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3,517,813

ROOF DRAIN

Filed Sept. 16, 1968

2 Sheets-Sheet 1

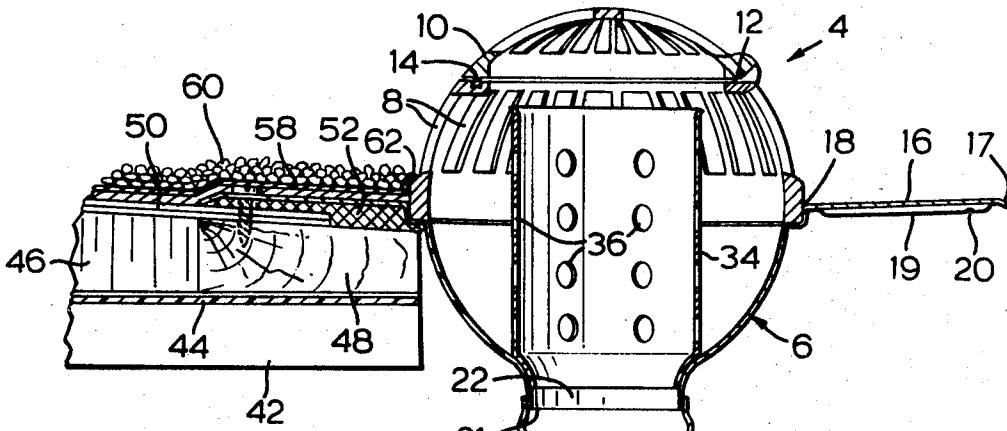


FIG. 1

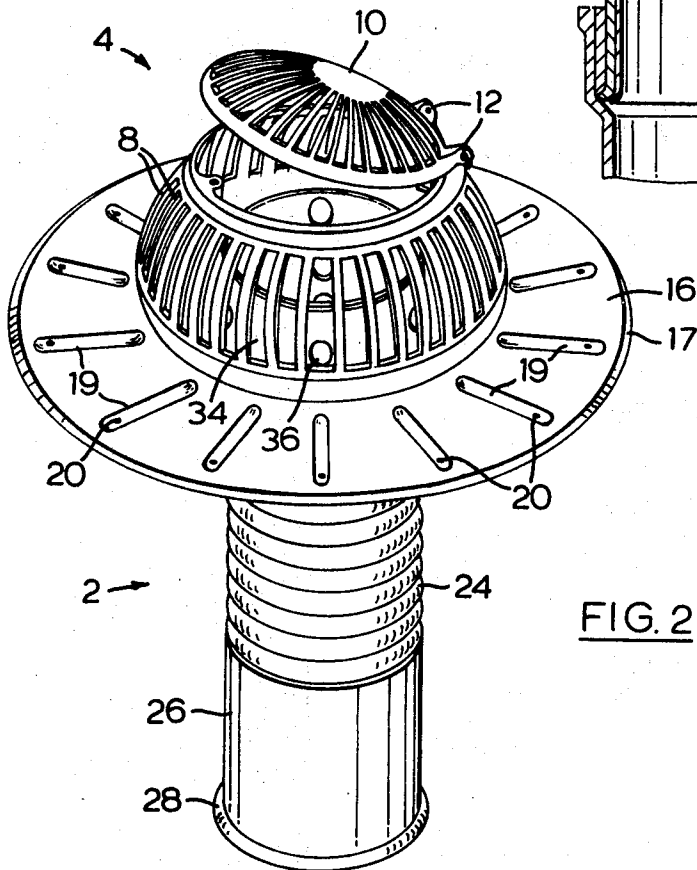


FIG. 2

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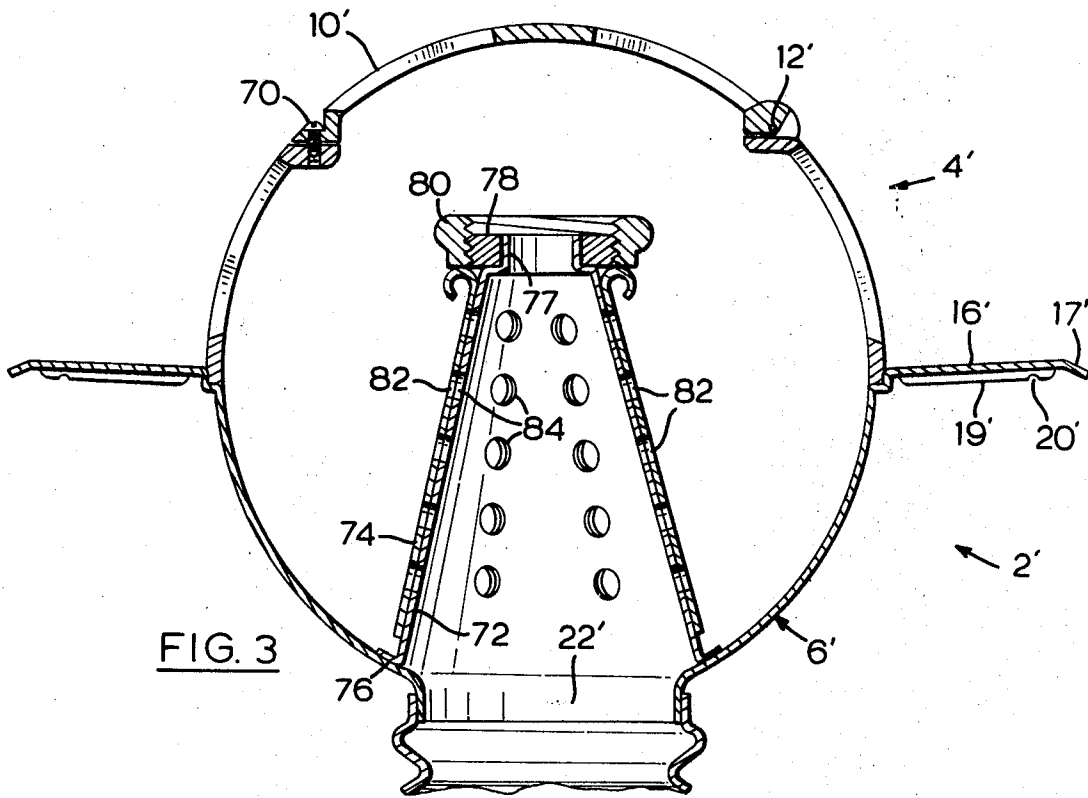


FIG. 3

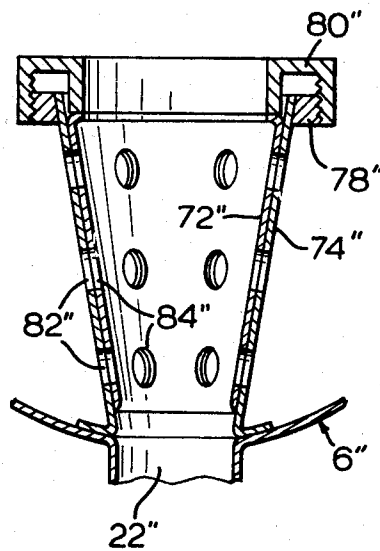


FIG. 4

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1

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**ROOF DRAIN**

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4 Claims

**ABSTRACT OF THE DISCLOSURE**

A roof drain having a spherical body with a hinged top permitting access to the body interior, a wide flange extending radially from the middle of the body to anchor the drain to a roof, and a corrugated metal expansion sleeve extending from a drain aperture at the bottom of the body for connection to a downpipe. Two concentric conical flow control sleeves, one fixed to the body and the other rotatable on the one, encircle the drain aperture. The fixed sleeve carries at its top a threaded bushing on which is screwed a nut which presses the rotatable sleeve against the fixed sleeve, to prevent unwanted rotation and to prevent water flow between the sleeves.

