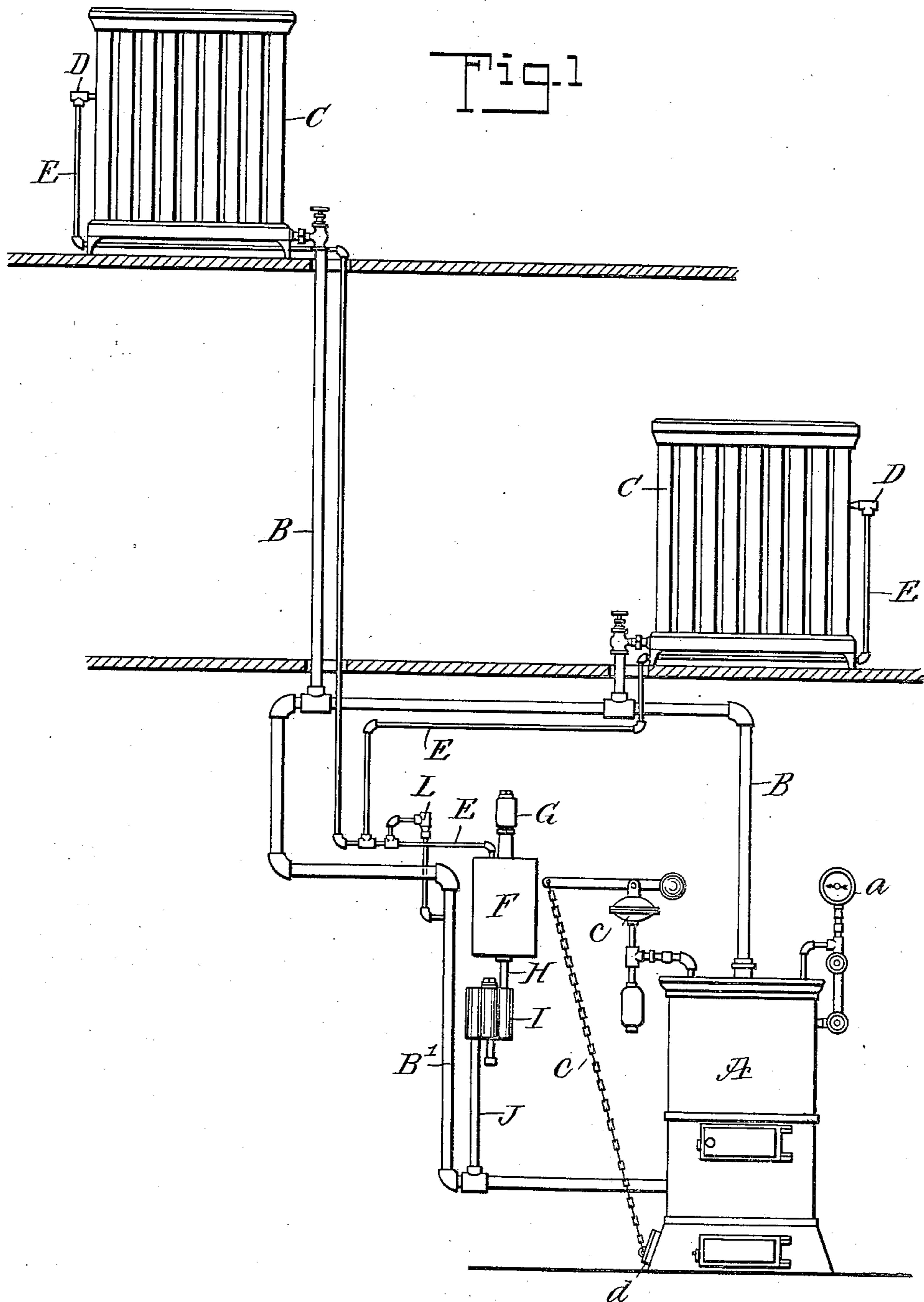


N. M. EDDY.
HEATING APPARATUS.
APPLICATION FILED MAY 5, 1908.

917,566.

Patented Apr. 6, 1909.
2 SHEETS—SHEET 1.



