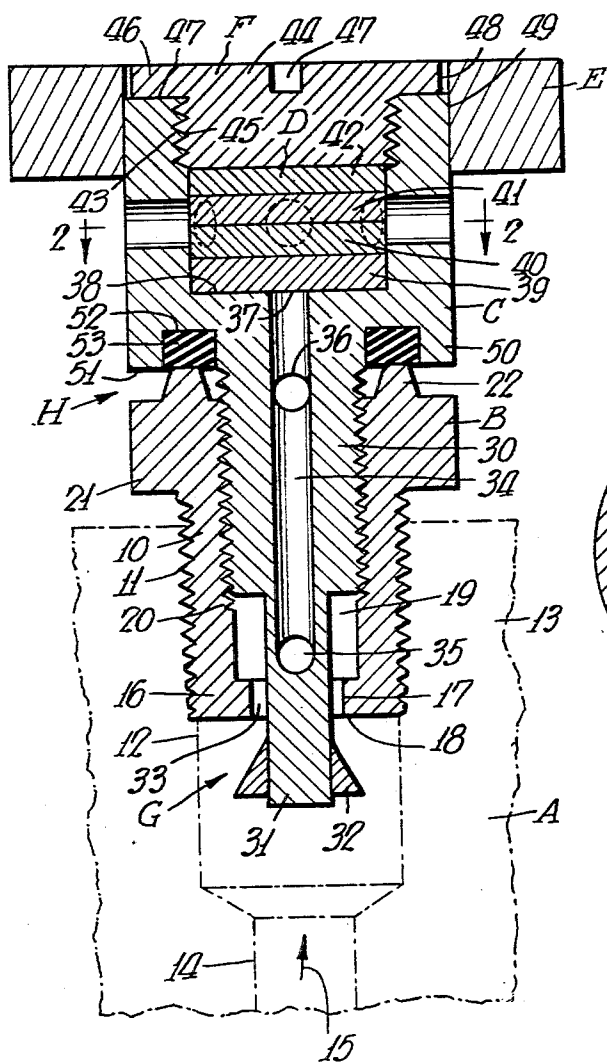


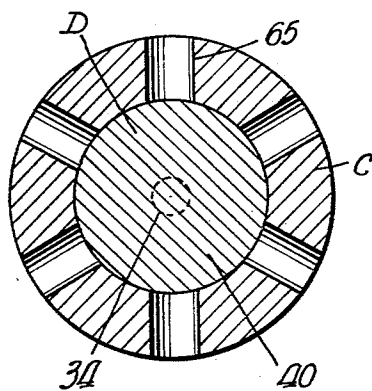
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Fig. 1.



Tig. 2.



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HYGROSCOPIC VALVE CONSTRUCTION

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The present invention relates to a hygroscopic valve construction and it particularly relates to a valve construction which may be utilized in connection with heating systems for households to permit ready escape of air but yet prevent escape of liquid or water from the heating system.

It is among the objects of the present invention to provide a novel hygroscopic valve construction for a radiator heating system which is particularly adapted for home use but which may also be utilized in an office, loft, factory or storage building, and which may be readily adjusted, constructed and installed.

Another object of the present invention is to provide a hygroscopic valve construction of simple construction which may be readily manufactured of few parts and which is readily applied to home radiators or similar radiator systems.

Still further objects and advantages will appear in the more detailed description set forth below, it being understood, however, that this more detailed description is given by way of illustration and explanation only and not by way of limitation, since various changes therein may be made by those skilled in the art without departing from the scope and spirit of the present invention.

In accomplishing the above objects it has been found most satisfactory to make the valve with a base cup receptacle having a threaded connection to be inserted upon an adaptor or other mounting upon the air outlet end of the radiator, and also provided with a hygroscopic disk carrying receptacle member having fluid and liquid connections to the radiator system.

In the preferred embodiment the main body portion is readily screwed into and out of the cup adaptor and the cup adaptor mounting is provided with lower and upper valving elements so that at each position of the inner dismountable stem there will be provided valving arrangements.

