Jan. 17, 1939. H. B. AHLBERG 2,144,097

BAFFLE CONSTRUCTION FOR AIR VALVES

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Fig.1.

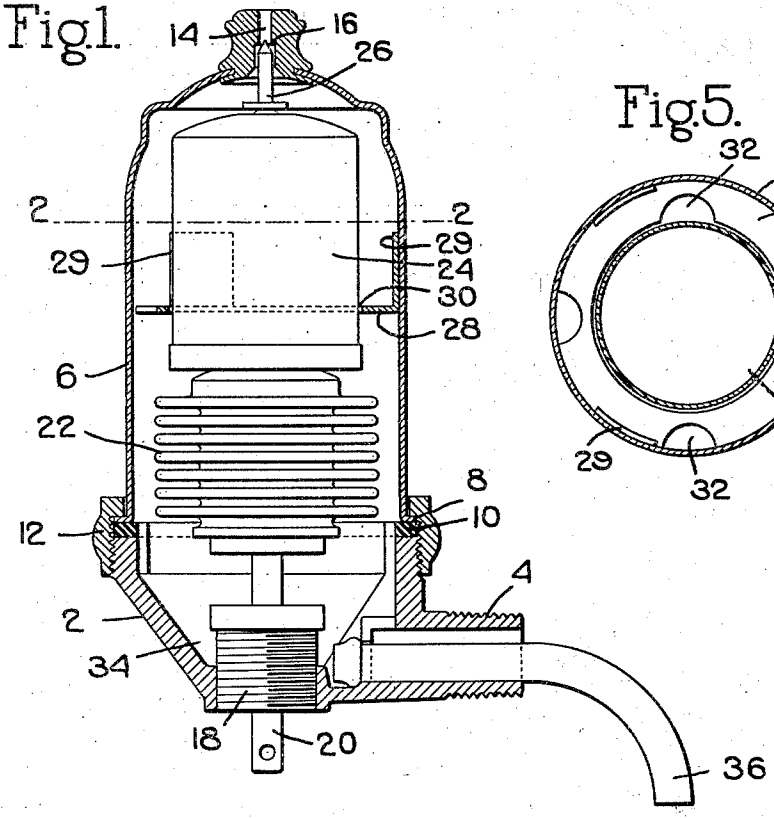


Fig.5.

Fig.2.

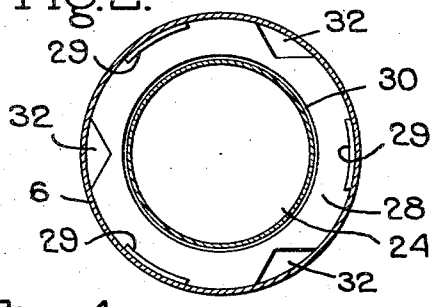


Fig.3.

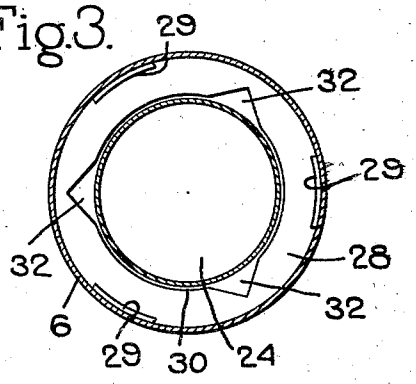
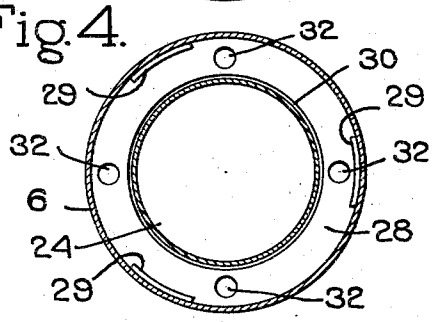


Fig.4.



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BAFFLE CONSTRUCTION FOR AIR VALVES

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7 Claims. (Cl. 137—122)

This invention pertains to air valves of the type commonly used for venting air from steam radiators used in heating systems.

Steam heating systems are usually either the so-called one-pipe system or the two-pipe system. In either case it is necessary that there be a vent on the radiator so that the entrapped air may have some means of escape ahead of the on-coming steam. Valves are, therefore, provided which permit the escape of air until such time as steam reaches the valve whereupon the temperature is raised to a predetermined point and the valve automatically closes.

Obviously, as steam reaches a cold radiator from the steam main or riser, condensation takes place rapidly, but as the radiator is gradually warmed, this condensation diminishes. However, there will always be a certain amount of condensate present in the escaping air as the steam and air are inevitably mixed.

