

(No Model.)

F. TUDOR.  
STEAM AND HOT WATER HEATER.

No. 559,551.

Patented May 5, 1896.

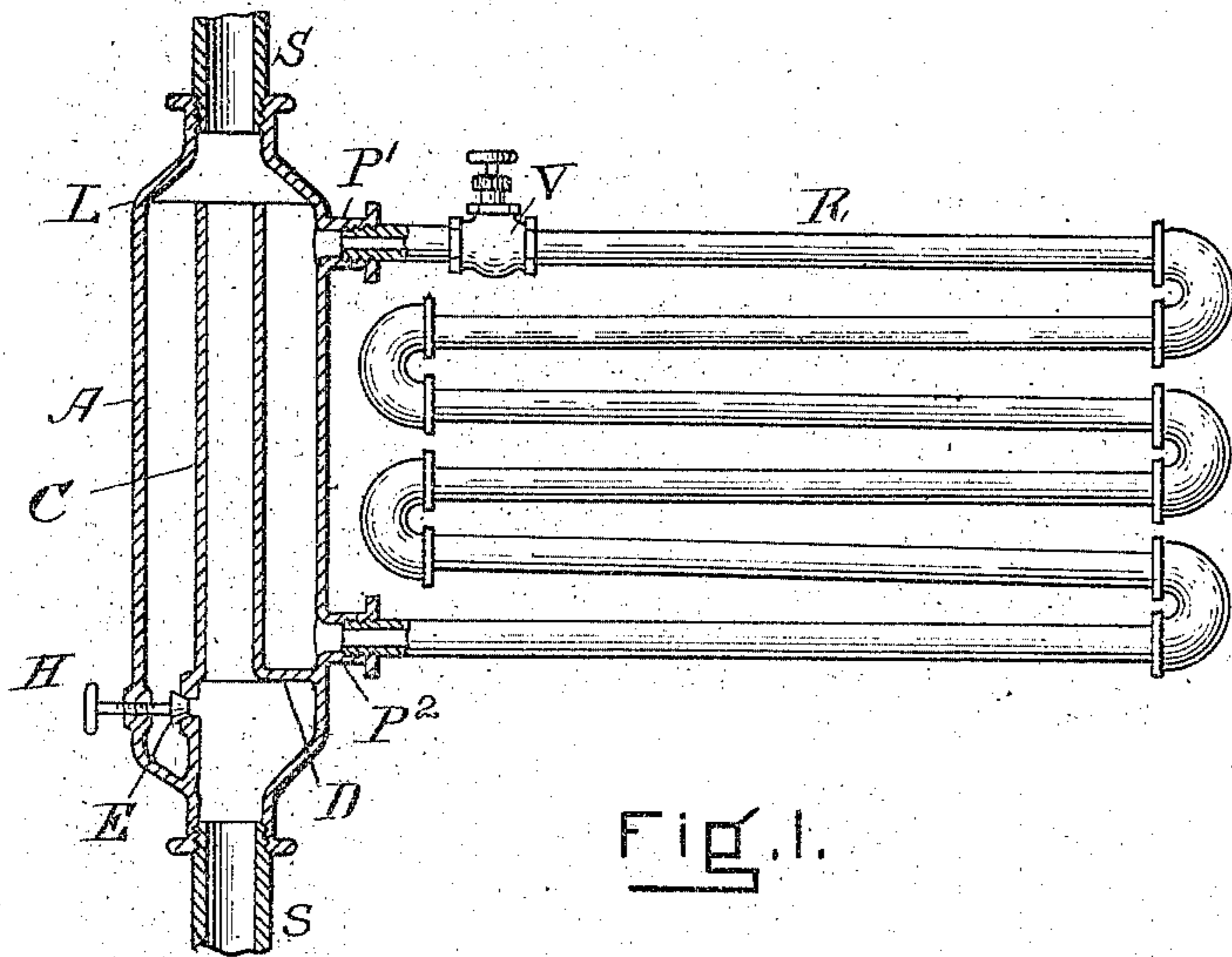


FIG. 1.

