F. C. GOFF.

AIR VALVE.

APPLICATION FILED AUG. 25, 1908.

939,196. **Patented Nov. 2, 1909.**

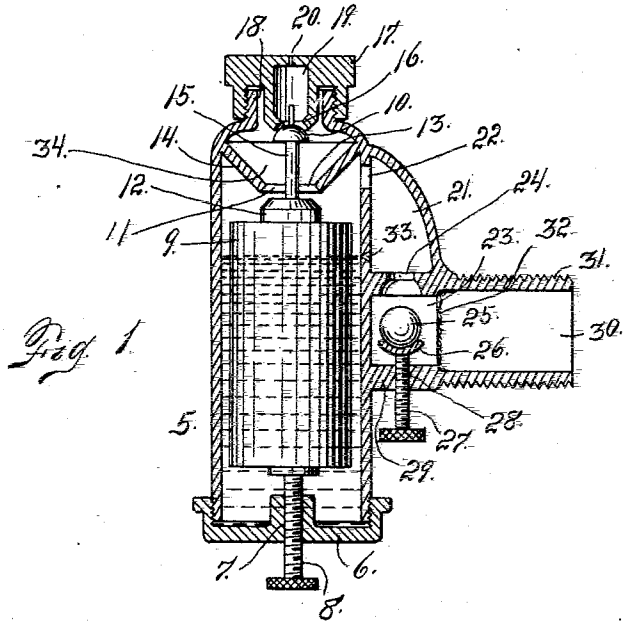

Fig. 1.

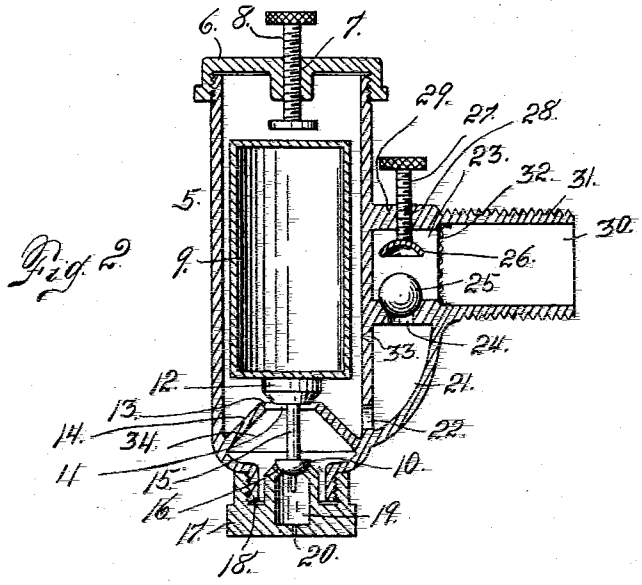

Fig. 2.

Witnesses

Otto E. Hoddick.

S. D. Thornburgh.

Inventor

Frank C. Goff.

By A. J. Boden Attorney

UNITED STATES PATENT OFFICE.

FRANK C. GOFF, OF DENVER, COLORADO.

AIR-VALVE.

939,196. Specification of Letters Patent. Patented Nov. 2, 1909.

Application filed August 25, 1908. Serial No. 450,155.

To all whom it may concern:

Be it known that I, FRANK C. GOFF, a citizen of the United States, residing in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Air-Valves; and I do 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 appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in air valves for steam or hot water heating systems, my object being to provide a device of this class which shall be exceedingly simple and economical in construction, reliable, durable and efficient in use, and to these ends the invention consists of the features hereinafter described and claimed, all of which will be fully understood by reference to the accompanying drawing, in which is illustrated an embodiment thereof.

In this drawing, Figure 1 is a vertical section taken through the casing of my improved valve. Fig. 2 is a similar view showing the casing in the inverted position for cleaning purposes.

The same reference characters indicate the same parts in all the views. Let the numeral 5 designate the casing of the valve. As shown in the drawing, the bottom of the casing is closed by a screw cap 6, having a centrally located threaded orifice 7 in which is inserted a screw 8, whose upper extremity forms the support for a hollow float 9, which is exteriorly sealed to prevent the entrance of fluid. The top of the float is provided with a projection 12, forming an auxiliary valve which may engage a seat 11 surrounding an opening 13, formed in a partition 14 with which the upper part of the casing is provided. The screw 8 may be utilized to cause the auxiliary valve 12 to engage its seat 11, when for any reason this may be necessary. Connected with auxiliary valve 12 is a stem 15 upon whose upper extremity is formed the main valve 10 which is adapted to engage a seat 16, formed in a screw cap 17, applied to the upper reduced extremity 18 of the casing. Above the valve seat 16, the cap is provided with a small chamber 19 from the upper extremity of which leads a small orifice 20 for the escape of the air from the valve casing.

The casing is provided on one side with an exteriorly located chamber 21 which communicates with the chamber of the main casing by an orifice 22 and with a second exterior chamber 23, by means of an orifice 24, which is adapted to be closed by a ball valve 25 which normally rests upon a support 26, with which a screw 27 is provided, the screw being threaded in an opening 28 formed in the casing 29 surrounding the chamber 23. This chamber 23 is separated from the passage 30 of a threaded nipple 31 by means of a mesh diaphragm or strainer 32.

The main casing 5 of the device, is provided with a small orifice or leak port 33, whereby the main chamber is placed in communication with the auxiliary chamber 21 to allow the water of condensation in a steam heating system, or the water constituting the heating medium in a hot water system, to leak from the main chamber into the auxiliary chamber and pass thence into the system, whereby the water may be lowered within the main chamber sufficiently to allow the float to drop and open the valve 10. This is particularly important in a hot water system, since the opening of the valve allows the air imprisoned at the top of the radiators to escape, thus obviating the necessity of manually opening the valves provided for this purpose.

