

No. 781,037.

PATENTED JAN. 31, 1905.

A. C. WALWORTH, JR.  
RADIATOR REGULATING DEVICE.  
APPLICATION FILED MAR. 21, 1904.

Fig. 1.

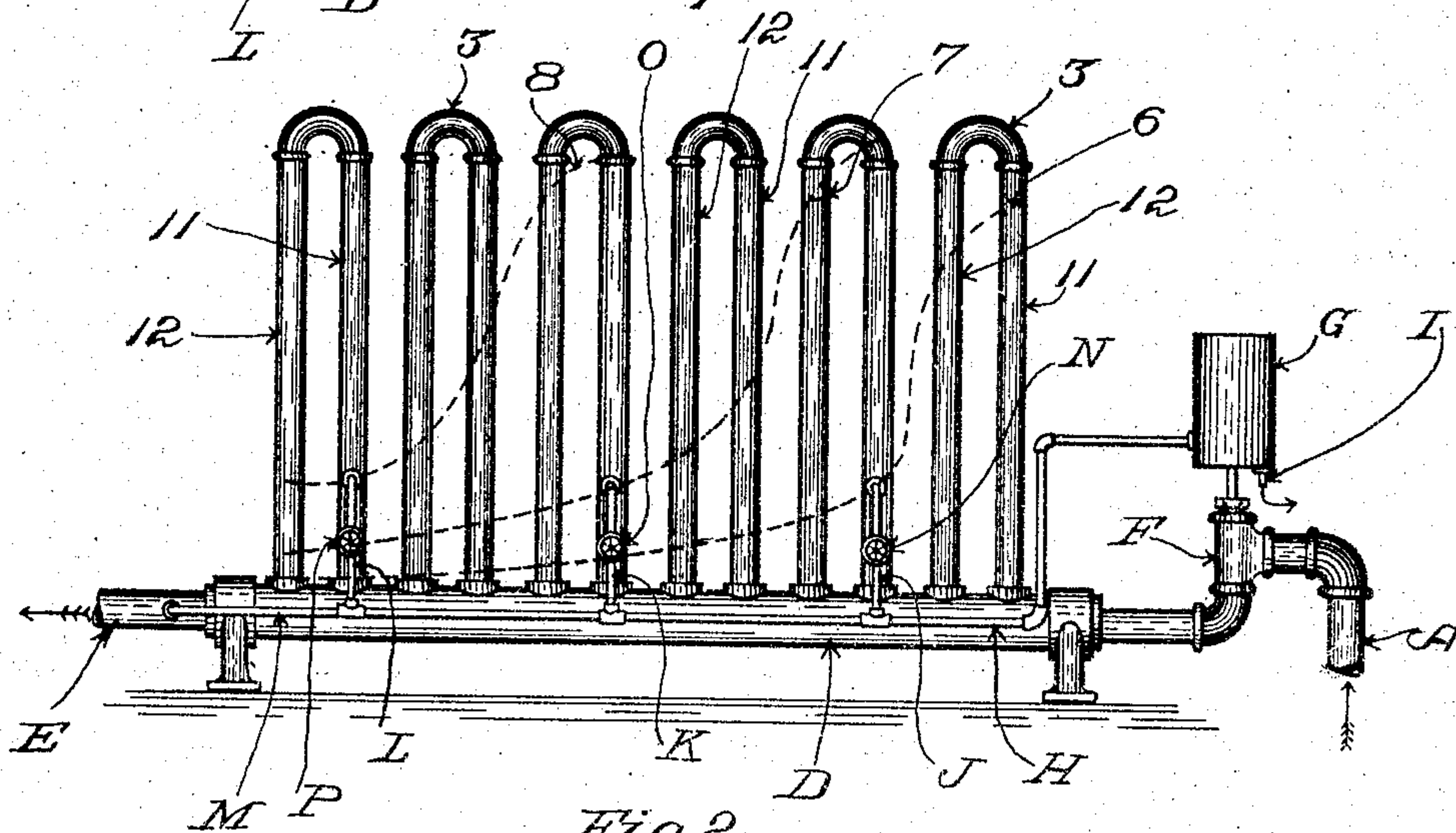
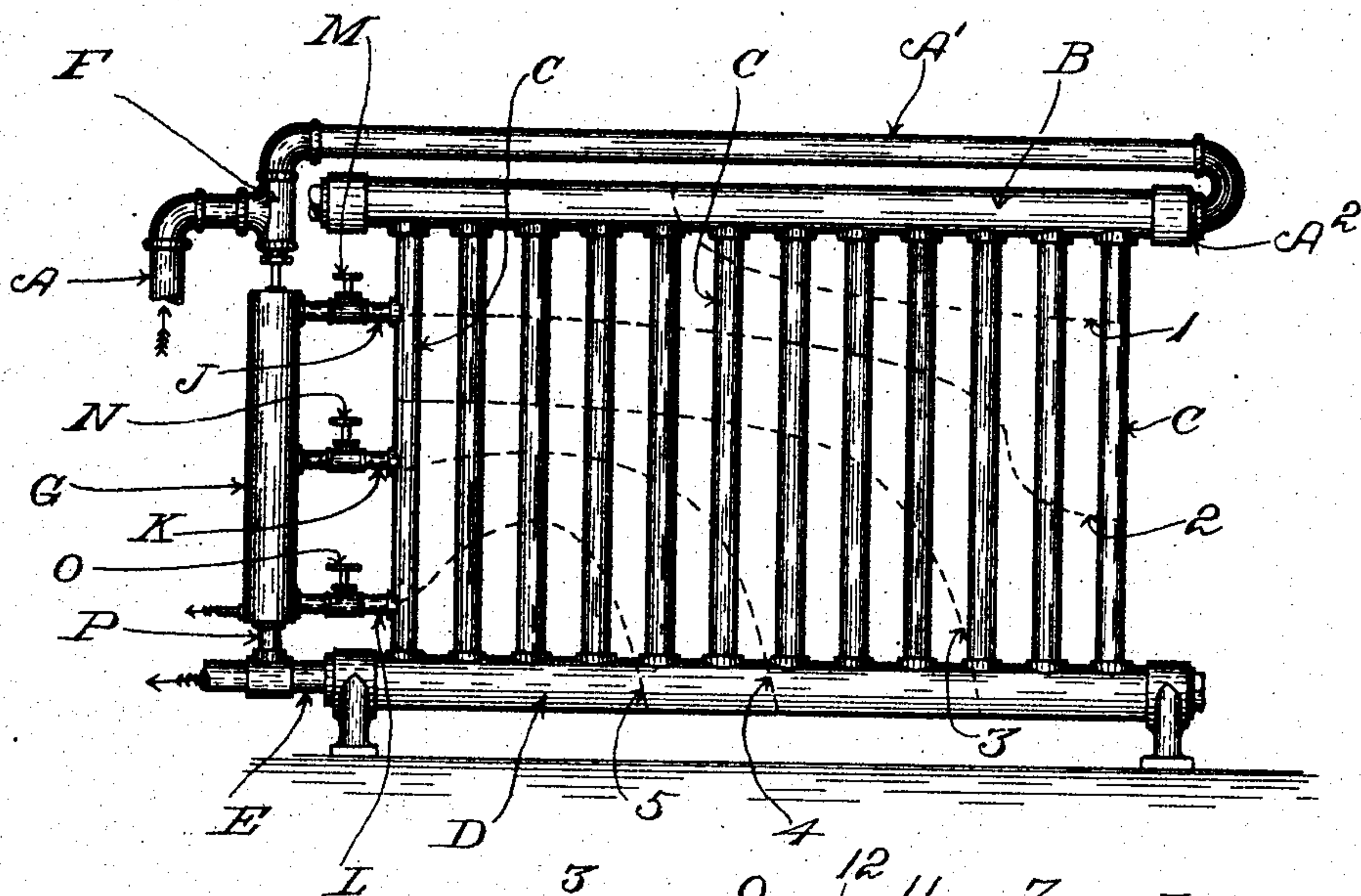


Fig. 2.

