No. 772,766. PATENTED OCT. 18, 1904.

T. WHEATLEY.

AIR VALVE FOR RADIATORS.

APPLICATION FILED APR. 16, 1903.

NO MODEL.

Fig. 1.

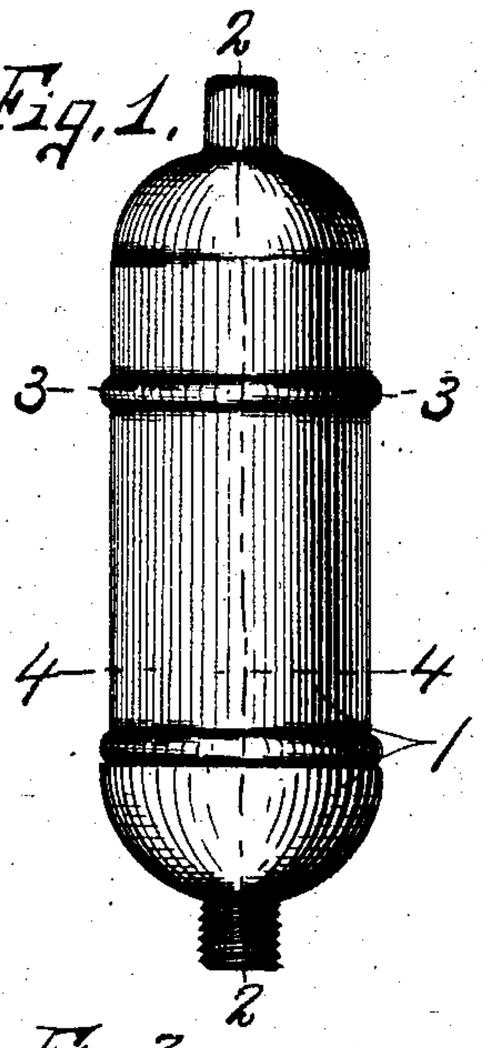


Fig. 2.

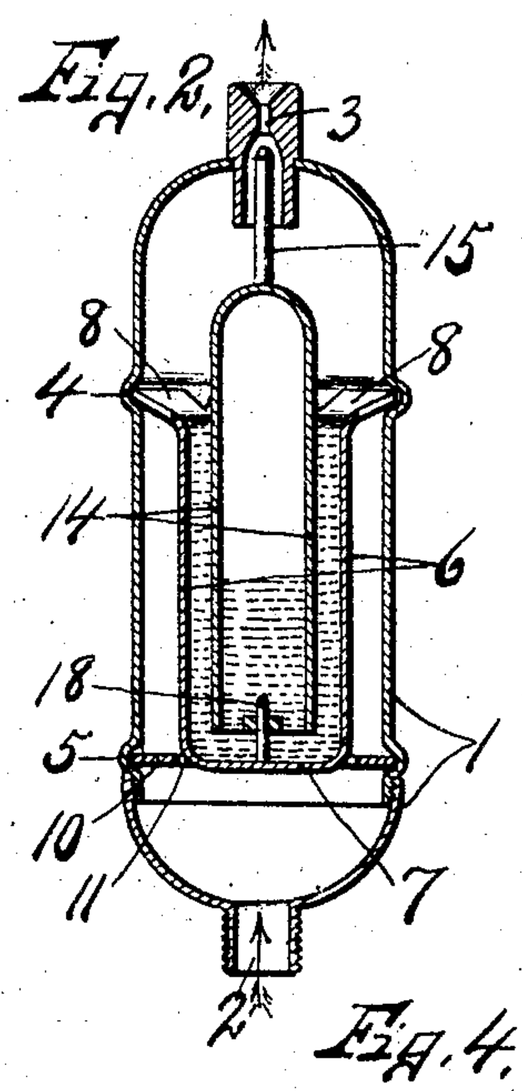


Fig. 3.

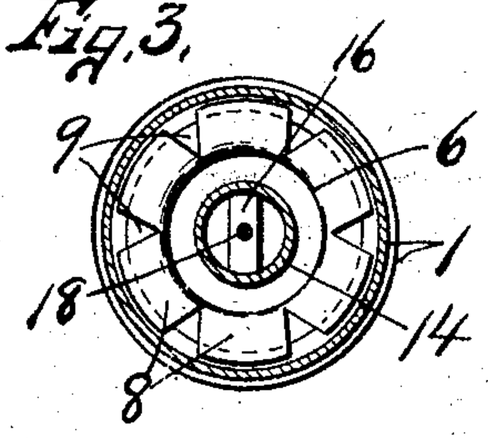


Fig. 4.

