Sept. 11, 1956 J. H. SCHMID ET AL 2,762,448

STEAM HEATED ROOF DRAIN

Filed Jan. 10, 1952 3 Sheets-Sheet 1

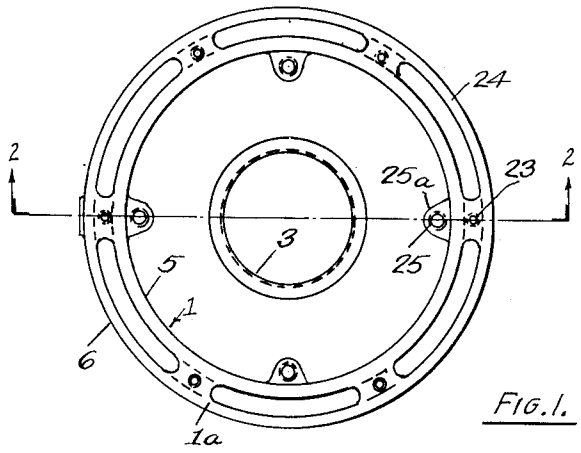


FIG. 1.

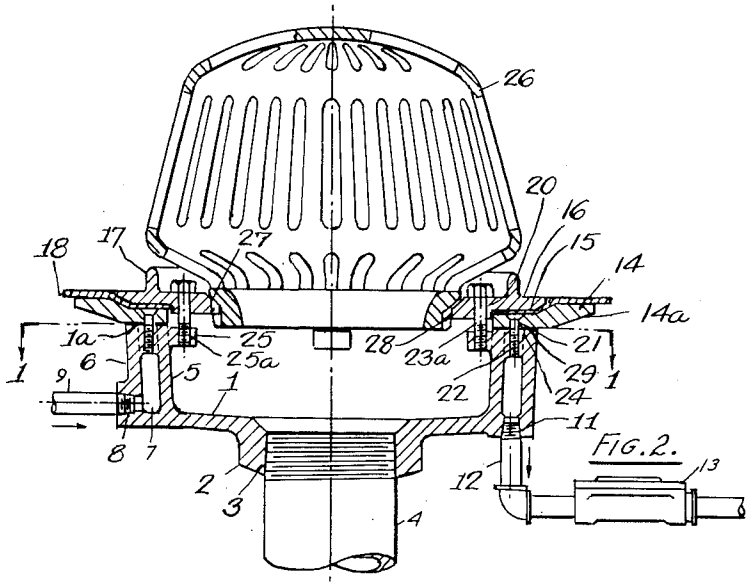


FIG. 2.

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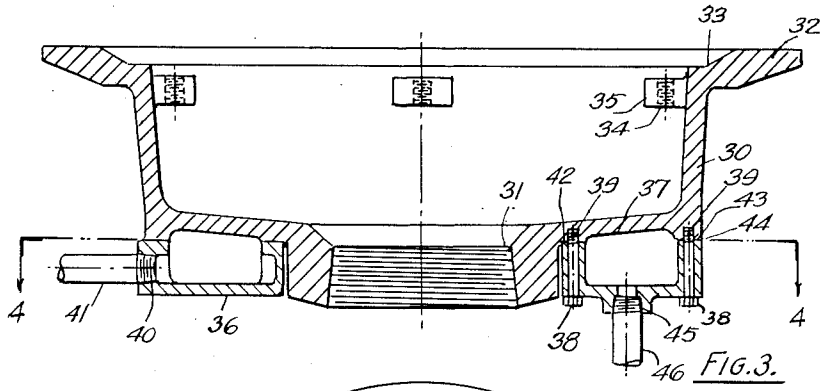


FIG. 3.

