No. 821,798. PATENTED MAY 29, 1906.

A. HARRISON.

AUTOMATIC RELIEF VALVE.

APPLICATION FILED SEPT. 21, 1904.

Fig. 4.

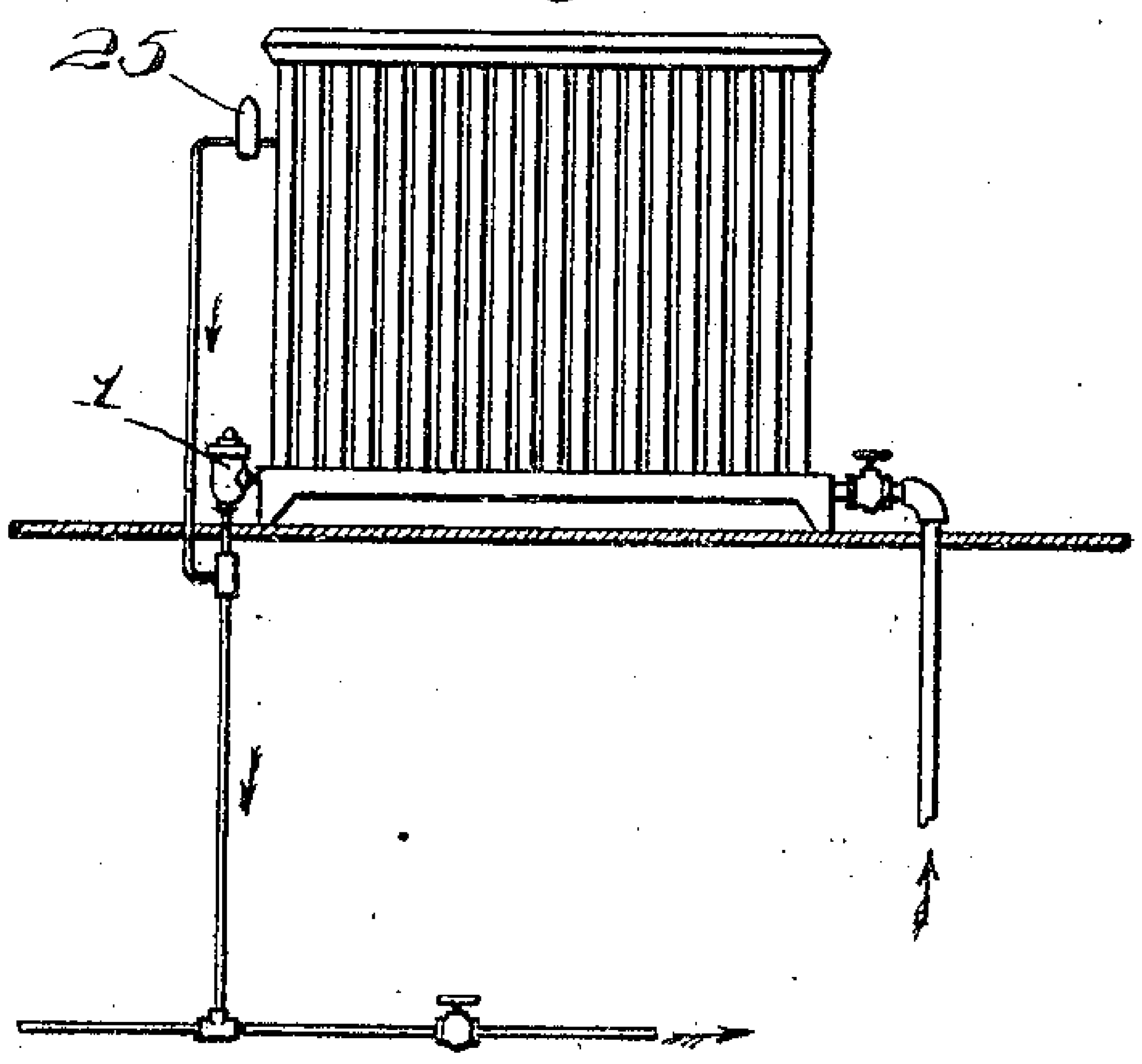


Fig. 1.

