

[54] ROOF DRAIN ARRANGEMENT

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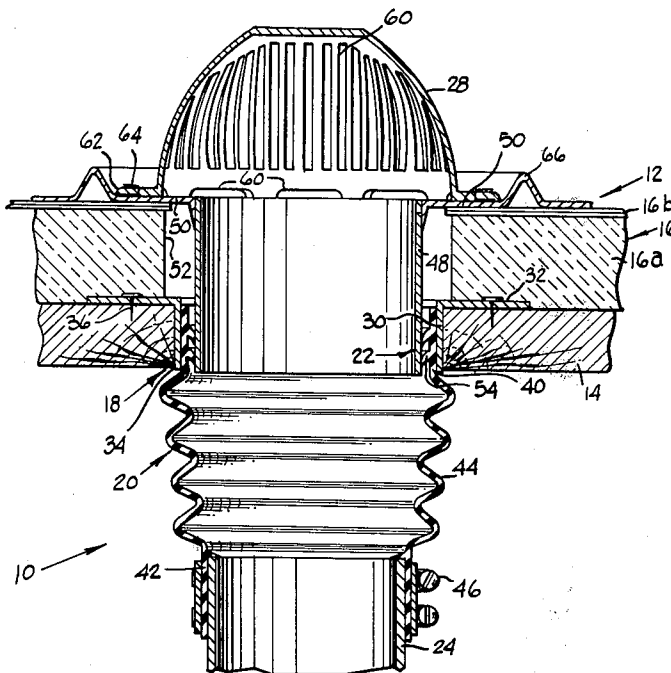
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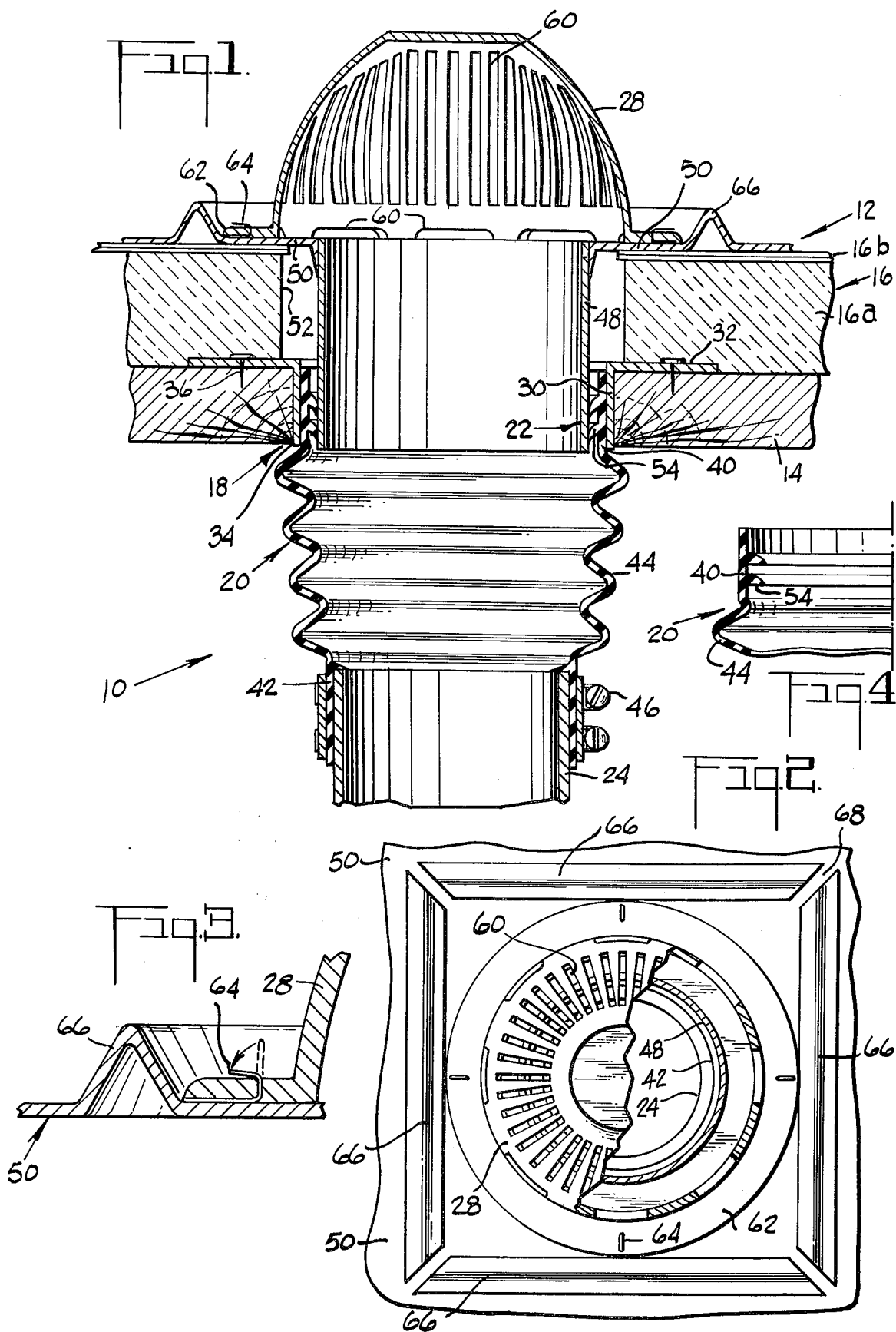
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ABSTRACT

A roof drain arrangement for use in a roofing system including a horizontal roof deck and a built-up roof thereon is disclosed herein. The arrangement includes a vertical roof deck connector, a tubular drain pipe connector, and a vertically extending and vertically adjustable drain tube. The arrangement also includes a strainer located over and around the top end of the drain tube.