This invention relates to improvements in roof drains.

Roof drains are commonly used to protect the entrance of a downpipe from a building at the location where the downpipe connects with the roof of the building, to prevent leaves and other material from entering and clogging the downpipe as water drains from the roof. Roof drains commonly take the form of a grate structure mounted over the downpipe to protect the downpipe. This grate structure has in the past been rigidly connected to the roof and has usually extended downwardly to a rigid connection with the downpipe. Such a construction has led to difficulties because newly constructed buildings usually settle and shift over a period of time, and the original alignment between the roof and the downpipe can typically shift by as much as two inches in a horizontal direction and two inches in a vertical direction. Such shifting usually destroys or seriously damages conventional roof drain structures, and create gaps which cause water from the roof to leak at the drain location without passing through the downpipe. This water leakage is annoying and can cause damage to the building.

It is therefore an object of the present invention to provide an improved roof drain of simple construction which permits a substantial degree of relative movement, both horizontal and vertical, between the building roof and the downpipe without damage to the roof drain and without leakage.

In a typical embodiment, the invention provides a roof drain having: an enlarged upper body having a generally spherical upper dome having apertures therein, and a base below said dome and joined thereto, said base having a drain aperture at the bottom thereof, a flange encircling said upper body adjacent the middle thereof and extending substantially radially outwardly therefrom to support said upper body on a roof; and a corrugated flexible expansion sleeve of durable material joined to the bottom of said base and encircling said drain aperture therein, said expansion sleeve extending downwardly from said base to conduct water therefrom into a downpipe.

Further objects and advantages of the invention will appear from the following disclosure, taken together with the accompanying drawings, in which:

FIG. 1 is an elevation, in section, showing a roof drain according to the invention with one side of its main body illustrated as mounted in a roof;

FIG. 2 is a perspective view showing the roof drain of FIG. 1 with its top cap partly open;

2

FIG. 3 is an elevation, in section showing a modification of the roof drain of FIG. 2; and

FIG. 4 is an elevation, in section, showing modified flow control sleeves.

Referring to the drawings, there is shown a roof drain generally indicated at 2. The roof drain 2 has a main upper body having an upper dome 4 and a lower base 6. The dome 4 is typically made of brass and includes a number of slots 8 therein, the slots being widest (e.g. 1/2 inch) at their bottoms and tapering to a point at the top of the dome.

The dome 4 further includes a top cap 10 hinged at 12 to the remainder of the dome in order to permit access to the inside of the dome and the base. A stabilizing pin 14 near the periphery of the top cap 10 opposite the hinge 12 assists in ensuring alignment of the top cap with the remainder of the dome.

The base 6 is typically made of copper and has the general shape of an inverted dome. At its top, the base 6 includes a generally radially outward projecting flange 16 having a downwardly bent rim 17, the flange being used to support the roof drain in a roof, as will be described. The base 6 is permanently fastened to the dome 4 by soldering or continuous welding or the like as indicated at 18, in order to provide a water tight seal between the base and dome. If desired, the base and dome can be fabricated as one piece, but it is usually easier to fabricate them separately and join them as described.

In order to improve the connection of the roof drain to the roof, i.e. to improve the seal and provide greater rigidity, the flange 16 contains a number of radially extending grooves or downward depressions 19. Each groove 19 is about one-quarter inch deep and contains a hole 20 for a screw to fasten the roof drain to the roof.

At its bottom, the base 6 includes a rim 21 defining a drain aperture 22. Connected to the rim 21 is a corrugated copper expansion sleeve 24, the corrugated portion of which is typically about five inches in length. Sleeve 24 will expand and contract both horizontally and vertically to accommodate roof movement. The top of the expansion sleeve 24 is joined to the rim 21 by continuous welding or soldering or the like, so as to form a water tight seal.