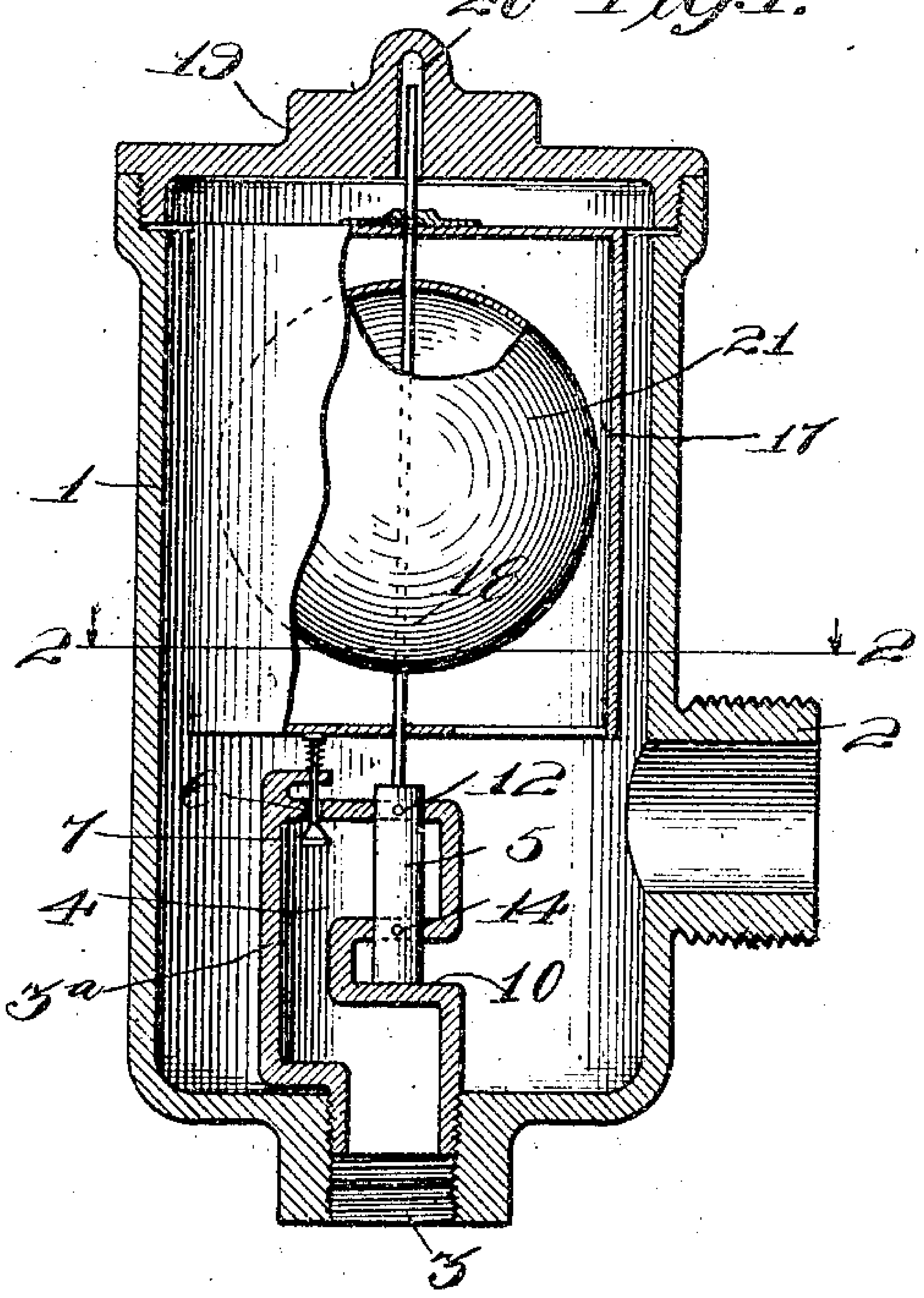


Fig. 3.