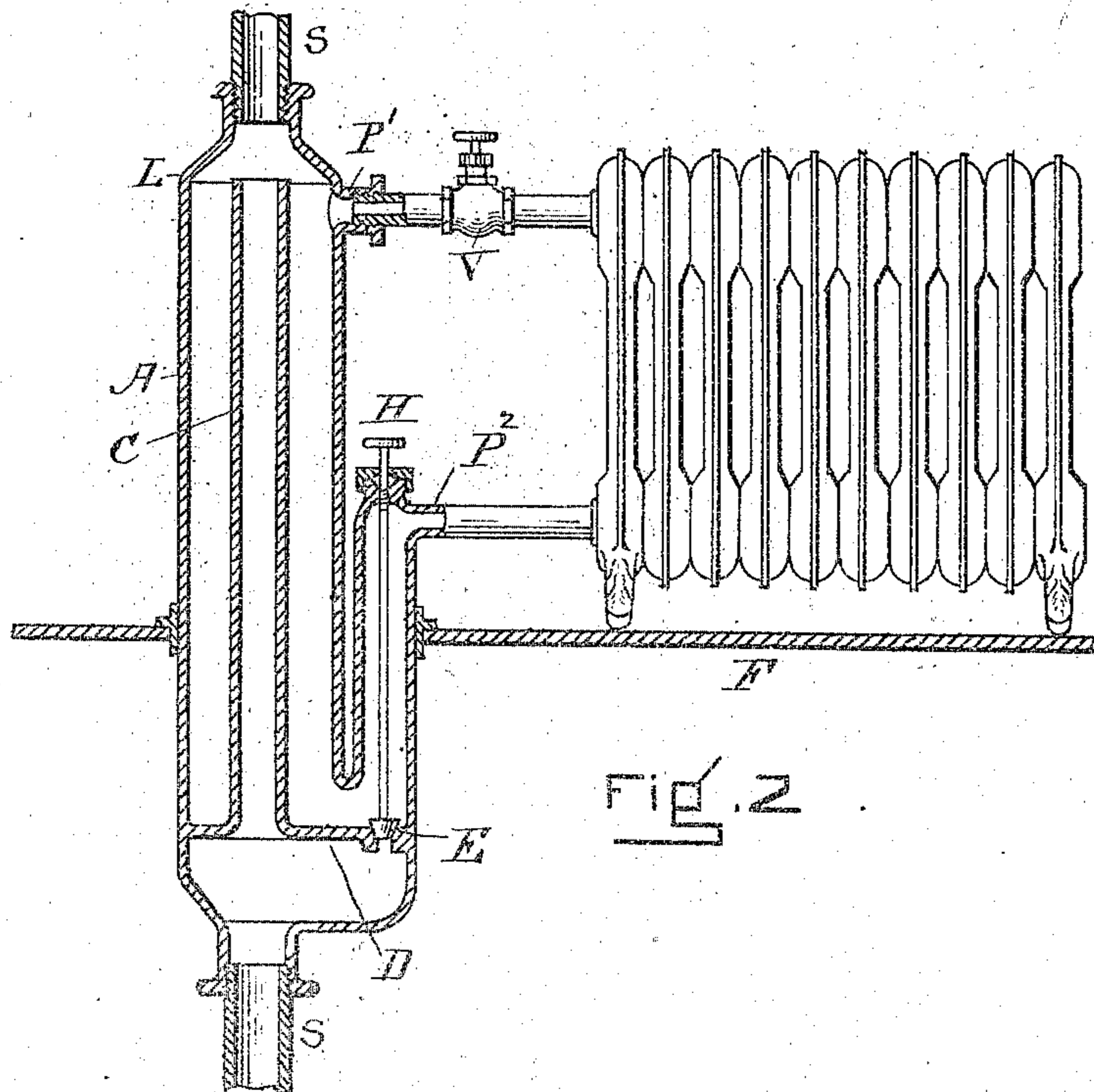


FIG. 2.

