No. 763,066. PATENTED JUNE 21, 1904.

D. F. MORGAN.

VALVE FOR RADIATORS.

APPLICATION FILED FEB. 24, 1902.

NO MODEL.

Fig. 1

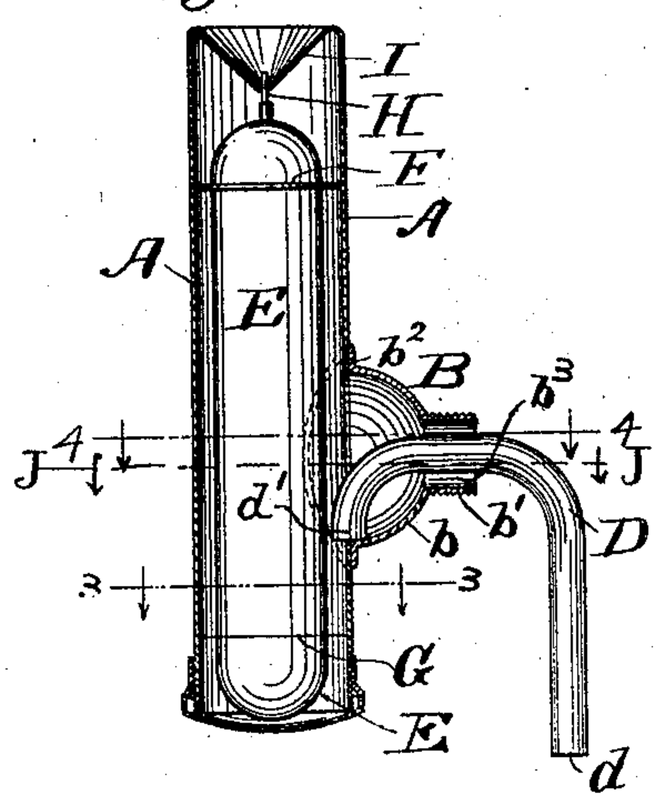


Fig. 2.

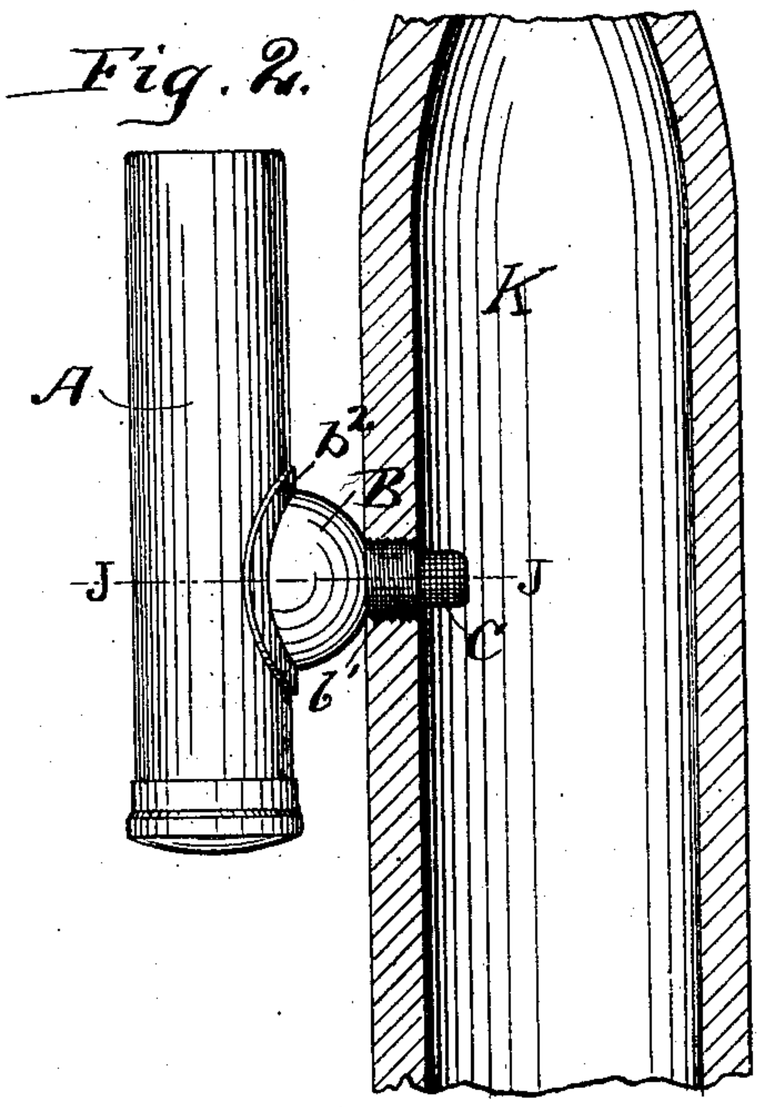
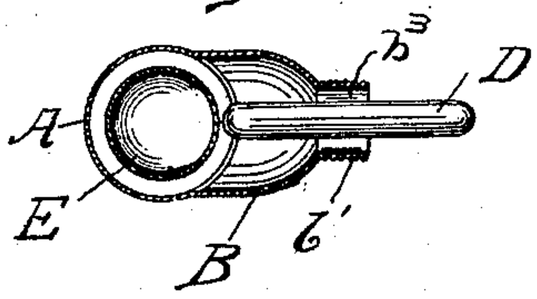


Fig. 3.