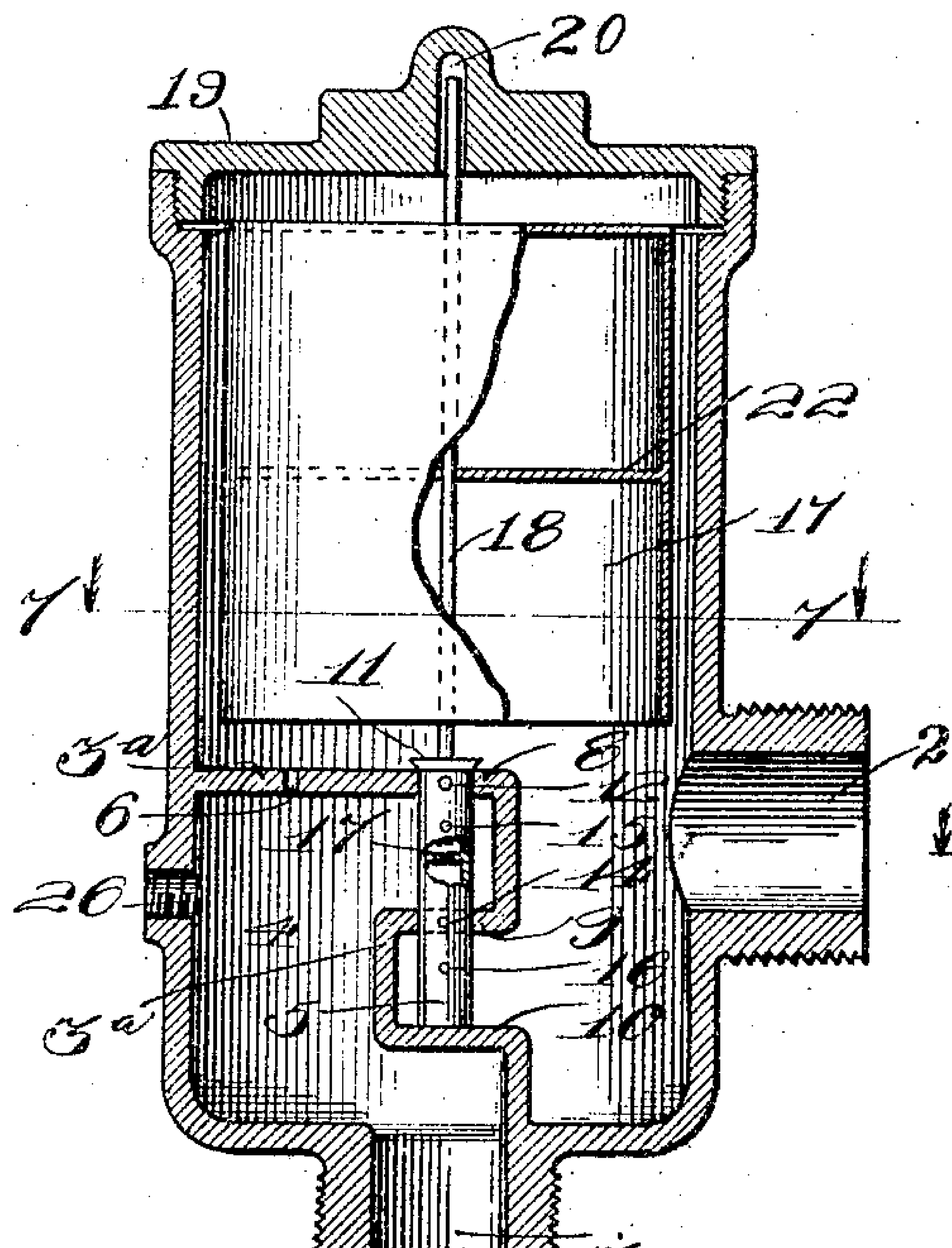
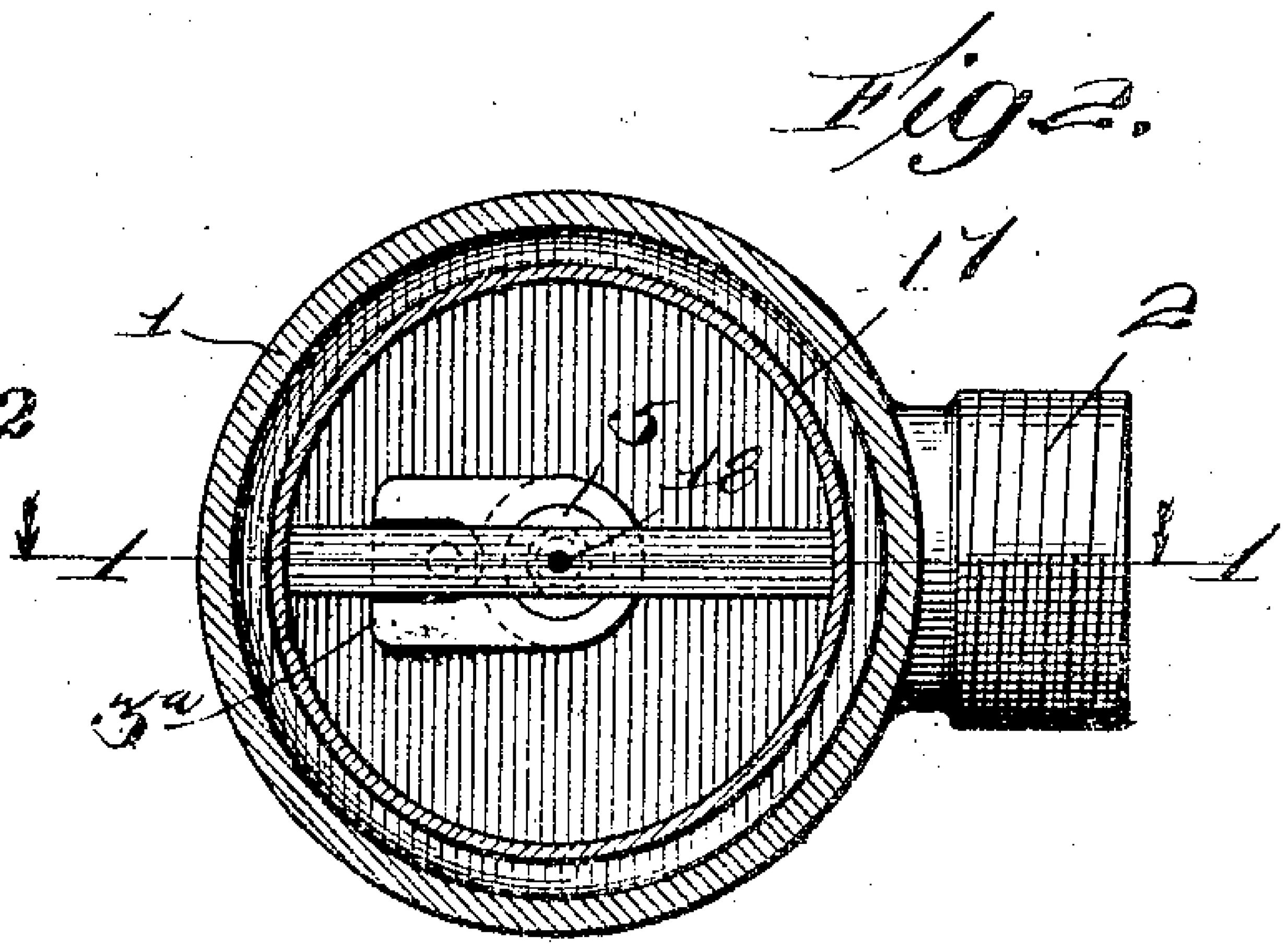


