W. B. POINDEXTER.

RADIATOR VENT VALVE.

APPLICATION FILED OCT. 3, 1912.

1,106,475. Patented Aug. 11, 1914.

Fig. 1

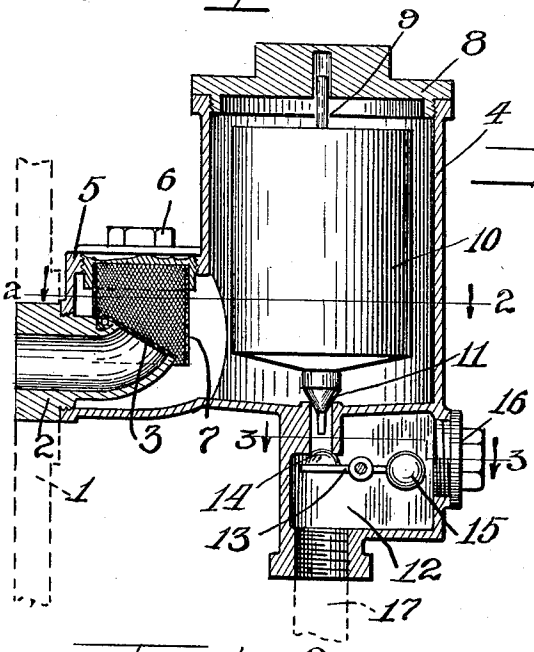


Fig. 3

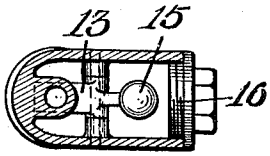


Fig. 4

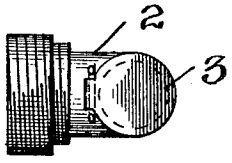


Fig. 2

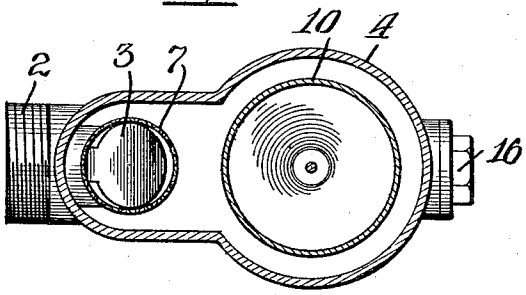
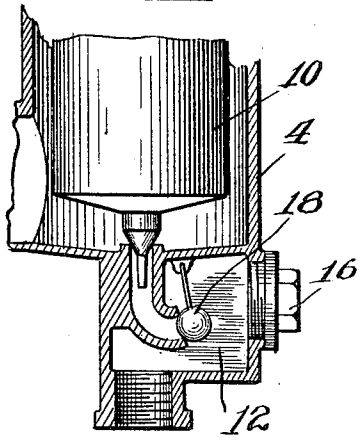


Fig. 5



Witnesses

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RADIATOR VENT-VALVE.

1,106,475. Specification of Letters Patent. Patented Aug. 11, 1914.

Application filed October 3, 1912. Serial No. 723,675.

To all whom it may concern:

Be it known that I, WILLIAM B. POINDEXTER, a citizen of the United States, and a resident of the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Radiator Vent-Valves; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the numbers of reference marked thereon, which form a part of this specification.

Many different vent valves have been devised in the attempt to afford a construction whereby the water of condensation may be permitted to freely flow from the radiator and the return thereof prevented. Where a vacuum or exhaust system is used for the purpose of withdrawing or assisting in withdrawing the air and water of condensation from the radiator it is found that the cooling of the radiator sometimes produces a lower vacuum than that in the vacuum system, and as a result the water may draw back in the radiator, practically filling the same, and the vibrations of the working parts of the valves when this occurs, causes loud hammering, which may be heard throughout the installation, even though in very large buildings. None of the constructions heretofore devised have proven adequate to overcome this difficulty, and in consequence damage to and failure of the valves because of such hammering is a common occurrence. Furthermore in practically all radiator vent valves, scale and dirt (a large quantity of which sometimes finds its way into the valves), is usually found in the pipes, clogging the same and preventing their proper operation. As heretofore designed, it has been usually necessary to shut off the radiator and the entire or a large part of the vacuum system, if used, before such vent valves may be examined for defect or even cleaned.

