No. 721,521. PATENTED FEB. 24, 1903.

F. W. LEUTHESSER.

AIR VALVE FOR RADIATORS.

APPLICATION FILED SEPT. 5, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

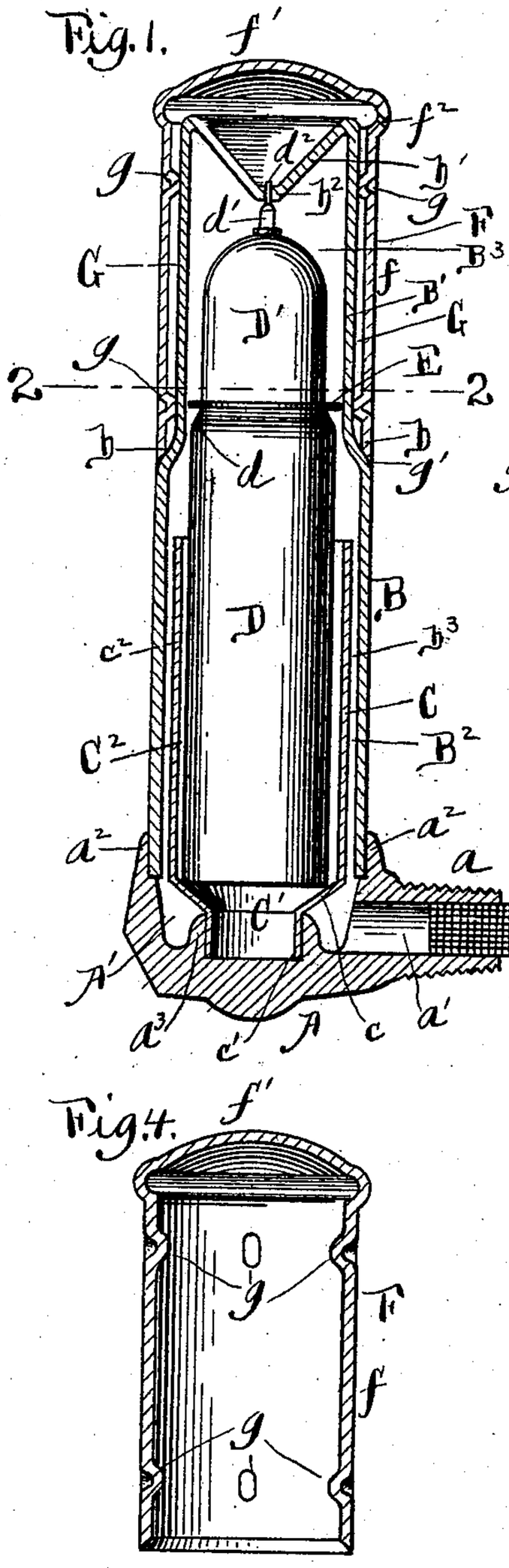

Fig. 2.

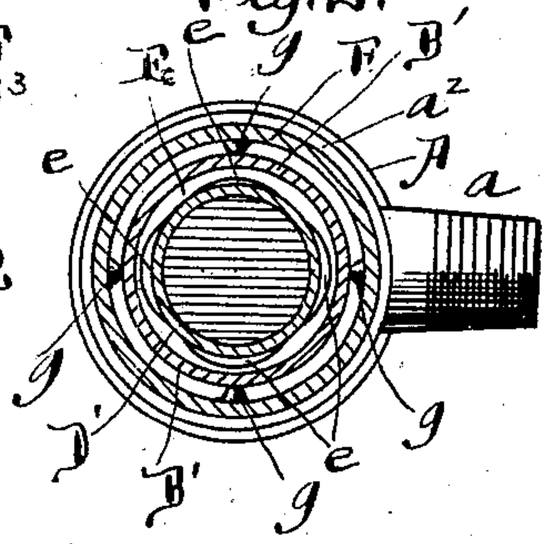

Fig. 3.

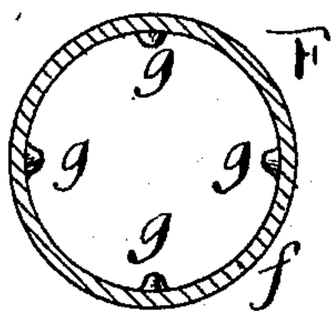

Fig. 4.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig 5.