Fig. 2.



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UNITED STATES PATENT OFFICE.

AMOS HARRISON, OF CHICAGO, ILLINOIS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO WARREN WEBSTER AND COMPANY, OF CAMDEN, NEW JERSEY, A CORPORATION OF NEW JERSEY.

AUTOMATIC RELIEF-VALVE.

No. 821,798. Specification of Letters Patent. Patented May 29, 1906.

Application filed September 21, 1904. Serial No. 225,314.

To all whom it may concern:

Be it known that I, AMOS HARRISON, a citizen of the United States of America, residing at Chicago, county of Cook, and State of Illinois, have invented a certain new and useful Improvement in Automatic Relief-Valves, of which the following is a description.

My invention relates to that class of devices employed upon steam-heating systems and the like to discharge the water of condensation from the radiators or equivalent parts without permitting a wasteful escape of the steam.

The object of my invention is to produce a simple and durable device of the kind described that is not liable to become clogged up or otherwise rendered inoperative when in use; and to this end it consists in the novel construction, arrangement, and combination of parts herein shown and described, and more particularly pointed out in the claims.

In the accompanying drawings, wherein like or similar reference characters indicate like or corresponding parts, Figure 1 is a longitudinal section of my device, taken substantially on line 1 1 of Fig. 2. Fig. 2 is a section taken substantially on line 2 2 of Fig. 1. Fig. 3 is a section similar to that shown in Fig. 1, but showing a modified form of my device. Fig. 4 is an elevation of a radiator and connecting pipes, showing the usual and preferred location of my device in relation thereto when in service.

In the preferred form shown in the drawings, 1 is the outer shell or case of my device having an inlet-port or connection 2 for attaching the same to a radiator or similar device and an outlet-port or connection 3 for attachment to one of the return-pipes of the system. An internal wall 3^a is arranged to form a chamber 4, inclosing the discharge-port 3. The wall 3^a is provided with one or more suitably-formed openings into the interior of the main chamber of the casing 1, which openings are controlled by a valve mechanism common to, or adapted to simultaneously control, them all. The chamber 4 may be formed integral with the shell 1, as shown in Fig. 3, or, if preferred, it may be separately formed and suitably attached to the casing 1, as shown in Fig. 1.

