

Jan. 21, 1936.

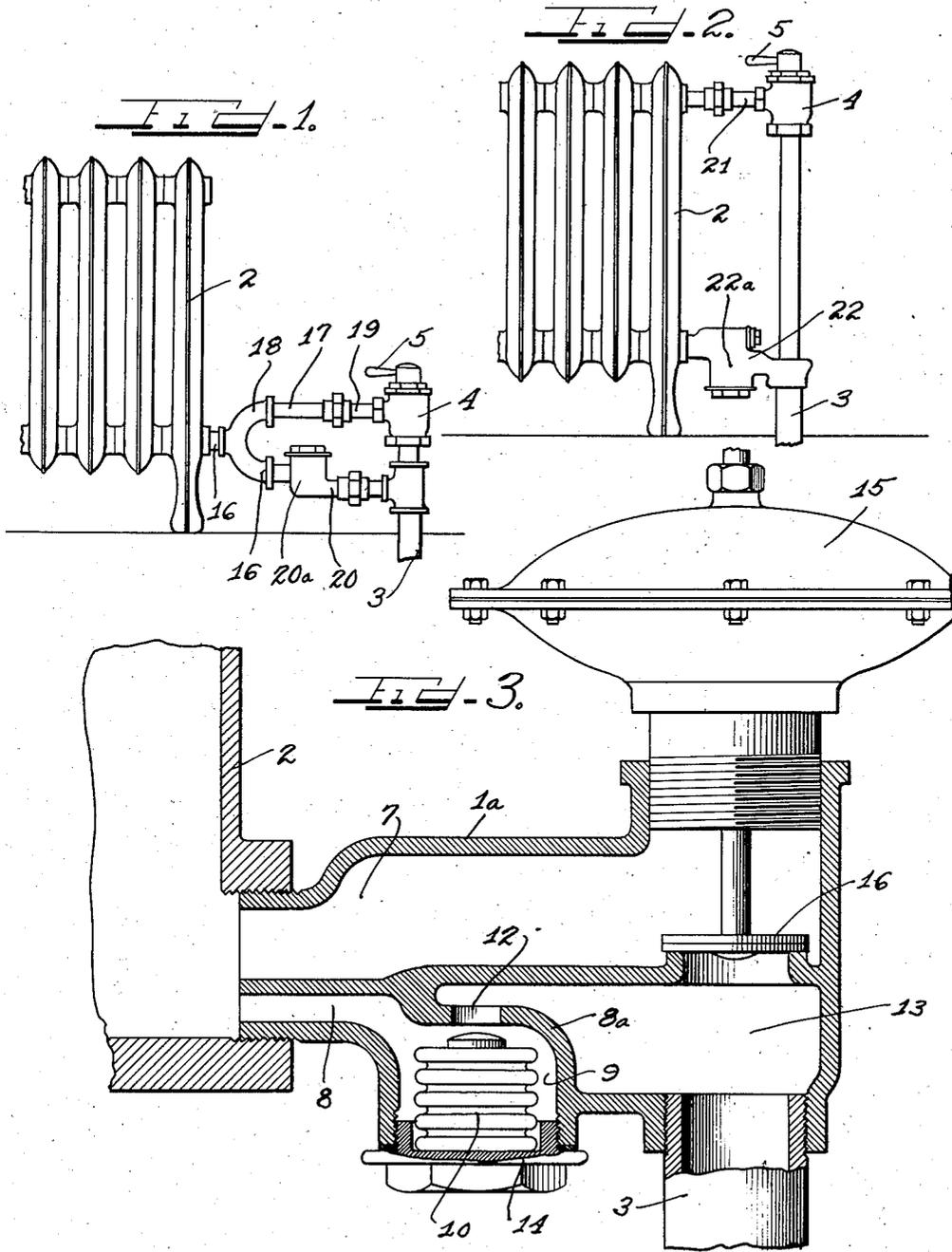
R. H. THOMAS

2,028,173

CONTROL FOR RADIATORS

Filed Jan. 27, 1934

2 Sheets-Sheet 1



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*Charles H. Thomas*

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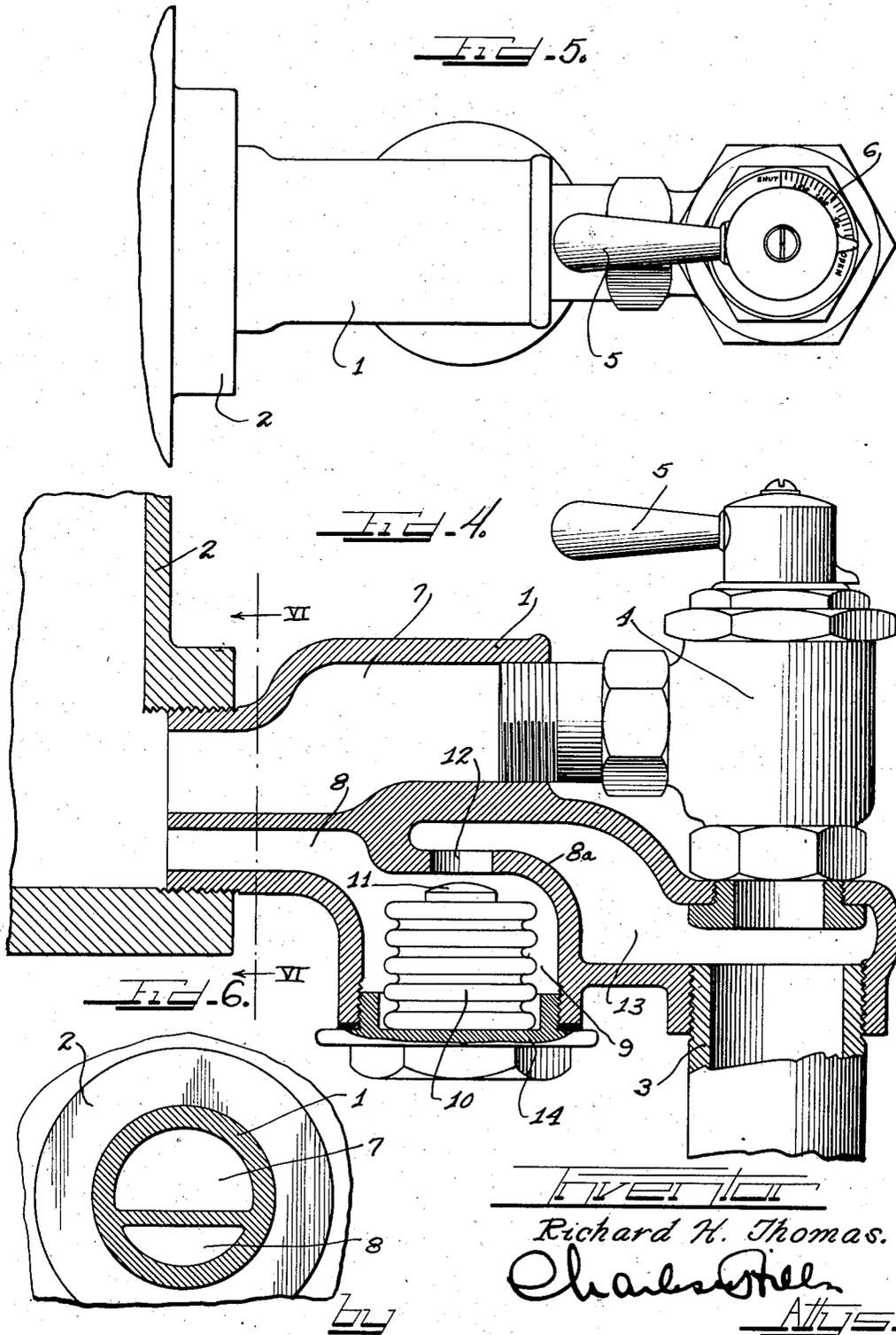
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2 Sheets-Sheet 2



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# UNITED STATES PATENT OFFICE

2,028,173

## CONTROL FOR RADIATORS

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Application January 27, 1934, Serial No. 708,580

3 Claims. (Cl. 237-67)

This invention relates to a single control for radiators and concerns itself with means for controlling the flow of the condensate to the single steam supply pipe.

