

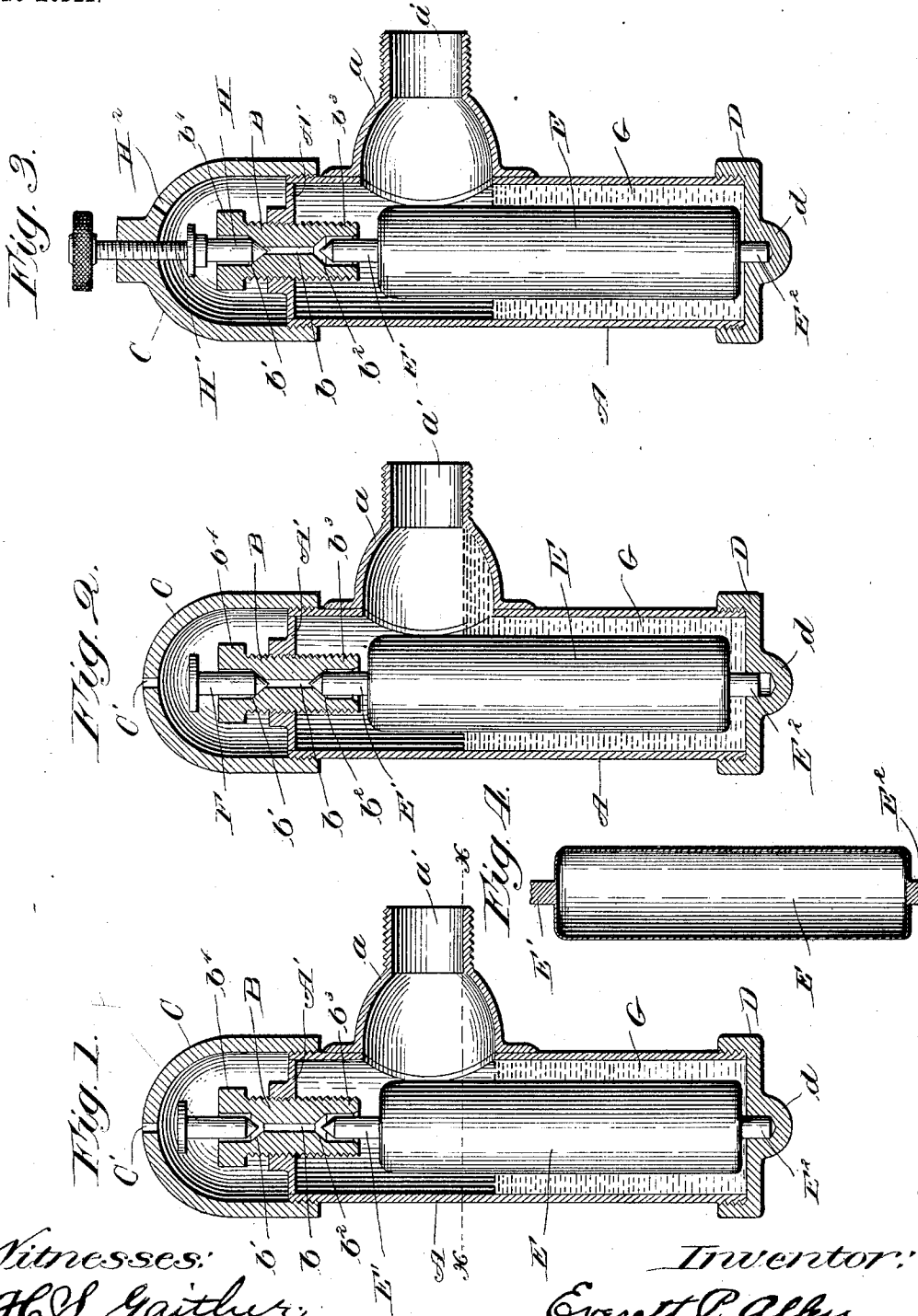
No. 757,873.

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E. P. ALLEN.
VALVE.

APPLICATION FILED SEPT. 3, 1901.

NO MODEL.



Witnesses:
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UNITED STATES PATENT OFFICE.