As the air escapes from the radiator it carries with it some condensate in the form of finely divided particles of water. This, however, is not objectionable for the water promptly evaporates into the atmosphere of the room. It so happens, however, that due to the construction of the air venting valves that are in common use, water will gradually be collected therein from the saturated air passing therethrough. Ordinarily this condensate will drain back into the radiator from the air venting valve, but on occasion the air rushing from the radiator into the valve will pick up the condensate in such a way that it will be carried in a body as a slug of water to the vent of the valve, whereupon it is shot forcibly out of the valve to the damage of the floor and wall and sometimes even the ceiling of the room. Action of this type is called "spitting" and is considered objectionable by the users.

Various means have been proposed for overcoming the spitting tendency of valves, but as far as I am aware no really satisfactory means has been put in use as yet. Spitting is still common in both types of valves now in general use, that is, in the non-vacuum and vacuum types. My invention proposes a means whereby spitting is entirely overcome in both the aforementioned types of valves. My construction is easy to make and low in cost and may be used with any type of valve employing a thermostatic float or even an ordinary float which does not operate under the influence of heat.

Other objects and accomplishments of my invention will become apparent as the description proceeds with the aid of the accompanying drawing, in which;

Fig. 1 is a cross section of a typical vacuum type air valve, certain of the parts being shown in elevation;

Fig. 2 is a vertical section on the line 2—2 of Fig. 1 showing a preferred form of my baffle;

Figs. 3, 4, and 5 are views similar to Fig. 2 but showing modified forms of baffles.

Referring to Fig. 1, the vacuum valve which I have selected as being typical of current practice and in which I have incorporated my non-spitting mechanism comprises a base 2 having an externally threaded nipple 4 attached for connection with a radiator. A casing 6 has a flange 8 which rests on a gasket 10 mounted on base 2. These parts are all drawn together by the nut 12.

The upper end of casing 6 is provided with a port 14 terminating at its inner end in a valve seat 16. Centrally located in the base is an adjusting mechanism 18 which is used in varrying the effective venting area of the valve, but as it is not a part of this invention there is no need for describing it in detail. The adjusting mechanism 18 carries a hollow stem 20 on which is mounted a bellows 22.

The bellows, in turn, supports a thermostatic float 24 which has on its upper end a valve pin 26 positioned to engage valve seat 16. As the bellows 22 is rigidly connected with stem 20, no lateral support for the bellows is needed. On the other hand, however, the thermostatic float 24 must be guided in such a way that valve pin 26 will be centered with respect to port 14.

I provide guide means at the lower portion of float 24 in the form of a combination guide and water baffle 28 which in plan view may take the form shown in Figs. 2, 3, 4, and 5. It will be noticed that there is a small clearance 30 between the inner circumference of the baffle and the float which it is intended to guide. This clearance is ample to permit the passage of water saturated air. Additional passages 32 are also provided in the baffle for a purpose that will be apparent presently.

For ease in installing baffle 28 within casing 6, I have provided the three upturned legs 29, integral with the baffle 28 and which are arranged by virtue of the set originally given them to press outwardly against the inside of the casing. Thus there is ample frictional engagement between the legs and the casing to hold the baffle firmly in position. Other attaching

means could, of course, be used. For example, the baffle could be soldered in place.

Heretofore in valves of the type shown it has been customary to provide guide mechanism for the float either in the form of ribs extending inwardly from the wall of the casing or in the form of a strip of metal or wire positioned circumferentially within the casing but bent in such a way as to guide the float. When such means for guiding a float are used water which has accumulated at the bottom of base 2 as at 34 could be driven upwardly as a slug of water by on-coming air, past the float, and out the port 14. Thus the type of guide just described in no way prevented spitting.

Another form of guide that has been used provided an imperforate annular ring mounted within the casing about the lower part of the float leaving but small clearance between the ring and the float. This type of guide is adequate to prevent spitting but it has the following serious objection. The air escaping from the valve is saturated with water vapor, some of which condenses in the upper portion of the valve and collects on the upper side of the annular guide ring. The space between the guide ring and float, however, is so limited, if the guide ring is to perform properly its function as a guide, that the surface tension and capillary action of the water prevents its downward passage between the guide and float. Thus, in time, a considerable amount of water will accumulate above the guide ring and the valve will reach a condition commonly known as waterlogged, in which state proper functioning is prevented.

By my construction, however, I provide a combination baffle and guide means which permits passage of water saturated air and at the same time is of sufficient area to effectively check any slugs of water that might be driven upwardly toward port 14. The passages 32 are of such size that surface tension or capillary action will not be effective to prevent any condensate which may collect on the upper side of baffle 28 from readily running downwardly therethrough to re-collect in base 2 from which it may be drained back to the radiator through syphon tube 36.

