April 11, 1939. G. SCOPPOLA 2,153,726

VENT DEVICE FOR HOT WATER HEATING APPARATUS

Filed Feb. 1, 1937

Fig. 1

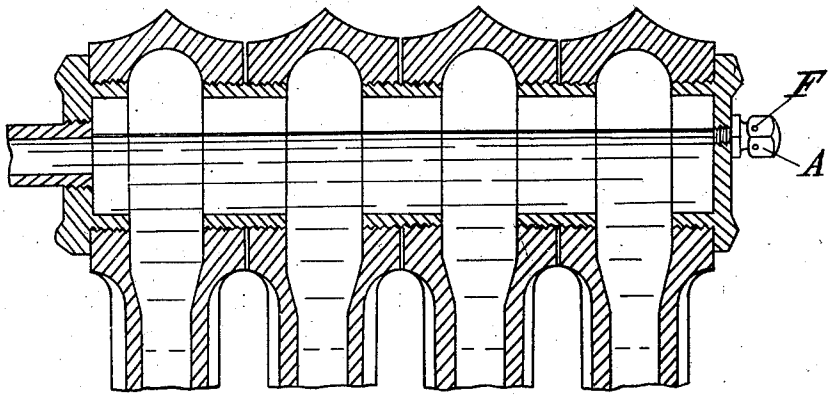


Fig. 2

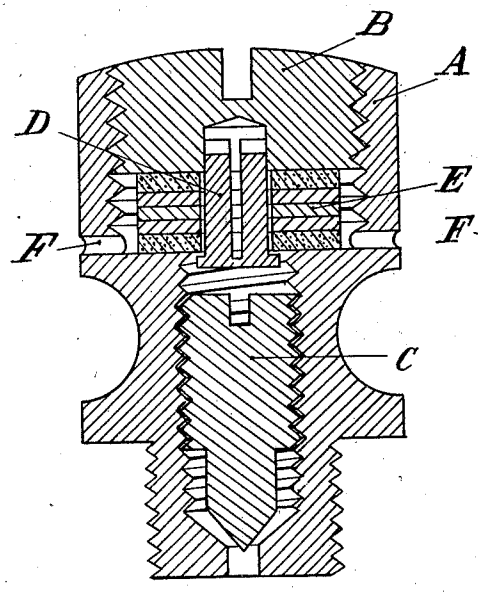
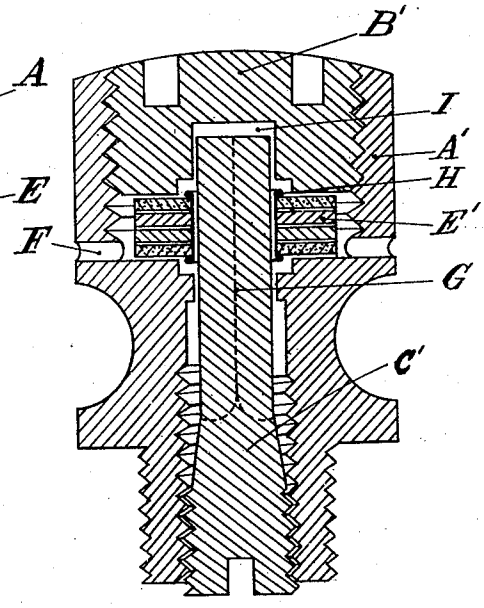


Fig. 3



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VENT DEVICE FOR HOT-WATER HEATING APPARATUS

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5 Claims. (Cl. 137—122)

In hot water heating apparatus there is known to occur the troublesome disadvantage that accumulations of air form at the highest points of the ribbed heating elements and of the pipes because the water always carries tiny bubbles of air with it which settle there.

These accumulations readily lead to interruptions of operation and usually require an attendant in charge of the apparatus to open valves, provided for this particular purpose, at intervals of about 14 days. When this is done, there often escape not only air but also water and the floor of the room becomes sprinkled with water.

The object of the present invention is to remove these disadvantages by an automatic exhaust valve for this accumulated air. The said valve eliminates labour of the periodical attention by the attendant and is essentially characterized in that it is provided with hygroscopic sealing material, which ensures the tight seating of the valve so long as it is moistened by water, while it permits the venting as soon as the accumulated air displaces the water to such an extent that drying of the hygroscopic material is possible.

Two forms of the valve in accordance with the invention are illustrated in the accompanying drawing as explanatory examples.

Figure 1 shows in section a ribbed heating element and the point at which the valve is preferably fitted.

Figure 2 is a longitudinal section through a first form of valve.

Figure 3 is a longitudinal section through a second form of the valve.

In the drawing, A represents the main body of the valve, which is provided with two internal sets of screw-threads, B represents an adjusting screw which in addition to the functions further to be described below, serves to close the valve from the outside. The hygroscopic sealing members are indicated by the reference E and the lateral vent holes by the reference F. In the form according to Figure 2, there is provided a safety screw C which must be closed while the seals E are being changed. The seals themselves are mounted upon a carrier D slotted axially in two orthogonal directions to provide a resilient member to be retained in place by the expansive force of the slotted cross-section exerted against the wall of a central bore of the adjusting screw B, the sealing rings lying in the space left between the outer adjusting screw B and the inner closing screw C, which space communicates with the atmosphere by way of the holes F.

In this form of construction the valve operates as follows:

It is assumed that the valve is fitted to a ribbed heating element in the position shown in Figure 1, which must naturally be done when the apparatus is empty.