WITNESSES
J. A. Brophy
Geo. H. Hoston

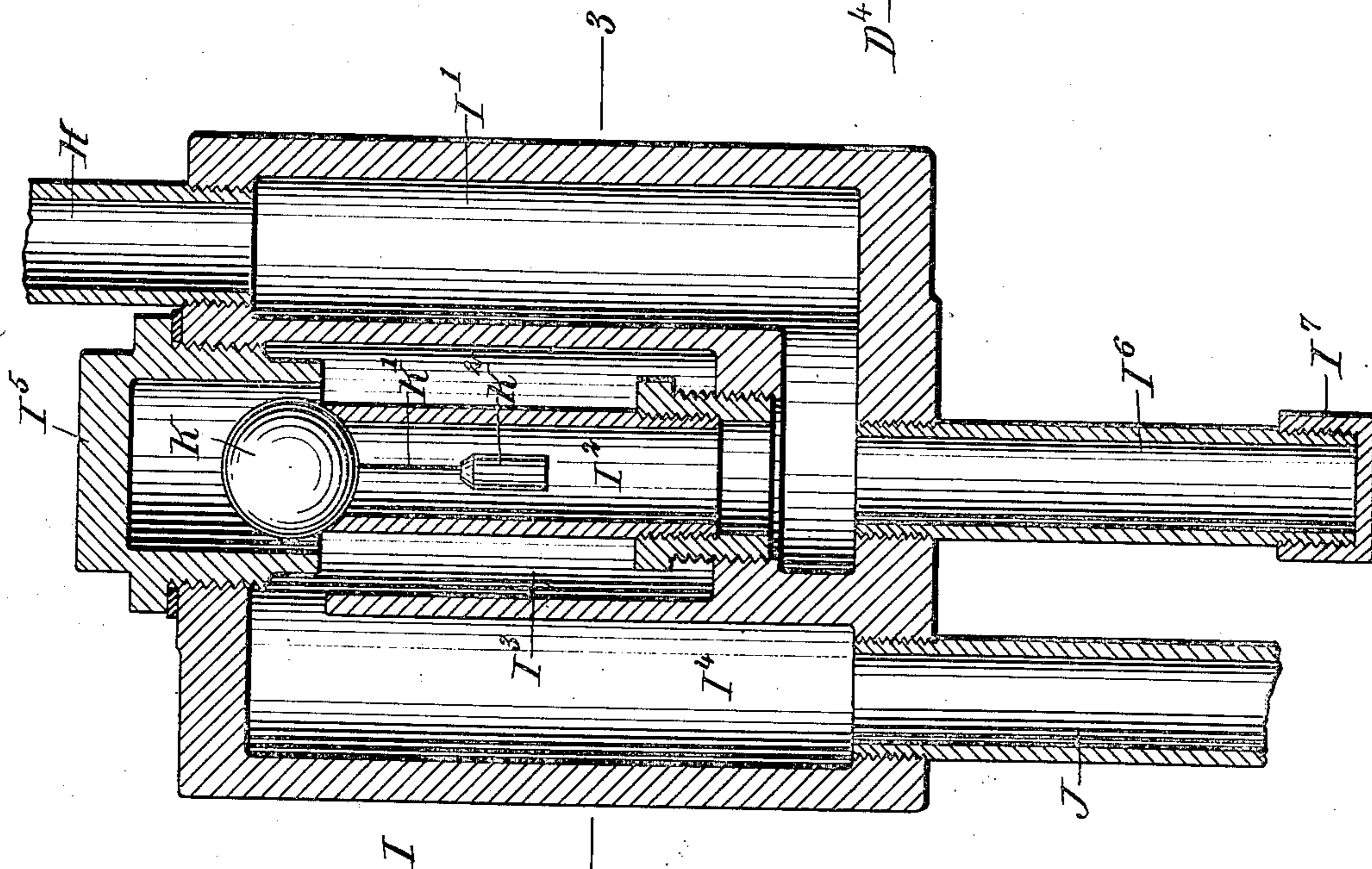