EVERETT P. ALLEN, OF CHICAGO, ILLINOIS.

VALVE.

SPECIFICATION forming part of Letters Patent No. 757,873, dated April 19, 1904.

Application filed September 3, 1901. Serial No. 74,181. (No model.)

To all whom it may concern:

Be it known that I, EVERETT P. ALLEN, a citizen of the United States, residing at Chicago, county of Cook, State of Illinois, have invented a certain new and useful Improvement in Valves; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention has for its object the production of a valve for use more particularly in connection with a radiator and forming an air-vent therefor. Heretofore, so far as I am aware, most of the devices of this class have been designed in such a manner that the vent-ports would be open while the air was escaping, but as soon as steam began to pass through the valve the heat thereof would, through a suitable thermostatic device or by means of some expansible medium, operate to close the valve, and thus shut off the vent. It is the object of my invention to produce a device in which no expansible medium whatever is employed to operate the valve, but the latter is operated entirely on the float principle and solely by the change of volume of the liquid which floats the valve; and to this end the invention consists generally in a suitable float carrying a valve and so arranged within the casing that when the latter contains a certain amount of water, either from water remaining in the radiator or through the condensation of steam passing through the valve-casing, the float will be raised and will carry the valve to its seat, thus shutting off the passage of the fluid through the vent-orifice, and when the volume of water within the casing falls below a certain volume the float will be lowered and will carry with it the valve away from its seat.

Combined with my float-valve as just described I have also added a vacuum check-valve to prevent the air from entering through the exhaust-port, and thus destroying any vacuum that may be in the radiator or system.

This check-valve may be either automatically or positively operated, as hereinafter more fully described.

In the drawings, Figure 1 is a vertical section of my valve, showing the ports open and the valve in position to allow the air to escape from the radiator or system to which it is attached; Fig. 2, a vertical section showing the ports closed; Fig. 3, a variation in which the vacuum check-valve instead of being automatic is positively operated, and Fig. 4 a sectional view of the float.

In carrying out the invention, A represents a suitable casing provided with any suitable form of nipple *a* (preferably threaded) for engagement with the radiator or other part of the system to which it is attached, said nipple forming the inlet-port *a'*. The main casing is provided with a suitable head *A'*, in which is screwed or otherwise engaged a suitable plug B, the latter bored, as at *b*, to form an outlet-port and provided with two valve-seats *b'* *b''*. It will be observed that the inlet-port *a'* is above the lower end of the casing, so that a fluid-accumulating chamber is provided below the inlet.

C is a cap suitably engaged to the casing by screw-threads or otherwise and having a vent-orifice *C'* extending therethrough. On the bottom of the casing is a suitable closure-cap D, engaged to the casing by screw-threads or otherwise, preferably having a depression *d* to receive the guide-stem of the float, as will hereinafter be described.

E is the float, preferably made of thin metal and hollow. This float is sealed—i. e., air-tight—so that when surrounded with a suitable amount of liquid it will float and be raised by the liquid. On the upper end of the float is a valve *E'*, adapted to seat against the seat *b''*, and on the lower end of the float is a stem *E''*, adapted to enter the depression *d*, the lower end of the float being thus held in place, while the upper end is held in place by the flange *b''*, which surrounds the seat *b''*.

F is a valve having its lower end formed conical to fit the seat *b'*, being held in place by the flange *b'*, which surrounds the seat *b'*.

G represents the liquid which accumulates in the casing A.

The operation of the device is as follows: The parts would normally be in the position shown in Fig. 1 except that the valve F would be resting on the seat b' . Pressure is now turned onto the radiator or system to which the device is attached, and the air passing in through the inlet a' passes the valve E' through the outlet-port b , raises the valve F, and passes off through the vent-orifice C'. The water in the casing A would be normally at the height shown in Fig. 1, and the float E is so constructed that with the water at this height the float will be in its lower position with the valve E' open. As soon as steam commences to flow through the casing there will be more or less condensation, and the water dropping down within the fluid or accumulating chamber at the bottom of the casing raises the level of the water to the height shown in Fig. 2. The float E is so balanced that when the water reaches this point it raises the float, and this carries the valve E' against the seat b' and shuts off further flow through the casing so long as the steam remains in the radiator. When the steam is shut off from the radiator and condenses therein, the vacuum formed by the condensation lowers the water in the fluid-chamber of the casing A until it is at a sufficiently low level to permit the float to drop back to its lower position and open the valve. It is thus evident that the operation of the valve depends solely upon the change of volume of the liquid in the fluid or accumulating chamber.