Witnesses:

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# UNITED STATES PATENT OFFICE.

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## RADIATOR-REGULATING DEVICE.

SPECIFICATION forming part of Letters Patent No. 781,037, dated January 31, 1905.

Application filed March 21, 1904. Serial No. 199,170.

*To all whom it may concern:*

Be it known that I, ARTHUR C. WALWORTH, Jr., a citizen of the United States, residing at Newton, in the county of Middlesex, State of Massachusetts, have invented a certain new and useful Improvement in Radiator-Regulating Devices, of which the following is a specification, reference being had therein to the accompanying drawings.

In constructing radiators for use in heating rooms it is desirable that as little steam as possible be condensed by the radiator and that means be provided for keeping the heat given off by the radiator constant in amount. It is also desirable that means be provided for controlling the heat of the radiator according to the peculiar conditions.

My device has for its object to provide an improved means of control which may be conveniently operated according to the circumstances and which will be simple and cheap, but will not waste steam.

In the construction of radiators a thermostat or other heat-controlled device may be used to operate a valve placed either in the outlet or inlet of a radiator, this thermostat being caused to act either by the changes of temperature in the radiator or in the room where the radiator is placed.

My device is dependent for its operation upon the heat of the various parts of the radiator. This enables me to use only certain portions of the radiator in cases where the full heating effect is not desired.

It has been found in the construction of so-called "open-top" radiators, in which there is a free passage for steam across the top of the vertical pipes composing the body of the radiator, that a portion of the radiator at the top will be quite hot while the bottom of the radiator remains cold, there being a distinct line of division between the hot and cold portions of the radiator. This line of division may be called an "isothermal" line, and I will so refer to it in this specification. If more steam is passed through the radiator the heated portion increases, the isothermal line moving downward slowly until the entire radiator becomes hot. It is also the case with so-called "open-bottom" radiators, which have

no opening across the top, but have one at the bottom, that the pipes nearest the inlet warm first and that the heat gradually creeps into the pipes one by one until the outlet is reached in the same manner as has been explained in the case of open-top radiators. In these radiators the movement of the isothermal lines is similar to their movement in the open-top radiators. I have therefore made my regulating device so that it will operate to close the inlet-valve when the portion of the radiator between the inlet and any given isothermal has been sufficiently heated and have also so arranged it that the point at which it shall operate may be changed to suit the convenience of the user.

With these ends in view I have devised the construction shown in the drawings, which I find accomplishes the desired results.

The invention will be more fully understood from the following description, in which reference is made to the accompanying drawings, and the novel features thereof are pointed out in the claims at the close of the specification.

In the drawings, Figure 1 is a side view of a radiator open at top and bottom embodying my invention. Fig. 2 is a side view of an open-bottom radiator also embodying my invention.

Referring to Fig. 1, A is a riser-pipe, through which the steam from the boiler is delivered by the horizontal pipe A' to the radiator at the point A<sup>2</sup>. In the figure I have shown a radiator open at top and bottom and composed of pipes C, screwed into the top B and bottom D. E is the waste or return pipe and may be arranged to open into the air or attached to a suitable return-pipe, as may be desired. Of course it is to be understood that any convenient and well-known form of radiator may be employed, and I do not wish to limit myself to the peculiar construction shown in the drawings. I have indicated by the dotted lines 1, 2, 3, 4, &c., several of the isothermals, thus showing the movement of the heat in the radiator. At F, I place an inlet-valve controlling the supply of steam to the radiator. This valve is operated by a thermostat, which I have indicated at G. This



thermostat may be of any well-known construction, and there are numerous types suitable for use in this connection. I have indicated the thermostat diagrammatically, it being unnecessary to show it in detail. Leading to the body portion of the thermostat G are pipes J, K, and L, provided with hand-valves M, N, and O. The pipes J, K, and L are connected at their other ends with the vertical pipe C of the radiator, entering it at different heights above the bottom D. I have also shown a pipe P connecting the thermostat and the waste-pipe E of the radiator. Other connections between the thermostat G and the various portions of the radiator may be provided as desired.