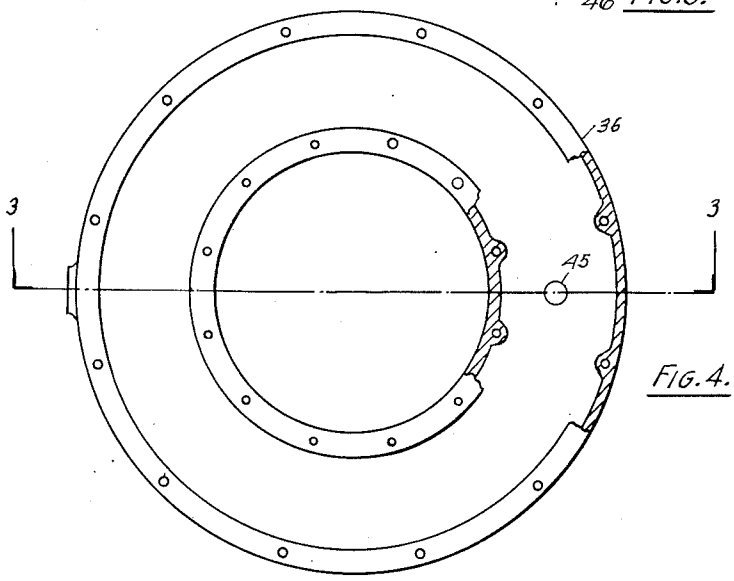


FIG. 4.

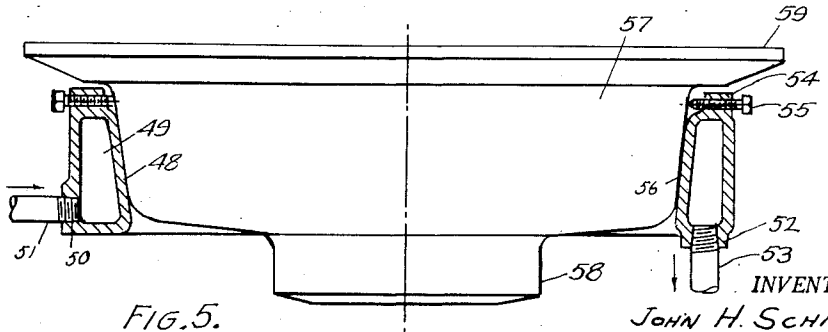


FIG. 5.

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Filed Jan. 10, 1952 3 Sheets-Sheet 3

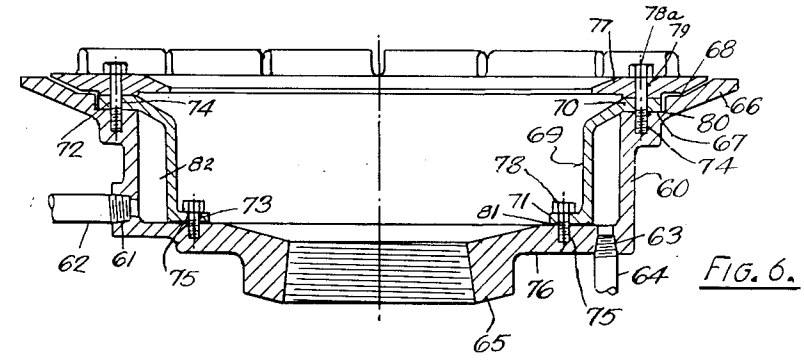


FIG. 6.

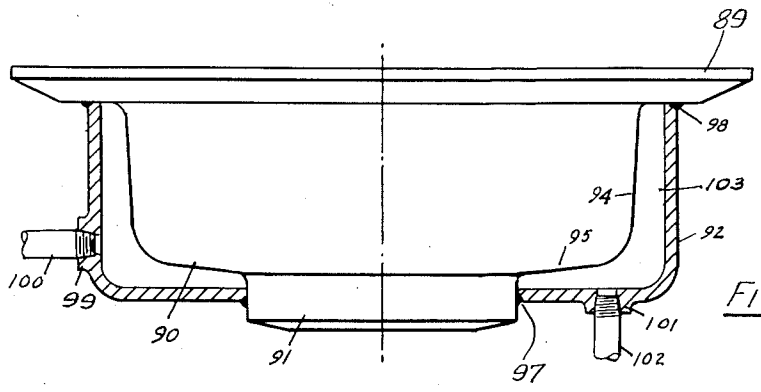


FIG. 7.