Fig. 4.



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No. 763,066. Patented June 21, 1904.

UNITED STATES PATENT OFFICE.

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VALVE FOR RADIATORS.

SPECIFICATION forming part of Letters Patent No. 763,066, dated June 21, 1904.

Application filed February 24, 1902. Serial No. 95,439. (No model.)

To all whom it may concern:

Be it known that I, DOCTOR FRANKLIN MORGAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Valves for Radiators, of which the following, when taken in connection with the drawings accompanying and forming a part hereof, is a full and complete description, sufficient to enable those skilled in the art to which it pertains to understand, make, and use the same.

This invention relates to valves used for venting radiators—that is, valves for automatically opening and closing to permit the air, if any, in the radiator to flow therefrom and not to permit water or steam to flow therefrom.

The object of this invention is to obtain a valve specially well adapted for use on steam and hot-water radiators, which will be simple in construction, not requiring adjustment, and durable.

A further and important object sought to be accomplished in this invention is to obtain a valve for radiators wherein the valve will be closed by flotation when the radiator to which it is attached is filled with steam and will not be closed by flotation to prevent the flow of air from the radiator when the radiator is filled with air and water, thus doing away with an expansible member in the valve.

In the drawings referred to and forming a part of this specification, Figure 1 is a vertical sectional view of a radiator-valve embodying this invention. Fig. 2 is a side elevation of such valve with the element thereof hereinafter termed the "siphon-tube" removed, thereby obtaining a modification and a vertical sectional view of a short section of a radiator to which such valve is attached. Fig. 3 is a horizontal sectional view on line 3 3 of Fig. 1, viewed in the direction indicated by the arrows; and Fig. 4 is a horizontal sectional view on line 4 4 of Fig. 1, viewed in the direction indicated by the arrows.

A reference-letter applied to designate a given part is used to indicate such part throughout the several figures of the drawings wherever the same appears.

A is the shell or casing of the valve.

B is the stem of the shell, by means of which such shell is attached to a radiator, and comprises the semispherical part *b* and the screw-threaded part *b'*.

C (in the modification illustrated in Fig. 2) is a wire mesh or wire-netting rolled and inserted in the stem B.

D is a bent tube forming a siphon-tube. The end *d* of such siphon-tube is in the radiator to which the valve is attached and is designed to be lower than the end *d'* thereof, (such end *d'* being contained in part *b* of stem B,) so that the weight of the water in the longer leg will be sufficient to start the flow of water from the shell A into the radiator. The siphon-tube D is smaller than the aperture in part *b'* of stem B, so that water of condensation may flow from such stem between the siphon-tube and the bottom of the aperture in such part *b'*—as, say, at b^3, Fig. 1.

E is a closed float in the shell A.

F and G are flanges on the closed float E. Flanges F and G serve as guides for the float E, and the flange F also serves as an obstruction to the direct flow of water through the radiator valve-casing A in case of a sudden rush of water from the radiator into the valve. The sieve C in the modification illustrated in Fig. 2, heretofore described, also serves the purpose of preventing a sudden rush of water into the valve-casing from the radiator.

H is a needle-valve mounted on the closed valve E and seating to close the aperture at the apex of the inverted-cone-shaped top I of the casing or shell A. There is no expansible member in this valve, although it is intended to use it on steam-radiators as well as hot-water radiators, and an expansible member is not required, because of the herein-described construction, as will be fully understood from the description of the operation of the apparatus hereinafter given.

K is a section in vertical cross-section of a radiator to which the valve is shown as attached. When the siphon-tube D is not used in this valve, it is not well adapted for use on steam-radiators, and, further, the weight of the closed float E must be proportionate to the shell and to the part of the shell below the

stem B, (termed the "well" of the shell,) so that when such well is filled with water, say, to line J J in Fig. 2 the float will not be raised to close the valve H to its seat, and when the casing is filled with water, say, to near the flange F such valve E will be raised to seat valve H.

When siphon-tube D is used, it is necessary to construct the float E so that the same will be raised to its seat whenever water is contained in the shell or casing E to a level, say, anywhere about the line J J, Fig. 1, and will not be raised to its seat when the water inside casing is not up to such line J J.

The stem B is made substantially of the shape illustrated to insure the flow of water from the shell A into the radiator between siphon-tube D and the bottom of the aperture in part b', as at b^3, and also when no siphon is used, and this object is obtained because when the stem has the semispherical part b the screw-threaded part b' is so short relative to the circumference of the hole therethrough that any water contained in such screw-threaded part will break—that is, will not be held by capillary attraction. In order to have the hole in part b' of such stem B as large as possible, I prefer to make the same of ductile sheet-metal—as, say, sheet-brass—and to attach it to the shell A by brazing or soldering the flange b^2.