The bottom of the expansion sleeve 24 is straight, rather than corrugated, and is joined by continuous welding or soldering to a brass ferrule or stiffening sleeve 26. The bottom of the sleeve 26 includes a bead 28 adapted to cooperate with a downpipe 30 and to form a seal therewith. Lead caulking will normally be inserted as shown at 32 to seal the joint between the sleeve 26 and the downpipe. The downpipe leads to a drain or storm sewer, or to the ground at a location away from the building, as desired.

The base 6 further includes a strainer sleeve 34, the bottom of this sleeve being continuously welded or soldered to the bottom part of the base so that the sleeve 34 encircles the drain aperture 22. Sleeve 34 contains holes 36 which permit water to flow from the roof through slots 8 to the drain aperture 22, and acts to stop leaves, etc. that pass through slots 8 from entering the downpipe.

The roof drain is typically connected to a roof in the manner shown in FIG. 1. A typical roof will include a roof deck 42, a vapour barrier 44, insulation 46, and a treated wood nailer or plywood anchor 48 encircling the aperture in the roof into which the roof drain is to be inserted. Built-up layers of waterproof roofing 50 usually rest on top of this structure.

The roof drain 2 is set with its flange 16 resting in a bed of plastic cement 52, the bent rim of the flange helping to contain the cement. Screws 54 are then inserted through the holes 20 (FIG. 2) in the flange 16 to hold

3

the roof drain down to the wood anchor 48. Two ply felt flashing 58 is then placed over the flange, and a conventional layer of stones and tar 60 is applied. Caulking 62 ensures a seal between the upper dome 4 and the flashing 58.

When the roof drain is initially installed, it is inserted as a unit, with the bottom sleeve 28 being pushed into the downpipe 30 as the roof drain 2 is pushed into position on the roof. Since the roof drain is a unitary structure, installation is extremely simple, there being no parts to assemble on the construction site. This has the additional advantage that there is no need to install the base and then the upper dome separately, and this reduces the likelihood that sand, gravel, etc. will enter the roof drain during installation and clog the drain.

Because of the expansion sleeve 24, the alignment of the roof with the downpipe 30 may shift to a substantial degree after installation without destruction of the drain. The wide flange 16 (typically about 4 inches in width) provides additional flexibility for the drain and also provides a good base for the flashing 58.

The hinging of the top cap 10 permits easy access to the interior of the dome for cleaning and at the same time ensures that the top cap will not be lost. The top cap also permits access to the strainer sleeve 34 for cleaning. The wide diameter of the upper dome and base (typically 10 inches at the middle level) allows substantial room for drainage without plugging, and the spacing of the middle level part of the dome and base from the strainer sleeve further reduces the likelihood of plugging.

Reference is next made to FIG. 3, in which primed reference numerals illustrate parts corresponding to those of FIGS. 1 and 2. The FIG. 3 embodiment is identical with the FIGS. 1 and 2 embodiments except for a screw 70 to hold down the top cap 10' (to prevent lifting of the top cap by children) and except for replacement of strainer sleeve 34 by cone-shaped flow control sleeves 72, 74.

The bottom of the inner control sleeve 72 encircles drain aperture 22' and is continuously welded or soldered at 76 to the bottom part of the base, as was the case for strainer sleeve 34. Sleeve 72 then extends upwardly, tapering as it rises, to its top. The top of sleeve 72 is inset as shown at 77 and the inset is encircled by a brass bushing 78 soldered to sleeve 72. Bushing 78 has a threaded outer surface onto which is screwed a brass nut 80.

The outer sleeve 74 has the same cone-shape as the inner sleeve 72 and is placed in position by opening the top cap 10', unscrewing and removing the nut 80, slipping the outer sleeve 74 over the inner sleeve 72 as illustrated, and then replacing the nut 80. The exterior diameter of the bushing 78 is slightly smaller than the interior diameter of the top of the outer sleeve 74, to permit removal and replacement of the outer sleeve e.g. for cleaning.