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STEAM HEATED ROOF DRAIN

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Application January 10, 1952, Serial No. 265,902

3 Claims. (Cl. 182—31)

This invention relates generally to non-freezing drains and it relates more particularly to steam heated roof and area drains.

In extremely cold climates, roof drains freeze over so that great accumulations of water remain on roofs in these areas. In some instances, a jet of live steam has been directed into the drain but the condensate rising through the dome of the drain freezes and ice caps the top of the drain which eventually clogs. Coils have been wrapped around the drain line leading from the drain but these have not been too efficient because there is poor conduction of the heat to the top of the drain. In both of these prior methods, especially when a direct jet of steam is used, the process is costly and much trouble is encountered.

It is, accordingly, an object of our invention to provide a non-freezing drain which is simple in construction, economical in cost, efficient in operation, easy to manufacture, and simple to install.

Another object of our invention is to provide a non-freezing drain with a steam jacket whereby the steam can be held therein at an elevated pressure to increase the efficiency of the drain.

Another object of our invention is to provide a steam jacket for a roof drain which may be utilized on present roof drains in use.

Another object of our invention is to provide a drain with a steam jacket whereby there is a maximum conduction of heat to all parts of the drain.

Other objects of our invention will become evident from the following detailed description, taken in conjunction with the accompanying drawings, in which

Fig. 1 is a view taken on the line 1—1 of Fig. 1 of our novel non-freezing roof and area drain;

Fig. 2 is a vertical sectional view of our novel non-freezing roof and area drain taken on the line 2—2 of Fig. 1;

Fig. 3 is a modified form of our novel roof and area drain taken on the line 3—3 of Fig. 4;

Fig. 4 is a view taken on the line 4—4 of Fig. 3;

Fig. 5 is a vertical sectional view of another form of steam jacket for a roof and area drain according to our novel invention;

Fig. 6 is a vertical sectional view of another form of our novel roof and area drain; and

Fig. 7 is a vertical sectional view of another form of steam jacket for a roof and area drain made according to our invention.

Referring now to the drawings, we shown in Figs. 1 and 2 a cup shaped reservatory 1 having a flanged outlet 2 internally threaded at 3 for connection to a threaded pipe line 4. The reservatory 1 has an inner wall 5 and an outer wall 6 spaced from each other defining an annular chamber 7 therebetween. The outer wall 6 has a threaded aperture 8 to which is connected an inlet pipe 9. On the opposite side of the chamber 7 to the aperture 8, a threaded outlet 11 extends downwardly from the chamber 7 to which is connected the threaded end of an

outlet pipe 12. A thermal trap 13 to maintain a given steam pressure in the chamber 7 is connected to the outlet pipe 12. The upper flat side 1*a* of the reservatory 1 as shown in Fig. 1 has an annular flange 14 with an outwardly extending tapered portion 14*a*, the flange 14 having an offset upper surface 15 for receiving a clamp 16 with an integral, upwardly extending gravel guard 17. The clamping collar 16 is utilized to clamp flashing 18 between the upper surface 15 of the flange 14 and the clamping collar 16. The flange 14 has circumferentially spaced apertures 21 through which extend threaded bolts 22 for threadable engagement with threaded apertures 23 in the upper face 24 of the reservatory 1. The clamping collar 16 has circumferentially spaced apertures 20 through which extend screw bolts 23*a* which threadably engage threaded apertures 25 in the inwardly extending lugs 25*a* on the inner side of the reservatory 1. A dome strainer 26 has a seating portion 27 for connection to the inner side 28 of the clamp 16, there being a bayonet connection therebetween. A suitable gasket 29 is disposed between the upper surface 1*a* and the flange 14.