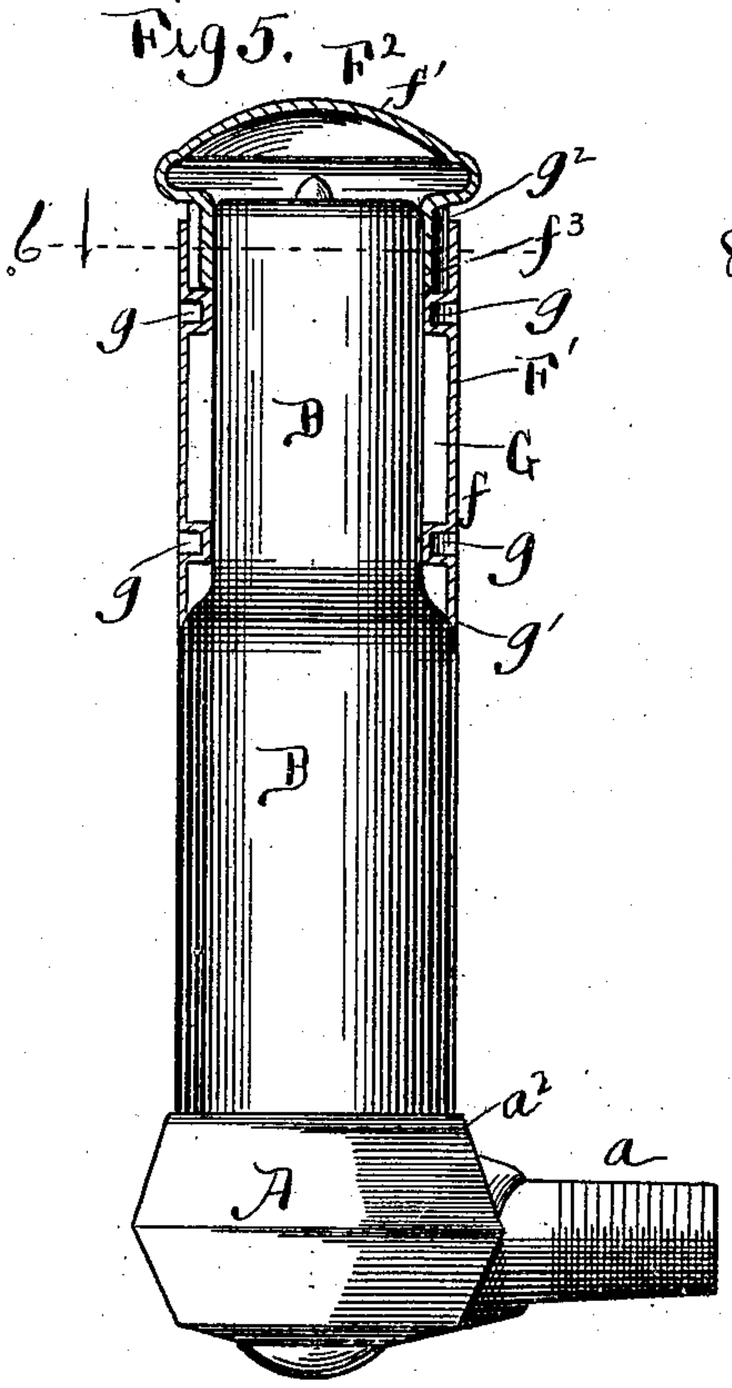


Fig 7.