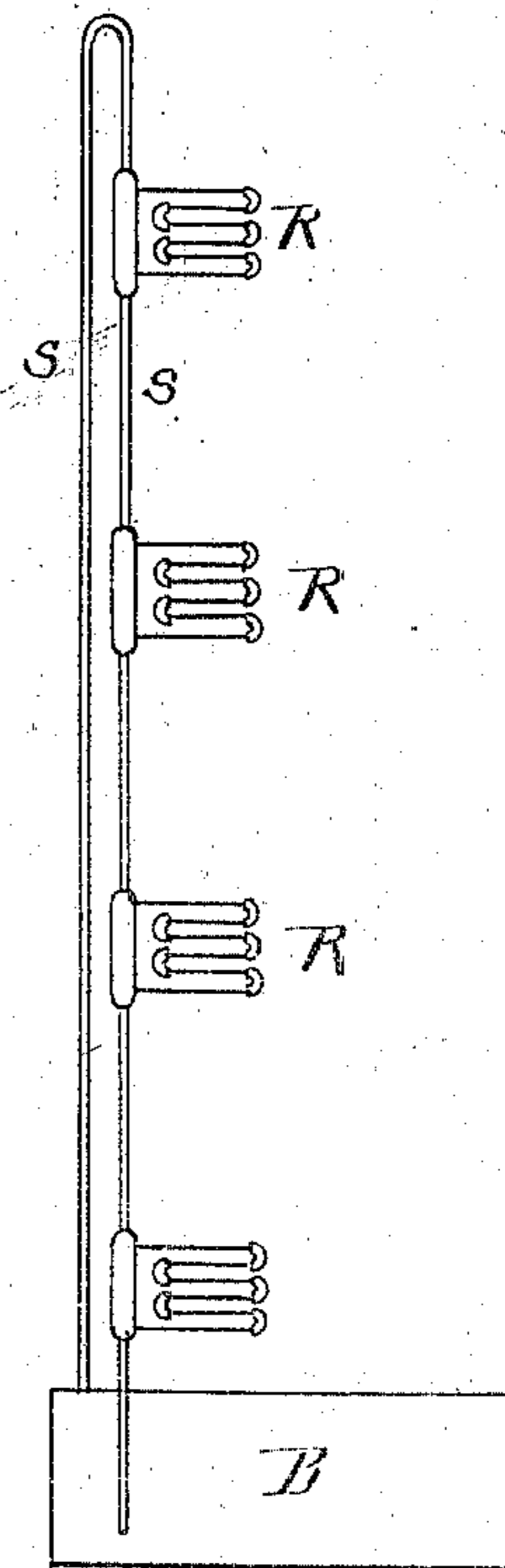


FIG. 3.

WITNESSES

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# UNITED STATES PATENT OFFICE.

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## STEAM AND HOT-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 559,551, dated May 5, 1896.

Application filed May 1, 1895. Serial No. 547,801. (No model.)

*To all whom it may concern:*

Be it known that I, FREDERIC TUDOR, of Boston, county of Suffolk, in the Commonwealth of Massachusetts, have invented sundry new and useful Improvements in Steam and Hot-Water Heaters, of which the following, read in connection with the accompanying drawings, constitutes a full and complete specification.

The object of my invention is to provide a simple and easily-controlled system of hot-water heaters for buildings wherein the local radiators are supplied with water which is heated by an interior steam-coil or its equivalent.

Following is a full and complete specification of my invention, which, read in connection with the drawings hereto annexed, will enable persons skilled in the art to which my invention pertains to practice it.

Figures 1 and 2 show forms of my steam-radiator with the steam-pipe connections broken away. Fig. 3 shows conventionally a system composed of such heaters as those of Figs. 1 and 2.

Referring to Fig. 3, B is a steam-generator, from the steam-space of which a main pipe S rises and ascends to the top of the building to be heated and there turns downward. In the descending portion of this double column, which is the form of circuit I prefer to use in the application of my improvements, are placed the radiators R and their respective heaters. Each of the radiators R, Fig. 3, is constructed and arranged as shown in Figs. 1 and 2. Referring to those figures, S is the steam-main, which is interrupted for the insertion of a trap. This trap consists of the bottle A, with necks at top and bottom for the juncture of the steam-pipe S. Within the bottle A is a diaphragm D, out of which rises an internal stand-pipe C. A valve E, having a regulating-wheel H, controls an opening in the diaphragm D.

