No. 677,551. Patented July 2, 1901.

E. P. ALLEN.

RADIATOR VALVE.

(Application filed Apr. 30, 1900.)

(No Model.)

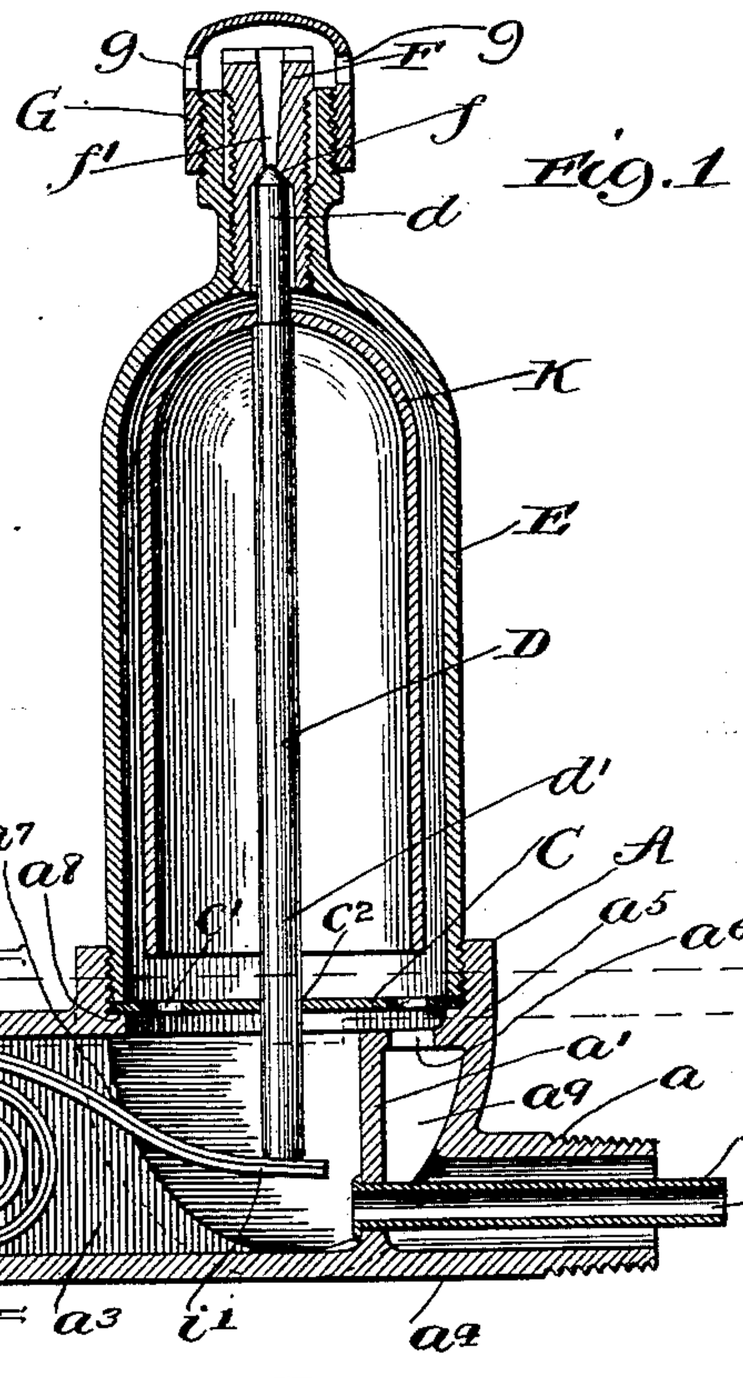

Fig. 1

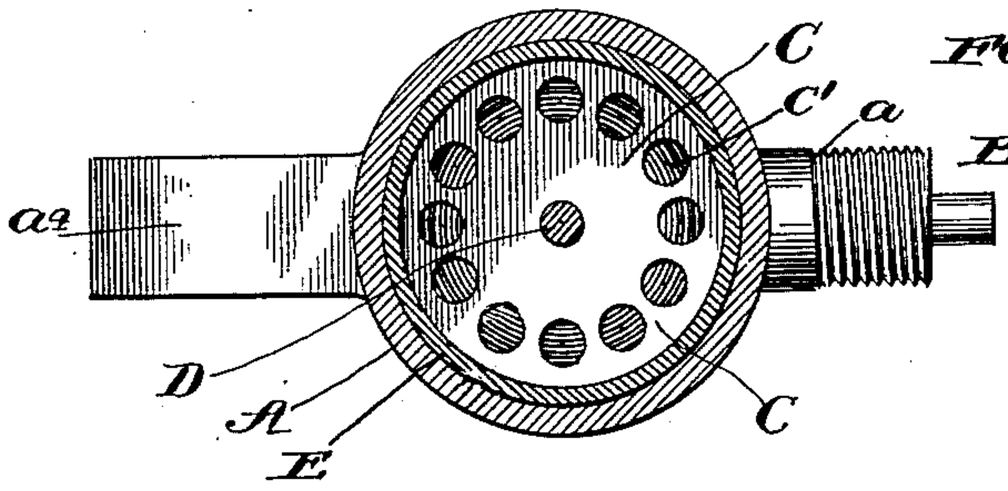

Fig. 2

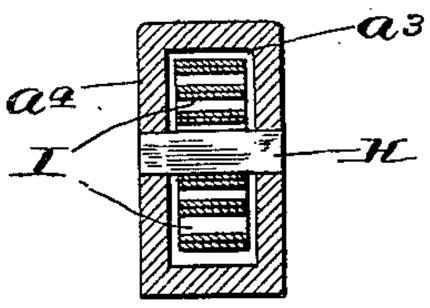

Fig. 4

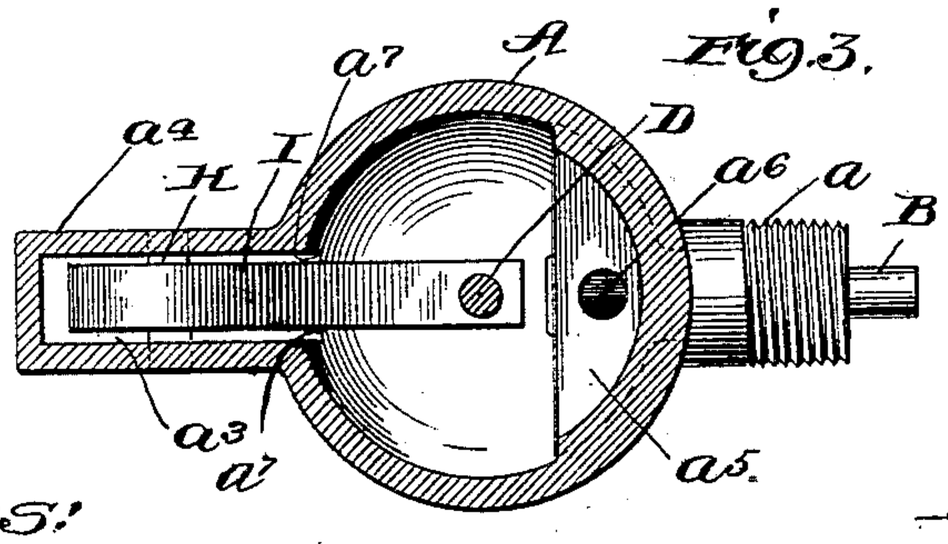

Fig. 3.

Witnesses:
Harold G. Barrett.
Frank S. Blanchard

Inventor:
Everett P. Allen
By. Poole & Brown his Attys.

UNITED STATES PATENT OFFICE.

EVERETT P. ALLEN, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO WILLIAM C. HILL, OF SAME PLACE.

RADIATOR-VALVE.

SPECIFICATION forming part of Letters Patent No. 677,551, dated July 2, 1901.

Application filed April 30, 1900. Serial No. 14,813. (No model.)

To all whom it may concern:

Be it known that I, EVERETT P. ALLEN, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Radiator-Valves; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to air-valves for radiators of that class comprising a hollow casing, a float, a valve, and a thermostatic strip or member.

The invention consists in the matters hereinafter set forth, and pointed out in the accompanying claim.

In the drawings, Figure 1 is a vertical longitudinal section through an air-valve, as hereinafter described. Fig. 2 is a transverse section through the air-valve, taken on line 2 2 of Fig. 1. Fig. 3 is a transverse section taken on line 3 3 of Fig. 1. Fig. 4 is a vertical section taken on line 4 4 of Fig. 1.

Referring to the drawings, A is a hollow base, and E an upper chamber forming with the base a closed casing. This upper chamber may be of any desired form. As shown, it is dome-shaped and is referred to herein as the "dome." A plug F is inserted in the upper portion of said dome, having an orifice f', constituting an air-outlet. Said orifice is provided with a valve-seat f.

D is a valve-closure consisting of a valve proper, d, fitted to close on the valve-seat f, and a stem d'. As shown, the valve d and stem d', constituting the valve-closure, are integral; but I contemplate forming them separately in use. A float K and a thermostatic strip I constitute means for operating the valve. A protecting-cap G is removably secured over the plug F, said cap having orifices g g. A connecting-nipple a is provided by which the whole structure may be secured to the radiator and steam admitted thereby.