The steam inlet aperture 8 is at the bottom of the steam chamber in order to minimize condensate settling in the bottom of the chamber 7. In operation, it is merely necessary to allow a low pressure steam to pass into the chamber 7 and remain therein under a given pressure as determined by the thermal trap 13 in the outlet line 12. Thus, maximum efficiency is obtained from the steam in that it is manitained at its maximum temperature. There is also good heat conduction from the reservatory 1 to the flange 14 and to the clamping collar 16, thereby clearing all ice and snow away from the entrance to the drain.

Figs. 3 and 4 show a modified form of our invention comprising a cup shaped reservatory 30 having a threaded flanged outlet 31 for connection to a pipe line (not shown). The reservatory 30 has an outwardly directed flange 32 on the upper side thereof which has an offset portion 33 to receive a clamp and a dome strainer similar to those shown in Figs. 1 and 2. The screw bolts 23*a* shown in Fig. 1 threadably engage the threaded apertures 34 in the inwardly extending lugs 35 in the reservatory 30 for the same purpose. An annular, generally U-shaped member 36 is disposed on the underside 37 of the reservatory 30 surrounding the depending flange 31 and it is connected to the bottom 37 of the reservatory 30 by screws bolts 38 which threadably engage threaded apertures 39 spaced circumferentially around the bottom of the reservatory 30 in radially spaced flat faces 42 and 43. Suitable gaskets 44 are disposed between the flat faces 42 and 43 and the upper faces of the member 36. The U-shaped member 36 has a laterally extending threaded inlet 40 on one side thereof for threadable engagement with an inlet pipe 41 for receiving steam under pressure and on the opposite side of the member 36 from the inlet 40, a threaded outlet aperture 45 extends downwardly and is threadably engaged with the threaded end of an outlet pipe 46 to drain off condensate and steam from the chamber formed by the member 36 and the underside 37 of the reservatory 30. The thermal trap 13 shown in Fig. 1 may be connected in the outlet line 46. The operation of this non-freezing drain is somewhat the same as the operation of the drain shown in Figs. 1 and 2 in that steam is admitted to the chamber formed by the member 36 and the underside 37 of the reservatory 30 and it remains therein under pressure wherein heat is conducted to all parts of the reservatory 30 and the clamp and dome strainer and other elements connected therewith.

Fig. 5 is another modified form of our invention which may be adapted for use with many of the roof drains now on the market. Fig. 5 shows a cup shaped reservatory 57 with a depending, internally threaded flange

58 for connection to an outlet pipe line (not shown) and an outwardly directed flange 59 on the upper side thereof, all being conventional construction of roof drains now in use. An annular, box-shaped member 48 with an inclined inner wall 56 has an internal chamber 49 with a threaded inlet at 50 for connection to a threaded inlet pipe 51 and a downwardly extending threaded outlet 52 for connection to a threaded outlet pipe 53. The member 48 has laterally extending threaded apertures 54 spaced circumferentially around the upper side thereof for receiving threaded bolts 55 with pointed ends for frictional engagement with the outer side of the reservatory 57 so as to hold the member 48 in a fixed position with reference to the side of the reservatory 57. The inner tapered wall 56 of the member 48 is tapered to correspond with the external taper of the reservatory 57. By having the inner wall 56 tapered, it will fit comparatively tightly on the outside of any tapered reservatory so that there is a good conduction of heat therebetween. The operation is the same as heretofore described with steam passing from the inlet pipe 51 into the chamber 49 to heat the reservatory 57 and the clamp, strainer, and other elements connected thereon and therewith and then passing out through the outlet 52 and the outlet pipe 53.

Fig. 6 shows another modified form of our novel non-freezing drain comprising a cup shaped reservatory 60 having a laterally extending threaded inlet 61 on one side thereof for connection to the threaded end of an inlet pipe 62 and a downwardly extending threaded aperture 63 in the bottom 76 of the reservatory 60 opposite to the inlet aperture 61 for threadable engagement with the threaded end of an outlet pipe 64. The reservatory 60 has a downwardly extending, internally threaded annular flange 65 for threadable engagement with the threaded end of a pipe line (not shown).