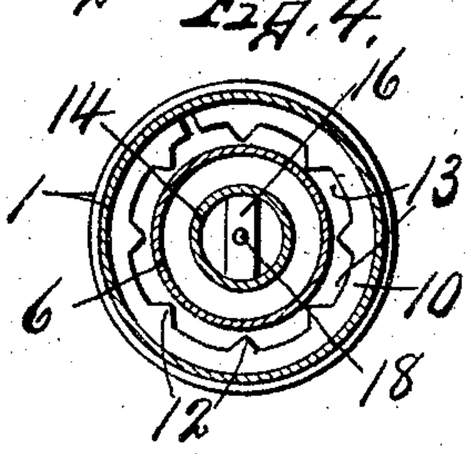


Fig. 5.

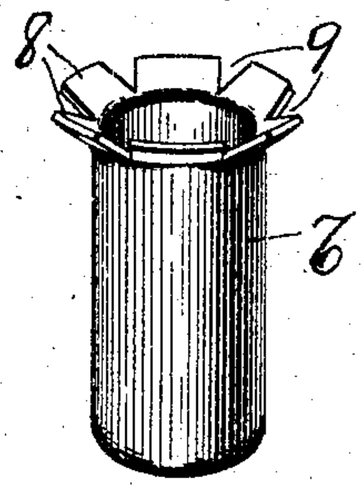


Fig. 7.

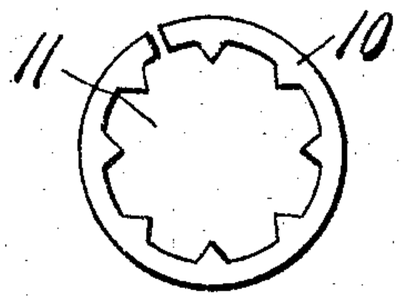
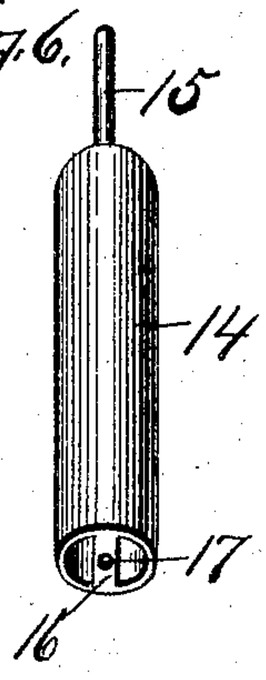


Fig. 6.



Witnesses:
F. E. Arthur,
H. E. Chase.

Inventor
Thomas Wheatley
By Edward P. Lyndon
Attorney.

No. 772,766. Patented October 18, 1904.

UNITED STATES PATENT OFFICE.

THOMAS WHEATLEY, OF SYRACUSE, NEW YORK.

AIR-VALVE FOR RADIATORS.

SPECIFICATION forming part of Letters Patent No. 772,766, dated October 18, 1904.

Application filed April 16, 1903. Serial No. 152,889. (No model.)

To all whom it may concern:

Be it known that I, THOMAS WHEATLEY, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Air-Valves for Radiators, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to improvements in air-valves for use in connection with steam and hot-water radiators for permitting the escape of air and preventing the exit of the inflowing steam or water. In order that this class of devices may be efficient, it is imperative that the valve be automatically closed as soon as the air is expelled from the radiator and before the heating agent has an opportunity to escape through the valved passage to atmosphere. This is accomplished more effectually by the use of what may be termed the "well-and-float" principle, in which a suitable well or cup is supported in an outer shell or casing to receive portions of the water of condensation when steam is employed as the heating agent or to receive portions of the inflowing water when hot water is used, the float being partially immersed in the liquid and is connected to operate a suitable valve for closing an air-vent in the outer shell.

I have discovered that air under certain conditions is more susceptible and responsive to light thermostatic changes than liquid and that by properly trapping and enveloping a small volume of air in the heating medium it may be utilized to operate the valve more speedily and positively than liquid, such as water.