The operation of the device described is like that of other similar valves heretofore used and will be readily understood. If the radiator be cold, the air-outlet f' remains open. On the entrance of the steam the expansion of the thermostatic strip I pushes the valve d to its seat f, thereby closing the air-outlet f'. If water enters, it raises the float K, which likewise actuates the valve-closure D and seals the air-outlet f'.

Reference will now be made to the special features of construction constituting my improvement and the distinct and important advantages gained by their use.

Directly opposite the nipple a is a chamber a^3, formed by the extension of the base-walls a^4 and connecting with the base by the opening a^7. Within this chamber is a coiled thermostatic strip I, fastened at its inner or coiled end to the square pin H, which is secured in the walls a^4 of the chamber. The free end of said strip I extends through the opening a^7 to the center of the base A. A diaphragm C, having orifices c' to permit the free passage of steam and water into the dome E, is secured between the base A and the dome E. As shown, said diaphragm is held between the inner flange a^8 on the wall a^4 of the base and the end of the dome E, which has screw-threaded connection with the upper portion of the base. Said diaphragm has a central aperture c^2, through which the valve-stem d' passes and in which it is free to move and which forms a guide acting to maintain the lower end of said stem in position for contact with the upper side of the free end of the thermostatic strip I. The said diaphragm also serves to hold the valve-stem upright and the valve-closure always in position for accurate engagement with its seat. The float K is rigidly fastened to the upper portion of the valve-stem d', which passes through it, and it is thereby held from contact with the wall of the dome E. A vertical division-wall a' is arranged between the nipple a and the center of the base A. A horizontal extension a^5 from its top to the nearest portion of the wall a' forms a separate compartment a^9 in the base A. An aperture a^6 in this extension communicates with the dome E, and a tube B, of considerably smaller external diameter than the internal diameter of the nipple a, leads through the division-wall a' to a point beyond the outer end of the nipple a.

I will now indicate the advantages gained by these special forms of construction. In

the operation of valves of this description as hitherto made, so far as known to me, the water, entering the nipple *a* and rising in the base A, frequently seals the nipple *a* against the entrance of the steam. By the arrangement of the cross-walls *a'* and a^5 and the tube B and the orifice a^6 the steam readily passes into the dome E and forces the water out through the tube B, and the valve is thus effectually cleared.

In valves heretofore made the float K by contact with the walls of the dome E and the collection of water between them by capillary action is liable under some circumstances to seal the air-outlet *f* against the free passage of the air, and various channels and passages have been required and used to admit the steam above the float K. The necessity of these devices is obviated by the construction shown, whereby contact between the float and dome is prevented in all positions of the valve shown.

In the constructions hitherto made, so far as known to me, the form of strip used has not allowed any considerable freedom or ease of motion in the valve-stem. It is often desired to open the valve temporarily to ascertain if steam has entered the casing, and this is done by thrusting a pin or like implement against the upper end of the valve-plug, so as to throw it away from its seat. The opening of the valve in this manner can be accomplished with little pressure in the construction shown, by reason of the great degree of flexibility possessed by the thermostatic strip, by reason of its great length, made possible by its spiral form. The large surface exposed by this helical form of the thermostatic strip makes it very sensitive to the heat of the steam and insures positive and quick action of the valve.

The principal objection to valves hitherto constructed, so far as known to me, is the impeding of the passage of steam or air in the base or in the chamber into which the steam-inlet opens by the location therein of the thermostatic strip. By placing said strip in a chamber exterior to said base and remote from said steam-inlet free ingress and egress for the steam and air are obtained and the valve as a whole made more efficient and prompt in its action.

An important feature of my invention is embraced in the construction by which the chamber for the thermostatic strip is arranged on the side of the casing opposite the steam-inlet, so that the entering steam will enter the chamber and impinge on the strip within the same. This construction affords the advantage that the strip is heated when the steam first enters the casing, so that the air-valve will be certainly closed before the steam reaches said air-valve and before any considerable steam can escape from said valve.

I claim as my invention—

In a radiator-valve, the combination of a casing comprising a dome and a base, said base being provided with a vertical partition dividing it into a steam-inlet chamber and a chamber for the return of the water of condensation and also with a thermostatic chamber communicating with the last-named chamber, an air-valve, and a thermostat secured within the thermostatic chamber and adapted to operate said air-valve.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 17th day of April, A. D. 1900.

EVERETT P. ALLEN.

Witnesses:
C. CLARENCE POOLE,
TAYLOR E. BROWN.