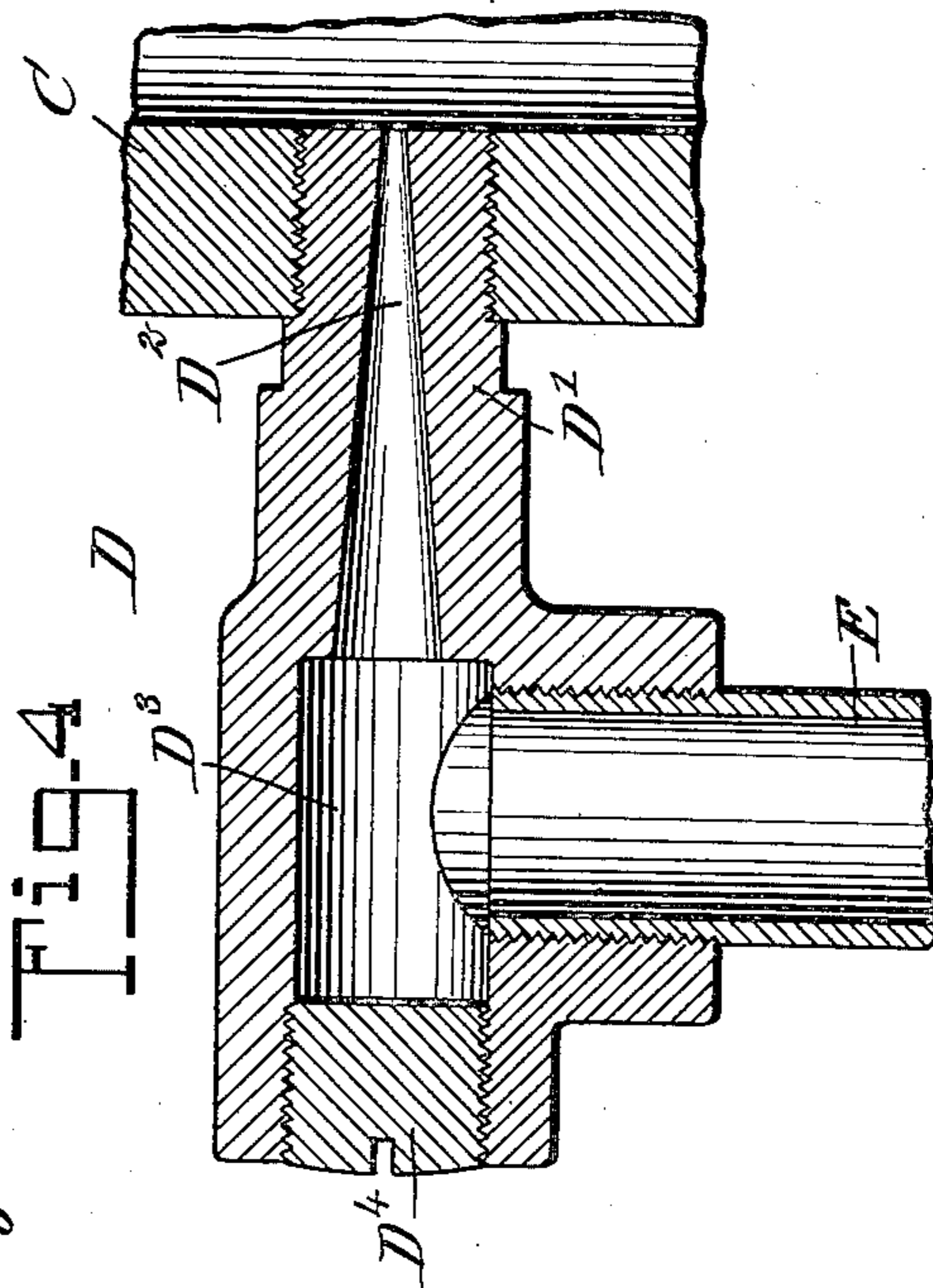
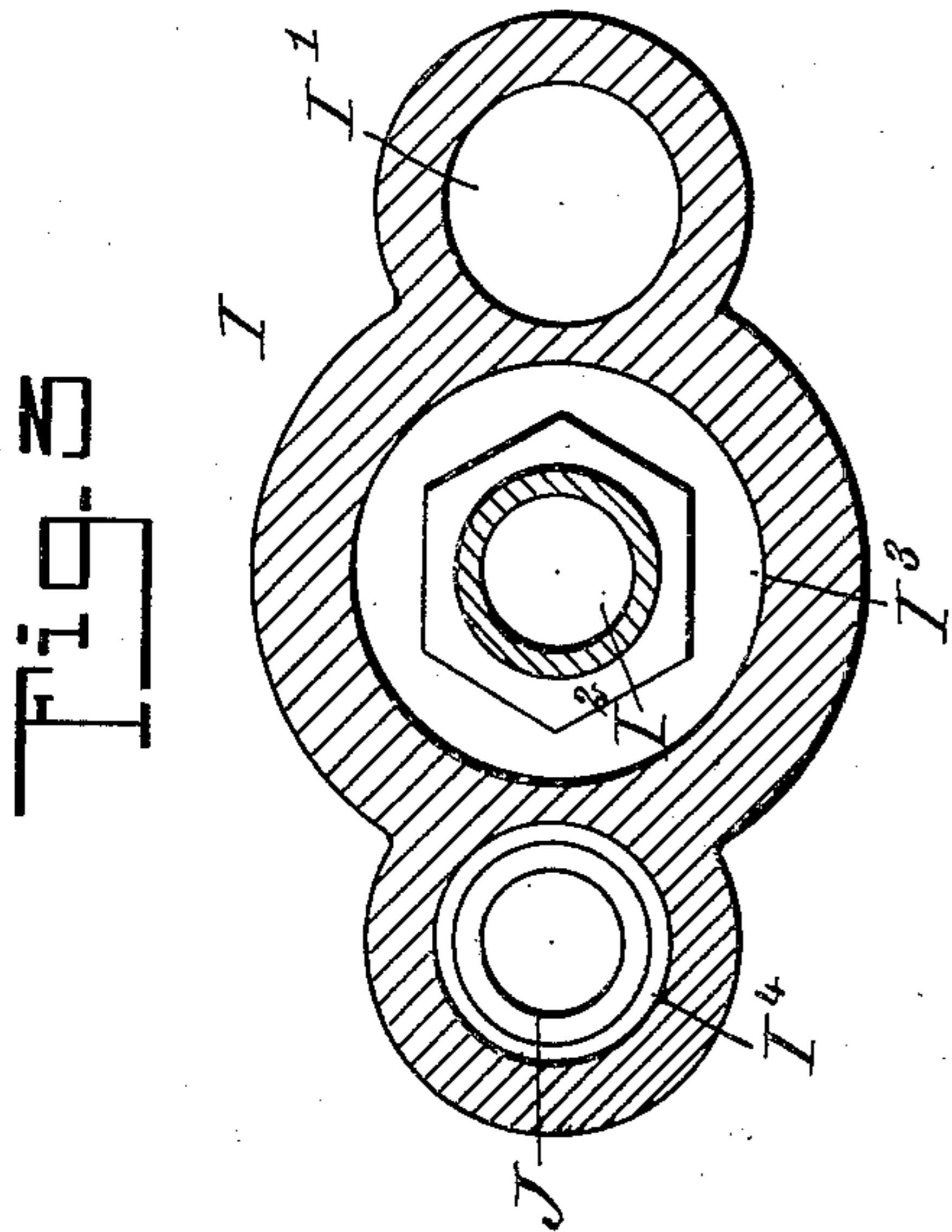
INVENTOR
Nelson M. Eddy
BY *Munn & Co.*
ATTORNEYS

