No. 616,575. Patented Dec. 27, 1898.

J. & W. H. JAMER.

VALVE.

(Application filed Mar. 30, 1898.)

(No Model.)

Fig. 1.

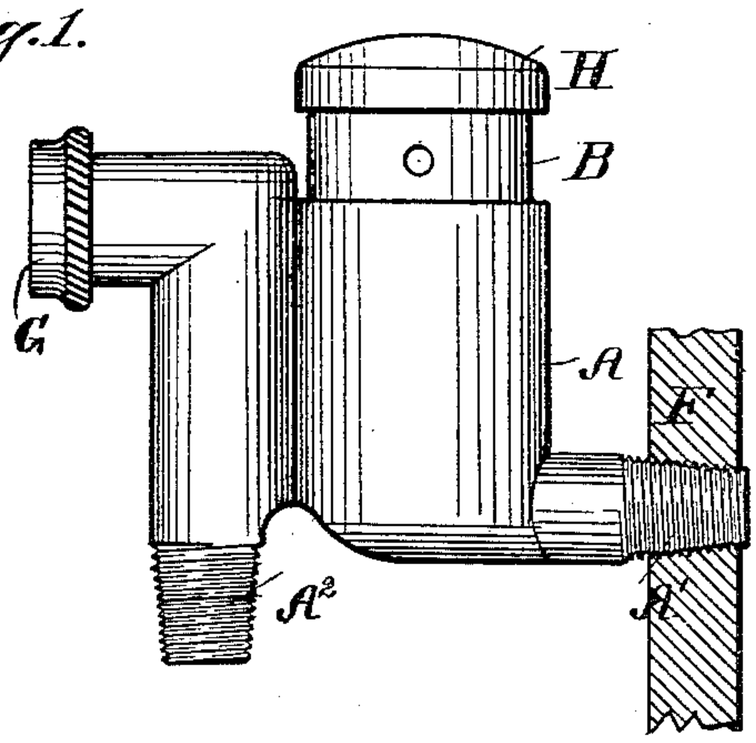


Fig. 3.

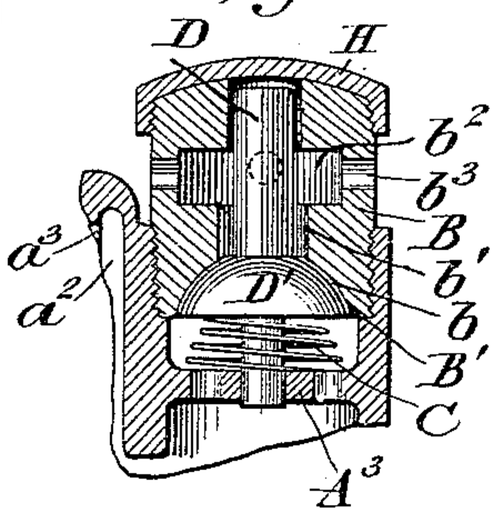
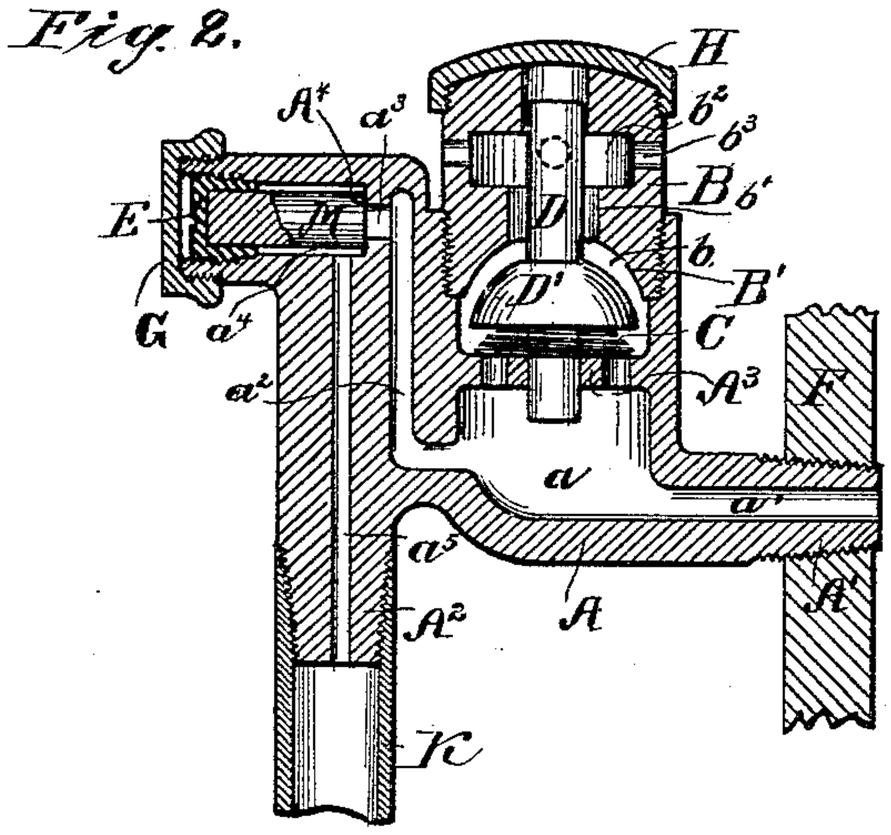


Fig. 2.



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VALVE.

SPECIFICATION forming part of Letters Patent No. 616,575, dated December 27, 1898.

Application filed March 30, 1898. Serial No. 675,679. (No model.)

To all whom it may concern:

Be it known that we, JACOB JAMER and WILLIAM H. JAMER, engineers, citizens of the United States, residing in the borough of Brooklyn, in the city of New York, in the State of New York, have invented a certain new and useful Improvement in Valves, of which the following is a specification.