The object of this invention is to afford a vent valve for steam radiators whereby the return of the water of condensation or of steam to the radiator through said valve is impossible.

It is also an object of the invention to afford in a device such as described, a float valve for controlling the outlet from the radiator, and pressure and gravity actuated valves for excluding any return flow to the radiator.

It is an object of the invention also to afford a construction wherein the escape or discharge of water through the vent valve is practically unobstructed, but wherein a plurality of valves are employed acting in part by gravity to exclude the return flow to the radiator through the vent valve.

It is an object of the invention to afford a construction in which the various valves may be inspected at will without the necessity of shutting off the system.

It is also an object of the invention to afford a screen for collecting any dirt or refuse coming through the valve and to provide means for readily removing the screen to clean the same when desired.

The invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

In the drawings: Figure 1 is a central vertical section of a radiator vent valve embodying my invention. Fig. 2 is a section on line 2—2 of Fig. 1. Fig. 3 is a section on line 3—3 of Fig. 1. Fig. 4 is a top plan view of the outlet valve from the radiator, showing the same removed from the vent valve. Fig. 5 illustrates a slightly modified construction of one of the sealing valves.

As shown in the drawings: 1, indicates a radiator into which is secured or threaded the nipple 2, on the upwardly inclined end of which, shaped to afford a seat therefor, a gravity acting flap valve closure 3 is hinged at its upper edge as shown in Figs. 1, 2 and 4. A float casing 4, is provided with a lateral branch or extension 5, near its bottom provided with an aperture into which threads said nipple, as shown in Figs. 1 and 2, and a cleanout tap nut 6, is threaded in a suitable aperture in said branch or extension 5, of the casing, axially above the flap valve 3, and secured on said nut, on the under side thereof, is a cylindric screen 7, which fits around the free end of said nipple 2, to catch any dirt or refuse coming therethrough from the radiator. A screw cap 8 is provided to close the upper end of the float casing 4, and is provided with an axial seat therein, in which slidably engages the stem 9, secured on the float 10. The floor of said casing is provided with an axial discharge passage, the upper end of which

is shaped to afford a seat for the conical valve closure 11, secured axially on the lower end of said float, and acting together with the stem 9, to hold said float at all times in operative position. A chamber 12, the walls of which are integral with said casing, is provided below the floor thereof and into which the discharge passage therefrom opens. Pivotally supported within said chamber 12, as shown in Fig. 1, is a substantially horizontal lever 13, on one end of which is a convex or ball shaped face or closure 14 adapted to seat in and close the lower end of said discharge passage. The other end of said lever 13, is provided with a counterbalancing weight or ball 15, the gravity of which is just sufficient to hold said valve normally closed. A cleanout or inspection aperture is provided in the wall of said chamber 12, in convenient position to permit inspection of said valve closure, and a plug 16 is secured therein to seal the same.

Opening downwardly from the chamber 12 is an internally threaded passage adapted to receive therein a suction or exhaust pipe 17, through which the water of condensation from the radiator is discharged. The construction illustrated in Fig. 5 is the same in all particulars with that before described, except that a slightly different sealing valve is contained within the chamber 12. In this instance, as shown, the lower end of the discharge passage from the float chamber to said chamber 12, is directed laterally, and a ball 18, is suitably supported to swing by gravity against return pressure, but is free to open with very slight pressure to permit the escape of water from the radiator.