In the side of bottle A are openings P' and P<sup>2</sup>, suitably constructed to receive the pipe connections of the radiator R. In the radiator-pipe is located a valve V, which may be used to close or open the passage through the radiator at will.

The heater operates as follows: Steam enters bottle A at the top thereof, the valves V

and E are open, and the steam fills all the spaces within the heater. Then valve E is closed, and the steam condenses, filling the radiator-pipes and the bottle A up to the level L of the top of stand-pipe C. Then all surplus condense-water overflows at L into C, which communicates with the continuation of the steam-main S at the bottom of bottle A. Suppose that the pipe S is continued, as from Fig. 1 to Fig. 2, the surplus condense-water of the upper heater, Fig. 1, flows with the steam to be intercepted by the trap of Fig. 2.

In a vertical series of heaters, like that indicated by Fig. 3, the condense-water of the upper heaters is constantly utilized to replenish the water in the lower heaters.

The circulation of the hot water in any radiator can be controlled or cut off by the valve V. When valve V is closed, the water in R cools off, and the radiator is cut out. This obviously is done at the will of the occupant of the room wherein the heater is located and in no way interrupts or affects the operation of the rest of the system.

If any user of these radiators wants more heat than the water-radiator affords him, he need only open valve E. All the water in radiator R and bottle A drains away, and the heater is transformed to a steam-radiator in an instant; but the operation of the rest of the system is not thereby affected.

The structures shown in Figs. 1 and 2 are simple in construction and effective in operation. It is obvious, however, that any heater which embodies the elements of steam-main, condense-water trap, overflow devices, and regulator-valves and is arranged and capable of use in substance like that above described, although in form unlike it, may be employed in the practice of this invention without departing from the substance thereof.

Only a single vertical series is shown herein; but it is plain to be seen that the main pipe S may be divided into as many branches as desired, each branch to contain a series of heaters such as herein described.

What I claim, and desire to secure by Letters Patent, is as follows:

1. In a heating apparatus the combination with a steam-main, of condense-water traps in said main at different levels, means for

permitting the accumulated condense-water to overflow from said traps into the main, radiators connected with said traps at levels suitable to the reception of the condense-water of the traps by the said radiators, means for regulating the circulation of the water in the radiators, and valve-controlled openings at or near the bottom of each condense-water trap, whereby the water can be drained away from the trap and radiator.

2. In a heating apparatus the combination with a steam-main, of condense-water traps in said main at different levels, means for permitting the accumulated condense-water to overflow from said traps into the main, radiators connected with said traps at levels suitable to the reception of the condense-water of the traps by the said radiators, circulation-regulating valves in the said radiators, and valve-controlled passages communicating with the steam-main, at or near the bottom of each condense-water trap, whereby the water can be drained from the trap and radiator into the main.

3. A heater consisting of the combination with a main steam-pipe of a condense-water trap, means for causing the accumulation and permitting the overflow of the condense-water of said trap, a radiator connected with the trap at a level suitable to the reception of the condense-water of the trap by the radiator, a partition separating the bottom of said trap from the steam-main, and a valve-controlled opening in said partition to permit the escape of the condense-water.

4. In a hot-water or steam heating system, the combination of a main steam-pipe, a se-

ries of water-receptacles arranged therein, a diaphragm in each receptacle, means for causing the accumulation and for permitting the overflow of the water of condensation, a radiator attached to and in connection with the water-space of each receptacle, and a valve in the diaphragm of each receptacle to permit the escape of the water of condensation.

5. In a heating apparatus, the combination of a receptacle provided with an inlet in its upper portion and an outlet in its lower portion, a diaphragm in the receptacle, means for causing the accumulation and for permitting the overflow of the water of condensation, and a radiator communicating with the water-space of the receptacle.

6. In a hot-water or steam heating system, the combination of a main steam-pipe, a series of water-receptacles arranged therein, a diaphragm in each receptacle, a stand-pipe in the diaphragm extending up into the chamber and affording communication between the upper part of the receptacle and the space below the said diaphragm, a radiator attached to and in connection with the water-space of each receptacle, and a valve in the diaphragm of each receptacle to permit the escape of the water of condensation.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FREDERIC TUDOR.

Witnesses:

WALTER E. BARNES,  
ROSALIE J. PEYRAND.