The object of my invention, therefore, is to support the well and float in such manner that the air will pass freely through the vent during the inflow of the heating agent and portions of the water, whether of condensation or in bulk, will be deposited in the well and trap a portion of the air in the float, the air thus trapped being enveloped by the heating medium, whereby the air in the float is immediately expanded and operates the float to close the air-vent, said float being provided with a suitable valve for this purpose.

Another object is to suspend the well wholly above the inlet of the outer shell, so that the inflowing heating agent impinges directly against its bottom wall and then flows upwardly along its side walls, thereby enveloping substantially the whole of the well in the heating agent for the purpose of insuring an immediate action of the valve to close the valve either by the expansion of the liquid in the well or by the expansion of the air which is trapped in the float, the latter action being more instantaneous on account of the greater conductibility of the air.

A further object is to provide means for preventing the congestion of the water in the passages leading to the well, which in many of the valves now in use interferes with the efficient operation of the float and valve mounted thereon.

A still further object is to provide means for guiding the lower end of the float in its vertical movement to prevent the walls of the float from adhering to the adjacent walls of the well, as is frequently the case in the use of floats which are not thus guided, it being understood that there is always present in the heating fluid more or less oil, dirt, or greasy substance, which adheres to the adjacent walls of the float.

Further objects will appear in the subsequent description.

In the drawings, Figure 1 is an elevation of my improved air-valve. Figs. 2, 3, and 4 are perspective views taken, respectively, on lines 2 2, 3 3, and 4 4, Fig. 1. Figs. 5 and 6 are perspective views showing, respectively, the detached well and the detached valve. Fig. 7 is a top plan of the detached retainer for holding the lower end of the well in lateral displacement.

Similar reference characters indicate corresponding parts in all the views.

In carrying out the objects of my invention I provide an outer case 1 with an inlet 2 and an outlet 3, the inlet in this instance being substantially in the base of the outer shell, and the outlet is arranged in the upper end of the shell in axial alinement with the inlet, said shell being provided with upper and lower annular recesses 4 and 5.

Suspended within and from the sides of the

shell 1 is a second shell 6, which is constructed in the form of a cup of smaller cross-sectional area than the interior of the shell 1 and is formed with an open upper end and an imperforate bottom 7. The upper end of this cup or well 6 is provided with lateral projecting shoulders 8, which enter the recesses 4 for holding the well in fixed relation to the shell 1, said shoulders 8 being preferably separated from each other for forming passages 9, which connect the space in the upper portion of the outer shell with the space surrounding the well, whereby the air and heating agent finds a ready passage from the inlet 2 to a point above the well; but the lower end of the well is detached from the base of the outer shell to permit its free expansion and to allow the heating agent to circulate across the bottom and around the sides of the well.

Supported in the recesses 5 is a baffle or deflector plate 10, which is provided with a substantially central opening 11 to receive the lower end of the well 6, said plate being formed with inwardly-projecting teeth 12 and openings or recesses 13, the teeth or shoulders 12 projecting into close proximity to the side walls of the well to prevent its lateral movement or displacement, and the recesses 13 form suitable passages for the air and heating fluid escaping from the radiator 2.

The shoulders 8 and 12 serve to break up any volume of water which may enter the shell 1, and thereby prevent any choking up or congestion due to any inequalities of pressure in the shell, the primary function of these shoulders and separate passages being to facilitate the circulation of the heating medium through the outer casing. It will also be noted that by flanging the upper edge of the well outwardly against the side walls of the outer shell the water of condensation which may accumulate in the upper end of the shell is more readily precipitated into the well, thus causing an earlier action of the float than would be possible if the upper end of the side walls terminated in straight lines or were not united to the shell at this point.

The bottom wall of the well 6 is disposed in a plane a considerable distance above the inlet 2, so as to form a chamber between the lower end of the well and inlet and to permit the inflowing heating agent to impinge directly against the center of the bottom wall and then to deflect upwardly along the sides of the well, where it passes through the passages 9 and into the chamber above the well.