The operation is as follows: All water of condensation readily drains from the radiator, inasmuch as the flap valve 3, opens very readily to outward pressure, discharging the water into the float valve casing, but retaining any dirt or scale in the aforesaid screen 7. As the water rises in the float chamber, the float is raised thereby and the water flows past the valve 14, and into the exhaust or suction pipe 17, and this will continue without cessation as long as sufficient water to support the float is passing from the radiator. When the water ceases to flow, the float, of course, seats, and the radiator is sealed from its said vent valve, no further escape taking place therefrom until a sufficient quantity of water is accumulated therein to enable said float to be again raised thereby, when of course the operation is repeated until the water is again driven down to the minimum. When the radiator is shut off, however, rapid condensation takes place until almost a perfect vacuum results, and were it not adequately provided against, the water of condensation from other radiators or from floors above would be driven back through the vacuum pipe 17, where greater pressure attains, and into the radiator approximately filling the same, and such return flow producing the hammering and endangering installation as before described. In the present construction, however, at the moment the flow ceases, the valve closure 3, the same being a flap valve, immediately closes, and so long as the pressure within the radiator is less than that in the surface vacuum pipe and said valve can not open, but is held the more firmly upon its seat. The same is true also of the valve closure 14, which positively closes the passage to the float chamber and, of course, the radiator. Immediately upon opening the radiator valve, however, the operation begins as before, and under no circumstances can the flow be reversed through the vent valve.

Of course, it is obvious that the particular type of valves may be varied through a considerable degree, for example, a ball valve may be substituted in lieu of the flap valve 3, and the same also is true of the valve 14 and 18.

It is to be understood that I have shown but a preferred form of my invention, and that many details of construction and operation may be varied without departing from the principles of my invention.

I claim as my invention:

1. A vent valve for radiators embracing a casing affording a float chamber, an inlet in said casing, an outlet in the bottom of said casing, a float in said chamber, a closure connected thereto seating to close said outlet and adapted to be opened by elevation of said float due to the water of condensation from the radiator, a valve connecting the inlet to the float chamber with the radiator, and permitting flow only from the radiator, a valve connected in the discharge passage from the float chamber, and preventing return flow therein, and means permitting attachment of a vacuum pipe with the casing below the last named valve.

2. In a vent valve for radiators a casing, a float valve therein, an outlet in said casing below the line of flotation of said float, a valve connected to said float to open and close said outlet, a valve affording connection between said casing and the radiator, and acting to permit flow only into said casing, a valve controlling the passage from the float valve to prevent return flow thereinto, a vacuum pipe below said valve to receive the discharge therefrom, and removable plugs in said casing positioned to provide upon their removal insertion and adjustment apertures for the respective valves.

3. In a device of the class described a float chamber, a float therein, an inlet and outlet for said chamber, a valve connected to said float to open and close the outlet in

said chamber below the line of flotation of said float, a check valve connected in the inlet to said float chamber to permit a flow thereinto and prevent a flow therefrom, and a valve connected in the outlet from said float chamber beyond said float valve to permit flow from the float chamber and prevent a reverse flow thereinto.

4. The combination with a radiator, of a vent nipple communicating therewith and extending outwardly therefrom, a valve on the outer end of the nipple closing the same against return flow to the radiator, a screen surrounding the discharge end of said nipple, a chambered casing secured on the nipple to receive the discharge therefrom, a float valve therein controlling the discharge from said casing, a vacuum pipe connected with the casing to receive the discharge from the float valve, a chamber below the float valve chamber, a valve therein acting to close the discharge passage from the float valve against return flow, and removable portions in the walls of said casing permitting inspection and removal of the respective valves.

5. In a device of the class described a float chamber, a float therein, an outlet passage in said chamber below the line of flotation of said float, a valve closure connected to said float to move therewith and adapted to open and close said outlet, an inlet passage connected to said float chamber and check valves in each of said passages to permit a flow of fluid therethrough in only one direction.

6. In a device of the class described a casing, an inlet and outlet in said casing, a float connected in said casing, a valve connected to said float to close said outlet, a check valve controlling the inlet to said casing, and a check valve disposed in the outlet beyond said float connected valve, said check valves permitting a flow of fluid through said casing in only one direction.

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

WILLIAM B. POINDEXTER.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."