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C. O. MYERS.

HOT WATER HEATING SYSTEM.

APPLICATION FILED MAR. 1, 1902.

NO MODEL.

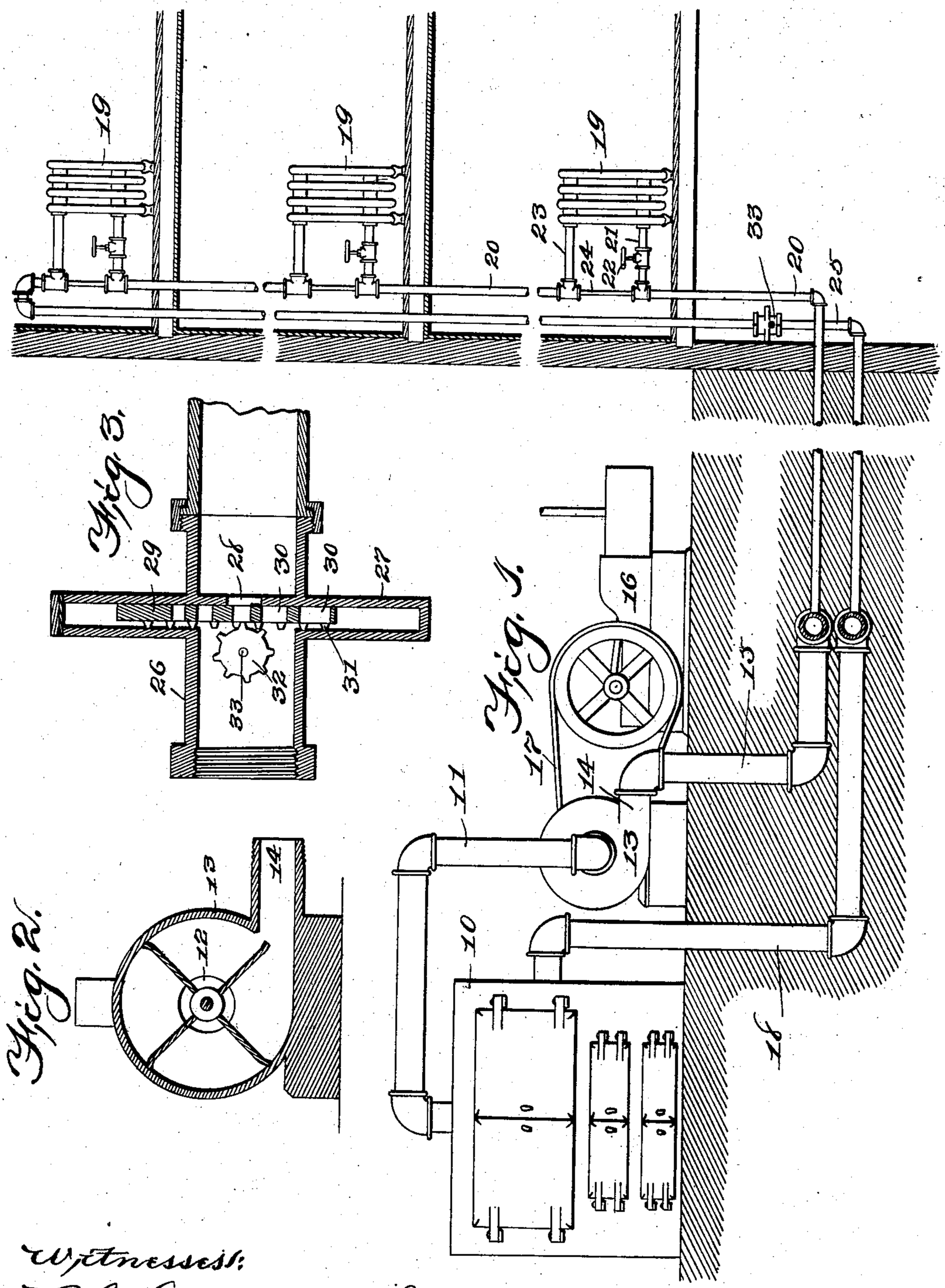

Fig. 3.

Fig. 2.

Fig. 1.

Witnesses:
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UNITED STATES PATENT OFFICE.

CHARLES O. MYERS, OF PERRY, IOWA.

HOT-WATER HEATING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 735,563, dated August 4, 1903.

Application filed March 1, 1902. Serial No. 96,269. (No model.)

To all whom it may concern:

Be it known that I, CHARLES O. MYERS, a citizen of the United States, residing at Perry, in the county of Dallas and State of Iowa, have invented certain new and useful Improvements in Hot-Water Heating Systems, of which the following is a specification.

My invention relates to that class of hot-water heating systems in which the circulation is maintained by pumping, as distinguished from that class of heating systems in which the circulation is maintained by gravity.

My objects are first to provide a heating system of this class in which the water may be forced through the mains and radiators at a temperature above the boiling-point.

Further, it is my object to provide means whereby the water may readily and easily be forced into radiators located a considerable distance above the boiler, and yet the water may be made to fill each radiator and be under pressure in the upper radiators.

My invention consists in certain details in the construction, arrangement, and combination of the various parts of the system whereby the objects contemplated are attained, as hereinafter set forth, pointed out in my claim, and illustrated in the accompanying drawings, in which—

Figure 1 shows a diagram of the complete system. Fig. 2 shows a vertical sectional view of the centrifugal pump, and Fig. 3 shows an enlarged longitudinal sectional view of the regulating-valve.