It will be remembered that the valve F has been raised from its seat by the passage of air through the port b , and, of course, as soon as the float is operated by the condensed steam to shut off the flow of fluid through the port b the valve F will drop to its seat, and when the float E again opens the valve E' the valve F will remain on its seat and will prevent any air entering through the outlet-port C' and destroying the vacuum in the radiator.

It will be observed that I have above described the water in the casing as being normally at the height shown in Fig. 1 and have stated that the creation of the vacuum in the radiator lowers the level of the water to this point.

I do not, of course, desire to be understood as limiting myself to the exact level at which the water must rest in order to allow the float to drop nor the exact level to which it must be raised in order to raise the float; but I have found from practice that the construction shown in my drawings and above described accomplishes the result and that there is no necessity in a construction such as I have shown and described for any expansion or thermostatic member whatever.

In Fig. 3 I have shown the check-valve H

connected with a screw-stem H', passing through a screw-threaded opening in the cap C, so that the check-valve can be positively operated rather than automatically. In this case the outlet for the air is arranged at H'. This construction of the device is principally applicable to hot-water systems where if the float-valve should at any time be disarranged or become inoperative, so that the hot water would leak through the outlet-port, the valve can be screwed down to its seat, and thus shut off the outlet until the difficulty can be remedied.

It will be observed that the upper end of the float E is made convex or rounding. While I do not care to limit myself to this specific form, yet I prefer it, because the air-pressure in passing through the casing will tend to hold the float down until such time as it is operated upon by the water in the casing.

What I claim is—

1. In a valve, the combination with a casing, an inlet-port above the bottom of the same whereby a fluid-accumulating chamber is provided, an outlet-port from the chamber above the level of the inlet-port, a valve controlling said outlet-port, and a float adapted to close said valve, said float adapted to be operated solely by the change of volume of the liquid in said chamber, substantially as described.

2. In an air-vent valve for a radiator system, the combination with a casing provided with a nipple for engagement to the radiator or system, said nipple forming an inlet-port for the valve and located above the bottom of the casing whereby a fluid-accumulating chamber is provided, an outlet-port from the chamber above the level of the inlet-port, a valve controlling said outlet-port, and a float adapted to close said valve, said float adapted to be operated solely by the change of volume of the liquid in said chamber, substantially as described.

3. In a valve, the combination with a casing, an inlet-port above the bottom of the same whereby a fluid-accumulating chamber is provided, an outlet-port from the chamber above the level of the inlet-port, a valve controlling said outlet-port, a float adapted to operate said valve, said float adapted to be operated solely by the change of volume of the liquid in said chamber, and a check-valve also controlling said outlet-port and adapted to prevent the entry of air into the casing through the outlet-port, substantially as described.

4. In a valve, the combination with a casing, an inlet-port above the bottom of the same whereby a fluid-accumulating chamber is provided, an outlet-port from the chamber above the level of the inlet-port, a valve controlling said outlet-port, a float adapted to operate said valve, said float adapted to be operated solely by the change of volume of the liquid

in said chamber, and an automatic check-valve also controlling said outlet-port and adapted to prevent the entry of air into the casing through the outlet-port, substantially as described.

5. In a valve, the combination with a casing, an inlet-port above the bottom of the same whereby a fluid-accumulating chamber is provided, a plug in the upper end of said casing provided with an outlet-port therethrough, a valve-seat on each end of said outlet-port, a valve controlling the initial end of said outlet-port, a float adapted to operate said valve,

said float adapted to be operated solely by the change of volume of the liquid in said chamber, and another valve controlling the final end of said outlet-port, said latter valve acting as a check-valve to prevent the return of air into the casing, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

EVERETT P. ALLEN.

Witnesses:

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