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WITNESSES
J. A. Brophy
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Fig. 2

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UNITED STATES PATENT OFFICE.

NELSON MONROE EDDY, OF ALPENA, MICHIGAN.

HEATING APPARATUS.

No. 917,568.

Specification of Letters Patent.

Patented April 6, 1909.

Application filed May 5, 1908. Serial No. 430,935.

To all whom it may concern:

Be it known that I, NELSON M. EDDY, a citizen of the United States, and a resident of Alpena, in the county of Alpena and State of Michigan, have invented a new and Improved Heating Apparatus, of which the following is a full, clear, and exact description.

The invention relates to heating apparatus, such as shown and described in the Letters Patent of the United States, No. 782,116, granted to me on February 7, 1905.

The object of the present invention is to provide a new and improved heating apparatus, arranged to return the water of condensation from air piping to the boiler and to render the action entirely automatic, without requiring readjustment of the parts at any time.

The invention consists of novel features and parts and combinations of the same, which will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the apparatus in a building, the floors of which are shown in section; Fig. 2 is an enlarged sectional side elevation of the return water valve; Fig. 3 is a sectional plan view of the same on the line 3—3 of Fig. 2; and Fig. 4 is an enlarged sectional side elevation of one of the air vents and retarders.

A boiler A of the usual construction is connected by the main steam pipe B with the various radiators or heating coils C, and the said steam pipe B is provided with a return section B' for returning the water of condensation to the boiler A from the various radiators or heating coils.

Each of the radiators C is provided with an air vent and retarder D, which serves the double function of a vent for allowing air to escape from the radiator C and of a retarder to retard the escape of both air and steam from the radiator. The air vent and retarder D is shown in detail in Fig. 4, and consists of a nipple D' screwed in a radiator leg and provided with a minute opening D² leading to the interior of the radiator leg and connected with a chamber D³ formed in the nipple D' and to which access is had by a screw plug D⁴, so that in case the minute

opening D² becomes clogged up the user can readily clean the opening D² on removing the screw plug D⁴. The chamber D³ is connected by a pipe E with a receiving tank F provided on top with an air escape or a vacuum valve G, preferably of the construction shown and described in the patent above referred to, so that further description of the same is not deemed necessary.

The bottom of the receiving tank F is connected by a pipe H with a return water valve I connected by a pipe J either with the return section B' or directly with the lower end of the boiler A, to return the water of condensation from the pipe E to the boiler, as hereinafter more fully described.

The return water valve I is shown in detail in Figs. 2 and 3, and consists essentially of an inlet compartment I' into the upper end of which leads the pipe H connected with the receiving tank F. The lower end of the inlet compartment I' connects with the lower end of a pipe I² arranged within a shell I³, closed at its lower end to the inlet compartment I' but connected at its upper end with an outlet compartment I⁴, from the bottom of which leads the pipe J above referred to. On the top of the pipe I² is normally seated a valve K made of rubber or other suitable material and provided with a depending rod K' carrying at its lower end a weight K², which latter and the rod K' extend in the pipe I². Now the water of condensation passing from the receiving tank F into the compartment I' can rise in the pipe I² and lift the valve K off its seat, to then flow into the shell I³ and out of the same into the compartment I⁴ and by way of the pipe J back to the boiler A. Access to the valve K can be had by removing a screw plug I⁵, as shown in Fig. 2, and from the bottom of the compartment I' extends a short pipe I⁶ closed by a screw cap I⁷, which when removed permits of cleaning the compartment I' of any sediment.

Now by the arrangement described, it will be seen that air in a radiator readily passes out of the same under the slightest pressure and down through the air pipe E into the receiving tank F, to escape from the latter by way of the air escape or vacuum valve G. Now should steam reach the retarder D and pass through the same, then the water of condensation of this steam flows by way of the pipe E down into the receiving tank F and accumulates therein as long as the boiler pressure is above that of atmos-

pheric pressure. The receiving tank F is sufficiently large to hold the water of condensation for any anticipated period that the boiler can run under pressure.

5 In practice, the steam escaping into the air pipe E by way of the air vent and retarder D is comparatively very little, amounting to about one quart for each air vent and retarder D on the apparatus, for
10 five hours with indicated steam pressure at five pounds in the boiler. As previously stated the water of condensation accumulates in and is held in the receiving tank F as long as the pressure within the boiler is
15 sufficient to hold it there, but as soon as the boiler pressure is reduced below atmospheric pressure, then the accumulated water in the receiving tank F immediately flows out of the same by way of the pipe H, the return
20 water valve I and the pipe J back to the boiler A.

By constructing a return water valve I in the manner described, it is evident that water can readily flow through the same
25 from the receiving tank F and through the same to the boiler A whenever the pressure in the boiler is reduced to below atmospheric pressure, but the valve K prevents a return flow of the water from the boiler into
30 the tank F the same as the valve G prevents inflow of air into the receiving tank F, but allows outflow of air from the said tank.

It will be noticed that the air vent and steam retarder D as well as the return water
35 valve I, are without adjustable features, and consequently the user of the device is not required to readjust any of the parts at any time, as the said parts will function auto-
40 matically for any length of time.

A retarder L connects the return section B' with the air pipe E to vent the said return pipe. The retarder L performs a similar function for the return section B' that is
45 performed by the retarders D for the radiators, that is it acts as a vent permitting the air to escape from the return pipe B' to the air pipe E.