By constructing stem B as described I find that I can insert therein the sieve C, as hereinbefore described, and that any water contained in the shell A will flow therefrom back into the radiator to which the shell is attached through the stem B and through the sieve therein as soon as the water recedes in the radiator.

To place this valve in a radiator, it is simply necessary to insert the end d in the radiator through the hole in which the screw-threaded part b' of stem B is to engage.

The manner of operation of this valve when attached to a steam-radiator is: When steam is turned onto the radiator, the pressure in the radiator will force the air, if there be any therein, from the radiator through the valve-casing A and out therefrom through the valve-seat of valve H. As such air flows from the radiator and from the valve-shell it is followed by water, which flows into the valve-shell A, usually in waves, filling the valve-shell above the line 4 4 in Fig. 1, this raising float E to seat the valve H and stopping the flow of water from the shell. When the water in the radiator recedes below the end d of the siphon-tube D, the weight of the water in the longer leg of such siphon-tube will cause a flow of the water from the shell or casing out through such tube D into the radiator, and the shell will be emptied of its water to below the end d' of siphon-tube D, thereby insuring the dropping of the float E and removal of valve H from its seat to open the valve. As float E falls air (and steam) may again flow from shell A through the seat of valve H. Alternate opening and closing of valve H will occur in the manner last above described until all the air in the radiator has been discharged therefrom through the shell A, when steam will enter the shell A. Such steam will be gradually converted into water of condensation, and such water of condensation will rise to about the line J J, thereby raising the float E to close valve H on its seat. The level of water of condensation will continue to be at about the line J J, because although the continuous conversion of steam in shell A into water of condensation tends to raise the level thereof such water of condensation will continuously flow through the stem—as, say, at b^3—back into the radiator without starting the siphon, and the level of such water of condensation will not rise in shell A sufficiently high to start the flow of water through the siphon-tube D. Hence float E will be held permanently up by the flotation to seat valve H, and no expansible member is required. When air and water are contained in the radiator, the radiator will "surge," as it is known in the art—that is, water entering shell A through stem B will flow in sufficient volume to raise the level thereof sufficiently high in shell A to fill the siphon-tube D, so that as the water recedes in the radiator below the end d of such tube D water will flow through such tube from shell A into the radiator until the level of the water in the shell is near the end d' thereof, at which time the float E will be lowered and valve H unseated, so that air (or steam, if any) may flow through the seat of such valve. In practice it will be found that but very little steam will flow through the seat of valve H before the water of condensation in shell A will rise to about line J J and raise float E to close valve H.

When the valve is designed to be used on hot-water radiators, the siphon-tube E may be omitted, if desired, the operation of the valve being substantially the same in such case whether the siphon D be present or omitted. Where the siphon-tube is omitted, I prefer to use wire mesh C. When the siphon-tube D is not built into the apparatus, as in Fig. 2, the flow of water from the shell or casing A into the radiator to which it is attached ceases when the water is below the part b' of stem B in such valve-casing, and therefore the float E must at such time fall to unseat valve H, and hence such float is made so heavy that when water in the valve-casing (of the construction illustrated in Fig. 2 of the drawings) is not above the line J J the float E is down and the valve H open. I find, however, that even if the siphon-tube D is not used the well obtained in shell A by placing stem B substantially where the same is illustrated in Figs. 1 and 2 is of value in the operation of the apparatus, as in such case the float is nearly balanced by the water in shell A, and

is therefore very sensitive and readily actuated by the inflow of additional water from the radiator.

Having thus described my invention and the manner of operation of the same, what I claim as new, and desire to secure by Letters Patent, is—

1. In a valve for radiators, the combination of a shell provided with a float-chamber and such chamber provided with an aperture at the upper end thereof forming an outlet, a screw-threaded stem located between the ends of the shell to obtain a well in the float-chamber, such stem provided with an aperture therethrough of more than one diameter, the larger diameter located adjacent to the float-chamber, a float within the float-chamber, and a valve on the float seating to close the outlet when the float is raised; substantially as described.

2. In a valve for radiators, a shell, a threaded stem on the shell forming a communicating passage-way between the float-chamber of the shell and the radiator, such stem provided with a passage-way therethrough of more than one diameter, the larger diameter thereof located adjacent to the float-chamber in the shell; substantially as described.

3. In a valve for radiators, the combination of a shell provided with an aperture at the upper end thereof forming an outlet, a screw-threaded stem between the ends of the shell, such stem provided with an aperture therethrough of more than one diameter, the larger diameter located adjacent to the shell, a siphon-tube in the stem, the shorter leg of such siphon-tube in the shell, and arranged to turn in the part of the stem of larger diameter to permit the shell to be screwed into a radiator, a closed float within the shell, and a valve on the float seating to close the aperture in the shell when the float is raised; substantially as described.

DOCTOR FRANKLIN MORGAN.

In presence of—

CHARLES TURNER BROWN,
CORA A. ADAMS.