5 In steam heating systems employing a single pipe for supplying the steam and returning the condensate there is usually a valve at each radiator for admitting or shutting off the steam. As a general rule such systems require the valve to be either wide open or completely shut with the result that there can be no modulation of the heat. At times there will be an excess of heat and at other times there will be insufficient heat.

15 To partially open the radiator valve of such a single pipe system, the radiator and the supply pipe would become clogged and flooded with condensate and cause that objectionable snapping action known as water hammer.

20 It is an object of this invention to provide a control means for the condensate returning from the radiator so that the radiator valve may be partially opened to control the amount of steam entering the radiator without causing the objectionable water hammer.

25 The invention comprises the novel structure and combination of parts hereinafter described and more particularly pointed out and defined in the appended claims.

30 In the accompanying drawings which illustrate a preferred form of this invention and in which similar reference numerals refer to similar features in the different views:

35 Fig. 1 is a fragmentary elevational view of a radiator equipped with a condensate control mechanism involving this invention.

Fig. 2 is a view similar to Fig. 1 illustrating a modified application of the invention.

40 Fig. 3 is an enlarged sectional view through a condensate control mechanism involving this invention in which the radiator valve is adapted to be controlled by a thermostat.

45 Fig. 4 is an enlarged sectional view through my condensate control mechanism with the steam supply valve in elevation and in which the thermostat control is omitted.

Fig. 5 is a top plan view of the structure shown in Fig. 4.

50 Fig. 6 is a sectional view taken upon the line VI-VI of Fig. 6 looking in the direction of the arrows.

55 The invention in its broadest aspects comprises a connection between a steam supply pipe and a radiator and having a steam inlet passage and a separate condensate return passage and where-

in the steam inlet passage is controlled by a valve which may be partially closed without interfering with the return of the condensate to the steam supply pipe. This construction will avoid the clogging or flooding of the radiator and supply pipe with condensate and prevent water hammer.

The connection between the radiator and the steam supply pipe may take various forms. It may be made as shown in Figs. 3 and 4 or as shown in Fig. 1 or as shown in Fig. 2 in order to meet the requirements of different radiators.

The invention can probably best be described in connection with Fig. 4 which illustrates a connection 1 between a radiator 2 and a steam supply pipe 3. This connection includes a valve housing 4 of any well known construction in which the valve stem (not shown) is equipped with a handle 5 adapted to move over a scale 6 (Fig. 5) whereby the valve may be opened or closed to any desired extent as indicated on the scale.

The connection embodies a steam passage 7 from the valve housing to the radiator and a condensate return passage 8 which communicates with a chamber 9 in which an expansible valve 10 is located. This expansible valve 10 embodies a plug 11 at its upper end which is adapted for closing an aperture 12 in the upper part of a web or barrier 8a in said passage of the chamber 9. The chamber 9 through said aperture 12 communicates with a passage 13 in said connection that leads to the steam supply pipe 3. It might be mentioned that the valve 10 is responsive to temperature for closing the aperture or port 12 as will later more fully appear. From a functional standpoint, the passage 8, aperture 12 and passage 13 may be considered as a single valve controlled passage leading from the radiator to the steam supply pipe. The chamber 9 is preferably provided with a closure 14 threaded into the connection 1 to provide for the insertion of the valve 10.

In Fig. 3, there is shown a connection 1a similar to foregoing one with the exception that a diaphragm valve housing 15 has been attached thereto. This valve may be connected to a room thermostat for operating the valve 16 that admits fluid to the passage 7.