Referring to the accompanying drawings, I have used the reference-numeral 10 to indicate the boiler-furnace. Communicating with the top of the boiler-furnace is a pipe 11, also communicating with the induction-port 12 of an ordinary centrifugal pump, (indicated by the reference-numeral 13.) The eduction-port 14 of the pump communicates with the main 15.

The numeral 16 is used to indicate an ordinary gasolene-engine, which drives the centrifugal pump by means of the belt 17.

The numeral 18 indicates a return-main which discharges into the boiler-furnace.

The reference-numeral 19 is used to indicate the radiators, which are of ordinary construction.

The numeral 20 indicates a riser communicating at one end with the main 15 and communicating at its other end with the radiator 19, a valve 22 being placed on the pipe adjacent to the radiator.

The numeral 23 indicates an outflow-pipe communicating with the radiator and with the riser 20 at some distance from the points where the riser 20 communicates with the inflow-pipe 21, and a small riser 24 communicates between the inflow and the outflow pipes, making a by-pass through which a quantity of the water flowing through the riser may pass without passing through the radiator. Each successive radiator is provided with the same connections, and from the top radiator a return-pipe 25 communicates and also communicates with the return-main 18.

Located in the return-pipe 25, at a point near its lowest portion, is a regulating-valve. This regulating-valve comprises a shell 26, arranged to communicate at each end with the return-pipe, so that the contents of the return-pipe may flow through the valve. Formed on the shell is a chamber 27, having a small opening 28 therein to limit the flow through the shell 26. Within the chamber 27 is a slide 29, having a series of openings 30 of different sizes, each one of which may be brought into alinement with the opening 28. Formed on the slide 29 are the cog-teeth 31, and a pinion 32 within the shell meshes with the said cog-teeth, and the pinion may be turned by turning the shaft 33, which extends to the exterior of the shell. By this means the amount of flow permitted through the regulating-valve may be accurately predetermined.

In practical use and assuming that the water in the boiler is heated to a degree at or above the boiling-point, so that if the water were discharged into the air or given room to expand it would generate steam, when the water is sufficiently heated the gasolene-engine is started and the centrifugal pump is operated thereby. The pump will then cause the water in the system to flow from the boiler through the pump, through the radiators, and

return-pipes to the boiler. Nowhere throughout the entire system is there a place where the water could expand so as to form steam, and hence no matter how hot the water may get the system will work the same as with the water at less than the boiling-point. In this connection it is to be remembered that in systems of this class employing a piston-pump the pump will not work if the water is heated above the steaming-point, for the reason that after the piston reciprocates a partial vacuum is formed, which vacuum will immediately fill with steam under pressure, so that the pump works on the steam and repeatedly compresses it and permits it to expand without in any way forcing water through the main, and in systems of this class employing piston-pumps it has been found that when the water is heated above the boiling-point it is necessary to let the fires cool down until the water falls below the boiling-point in order to create proper circulation through the system. I have discoved that a maximum of heat may be had with a minimum of fuel, as the water is constantly maintained at above 250° Fahrenheit, and I have also discovered that the only way that water may be forced through a heating system in which the water is at or above the boiling-point is by using a pump of the kind shown, in which the pump-chambers are completely filled at all times and there is no chance for expansion of the steam.

Another feature of my invention which is essential to its operation is the use of a valve or its equivalent by which the volume of water passing from the return-pipe in a building may be reduced and controlled. I have discovered that if the return-pipe is of the same capacity as the riser in a building the water cannot be forced to the top of a high building by means of a pump when the source of the water-supply is a considerable distance beneath the radiator, or if the supply-pipe is placed some distance above the radiator the water may be made to flow through the radiator, but will not fill it, nor will it be under pressure, but by restricting the capacity of the outflow-pipe in the basement of a tall building water is forced into the building through the flow-pipe or riser, and this water gradually builds up from the valve until it completely fills the return-pipe of the radiators and the risers, and the water is held in the radiators under pressure, so that it may be utilized in giving off its heat, and yet there is sufficient passage-way through the valve for proper circulation of the water.

In use assuming that the flow-pipe 20, leading from the main through the building to be heated, is one inch in diameter and assuming that the regulating-valve is set to permit the flow of a current of water one-quarter of an inch in diameter it is obvious that after a short time the one-inch stream from the main will fill all the pipes and radiators within the building, and the water will be under pressure, and at the same time a continuous flow one-quarter of an inch in diameter will pass through the return-pipe through the main, thus maintaining a circulation through the building and at the same time holding the water under pressure in the building.

The by-pass 24 for each radiator is made of less capacity than the service-pipes, so that part of the heating fluid may be forced through the radiator and part through the by-pass. The opening in the regulating-valve, which is located on the return-pipe, is at all times of less capacity than the openings through the by-passes, so that when one or more of the radiators are cut-out there will be sufficient flow through the by-passes to furnish sufficient heating fluid to fill the remaining radiators and maintain a column of water in the return-pipe, thereby keeping all of the open radiators and service-pipes in a building full of water under pressure.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

An improved hot-water heating system, comprising a boiler-furnace, a radiator located above the boiler-furnace, a flow-pipe communicating between the boiler-furnace and the radiator, a centrifugal pump in the flow-pipe for forcing water through the flow-pipe at a temperature above the vaporizing-point, a return-pipe communicating between the radiator and the boiler-furnace and a regulating-valve in the return-pipe restricting the flow through the return-pipe and coacting with the pump to keep the radiator filled with water under pressure.

Des Moines, Iowa, December 28, 1901.

CHARLES O. MYERS.

Witnesses:

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