Movable within the well is a hollow float 14, which is open at its lower end and closed at its upper end, said float being of less diameter than the inner diameter of the well, and its lower end is immersed in the liquid, as water, which is precipitated into the well, thereby trapping the air in the upper portion of the float. It will now be readily understood that the heating agent entirely envelops the float and that, owing to this fact, the air which is sealed in said float is immediately expanded and causes the float to rise as soon as the lower end is sealed, this sealing operation taking place almost simultaneously with the expulsion of the air from the upper end of the outer shell through the vent 3. This float is therefore provided with a valve 15, which is adapted to close the passage 3 as the float is elevated, so that as soon as the air is expelled from the radiator through the inlet 3 and the heated fluid follows into the shell 1 the water, either of condensation or in bulk, is precipitated into the bottom of the well 6, thereby trapping the air in the float 14, which is immediately expanded by the heat of the surrounding fluid and causes the float to raise the seat and valve 15 in the passage 3. This passage 3 is somewhat elongated vertically and forms a guide for the upper end of the float, while the lower end of the float is provided with a transverse bar 16, having an aperture 17, which receives a pin 18, projecting upwardly from the bottom wall of the well 6, this latter arrangement serving to guide the lower end of the float and to prevent it from coming in contact with the side walls of the well, and therefore obviates any liability of the float sticking or adhering to the side walls of the well.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In an air-valve for radiators, the combination of an outer shell having an inlet in its base and an outlet in its top, a well suspended from the sides of the outer shell and having its lower end imperforate and detached from the base to permit access of the steam to the bottom of the well, a float in the well, and a valve for the outlet actuated by the float.

2. In an air-valve for radiators, the combination with an outer shell having an inlet in its base and an outlet in its top, a well in the shell having its upper part engaged with the sides of the shell to deflect the water of condensation into the well and provided with passages between the shell and well connecting the upper with the lower portion of the shell, a float in the well, and a valve for the outlet actuated by the float.

3. In an air-valve for radiators, the combination of an outer shell having an inlet in its base and an outlet in its top, a well in the shell engaged with the sides of the shell and detached from the base and provided with an imperforate bottom separate from the base to allow access of the heating agent to said bottom, the sides of one of the parts having passages connecting the space above the well with the space between the well and shell, a float in the well, and a valve for the outlet actuated by the float.

4. An air-valve for radiators comprising a shell having an inlet in one end and an air-

outlet in its opposite end, a cup having an imperforate bottom in a plane above the inlet, a baffle-plate between the cup and shell to hold the well from lateral displacement, a float in the well, and a valve operated by the float to close the outlet.

5. An air-valve comprising an outer shell having an inlet and an outlet, an inner shell forming a well and having an imperforate bottom above the inlet, a float in the well having an open lower end, a valve actuated by the float to close the outlet, and a guide in the base of the well for guiding the lower end of the float.

6. A radiator-valve comprising a shell having an inlet and an outlet, a well suspended in the shell wholly above the inlet, a baffle-plate between the sides of the shell and well, a float in the well, and a valve actuated by the float to close the outlet.

7. In an air-valve for radiators, the combination with an outer shell having an inlet in its base and an outlet in its top, a well in the shell having its upper end attached to the sides of the shell and its lower end detached from the base and formed with an imperforate bottom separate from the base to permit access of the heating fluid to said bottom, a float in the well and having a valve on its upper end to close the outlet, and a guide in the well for the float.

8. In an air-valve for radiators, the combination with an outer shell having an inlet in its base and an outlet in its top, a well in the shell having its lower end detached from the base and provided with an imperforate bottom above the inlet separate from the base to permit access of the heating fluid to said bottom, a float in the well, a guide in the well for guiding the float and a valve on the upper end of the shell to close the outlet.

9. In an air-valve for radiators, the combination with an outer shell having an inlet in its base and an outlet in its top, a well in the shell having its upper end attached to the sides of the shell and provided with passages therein and its lower end detached from the outer shell and provided with an imperforate bottom separate from the base to permit access of the heating fluid to said bottom, a float in the well and a valve for the outlet actuated by the float.

10. In an air-valve for radiators a shell having an inlet and an air-vent, a well suspended in the shell and separate from the bottom of the shell and communicating with the inlet between the shell and well, a float in the well, and means actuated by the float to close the vent.

11. In an air-valve for radiators an outer shell having an inlet and an air-vent, a well in the shell having portions thereof engaged with the inner wall of the shell to deflect the water of condensation into the well, a float in the well, and means actuated by the float for closing the vent.

In witness whereof I have hereunto set my hand this 13th day of April, 1903.

THOMAS WHEATLEY.

Witnesses:

H. E. CHASE,

J. M. HAMMEKEN.