The flow control sleeves contain holes 82, 84 which may be aligned for conventional roof drainage, misaligned for roof flooding, and partially misaligned for control of the rate of flow from the roof. For full roof drainage, the top cap 10' is opened; the outer sleeve 74 is rotated so that its holes are aligned with those in the inner sleeve 72, and nut 80 is then tightened to press outer sleeve 74 against inner sleeve 72, to prevent unwanted rotation of the outer sleeve.

For roof flooding, nut 80 is loosened, outer sleeve 74 is pulled slightly upwardly to free it from inner sleeve 72, and outer sleeve 74 is then rotated until its holes are misaligned with those in the inner sleeve. The nut 80 is then tightened, forcing outer sleeve 74 downwardly so that its inner surface presses tightly against the exterior of inner sleeve 72. This prevents water from making its way between holes 87, 84 in the sleeves, permitting roof flooding. The top of nut 80 is typically located about two inches above the finished roof level, which permits flood-

4

ing to a depth of two inches (after which water overflows the sleeves and runs down through the downpipe). To improve the watertightness of the seal between sleeves 72, 74 the inner surface of sleeve 74 and the outer surface of sleeve 72 may be sprayed with a thin rubberized weather resistant compound, such as neoprene rubber.

If desired, the cone arrangement of the flow control sleeves may be turned upside down, as shown in FIG. 4 where double primed reference numerals indicate corresponding parts. In this case the bushing 78'' is soldered to the outer sleeve 74'' and the nut 80'' presses down against the inner sleeve 72'', the inner sleeve here being the rotatable sleeve.

What I claim as my invention is:

1. A roof drain having an upper strainer portion having apertures therein, a lower base joined to said upper strainer portion, said base having a drain aperture at its bottom, means for supporting said roof drain on a roof, and adjustable flow control means for controlling flow of water into said drain aperture, said flow control means comprising: a first conical sleeve fixed to said base and encircling said drain aperture, said first sleeve extending substantially above the level of the lowest apertures in said upper strainer portion, a second conical sleeve fitted snugly over said first conical sleeve from above said first conical sleeve so that said second conical sleeve is removable by lifting it upwardly, a part of said upper strainer portion being removable to leave an access aperture of diameter sufficient for said first conical sleeve to be lifted therethrough, said sleeves having matching holes therein and said second sleeve being rotatable on said first sleeve so that the rate of flow of water from said strainer portion into said aperture in said base can be adjusted by rotation of said second sleeve on said first sleeve until said holes are aligned to a selected degree, and co-operating fastening means connected to one of said sleeves and co-operable with the other of said sleeves for pressing said second sleeve downwardly against said first sleeve to tighten said second sleeve against said first sleeve.

2. A roof drain according to claim 1 wherein said sleeves taper upwardly, said first sleeve being an inner sleeve and said second sleeve being an outer sleeve, said fastening means including a bushing fixed to the top of said first sleeve and having a threaded exterior of diameter less than the interior diameter of the top of said second sleeve, and a nut on said bushing, said nut having a lower surface adapted to press against the top of said second sleeve when said nut is screwed downwardly, to press said second sleeve against said first sleeve.

3. A roof drain according to claim 1 wherein said sleeves taper downwardly, said first sleeve affixed to said base being an outer sleeve and said second sleeve being an inner sleeve.

4. A roof drain according to claim 2 including a sleeve of durable material joined to the bottom of said base and encircling said drain aperture therein, said sleeve having a corrugated flexible portion extending downwardly to a substantial extent from said base to conduct water therefrom, said sleeve also having a lower cylindrical portion below said corrugated portion and integral with said corrugated portion, and a further sleeve of stiffening material encircling said lower cylindrical portion and connected therewith and adapted to be connected to said downpipe.

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