While I have shown certain preferred forms of passages 32 which are adequate to cause breaking of the surface tension of the water, I wish it to be distinctly understood that other forms of openings may be used. A requisite of my invention is that the baffle in acting as a guide must fit the float 24 closely enough so as to keep it in satisfactory alignment but at the same time there must be no binding whatsoever between the guide and float. Another requisite is that the passage 32 must be adequate to permit the return of any condensate that may collect on top of the baffle but at the same time the passages must be small enough and so distributed that a slug of water, driven from the base 2 toward port 14, will be checked or broken up so that spitting will not take place. To effectively check spitting it is necessary that the water be delayed or diffused so that the air which is driving the water may get by and reach the port 14 first. This result, my combination baffle and guide effectively accomplishes.

While I have described my invention by reference to a preferred form I wish it to be distinctly understood that I do not intend to be limited thereby but only by the appended claims.

I claim:

1. In an air valve for steam radiators, in combination, a casing having an intake port and a vent, vent closing means comprising a float having a valve pin mounted thereon, and a guide means for said float, said guide means comprising an annular baffle positioned circumferentially within said casing and surrounding said float with slight clearance therebetween, said clearance being insufficient to permit free downward passage of water that may accumulate above said baffle, said baffle being cut away at a selected area to provide an opening large enough to permit free downward flow of water that may accumulate above said baffle, and resilient means for holding said baffle in place by frictional engagement with said casing.

2. In an air valve for use on steam radiators, in combination, a casing having an inlet and a vent, means for closing said vent including a float, a guide for said float in the form of an annular plate positioned within said casing, the inner curvilinear edge of said plate being closely adjacent said float, said plate having a plurality of openings of substantial area, the space between said inner curvilinear edge and said float being sufficiently small to retain water by capillary action, the said openings being large enough to prevent the retention of water by capillary action.

3. In an air valve for steam radiators, in combination, a casing having an intake port and a vent, vent-closing means comprising a float, guide means for said float, said guide means comprising a baffle interposed between said casing and said float, said baffle being annular in form and secured to said casing, the clearance between a major portion of the inner circumference of said baffle and float being substantially uniform but so narrow that condensate collected thereabove will not flow downwardly through said clearance, and openings in said baffle large enough to permit the downward flow of condensate, the total area of said baffle being sufficient to effectively check upward surges of water.

4. In an air valve for steam radiators, in combination, a casing having an intake port and a vent, vent-closing means comprising a float, guide means for said float, said guide means comprising a baffle interposed between said casing and said float, said baffle being annular in form and secured to said casing, the clearance between a major portion of the inner circumference of said baffle and float being substantially uniform but so narrow that condensate collected thereabove will not flow downwardly through said clearance, a minor portion of the inner circumference being cut away to form openings in said baffle large enough to permit the downward flow of condensate, the total area of said baffle being sufficient to effectively check upward surges of water.

5. In an air valve for steam radiators, in combination, a casing having an intake port and a vent, vent-closing means comprising a float, guide means for said float, said guide means comprising a baffle interposed between said casing and said float, said baffle being annular in form and secured to said casing, the clearance between a major portion of the inner circumference of said baffle and float being substantially uniform but so narrow that condensate collected thereabove will not flow downwardly through said clearance, a minor portion of the outer circumference being cut away to form openings in said baffle large enough to permit the downward flow of condensate, the total area of said baffle being sufficient to effectively check upward surges of water.

6. In an air valve for steam radiators, in com-

bination, a casing having an intake port and a vent, vent-closing means comprising a float, guide means for said float, said guide means comprising a baffle interposed between said casing and said float, said baffle being annular in form and secured to said casing, the clearance between a major portion of the inner circumference of said baffle and float being substantially uniform but so narrow that condensate collected thereabove will not flow downwardly through said clearance, said baffle having a plurality of small cut-away areas large enough to permit the downward passage of condensate but small enough in proportion to the area of said baffle so that said baffle is effective to check upward surges of water.

7. In an air valve for steam radiators, in combination, a casing having an intake port and a vent, vent closing means comprising a float, said casing and float forming relatively movable members, guide means for said float, said guide means comprising a baffle interposed between said relatively movable casing and float, said baffle being annular in form and secured to one of said relatively movable members, there being a clearance between the major portion of the free circumference of said baffle and the other member, said clearance being substantially uniform but so narrow that condensate collected thereabove will not flow downwardly through said clearance, and openings in said baffle large enough to permit the downward flow of condensate, the total area of said baffle being sufficient to effectively check upward surges of water.

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