In the preferred construction shown one side of the wall 3^a is dentilated or corrugated, forming two or more substantially horizontal walls arranged one above the other, with the valve-openings substantially registering with each other for convenience in assembling the parts and simplicity of construction. Preferably an opening or vent 6 is provided near the upper end of the chamber 4 to allow any air confined within the casing 1 to be drawn into the chamber 4, and so discharged into the return-pipe. In some cases a valve 7 may be provided and arranged to close the opening 6 when the main valve is open. The main valve 5, which is preferably of tubular section, is arranged to closely fit and slide within the valve-openings formed in the parts 8 and 9 of the wall 3^a. If desired, the wall 10 may be so arranged that when the valve 5 is at the limit of its travel in that direction its end will contact with the wall 10 and arrest its movement. In some cases I prefer to provide a slightly-enlarged portion 11 at the upper end of the valve 5, which may assist in preventing the passage of fluid past the wall 8 when the valve 5 is at its lower limit of travel. The conical part 11, seated upon the outer surface of the port 8, also acts as a stop to limit the further movement of the valve. In order to permit fluid to pass the valve 5, I provide a plurality of openings or ports in its wall, so arranged that when the valve is open the openings or ports will afford a means of communication between the interior of the casing 1 and the chamber 4; but when the valve is closed communication is prevented.

In the form shown in Fig. 1 ports 12 and 14 are provided in the valve, the walls 8 and 9 being formed of sufficient thickness and the ports so positioned that when the valve is closed the walls 8 and 9 entirely cover both openings, and so close them. When the valve is raised, the ports 12 and 14 are respectively elevated above the walls 8 and 9, and the fluid within the outer chamber can enter the chamber 4 by means of the said ports and the tubular interior of the valve 5. Obviously in this case the ends of the valve 5 may be open or closed, as preferred, without affecting the operation.

In the form shown in Fig. 3 two additional ports 15 and 16 and a transverse partition 17 are provided. In this case when the valve

is open the fluid entering the valve by the opening or port 12 is discharged into the chamber 4 by way of the opening 15, while that entering the chamber 4 by the opening 14 enters the valve by way of the opening 16, the partition 17 preventing communication between the two pairs of openings. In this form of valve it is necessary that the upper end of the valve 5 be closed, while the lower end may be open or closed, as preferred. The movements of the valves are preferably controlled by a suitable float 17, positioned within the main chamber of the casing 1 and connected to the valve by means of the rod or stem 18. Preferably the end of the rod 18 or equivalent means projects beyond the top of the float 17 to act as a guide and a stop to engage the cap 19 of the casing 1 and limit the upward movement of the float. As shown, the projecting end of the rod 18 is loosely engaged within a recess 20, which serves as a guide to prevent binding of the valve or damage to the float by contact with the sides of the casing. The float 17 may be of any desired form or type; but in my preferred construction I employ a combination closed and open type, two forms of which are shown in Figs. 1 and 3. In this type of float should the open portion from any cause become filled with fluid the closed portion would still possess sufficient buoyancy to continue to operate the valve.

In the float shown in Fig. 1 a closed vessel or float 21 of any preferred form is positioned within the inverted-cup-shaped vessel or float 17, and both are secured to the rod 18 in any preferred manner, while in the form shown in Fig. 3 a partition 22 extends across the inverted-cup-shaped vessel 17, forming a closed vessel or float in its upper end, while the lower portion remains as an open float.

It will be seen that by my improved construction a dirt pocket or chamber is provided below the level of the outlet-ports, preventing the clogging of the valves and interference with their operation.

In attaching my valve to a radiator it is preferred that the usual automatic air-relief valve 25 shall be attached to the radiator in the usual manner and be connected by suitable piping to the return-pipe leading from my valve. When the valve is constructed as shown in Fig. 3, the piping may, if preferred, connect with the chamber 4 at 26, as indicated.

The operation of my device is obvious from the foregoing description, and a further explanation is deemed unnecessary.

So far as my invention relates to the combination of valves to control both a valve-port and air-vent to the discharge-chamber it is not to be restricted to the tubular valve shown for controlling the port to the discharge-chamber; but valves of any suitable form may be used.

Having thus described my improvement, it is obvious that various immaterial modifications may be made without departing from the spirit of my invention. Hence I do not wish to be understood as limiting myself to the exact form or construction shown.