The hot-water heating apparatus is then filled, the screws B and C being loosened sufficiently to allow the air to escape quickly.

After a time, the water reaches the level in the valve, as shown, and begins to seek a way between the threads of the valve and those of the screw C. It reaches the member D and proceeds by way of the internal slots thereof to the hygroscopic seals E, which expand and thus prevent any considerable escape of water. The screw B is then screwed in sufficiently to cause the slight escape of water to cease completely.

From this moment, the valve operates automatically for any future venting which may become necessary. If so much air accumulates that the level of the water sinks below that of the valve, the hygroscopic seals remain out of contact with the water and, after a certain time, which depends upon the sealing material used, become dry through evaporation and contract to allow the air accumulated in the ribbed heating element to escape. As soon as the water again reaches the level of the valve, the hygroscopic seals again become wet, swell and prevent the further escape of water and air into the atmosphere.

Once the screw B has been adjusted upon filling the apparatus, it requires no further attention since the opening and closing of the valve occurs automatically.

The safety screw C serves as a closure only for occasions when the seals must be changed; the water, if it is at the level shown in Figure 1, leaks past the threads between screw C and casing A in a small quantity so that it can easily be collected in a glass or like container when the plug B is being removed and before the plug C can be forced to its seat.

In the form shown in Figure 3, the inner safety screw C^1 has, at its upper part, the form of a square head which fits in a square internal recess I of the screw B^1. Below this square head of the screw C^1 is formed an annular tapering part G upon which the sealing members E^1 secured together by means of an annular carrier H are slidably supported thereon in the casing A^1. The device in this embodiment is assembled by

introducing first the screw C^1 into the casing A^1, then the carrier ring H with the discs E^1 is simply slid past the square head of the part G and finally the outer screw B^1 is screwed in the casing A^1 with the recess I lodged over the square head of the part G. Consequently as the threads of both screws B^1 and C^1 are of the same pitch, the screw C^1 will follow the screw B^1 in its movement and take up the position as shown in Figure 3. This closing screw C^1 is tapered at its lower end whereby the passage through body A may be closed when the closing screw C^1 is screwed further into the body A^1.

The mode of operation of this second form of construction corresponds exactly with that of the first form, so far as the automatic venting is concerned. The difference lies in the fact that unscrewing the adjusting screw B^1 causes the valve to become closed by the safety screw C^1. This may be of advantage if the seals are to be closed when the plant is under pressure. This form also has the advantage that air can be allowed to escape rapidly while the hot water pipes are being filled by merely loosening the screw B^1.

It is to be understood that the form of the valve in accordance with the invention, the number and the arrangement of its parts can be changed within the ambit of the invention. The essential feature is that the accumulated air is released by the successive contraction and expansion of the hygroscopic sealing members.

What I claim is:

1. Automatic air relief valve comprising a valve casing having a bore therethrough provided with inner and outer sets of internal screw threads, an inner screw plug engaging the inner set of threads, an outer screw plug engaging the outer set of threads, a space provided in the bore between said inner and outer plugs communicating with the atmosphere through openings in the wall of the casing, and hygroscopic sealing material placed in said space and subjected to an adjustable pressure by said outer screw plug.

2. Automatic air relief valve comprising a valve casing having a bore therethrough provided with inner and outer sets of internal screw threads, an inner screw plug engaging the inner set of threads, an outer screw plug engaging the outer set of threads, a space provided in the bore between said inner and outer plugs communicating with the atmosphere through openings in the wall of the casing, and hygroscopic sealing material placed in said space and compressible between the inner surface of said outer screw plug and a seating in the valve casing.

3. Automatic air relief valve comprising a valve casing having a bore therethrough provided with inner and outer sets of internal screw threads, an adjustable outer closing screw engaging in the outer set of internal screw threads, an inner safety closing screw engaging in the inner set of internal screw threads and adaptable to cut off communication between the inner end of said bore and the atmosphere, the space between the inner and outer closing screws communicating with the atmosphere by means of openings through the wall of the casing, and hygroscopic sealing material placed in said space and compressible between the inner surface of said outer closing screw and a seating in the valve casing.

4. Automatic air relief valve comprising a valve casing having a bore therethrough provided with inner and outer sets of internal screw threads, an adjustable outer closing screw engaging in the outer set of internal screw threads, an inner safety closing screw engaging in the inner set of internal screw threads and adaptable to cut off communication between the inner end of said bore and the atmosphere, the space between the inner and outer closing screws communicating with the atmosphere by means of openings through the wall of the casing, and hygroscopic sealing material mounted on a support slotted in a manner to exert expansive force against the walls of a central bore of the outer closing screw, said sealing material extending into the space between the inner and outer closing screws and being compressible between the inner surface of said outer closing screw and a seating in the valve casing.

5. Automatic air relief valve comprising a valve casing having a bore therethrough provided with inner and outer sets of internal screw threads, an adjustable outer closing screw engaging in the outer set of internal screw threads and having an internal square recess, an inner safety closing screw engaging in the inner set of internal screw threads and adaptable to cut off communication between the inner end of said bore and the atmosphere, the space between the inner and outer closing screws communicating with the atmosphere through openings in the wall of the casing, and hygroscopic sealing material securely mounted on an annular carrier, said inner safety closing screw having an annular tapering extension adapted to slidably support said annular carrier thereon and upon the upper part of which extension a square head is formed to fit said square recess in the outer closing screw, said sealing material being compressible between the inner surface of said outer closing screw and a seating in the valve casing.

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