It will be seen that when the steam enters the radiator through the riser A the portion of the radiator nearest the inlet A<sup>2</sup> is heated first, as shown by the isothermal lines 1, 2, 3, 4, and 5, and when the portion of the radiator up to the isothermal line 2 has been filled steam will pass through the pipe J to the thermostat, thereby causing the portions of the thermostat to expand and close the inlet-valve F. Should it be desired that the portion of the radiator between the inlet A<sup>2</sup> and the isothermal line 4 be heated, it is only necessary to close the hand-valve M, thereby preventing the escape of steam to the thermostat through the pipe J. When the steam has reached the point of connection between the pipe K and vertical radiator-pipe C, the hand-valve N being open, steam will pass to the thermostat, and the thermostat will close the inlet-valve F. In the same manner if it is desired to heat all the radiator between the inlet A<sup>2</sup> and the isothermal line 5 the valves M and N are closed and the steam finds its way through the pipe L to the thermostat, when the radiator up to the said isothermal line 5 has been filled with steam. If it is desired to heat the whole radiator, all three valves M, N, and O are closed, and the steam from the escape-pipe E operates the thermostat. The operation of my device as the radiator cools is the reverse of the operation just described. When the radiator has cooled so that steam no longer is flowing from one of the thermostat supply-pipes into the thermostat, the resulting contraction of the parts of the thermostat opens the valve F and again admits steam to the radiator.

In Fig. 2 I have shown a modification of my device arranged for application to an open-bottom radiator. For convenience I have shown this radiator as composed of vertical tubes 11 and 12, connected in pairs at the top by semicircular unions 3. The riser-pipe is marked A, the inlet-valve F, the thermostat G, and its exhaust-outlet E, as in previous

figure. Isothermal lines of the radiator are indicated at 6, 7, and 8. Entering the vertical pipes of the radiator at a point somewhat above the bottom D are pipes J, K, and L. I have for convenience connected the second, fourth, and sixth pairs of pipes from the right-hand end; but it is obvious that each one of the pairs of pipes might be connected with the thermostat or that others might have been chosen, also that the pipes J, K, and L might have been made to enter the various vertical pipes of the radiator at different heights above the bottom D, according to the conditions under which the invention is to be used. Each of these pipes J, K, and L are supplied with hand-valves N O P, as in Fig. 1. I have also shown a pipe M leading to the escape-pipe E of the radiator for use in case it is desired to fill the entire radiator with steam.

The operation of my device when employed in connection with an open-bottom radiator, as is shown in Fig. 2, is the same as that previously described in connection with Fig. 1. The steam enters the portion of the radiator which lies between the inlet-valve F and the isothermal line passing through the entrance of whichever of the thermostat supply-pipes J, K, or L has its hand-valve open to allow steam to pass back to the thermostat and thence passes to the thermostat, causing it to close the inlet-valve. When the steam ceases to flow to the thermostat, the thermostat cools and opens the valve, as has been previously described.

I claim as my invention—

1. In a radiator-regulating device, the combination of a thermostat, a control-valve for the radiator operated thereby, and steam connections to the thermostat from different points of the radiator determined by its isothermal lines.

2. In a radiator-regulating device, the combination of a thermostat, a control-valve for the radiator operated thereby, connections to the thermostat from different points of the radiator determined by its isothermal lines, and valves in the said connections controlling the flow of steam from the radiator to the thermostat.

3. The combination of a radiator, a control-valve therefor, a thermostat operating the said control-valve, and steam connections to the thermostat from different points of the radiator determined by its isothermal lines.

In testimony whereof I affix my signature in presence of two witnesses.

ARTHUR C. WALWORTH, JR.

Witnesses:

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WILLIAM A. COPELAND.