In Fig. 1 there is shown a connection 1b between the radiator and the supply pipe 3. This connection involves the same principle as the others and differs in the following structural respects. A pipe 16 provided with short branches 17 and 18 is connected to the radiator. A steam supply pipe 19 connects the branch 18 with the valve housing 4 on the steam supply pipe, while

a condensate return pipe 20 connects the branch 17 with the steam supply pipe 3 below the valve housing. The condensate return pipe 20 is provided with an enlargement 20a that forms a chamber for an expansion valve. It is, however, immaterial whether the connection is formed of separate pipes or a housing having two passages.

In Fig. 2, there is shown a further application of the invention. In this application, the steam supply pipe 3 has a pipe 21 that connects its valve housing 4 with the top of the radiator and a return condensate pipe 22 that connects the lower part of the radiator with the steam supply pipe 3. This connection 22 embodies also an enlargement 22a for containing a valve similar to the valve 10. It will of course, be understood that the exhaust passage in the connections 20 and 22 may be similar to the exhaust passage shown in Figs. 3 or 4.

According to this invention, the steam rising in the supply pipe will enter the radiator through the passage 7 while the condensate will emerge from the radiator through the passage to the steam supply pipe. The steam supply valve may be manually controlled or may be controlled by a room thermostat as desired.

In the event that steam should endeavor to enter the radiator through the passage 13, the temperature would cause the valve 10 to expand and close the port 12. The valve 10 will contract and open the port 12 for the escape of the condensate when the same enters the chamber and cools the valve.

It will be appreciated that according to this invention, the condensate can always freely escape no matter whether the steam valve is partly closed, due to the fact that it does not pass through the valve. Consequently, there will be no clogging or flooding of the radiator and water hammer will be eliminated.

I am aware that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this invention and I, therefore, do not purpose limiting the patent granted hereon otherwise than necessitated by the prior art.

I claim as my invention:

1. In a single pipe heating system, the combination with a radiator, of a steam supply pipe, a single connection between said pipe and radiator, said connection having an upper steam passage leading to the radiator and a lower condensate return passage leading from said radiator to said steam supply pipe, said condensate return passage having an intermediate chamber and a barrier between said chamber and said steam supply pipe, said barrier having a port and a thermostatically controlled valve in said chamber for controlling the flow of condensate through said port, said condensate return passage being unobstructed between said chamber and radiator to permit said condensate to continually escape from said radiator into said chamber for influencing said thermostatically controlled valve.

2. In a single pipe heating system, the combination with a radiator, of a steam supply pipe, a connection between said pipe and radiator, said connection having a condensate return passage leading from the bottom of the radiator to said pipe, said passage having a chamber intermediate the ends thereof and a barrier extending across said passage and forming the top and front wall of said chamber, the top portion of said barrier having a port for the escape of condensate from said chamber and a thermostatically controlled valve in said chamber for controlling the flow of condensate through said port, said chamber being always in open communication with said radiator to receive condensate therefrom.

3. In a single pipe steam heating system, a steam supply pipe, means connecting said pipe to said radiator for providing a steam conducting passage and a separate condensate return passage, said condensate return passage having a chamber intermediate its ends continually in open communication with said radiator, said condensate return passage having a barrier extending thereacross and forming the top and front wall of said chamber, said barrier having a port in the top thereof and a thermostatically controlled valve in said chamber for controlling the flow of condensate through said port.

RICHARD H. THOMAS.

CERTIFICATE OF CORRECTION.

Patent No. 2,028,173.

January 21, 1936.

RICHARD H. THOMAS.

It is hereby certified that the name of the assignee in the above numbered patent was erroneously written and printed as "Lurielle A. Thomas" whereas said name should have been written and printed as Lucille A. Thomas, as shown by the records of assignments in this office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 25th day of February, A. D. 1936.

Leslie Frazer

Acting Commissioner of Patents.

(Seal)