Our improved valve is adapted for use on radiators for steam-heating and in analogous situations. It provides for the gradual discharge of air when air is present in the radiator instead of steam, and thus allows the steam to take its place and make the radiator efficient, and also provides means for an instantaneous and copious induction of air when the conditions are such as to form a partial vacuum. We combine the provisions for both peculiarly related in a single valve. We term the device an "automatic vacuum and air valve."

The accompanying drawings form a part of this specification and represent what we consider the best means of carrying out the invention.

Figure 1 is a side elevation, and Fig. 2 a central vertical section. This shows the air-induction valve open in the act of inducting air. Fig. 3 is a corresponding section showing the valve closed, the position which it maintains under ordinary working conditions.

Similar letters of reference indicate corresponding parts in all the figures where they appear.

A is the body, of cast-brass or other suitable material, made in a single piece of compact form, as shown, certain parts being designated by supernumerals when necessary. A′ is the screw-threaded nozzle, by which it is connected to a radiator. (Not shown.) A passage a' is cored in the casting, leading from the radiator through the nozzle A′ into a broader chamber a in the lower portion of the body, with an extension a^2 upward to a point near the top of the device. A small orifice a^3 extends thence laterally into a larger chamber a^4, which loosely incloses a plug, to be described farther on. A seat A^4 should be smoothly finished around the orifice a^3, against which the plug may fit, and thus prevent the escape of the steam. A^2 is another screw-threaded nozzle at the bottom of the device. Through this is a passage a^5, leading down from the chamber a^4. Screw-threads are provided on the exterior of the nozzle A^2, by which a drain-pipe K may be connected when such shall be found expedient.

A^3 is a horizontal open-work partition over the broad chamber a, through which the air may descend in liberal quantities to enter the radiator when required.

B is a separable portion tapped upon the main body A and providing a chamber b on its under side, the upper portion of which chamber is nicely finished to form a valve-seat B′. A considerable passage b' leads up from this into a chamber b^2 above, which opens into the atmosphere through apertures b^3.

D is a valve-stem carrying an inverted puppet-valve D′, loosely inclosed in the chamber b, having its upper face nicely finished to match the valve-seat B′ in its top. The stem D, with the valve D′, is allowed to move vertically only, being guided by its lower end playing through a hole in the partition A^3 and its upper end in a corresponding hole in the crown above the chamber b^2. A spiral spring C (shown as conical) abuts on the partition A^3 and lifts the valve D′, holding it up gently into contact with its seat B′.

When conditions obtain which tend to induce a vacuum, such as are caused by shutting off the radiator F, and the steam gradually condenses in the radiator, the external air entering through the lateral apertures b^3 depresses the valve D′ and descends past the valve and spring through the apertured partition A^3 into the chamber a, and thence through the nozzle A′, rapidly filling the radiator. Under all ordinary conditions the valve is held up to its seat by the spring and by the greater or less pressure of steam below. The provision for disposing of the air is also connected to the chamber a. Besides that which is drawn in, air accumulates in the radiator, as is well known, by coming up with the steam from the boiler and being isolated by the condensation of the steam.

M is a cylindrical mass, which we term a "plug," of hard vulcanized rubber or other material more expansible with heat than the metal of the body. This is carried in a screw-plug E, tapped into the chamber a^4, as represented, so that the end of the plug M may be

adjusted close to the valve-seat A^4. So long as steam is presented and the device is kept up to steam heat the end of the expansible plug M presses tightly on the seat A^4, but when air accumulates it rapidly loses its heat. Then the superior contraction of the plug M draws it sufficiently away from the seat to allow the air to escape until steam is again presented. In the rare cases when through any cause water shall be discharged with the air the drain-pipe K, fitted on the nozzle A^2, leads it harmlessly away.

Devices of this general character have been before known for slowly discharging the air and for allowing air to be rapidly inducted. We have combined the two in one simple device and have so arranged the air eduction that it will rarely, if ever, deliver water.

The non-delivery of water is attained by leading the passage a^2 upward to a high point. Water is formed in the device by the more or less rapid condensation of the steam therein. The slight opening provided by the cooling and contraction of the plug M and the possible small leakage upward past the valve D′ tends to draw such water away from the radiator by the gentle current thus induced. By the passage a^2 extending upward some two inches, more or less, above the level of the passage a' we insure the arresting of that water and the holding it quietly in the bottom of the passage a' until the conditions change, so that it can flow into the radiator F, and thence be returned to the boiler. The provision for the induction of air, also extending up alongside, enables the two provisions to mutually protect each other against any violence and gives symmetry to the device.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention. The upper face of the valve D′ may be dome-shaped, as shown, or may be conical, flat, or variously formed, the seat A^4, against which it is pressed up by the spring, being correspondingly formed. Parts of the device can be used without the whole. We have shown the outer end of the plug M as held in a larger plug, which may be tapped into the body. This may be convenient for adjustment; but it can be dispensed with. A cap G is shown fitting over the outer end of the plug M and forming an efficient cap to this air-educting portion. A cap H is shown as fitted on the top of the air-inducting portion, both being connected by screw-threads; but either or both of the caps can be dispensed with.

We claim as our invention—

In an automatic valve, the combination of a casing provided with two ports and a nipple, the latter being adapted to connect the same with a radiator, a self-closing valve D′ for one of the ports adapted to be opened by atmospheric pressure when the same preponderates over the internal pressure of the radiator, and a thermostatic valve adapted to control the other port, substantially as set forth.

In testimony that we claim the invention above set forth we affix our signatures in presence of two witnesses.

JACOB JAMER.
WILLIAM H. JAMER.

Witnesses:
THOMAS DREW STETSON,
M. F. BOYLE.