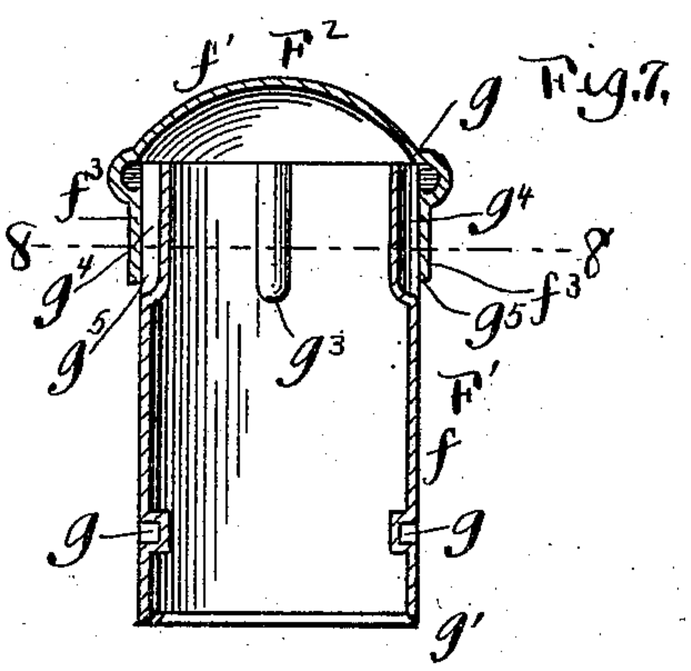


Fig 8.

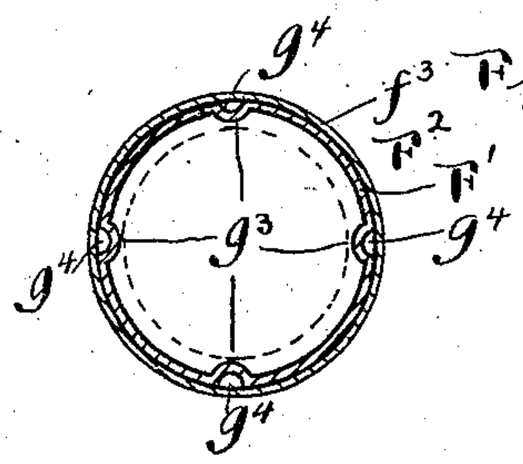


Fig 6

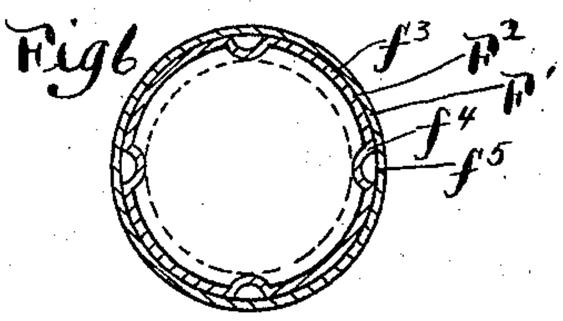


Fig 9.

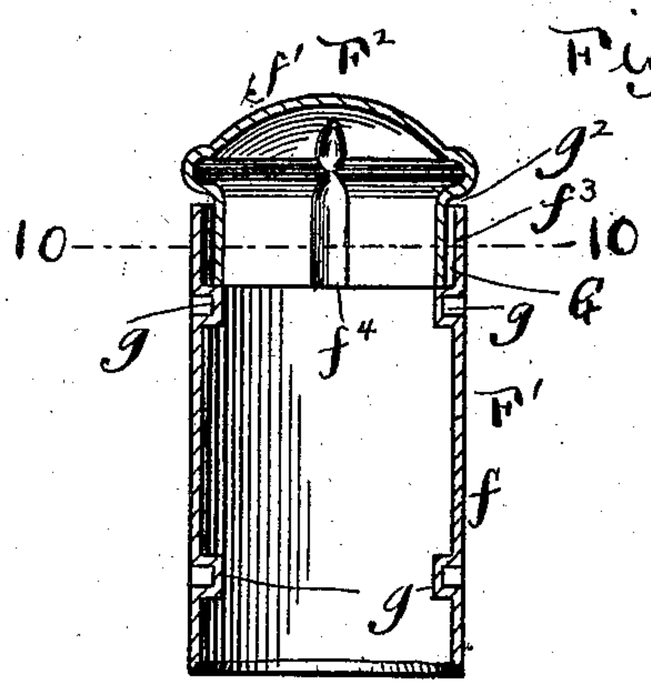
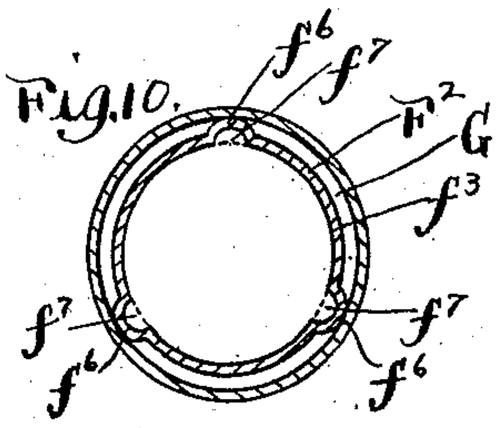


Fig 10.