Desirably the interior structure is then provided with an insulating grip or handle member enabling it to be readily adjusted to open or closed position and it may be also provided with a detachable screw or cap for the chamber which receives the hygroscopic disks.

In one preferred embodiment the device may be readily manually vented by turning in one direction whereas it may be hygroscopically vented by turning in the other direction. At the same time the hygroscopic disks may be readily replaced by a sealing member and then remove the detachable cap which covers the chamber having the hygroscopic disks.

With the foregoing and other objects in view the invention consists of the novel construction, combination and arrangement of parts as hereinafter more specifically described, and illustrated in the accompanying drawings, wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which fall within the scope of the claims hereunto appended.

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In the drawings wherein like reference characters denote corresponding parts throughout the several views:

Fig. 1 is a transverse vertical longitudinal sectional view of the valve arrangement according to the present invention.

Fig. 2 is a transverse sectional view upon the line 2—2 of Fig. 1 upon a slightly increased scale as compared to Fig. 1.

Referring to Fig. 1 there is shown the main mounting or radiator structure A onto which or into which is screwed the valving cup B. Mounted in the valving cup B is the carrier member C which has a hygroscopic valve chamber D, an insulating handle E and a hygroscopic chamber cap F.

The carrier member C and the mounting cup B are provided with the lower valving arrangement G and the upper valving arrangement H.

As shown in Fig. 1 the cup B has the side wall 10 which is provided with an external thread 11 which is received in the socket 12 on the nipple 13 forming part of the radiator system.

The passageway 14 will communicate with the radiator system and at the commencement of operation either air or water will ascend the passageway 14 as indicated by the arrow 15.

The base 16 of the cup B has a central opening 17 the lower end 18 of which acts as a valve seal element. The cup B has an interior chamber 19 which is tapped or threaded at 20.

The upper portion of the mounting cap 10 has an enlarged head 21 which may be hexagonal or square shape to receive a wrench and enable the threaded portions at 11 and 12 to be firmly screwed together.

The head has an upwardly projecting ridge 22 which forms part of the valve arrangement H.

Received in the threaded chamber 19 is the reduced threaded lower portion 30 of the receptacle member C. This member 30 has a depending stem 31 having the conical valving ring 32 which cooperates with the seal 18 and forms the valving arrangement G.

The stem 31 is of less diameter than the opening of the passageway 17 so as to leave an annular space 33 through which the air or water may pass.

The lower portion of the cup as indicated at 19 will form a receptacle for such air or water as will pass through the annular opening 33.

Extending longitudinally or axially through the stem 31 and the body portion 30 is the passageway 34. The passageway 34 has a lower inlet transverse radial opening 35 communicating with the chamber 19, and it also has the upper transverse radial passageway 36.

The upper end 37 of the passageway will open into the lower portion 38 of the hygroscopic valve chamber D having the valve members 39, 40, 41 and 42.

The top of the hygroscopic valve chamber D is threaded as indicated at 43 to receive the plug 44 having the threaded lower portion 45 and the flange 46. The flange 46 when screwed down will abut the shoulder 47.

The center portion of the cap F has the fillister or Phillips slot 47.

It will be noted that the flange 46 terminates at 48 short of the outer diameter 49 of the upper enlarged portion 50 of the carrier member C.

The enlargement at 50 will form a shoulder 51 in which is positioned a groove 52 receiving the sealing ring 53. This sealing ring 53 will cooperate with the valve ridge 22 to form the valve arrangement H.

The chamber D is provided with a plurality of radial openings or bores 65 through which air may pass when being ejected from the radiator system as indicated by the arrow 15.

The insulating handle E is press-fitted or otherwise

permanently mounted upon the outer diameter 49 of the enlarged portion 50 of the carrier member C.

In the position shown the valve arrangement A is shown closed by turning the handle E in one direction, in which case the exit air or water must pass in the direction 15 through the annular area 33, the chamber 19, the radial passage 35, the bore 34, the chamber D and out through the opening 65.

Air will readily pass the hygroscopic disks 39, 40, 41 and 42 and out through the radial passageways 65 at the enlarged portion 50 of the carrier C.

