-pipe is a vacuum-tank 3, which is in communication therewith and is provided on its upper side with an air-valve 4.

The radiators 5 may be of any suitable construction, but are preferably of the construction shown in Fig. 3, and are each connected at an elevated point to the riser-pipe, as at 6, and

at a point at or near the bottom to the return-pipe 7, as at 8. The return-pipe discharges water into the lower portion of the boiler or heater 2. In each connection 6, excepting the uppermost, is a manually-operated valve 9, adapted to establish or cut off communication between the radiators and the riser-pipe at will. Each connection 6, excepting the uppermost, has a communicating valve-chamber 10 on its upper side, of suitable size, of cylindrical form, and having a removable tightly-fitting cap 11. A spherical float-valve 12 of suitable size and weight and made of suitable material is adapted to rise and fall in each of said connections and its valve-chamber. Each of said connections has a ground valve-seat 13 on the side toward the riser-pipe and has in its lower side below the valve-chamber an inclined seat 14, adapted to direct the valve by gravity to the seat 13, where the valve is lowered, as indicated in dotted lines in Fig. 2. In each cap 11 is an air-valve 15. The radiators vary in size, the lowest being of greatest capacity, as shown in Fig. 1. At a suitable point, preferably in the lowest story, siphon-pipes 16 are connected to the riser and return pipes by inverted-Y connections 17, each of which has a manually-operated valve 18. Each of said siphon-pipes is provided at its highest point with an air-valve 19. Normally the valves 12 are in open position, as shown in full lines in Fig. 2. Their function is in the event of a leak or break in any part of the system to close against the admission of water to the radiators as the water falls in the riser-pipe. In this event a backward current is caused, water returns through the inlet, and as the last water passes back into the riser-pipe the valve falls with the receding current and because of the suction thereof and seals this outlet to the riser-pipe, thus keeping the latter air-tight at all points below the breach or air-vent caused by a break. Hence in the event of a break or leak in a radiator or in the return-pipe the valve 12 will prevent the radiator next below the leak from draining before the pipes and radiators above and air from passing through said radiator by

the water-channel and preventing the proper siphonic action of the riser and return pipes with the former as the long leg of the siphon.

The function of the siphon-pipes 16 is to drain the circulating system when air is admitted thereto by a break or leak, and hence prevent injury to the house and its contents.

To charge the system with water, the same is admitted at any suitable point, the water-valves 9 18 and the air-valves 4, 15, and 19 being open. When the water reaches the valves 19, the valves 18 should be closed. Close the air-valves 15 of the radiators as each is reached by the rising water and close the air-valve 4 of the vacuum-chamber 3 after the latter is completely filled with water. The supply is then cut off and the valves 18 (one or both) opened until the vacuum-chamber is empty, as indicated in Fig. 1. Said valves 18 are then closed. The vacuum in the vacuum-chamber above the column of water in the riser-pipe reacts on said column, diminishes the pressure in the boiler or heater, and materially promotes the circulation of water from the boiler through the riser-pipe and radiators and the return-circulation to the boiler, and hence increases the efficiency of the heating system and enables a material economy of fuel to be effected. The siphons 16 in addition to their functions hereinbefore set forth also effect water seals at the lower portions of the riser and return pipes and prevent air from entering them.

I do not desire to limit myself to the present construction and combination of devices herein described, as it is evident that modifications may be made therein without departing from the spirit of my invention and within the scope of the appended claims.

Having thus described my invention, what

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

1. A hot-water heating system comprising a boiler, riser and return pipes, a radiator connected to the return-pipe and having a connection with the riser-pipe, said connection having a chamber 10 rising therefrom and provided with an air-valve 15, and a float check-valve in said connection, to close communication between the radiator and riser-pipe and to rise in the chamber 10 during normal conditions.

2. A hot-water heating system having riser and return pipes, a plurality of radiators disposed at different elevations and connected thereto, the connection between each lower radiator and the riser-pipe including a valve to close against back pressure, a manually-operated valve to admit air, and a manually-operated valve to establish and cut off communication between the riser-pipe and radiator, and means to drain the riser and return pipes.

3. A hot-water heating system having riser and return pipes, a plurality of radiators disposed at different elevations and connected thereto, the connection between each lower radiator and the riser-pipe including a valve to close against back pressure, a manually-operated valve to admit air, and a manually-operated valve to establish and cut off communication between the riser-pipe and radiator, and means to drain the riser and return pipes independently of each other.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

GEORGE L. RANKIN.

Witnesses:

T. C. WHITEMAN,
SAMUEL J. ORR.