Witnesses
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By Banning & Banning
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UNITED STATES PATENT OFFICE.

FRED W. LEUTHESSER, OF CHICAGO, ILLINOIS, ASSIGNOR TO MONASH-YOUNKER COMPANY, OF CHICAGO, ILLINOIS.

AIR-VALVE FOR RADIATORS.

SPECIFICATION forming part of Letters Patent No. 721,521, dated February 24, 1903.

Application filed September 5, 1902. Serial No. 122,173. (No model.)

To all whom it may concern:

Be it known that I, FRED W. LEUTHESSER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Air-Valves for Radiators, of which the following is a specification.

This invention relates more particularly to that type of air-valves for radiators shown and described in Letters Patent of the United States No. 695,616, dated March 18, 1902, in which the vent for escaping the air is controlled by a valve-stem carried by and actuated from a float; and the primary object of the invention is to furnish an effectual safeguard against the jetting of the water of condensation through the vent for the air, which jetting of the water of condensation is liable to produce injurious effects by striking the ceiling of a room or otherwise creating damage in the room or place of use; and to this end the invention consists in providing a cap or cover inclosing the upper end of the wall of the valve and in the features of construction and combinations of parts hereinafter described and claimed.

In the drawings, Figure 1 is a sectional elevation of a valve having thereon the cap or cover constituting the main feature of the present invention for preventing jetting or squirting of the water of condensation through the escape or vent opening for the air; Fig. 2, a cross-section on line 2 of Fig. 1; Fig. 3, a cross-section of the cap or cover; Fig. 4, a sectional elevation of the cap or cover; Fig. 5, an elevation of a valve, showing a modification in the construction and arrangement of the cap or cover; Fig. 6, a cross-section on line 6 of Fig. 5, showing the cap or cover in full lines and the top of the valve shell or casing in dotted lines; Fig. 7, a sectional elevation showing another modification in the construction and arrangement of the cap or cover; Fig. 8, a cross-section on line 8 of Fig. 7 looking in the direction of the arrow, showing in full lines the cap or cover with the top of the valve shell or casing in dotted lines; Fig. 9, a sectional elevation showing another modification in the construction and arrangement of the cap or cover, and Fig. 10 a cross-section on line 10 of Fig. 9 looking in the direction of the arrow.

The valve illustrated is constructed with a base or cup A, having an annular chamber A′, with a nipple or stem a extending out from the wall of the base or cup on one side for attachment of the valve to a radiator, and the stem or nipple a has a passage a' in communication with the chamber A′ of the base or cup. An annular rim a^2 has entered thereinto the outer wall or shell of the valve, which wall or shell, as shown, has a lower portion B and an upper portion B′ of a less diameter than the lower portion and joined thereto by a curve or bend b, and the wall or shell has a lower compartment or well B^2 and an upper compartment or chamber B^3, and the upper end of the wall or shell is inwardly turned to form a wall b', having at the apex or center thereof an opening or passage b^2, furnishing the vent for the outlet of the air.

An open-ended cylindrical wall or shell C is located within the lower chamber or well of the outer wall or shell, leaving a channel or passage between the two, with a mouth or opening at the upper end furnishing communication to the interior of the wall or shell C, which wall or shell at its lower end has an inwardly-inclined wall c and a straight wall c', forming a mouth C′, opening into the lower end of the chamber or passage C^2 of the wall or shell. The straight wall c is entered into an annular rim a^3 on the interior of the base or cup and holds the inner wall or cylinder C in a vertical relation and parallel with the outer wall or shell, so that the water of condensation entering the chamber A′ through the inlet a' is free to rise in the passage or channel b^3 and flow over the upper end of the wall or shell C and enter the chamber or passage C^2 of such wall or shell, the water of condensation rising in the chamber C^2 upwardly from the bottom.