The boiler A is provided with the usual pressure gage *a*, and is also provided with
50 the usual damper *d* and damper regulator *c*.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In a steam heating apparatus, a receiving tank, a pipe line connected with the receiving tank, a radiator, a device connecting the pipe line with the radiator for venting the radiator and retarding the escape of steam therefrom, and a return water valve
60 having an inlet compartment connected with the said receiving tank and provided in its lower end with a normally closed outlet, an outlet compartment connected with the boiler of the heating apparatus, a vertical
65 valve-controlled pipe communicating at its

lower end with the said inlet compartment, and a compartment closed at its lower end and in communication at its upper end with the said valve controlled pipe and the said outlet compartment. 70

2. A steam heating apparatus comprising a boiler, radiators, a main steam pipe connecting the boiler with the said radiators, a receiving tank, a pipe line connected with the receiving tank, devices connecting the
75 radiators with the pipe line for venting the radiators and retarding the escape of steam therefrom, an air escape and vacuum valve connected with the said receiving tank, and a return water valve having an inlet com-
80 partment connected by a pipe with the receiving tank, an outlet compartment connected with the boiler, an overflow compartment communicating with the outlet compartment and valve controlled pipe extend-
85 ing centrally in the said overflow compartment for establishing communication between said inlet and overflow compartments.

3. A steam heating apparatus comprising a boiler, radiators, a main steam pipe connecting the boiler with the said radiators, a receiving tank, devices connected with the radiators for retarding the escape of air and steam therefrom, a pipe line connecting the
90 said devices with the said receiving tank, a return water valve having an inlet compartment connected with the said receiving tank, an outlet compartment connected with the said boiler, an intermediate compartment, a
95 central vertical pipe removably secured in said intermediate compartment, the said pipe being in communication at its lower end with the said inlet compartment, and the upper end of the said intermediate compartment being in communication with the said
100 outlet compartment, and a self-seating valve held on the upper end of the said pipe. 105

4. In a heating apparatus, a water return valve, comprising an inlet compartment arranged for connection with the return water
110 supply, an outlet compartment arranged for connection with the boiler of the heating apparatus, an intermediate compartment having its bottom provided with a screw threaded opening, a vertical pipe removably
115 secured at its lower end in said opening, the said pipe extending upward into the intermediate compartment and in communication at its lower end with the lower end of the said inlet compartment, the upper end
120 of the said intermediate compartment being in communication with the said outlet compartment, and a self seating valve on the upper end of the said pipe.

5. In a heating apparatus, a water return
125 valve comprising an inlet compartment arranged for connecting with the return water supply, an outlet compartment arranged for connection with the boiler of the heating apparatus, an intermediate compartment, a
130

vertical pipe extending into the intermediate compartment, and in communication at its lower end with the lower end of the said inlet compartment, the upper end of the said intermediate compartment being in communication with the said outlet compartment, a self-seating valve on the upper end of the said pipe, a drip cap connected with the lower end of the said inlet compartment, and a hollow screw plug for giving access to the said upper end of the said intermediate compartment and valve, the said plug when in position partially inclosing the said valve.

6. A steam heating apparatus comprising a boiler, radiators, a main steam pipe connecting the boiler with the said radiators, the said pipe being provided with a return section for returning the water of condensation to the boiler, a receiving tank, an air escape and vacuum valve connected with the said receiving tank, devices connected with the radiators for venting the radiators and retarding the escape of steam therefrom, an air pipe connecting the said devices with the said receiving tank, a vent device connecting the return section of the steam pipe with the said air pipe, a return water valve having an inlet compartment connected with the said receiving tank, an outlet compartment connected with the said boiler, an intermediate compartment, a vertical pipe

in said intermediate compartment, the said pipe being in communication at its lower end with the said inlet compartment, and the upper end of the said intermediate compartment being in communication with the said outlet compartment, a self seating valve held on the upper end of the said pipe, and a pipe leading from the bottom of the said inlet compartment and provided with a removable cap.

7. In a heating apparatus, a receiving tank for the water of condensation, and a return water valve, comprising an inlet compartment arranged for connection with the receiving tank, an outlet compartment arranged for connection with the boiler of the heating apparatus, means establishing communication between the inlet and outlet compartments, the said means including a vertical pipe and a valve seated on the upper end of said pipe, and a hollow plug for giving access to the said valve, the said plug when in position partially inclosing the said valve.

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

NELSON MONROE EDDY.

Witnesses:

ANGUS A. MACDONALD,
FLORENCE J. MACDONALD.