However, when water ascends following the air, as indicated by the arrow 15, it will pass up through the bore 34 from the chamber 19 and as soon as it hits the disks 39 to 42 it will cause a swelling thereof which will seal the chamber D and prevent passage of any water therethrough thus effectively holding the hot water or mixture of water and steam within the radiator system and preventing escape thereof.

When it is desired to hand vent the system or to permit escape of air or water or both, the handle E may be turned so as to unseat the ridge 22 from the sealing insert 53. Then the air, or water, or both may be permitted to escape from the bore 34 through the radiator passage 36 and past the open valving arrangement H, thus by-passing the hygroscopic chamber D.

In this condition the valving ring 32 will not be moved up sufficiently to contact the seal 18.

Where it is desired to change the hygroscopic disks or to inspect the valving arrangement, the handle E is turned until the conical valving ring 32 contacts the valving edge 18 disconnecting the radiator system 14 from the valve. When this is done the plug D may be removed and the disks 39 to 42 may be removed for inspection or replacement.

It is also possible to clean the bore 34 as well as the passageway 65 and the valving arrangement H.

It will be noted that the arrangement shown is made of relatively few parts which may be readily machined. The basic parts are the brass, steel or aluminum cup B, the brass, steel or carrier elements E, the brass, steel and/or aluminum cup F and the plastic handle E.

The valve insert 53 as well as a conical valving ring 32 may be readily assembled to the other elements and the entire arrangement may be assembled with a minimum labor charge and is reliable in operation.

While there has herein been illustrated and described the preferred embodiment of the invention, it is to be understood that applicant does not limit himself to the precise construction herein disclosed, and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

Having now particularly described and ascertained the nature of the invention, and in what manner the same is to be performed, what is claimed is:

1. A manual-automatic venting valve of the hygroscopic type having an inside cup with an external threaded cylindrical wall for threading into a tapped socket in a radiator, said inside cup having a threaded interior and a central opening in its base establishing communication between the interior of the cup and the radiator, the outside peripheral edge of said opening serving as an inside

valve seat, the outer edge of the cup having an outwardly projecting circular ridge serving as an outside valve seat, and an outside cup having an elongated threaded and axially bored nipple threaded into said threaded interior, said threaded nipple having a reduced diameter elongation projecting through and beyond said central opening, the nipple bore extending partially into said elongation, said outside cup having a shoulder to act as a valve for said outside seat and said elongation having an enlargement to act as a valve for said inside seat, said outside cup receiving a plurality of superimposed hygroscopic fibrous disks and a plug in said cup to hold said disks in the cup, the bored nipple having a transverse passage to the bore adjacent said shoulder and the outside cup having a transverse passage adjacent said disks and the elongation having a transverse passage to that portion of the nipple bore extending thereto to establish communication from the radiator successively through the central opening, the inside cup, transverse elongation passage, the bored nipple, the outside cup and the transverse outside cup passage finally to the atmosphere.

2. The valve of claim 1, said outside cup having an annular insulating handle and a peripheral recess in the outside of its base at said shoulder to receive an annular valving member and said enlargement consisting of a frusto-conical valving member.

3. A hygroscopic valve construction including an upper cup having an insulating handle, a central recess in the cup, a threaded depending bottom projection, an axial bore extending from said recess partially into and through said projection, a conical valve, at the lower end of said projection, an annular recess in the bottom of the cup, an annular valve sealing gasket in the annular recess, a plurality of hygroscopic disks in the central recess and a compression fillister screw plug pressing down on said disks and closing said central recess; and a lower cup having a threaded interior recess receiving said threaded projection, a lower opening acting as a valve seat for said conical valve, said projection projecting downwardly beyond and through said lower opening, and said lower cup also having an outstanding top flange carrying an annular valving ridge seating on said annular gasket, the axial bore of said projection extending between the central recess of the upper cup and the interior recess of the lower cup and said upper cup having transverse radial bores leading into central recess and transverse passages extending through the threaded projection at and below the bottom of the cup and also at the portion of the said projection projecting through said lower opening to establish communication through said axial bore from said central recess to said lower opening and to the threaded interior recess of the lower cup.

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