A float is located in the chamber C^2 and, as shown, has a lower portion D and an upper portion D′ integral one with the other, with a curved shoulder or rest d at the juncture of the two portions or divisions. The float is open at the bottom and closed at its upper end, and the top, as shown, is round or semi-

spherical in shape, and the body of the lower portion D of the float is of a less exterior diameter than the interior diameter of the chamber C^2, leaving a space or channel c^2 between the float and the inner face of the wall or shell C, into which space or channel the water of condensation is free to rise in the chamber. The float is open at the bottom and closed at the top, and the water of condensation will rise in the interior of the float to the limit formed by the natural pressure of the atmosphere within the float, and with the admission of steam to the upper compartment or chamber the air will be expanded against the water in the float as an abutment, thereby raising the float. The float at its upper end has a head d, from which extends a valve-stem d', which passes through the vent hole or opening b^2 and furnishes a guide for the rise and fall of the float and have the head, as the float rises, contact or seat against the face of the end of the outer wall or shell around the hole or opening b^2 and close the same, preventing the passage therethrough of steam, and when fully closed preventing the passage therethrough of the water of condensation, and with the fall of the float the head d is withdrawn from its contact or seat, opening the vent hole or passage for the escape of air. On the upper portion or division of the float is a metal ring or band E, the periphery of which contacts the interior face of the upper portion of the outer wall or shell and furnishes a guide for positively centering the float in entering it into the shell or casing, and this ring in order to permit the passage of air into the upper compartment or chamber B^3 is provided with openings e, as shown in Fig. 2 or of other suitable form, which openings allow of the passage of steam into the upper compartment or chamber after the air is expelled.

The float in normal position is down, opening the vent hole or passage b^2 for the escape of air which is forced out from the radiator with the admission of steam, and the air will be forced out until the steam following the air enters the upper chamber or compartment, when the air contained in the upper portion of the body of the float will be rarefied and expanded from the heat of the steam for the air to act as a lifter and raise the float for the head d to contact and seat around the hole or passage b^2, closing the hole or passage. The reduction of the steam-pressure lowers the heat and reduces the expansion of the air within the float, allowing the float to fall and open the vent hole or passage b^2 for again escaping the air forced out with the increase of steam-pressure until the heat of the steam again expands the air to raise the float and close the vent.

The valve operates effectually in venting the air; but under some conditions, as when the vent opening or passage in the head end of the outer shell or casing is not fully closed, the water of condensation is liable to jet or squirt through the opening with more or less force, and this ejected water of condensation might cause damage to the wall or ceiling or the furnishings of a room. It is to prevent this jetting or squirting of the water of condensation that constitutes the feature of the present invention, and to this end the head end of the outer shell or casing is surrounded and closed by a cap or cover. The cap or cover shown in Figs. 1 to 4, both inclusive, is in the form of a shell or cylinder F, having a side wall or body f and a top f', with the interior of the body of a greater diameter than the exterior of the upper portion or division of the outer shell or casing, leaving a passage G between the wall of the outer shell or casing of the valve at the upper portion thereof and the wall of the shell or cylinder F, as shown in Fig. 1. The body of the cylinder or shell F is indented to form projections g, which contact the exterior of the outer wall of the shell or casing, as shown in Figs. 1 and 2, and maintain the passage G between the outer wall or casing of the valve and the cylinder or shell of the cap or cover. The cap or cover, as shown in Fig. 1, has therein a small hole f^2, which permits of the escape of the air and of the water of condensation, if necessary, and this hole preferably has a downward inclination and projects the water in the direction of the radiator.

The water of condensation passing through the vent hole or opening b^2 will strike the closed top of the cap or cover and will be thrown back or turned to flow down the inner face of the cylinder or shell F in the passage G, and with the heat from the steam when it enters the upper compartment or chamber of the valve the water of condensation in the passage G will be evaporated and escape in the form of vapor through the opening f^2, and this vapor will be so small in quantity as not to cause damage or injury. The chamber or passage G is closed at the lower end against the escape of water by brazing or otherwise attaching the lower end g' of the cylinder or shell F to the outer shell or casing of the valve, thus making a tight chamber and a closure for the head end of the valve, by means of which the water of condensation will be prevented from jetting or squirting to produce damage and cause injurious effects and in which chamber any overflow or escaped water of condensation will be evaporated or vaporized, so as not to remain in the chamber, and thereby damaging or injuring the valve. The cap or closure for the upper or head end of the valve can be made in various forms. As shown in Figs. 1 to 4, the cap or closure has its body and its top integral or in a single piece. As shown in Figs. 5 and 6, the cap or closure has a body in the form of a cylinder or shell F', with indentations forming lugs or projections g for maintaining the cylinder or shell F' away from the upper end of the wall of the outer shell or casing to form the chamber or passage G, and the lower end g' of the

