(No Model.)

W. B. VAN SICKLE.

AIR VALVE FOR HOT WATER HEATING SYSTEMS.

No. 570,073. Patented Oct. 27, 1896.

Fig. 2.

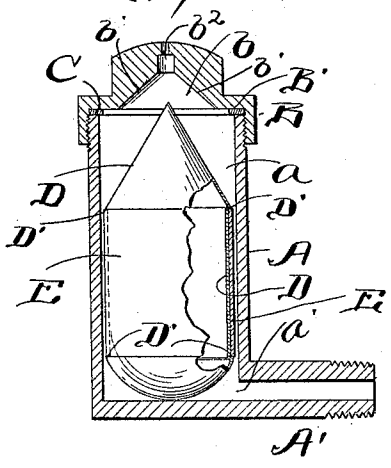
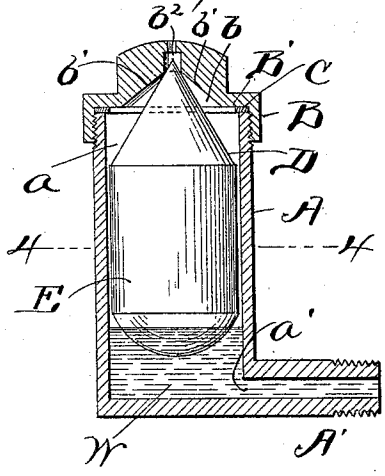


Fig. 1.



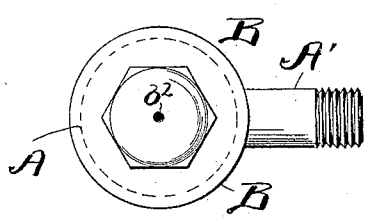


Fig. 3.

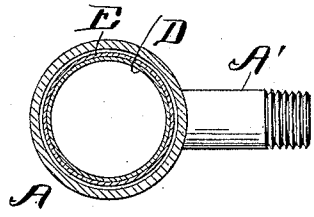


Fig. 4.

Witnesses.
E. B. Gilchrist
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UNITED STATES PATENT OFFICE.

WILLIAM B. VAN SICKLE, OF CLEVELAND, OHIO.

AIR-VALVE FOR HOT-WATER HEATING SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 570,073, dated October 27, 1896.

Application filed October 26, 1895. Serial No. 566,950. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM B. VAN SICKLE, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Air-Valves for Hot-Water Heating Systems; and I do hereby 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.

My invention relates to improvements in air escapes and vents for hot-water heating systems; and it consists in certain features of construction and combinations of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figures 1 and 2 are side elevations, mostly in vertical section, of an air escape and vent embodying my invention. The combined float and valve is shown in its upper extreme position in Fig. 1 and in its lower extreme position in Fig. 2. Fig. 3 is a top plan. Fig. 4 is a top plan, in horizontal section, on line 4 4, Fig. 1.

I would here remark that the drawings show a full-sized device.

My improved air-escape and air-vent for hot-water heating systems comprises an upright chambered cylindrical metallic case A, and *a* designates the chamber of said case. The surrounding wall of chamber *a* at its lower end is provided with a lateral hole or opening *a'*, that communicates with a laterally-extending tube A', that is preferably integral with case A and is screw-threaded externally at its outer end for engaging a correspondingly-threaded hole (not shown) in the radiator or hot-water pipe to which the device is to be attached. Case A at its upper end is screw-threaded externally and is engaged by a correspondingly internally threaded and removable cap or head B. Head or cap B a suitable distance from its lower extremity is provided with an internal annular shoulder B', that presses an elastic washer C, composed, preferably, of rubber and confined within said cap, against the upper end of case A, and thereby renders the joint between the cap and case positively water-tight. Cap B is provided centrally thereof with a conical chamber *b*, extending upwardly from the inner extremity of annular shoulder B' and being in open relation with chamber *a*. The surrounding conical wall *b'* of chamber *b*, at its apex, is provided with an orifice b^2, located centrally of the top of the cap. The surrounding wall *b'* of conical chamber *b* is polygonal externally, as shown in Fig. 3, to accommodate the application of a wrench for screwing the cap onto or removing it from case A.