From the foregoing description, the use of my improved air valve will be readily understood. Assuming that the parts are in the position shown in Fig. 1 when the steam in a steam-heating system is turned on, the steam acting upon the air, forces it into the casing of the valve and thence out of the small orifice 20 until all of the air has escaped, after which the steam which enters the valve casing will condense and the water resulting therefrom will rise in the main chamber sufficiently to lift the float and close the valve 10, to prevent the escape of steam from the system.

Assuming that the valve is employed in connection with a hot water system, it should be located at the top of the radiators so that the air, which naturally seeks the highest portion of the radiator, may enter the valve and accumulate in the upper part of the

casing. In this event, the air will prevent the water from filling the casing and the water will gradually escape into the system through the leak port 33, until the float 9 is lowered sufficiently to allow the valve to open, thus permitting the air to escape. As soon as this occurs, the water in the hot water system will enter the well or chamber within the casing and cause the float to rise, thus closing the valve and preventing the escape of the water.

When it is desired to clean the valve, the casing may be given a half turn whereby it is inverted or placed in the position shown in Fig. 2. In this event the valve 10 acted upon by the gravity of the float, will close while the opening 13 will be free to allow any foreign matter that may have accumulated in the main chamber to pass into the interior auxiliary chamber 34. The screw cap 17 may then be removed, in which event the auxiliary valve 12 will close the opening 13 by engaging the seat surrounding said opening, whereby the escape of water from the system will be prevented. At the same time, however, the auxiliary chamber 34 will be open to allow the escape of the foreign matter therefrom. If necessary, when the casing is inverted, the screw 8 may be employed to cause the auxiliary valve 12 to engage its seat 13. Ordinarily the auxiliary valve will close by gravity under the circumstances stated. If, however, there should be a slight obstruction between the auxiliary valve and its seat, it may be found necessary to utilize the screw 8 in order to cause the auxiliary valve to tightly engage its seat. In this manner the valve may be thoroughly cleansed.

When the valve is inserted, as shown in Fig. 2, the ball valve 25 closes the opening 24 and prevents the water of condensation in a steam heating system, or the heating medium in a hot water system, from passing from the system into the main casing. If it is desired to secure the ball valve in the closed position, the screw 27 may be turned until the part 26 attached to its inner extremity engages the ball valve from above, thus locking it in the position shown in Fig. 2.

Having thus described my invention what I claim is:

1. An automatic air valve, comprising a casing, forming a water-containing well, said casing having an inlet passage communicating with the upper portion thereof, and an air vent, a float within the well, the said float carrying a valve for controlling the said vent, the casing also having a restricted port, located above the bottom of the well, but below the line of flotation, and adapted to provide a continuous drain to said inlet passage, until the water level within the well falls to the level of the said port.

2. In a device of the class described, the combination of a casing forming a water-containing well, the said casing having an inlet passage communicating with the upper portion thereof, and a vent port, a non-expanding float within the well, the said float carrying a valve for controlling the said vent, the casing also having a restricted port above the bottom of the well, but below the line of flotation and adapted to provide a continuous drain to the said inlet passage until the water level within the well falls to the level of the said port.

3. The combination of a casing, forming a water-containing well, said casing having an inlet passage communicating with the upper portion thereof, and an air vent, a float within the well, said float carrying a valve for controlling said vent, the casing also having a restricted port, located above the bottom of the well but below the line of flotation, and adapted to provide a continuous drain to said inlet passage, until the water level within the well falls to the level of the said port, and a screw placed at the bottom of the casing and arranged to act on the float to close the valve.

4. An automatic air valve, comprising a casing forming a water-containing well, the said casing having an inlet passage communicating with the upper portion thereof, and an air vent, a removable cap in which the vent is formed, a float within the well, the said float carrying a valve for controlling said vent, the casing also having a restricted port, located above the bottom of the well but below the line of flotation, and adapted to provide a continuous drain to the said inlet passage, until the water level within the well falls to the level of said port, a partition formed in the upper part of the casing, a chamber between the well and the air vent, the partition having an opening forming communication with the said chamber and the water-containing well, a second valve for controlling the said opening in the partition, the said second valve being also carried by the float and engaging its seat when the said cap is removed, both valves being located at one end of the float and suitably separated for the purpose set forth.

5. An automatic air valve, comprising a casing forming a water-containing well, said casing having an inlet passage communicating with the upper portion thereof, and an air vent, a float within the well, the said float carrying a valve for controlling the said vent, the casing also having a restricted port located above the bottom of the well but below the line of flotation, and adapted to provide a continuous drain to the said inlet passage until the water level within the well falls to the level of the said port, the last named port being so arranged that a considerable quantity of water is contained

in the well after the water ceases to escape through the restricted port.

6. An automatic air valve, comprising a casing forming a water containing well having an inlet opening at the top, a float within the well, the casing having a removable cap provided with a vent port, a valve for controlling said port, a partition forming with the upper part of the casing, a chamber between the well and the air vent port, the partition having an opening forming communication between the said chamber and the water containing well, a second valve for controlling said partition opening, both of said valves being mounted on the float and so spaced that the second valve is normally unseated, but is capable of being seated when the vent port cap is removed, and means placed at the bottom of the casing and acting on the float for forcing said valves to their seat.

7. An automatic air valve, having a water-containing well, provided with an inlet passage, communicating with the upper portion of the well, and an air vent, a float within the well, the said float carrying a valve for controlling the vent, the well having a restricted port located above its bottom, but below the line of flotation, and adapted to provide a continuous drain from the well to the said inlet passage, until the water level in the well falls to the level of said port.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK C. GOFF.

Witnesses:

LOUISE COSNER,

ALODIA HUTCHISON.