cylinder or shell F′ is brazed or otherwise tightly united to the outer wall or shell of the valve, so as to form a chamber tightly closed at the bottom and open at the top or upper end. The top F^2 of the cap or cover in the construction of Figs. 5 and 6 is independent of the cylinder or shell, and this top has a closed wall f' and a depending rim or body-wall f^3, the main portion of which fits within the upper end of the cylinder or shell F′, and the rim or body f^3 of the top F^2 at intervals therearound has indentations f^4, which contact, as shown, the exterior of the outer shell or wall of the valve, leaving passages f^5, through which and a mouth or opening g^2 between the upper end of the cylinder or shell F′ and the top F^2 the air and vapor in the chamber G from the water of condensation is free to escape without causing any damage or injury. The water of condensation projected through the vent hole or opening will strike the closed wall of the top and will be deflected and flow through the channels or openings f' into the passage G, where it will be evaporated or vaporized. As shown in Figs. 7 and 8, the cap or closure for the upper end of the valve is formed of a cylinder or shell F′, having a wall or body f with indentations g at the lower end, as in the construction of Fig. 5 and for the same purpose, and the upper end of the cylinder or shell F′ has indentions g^3, forming passages g^4 for escaping the air and the vaporized water of condensation. The construction of Figs. 7 and 8 also has a top F^2 independent of the cylinder or shell, with a closed upper wall f' and a depending rim or body f^3, having an interior diameter to closely fit around the exterior of the cylinder or shell F′, leaving at the bottom of each passage g^4 a mouth g^5 for escaping the air and the produced vapor from the water of condensation. This construction of cap or closure might escape some of the water of condensation through the passages g^4; but such water of condensation would be evaporated or vaporized as it flowed or passed down on the exterior of the cylinder or shell, thereby preventing damage or injury therefrom. As shown in Figs. 9 and 10, the cap or closure is formed with a cylinder or shell F′, with indentations g similar to the cylinder or shell of the construction of Figs. 5 and 6. The cap or cover F^2 has its rim or body-wall f^3 of a less diameter than the interior diameter of the upper end of the cylinder or shell, and the rim or body-wall f^3 has outward indentations f^6, forming passages f^7 on the interior of the top. The indentations fit against the inner face of the upper end of the cylinder or shell F′ and maintain the continuity of the chamber G to the top of the cylinder or shell, with a mouth or opening g^2 between the end of the cylinder or shell and the top for the escape of the evaporated or vaporized water of condensation from the chamber.

It will be seen that by means of surrounding the upper end of the outer wall or shell of the valve with a cap or closure, leaving a chamber between the body of the cap or closure and the outer wall or shell of the valve, and with a closed top for the cap or closure an effectual preventive against the jetting or squirting of the water of condensation is provided and at the same time a receiver is furnished into which the water of condensation is free to pass to be evaporated or vaporized in the chamber to escape therefrom, thus providing a safeguard against damage or injury from the jetting or squirting of the water of condensation, leaving the valve operative for venting the air, which is free to escape through the vent hole or opening in the upper end of the valve and to pass out from the chamber formed by the cap or closure surrounding the upper end of the valve.

What I regard as new, and desire to secure by Letters Patent, is—

1. In an air-valve for radiators, the combination of an outer shell or casing having in its head or upper end a vent hole or opening for the escape of air, and a cap or closure surrounding the upper end of the outer shell or casing of the valve and spaced therefrom to form a chamber for the reception of the water of condensation and in which the water of condensation is evaporated or vaporized, and having an escape opening or passage leading from the chamber, substantially as described.

2. In an air-valve for radiators, the combination of an outer shell or casing having in its head or upper end a vent hole or opening for the escape of air, a valve controlling the vent hole or opening, and a cap or closure surrounding the upper end of the outer shell or casing for the valve and spaced therefrom to form a chamber for the reception of the water of condensation and in which chamber the water of condensation is evaporated or vaporized the cap or closure having a closed top and escape-openings leading from the chamber, substantially as described.

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Witnesses:
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WALKER BANNING.