The reservatory 60 has an outwardly directed flange 66 on the upper end thereof with stepped, annular, flat surfaces 67 and 68 in a plane normal to the axis of the reservatory 60. An angularly offset annular member 69 has offset, parallel spaced, flanged portions 70 and 71 on opposite ends thereof, each flanged portion 70 and 71 having circumferentially spaced apertures 72 and 73 corresponding to circumferentially spaced, threaded apertures 74 and 75 in the stepped face 67 and the bottom 76 of the reservatory 60. The upper flange 70 seats on the stepped surface 67 and the lower flange 71 seats on the bottom 76 of the reservatory 60. Threaded bolts 78 extend through the apertures 73 in the bottom flange 71 to threadably engage the threaded apertures 75 in the bottom of the reservatory 60. A conventional flashing clamp 77 is mounted on the flange 70 of the member 69 and the flat surface 68 of the reservatory 60. Screw bolts 78*a* extend through circumferentially spaced apertures 79 in the clamp 77 and the apertures 72 in the flange 70 to threadably engage the threaded apertures 74 in the face 67 of the reservatory 60. Suitable annular gaskets 80 and 81 are disposed between the flanges 70 and 71 of the annular member 69 and the stepped annular surface 67 and the bottom of the reservatory 60, respectively. It will be evident that a drain of the type shown in Fig. 6 may be adapted for use without the member 69 by merely providing an annular ring instead of the flange 70 of the member 69. The member 69 and the inner side of the reservatory 60 form a chamber 82 for steam with an inlet aperture 61 and an outlet aperture 63. In operation, steam enters the chamber 82 from the steam inlet pipe 62 and passes through the chamber 82 and then through the outlet 63 in the outlet pipe 64. There is good heat conduction in this type of reservatory and it is not necessary that the heat be transferred through any non-conducting material in that it is metal to metal conduction.

Fig. 7 is another modified form of our non-freezing drain comprising a cup shaped reservatory 90 with an internally threaded, depending flanged portion 91 for connection to a pipe line (not shown). An outwardly directed flange 89 extends outwardly from the upper side of the reservatory 90 in a conventional manner. An annular member 92 with an angle shaped cross section is spaced outwardly from the outer side 94 and the bottom 95 of the reservatory 90 and it is connected to the outer side of the depending flanged portion 91 by welding at 97 to the underside of the flange 89 at 98. The member 92 has a laterally extending threaded inlet 99 for connection to the threaded end of an inlet steam pipe 100 and a downwardly extending outlet 101 on the opposite side thereof for connection to the threaded end of an outlet pipe 102. The operation is the same in this modification of our invention in that steam enters the chamber 103 mainly formed by the outer side of the reservatory 90 and the inner side of the member 92 through the inlet 99 to completely surround the body of the reservatory 90 to provide a maximum transfer of heat from the steam to the reservatory 90.

It will be evident from the foregoing description that we have provided a novel non-freezing drain with a steam chamber associated therewith so as to transfer a maximum amount of heat from the steam to the body of the drain, and it is of such construction that there is a maximum conduction of heat after it is transferred to the adjacent metal body of the drain.

Various changes may be made in the specific embodiment of our invention without departing from the spirit thereof or from the scope of the appended claims.

What we claim is:

1. A non-freezing roof and area drain comprising a cup shaped reservatory having a centrally disposed outlet in the bottom thereof and spaced sides having an annular chamber formed therein and extending around the periphery thereof, the outer of said sides having an inlet aperture and the bottom of said reservatory having an outlet aperture in communication with said chamber, an annular flange sealingly secured to the upper side of said reservatory, and a clamp secured to said reservatory for securing flashing between said flange and said clamp.

2. The roof drain recited in claim 1 wherein said chamber terminates at the upper edge thereof in a flat shoulder and said flange rests on said flat shoulder and is clamped thereto.

3. The roof drain recited in claim 1 wherein said chamber has spaced ears disposed around the upper inner periphery thereof and bolts extend through said clamp and engage threaded holes in said ears whereby said clamp is held on said flange.

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