A combined pneumatic float and valve D is provided within case A.

Member D comprises, preferably, a closed rubber bag inflated with air or other suitable aeriform fluid, so that said member will be as light as possible. The central portion of member D is cylindrical in cross-section and a trifle smaller in external diameter than the internal diameter of case A to form a narrow annular passage-way between member D and the surrounding wall of the chamber of case A. The lower end of the inflated member D has, preferably, the shape of a segment of the globe or sphere, and the upper end of member D is preferably conical. The conical portion of member D constitutes the valve proper.

The operation of the combined float and valve is as follows: As the hot water (marked W in Fig. 1) rises within the pipe system of the hot-water heating system and enters case A and rises within said case, float D will be elevated, and the valve formed upon the upper end of said float will, upon its elevation into its extreme upper position, engage the lower edge of the surrounding wall of discharge and vent orifice b^2, as shown in Fig. 1, and thereby close said orifice. The conical shape of the valve and the conical wall *b'* of the chamber in cap B are instrumental in centering the valve during the movement of the latter to close the aforesaid orifice. As the water recedes within case A member D of course descends and air enters at the discharge and vent orifice. To prevent the cylindrical portion of member D from expanding diametrically and obstructing the up-and-down movement of the same, I provide a retaining-ring E, that embraces said cylindrical portion and is arranged between two annular shoulders D', formed upon and externally of opposite ends, respectively, of the cylindrical portion of member D. The re-

taining-ring is composed of any light material, such, for instance, as vulcanized rubber, that will not be affected by the heat or water.

It is obvious that any expansion of member D or the retaining-ring by the construction hereinbefore described will be in the direction of the length of said members and that the retaining-ring will effectually prevent diametrical expansion of the inflated member. I would also remark that the retaining-ring is provided with a smooth external surface, so that there are no fins or roughness upon said surface that might interfere with the free movement of the combined float and valve in the operation of the device, and I would also remark that the retaining-ring is preferably somewhat larger in external diameter than the adjacent portions of the member D that extend beyond the ends of the retaining-ring.

What I claim is—

1. A device of the character indicated, comprising an upright cylindrical chamber or case A provided, at its lower end, with an opening a'; a cap or head B engaging the upper end of said case and provided with an orifice b^2, an inflated float located within and somewhat smaller diametrically than the aforesaid case, a valve formed upon the upper end of said float and arranged in line with the aforesaid orifice, and the retaining-ring embracing the float, substantially as shown, for the purpose specified.

2. A device of the character indicated comprising an upright cylindrical chambered case A provided, at its lower end, with an opening a'; a cap or head engaging the upper end of said case and provided centrally with an air-discharge and air-vent orifice; a combined inflated float and valve located within and somewhat smaller diametrically than the aforesaid case, said combined float and valve comprising a cylindrical portion and a conical valve-forming member projecting above the cylindrical portion, and a retaining-ring embracing the cylindrical portion of the combined float and valve, substantially as shown, for the purpose specified.

3. A device of the character indicated comprising an upright cylindrical chambered case A provided, at its lower end, with an opening a'; a cap or head B engaging the upper end of said case and provided centrally with the orifice b^2; the inflated float D having a valve formed upon its upper end, said float having a cylindrical portion that is diametrically smaller than the chamber of the aforesaid case and is provided with the two external annular shoulders D′, and the retaining-ring E embracing the float between said shoulders, and having a smooth external surface, all arranged and operating substantially as shown, for the purpose specified.

In testimony whereof I sign this specification, in the presence of two witnesses, this 3d day of October, 1895.

WILLIAM B. VAN SICKLE.

Witnesses:
C. H. DORER,
ELLA E. TILDEN.