What I claim as new, and desire to secure by Letters Patent, is—

1. A device of the kind described, comprising an inclosing shell provided with an inlet-port and a discharge-port, an internal wall provided with a plurality of valve-ports and arranged to form a chamber inclosing the discharge-port, and means for connecting the shell in a heating system, in combination with an open tubular valve for controlling said valve-ports, and a float arranged within the shell connected with and controlling the movements of said valve.

2. A device of the kind described, comprising an inclosing shell provided with an inlet-port and a discharge-port, an internal wall having substantially parallel horizontal walls arranged one above the other, registering valve-ports extending through a plurality of said horizontal walls, said internal wall forming a chamber inclosing the discharge-port, and means for connecting the shell in a heating system, in combination with a sliding tubular valve for said valve-ports provided with a seat for each horizontal wall-opening and having openings formed therein which are normally covered by said horizontal walls inclosing the valve but are uncovered when the valve is moved to permit the escape of the fluid from the main chamber into the inclosing chamber, and a float arranged within the shell connected with and controlling the movements of said valve.

3. A device of the kind described, comprising an inclosing shell provided with an inlet-port and a discharge-port, an internal wall forming a chamber inclosing the discharge-port and having substantially horizontal walls arranged one above the other, registering valve-ports extending through a plurality of said horizontal walls, a vent through said wall connecting with the main chamber, and means for connecting the shell in a heating system, in combination with a sliding tubular valve for said valve-ports provided with a seat for each horizontal wall-opening and having openings or ports formed therein which are normally covered by said horizontal walls, but when the valve is moved uncover said ports to permit the escape of the fluid from the main chamber into the inclosing chamber, a float arranged within the shell connected with and controlling the movements of said valve, substantially as described.

4. A device of the kind described, comprising an inclosing shell provided with an inlet-port and a discharge-port, an internal wall arranged to form a chamber inclosing the dis-

charge-port and provided with valve-ports and a vent, and means for connecting the shell in a heating system, in combination with an open tubular valve for said valve-ports and a float arranged within the shell connected with and controlling the movements of the said valve.

5. A device of the kind described, comprising an inclosing shell provided with an inlet-port and a discharge-port, an internal wall arranged to form a chamber inclosing the discharge-port and provided with a valve-port and a vent, and means for connecting the shell in a heating system, in combination with a valve for said valve-port, a valve for said vent, and a float arranged within the shell connected with and controlling the movements of said first-mentioned valve and adapted by its movement to control the operation of the vent-valve.

6. In a device of the kind described, an inclosing shell provided with an inlet-port and a discharge-port, an internal wall having a plurality of valve-ports and a vent connecting with the main chamber in the shell formed therein, the said wall forming a chamber inclosing the discharge-port, and means for connecting the shell in a heating system, in combination with a single valve provided with a valve-seat for each valve-port, a valve controlling said vent, a float arranged within the shell connected with and controlling the movements of said first-mentioned valve and by its movements also controlling said vent-valve.

7. A device of the kind described, comprising an inclosing shell provided with an inlet-port and a discharge-port, an internal wall forming a chamber inclosing a discharge-port and having substantially horizontal walls arranged one above the other, substantially registering valve-ports extending through a plurality of said horizontal walls a vent through said internal wall connecting with the main chamber, and means for connecting the shell in a heating system, in combination with a sliding tubular valve for said valve-ports provided with a seat for each horizontal wall-opening and having openings or ports formed therein which are normally covered by said horizontal walls but when the valve is moved uncover said ports and permit the escape of fluid from the main chamber into the inclosing chamber, a valve arranged to control said vent, and a float arranged within the shell and adapted to control the movements of said valves.

8. A device of the kind described, comprising an inclosing shell provided with an inlet-port and a discharge-port, an internal wall arranged to form a chamber inclosing the discharge-port and provided with a plurality of valve-ports, and means for connecting the shell in a heating system, in combination with an open tubular valve for controlling said valve-ports, a float provided with an air-chamber and arranged within the shell connected with and controlling the movements of said valve.

9. In an automatic valve for the purpose described, the combination of an inclosing shell having an inlet-port and a discharge-port, an internal wall forming a chamber inclosing the discharge-port, said chamber having a valve-port and an air-vent to the interior of the shell, and valves controlled by the accumulation of water of condensation in the shell to control the valve-port and air-vent to the discharge-chamber in said internal wall.

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

AMOS HARRISON.

Witnesses:
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CHARLES I. COBB.