8 Claims, 4 Drawing Figures





ROOF DRAIN ARRANGEMENT

BACKGROUND OF THE INVENTION

The present invention relates generally to drain arrangements and more particularly to a specific roof drain arrangement for use in a built-up roofing system.

Roof drains for use in built-up roofing systems are well known in the art. One common type of drain arrangement includes a drain tube which extends through an opening in the built-up roof and roof deck and which is held in position by nailing or otherwise fastening a flange at the top end of the tube to the upper surface of the built-up roof. The bottom end of the drain tube is connected to a drain pipe located below the deck. One drawback with this type of arrangement is that it is designed for a roof deck and built-up roof of particular thicknesses and cannot be readily adjusted to compensate for variations in the thickness of the roof deck and/or built-up roof. For example, if the built-up roofing system is thicker than that for which the drain tube is designed, additional tube sections may be required. Another drawback resides in the fact that the drain tube is directly fastened by means of, for example, nails to the built-up roof. This is not desirable, if it can be avoided, since the nails or other such fastening means could be a possible source of leakage through the built-up roof and/or damage generally.

BRIEF SUMMARY OF THE INVENTION

An object of the present invention is to provide a roof drain arrangement for use in a built-up roofing system, which arrangement is uncomplicated in design and economically provided.

Another object of the present invention is to provide a roof drain arrangement which can be readily assembled in the field and which, once assembled, remains reliably in place.

Still another object of the present invention is to provide a roof drain arrangement which is compatible with roofing systems of variable thicknesses.

Yet another object of the present invention is to provide a roof drain arrangement which, to be assembled in place, does not require direct fastening through the built-up roof membrane comprising part of the roofing system.

The foregoing objects as well as other objects and features of the present invention are attained by the provision of a specifically designed roof drain arrangement for use in, for example, a roofing system including a horizontal roof deck and a built-up roof thereon. The arrangement includes a tubular roof deck connector flanged at its top end, a tubular drain pipe connector, preferably constructed of resilient material and preferably including a bellowed section for providing lateral and longitudinal flexibility, and a roof drain tube also flanged at its top end to provide a roof drain flashing with an integral gravel stop.

The tubular roof deck connector extends downwardly through an opening in the roof deck and is held in place by securing its top flanged end to the top surface of the deck. The drain pipe connector has a top end portion which is located concentrically within and fixedly connected to the tubular deck connector, its bottom end being adapted for connection to a drain pipe located below the deck. The drain tube extends downwardly through an opening in the built-up roof and includes a bottom portion which is located concen-

trically within the top portion of the drain pipe connector. The top flanged end of the drain tube, which comprises the roof drain flashing, is spaced vertically above the flanged end of the deck connector and, in fact, rests on the top surface of the built-up roof. To secure the drain tube in position, the roof drain arrangement includes resilient ridge means fixedly connected with the internal surface of the drain pipe connector, preferably integrally formed therewith, for allowing the bottom portion of the drain tube to be readily inserted into the drain pipe connector and, once inserted, for providing a secure connection to prevent its removal therefrom. In a preferred embodiment, these ridge means provide a waterproof seal between the drain tube and drain pipe connector. The arrangement also includes a strainer located over and around the top end of the drain tube.

The components just described provide a roof drain arrangement which can be readily assembled in the field regardless of reasonable variations in the thickness of the particular roofing system in which the arrangement is to be assembled, without requiring additional components. The components described also provide an arrangement which does not require direct fastening through the built-up roof membrane comprising part of the roofing system. Other features of this roof drain arrangement will become apparent hereinafter as the arrangement is described in more detail.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a vertical cross-sectional view of a roof drain arrangement which is constructed in accordance with the present invention and which is shown assembled in a roofing system.

FIG. 2 is a top plan view of the arrangement of FIG. 1.

FIG. 3 illustrates a detail in the arrangement of FIG. 1.

FIG. 4 is a diametral, cross-sectional view illustrating a preferred embodiment of one component of the arrangement of FIG. 1.

DETAILED DESCRIPTION AND PREFERRED EMBODIMENTS

Turning now to the drawing, wherein like components are designated by like reference numerals throughout the four figures, a roof drain arrangement, constructed in accordance with the present invention, is illustrated in FIG. 1 and generally designated by the reference numeral 10. Arrangement 10 is shown assembled in place in a roofing system generally designated by the reference numeral 12. The roofing system includes a horizontally extending roof deck 14 and may include a built-up roof 16 comprised of, for example, roof insulation 16a and a roof membrane 16b located directly over the deck and/or other components, as is well known.

Arrangement 10 is comprised of three main components, i.e., a roof deck connector 18, a drain pipe connector 20, and a drain tube 22 including a roof drain flashing. As will be more apparent hereinafter, these components cooperate with one another to provide an uncomplicated and economically produced drain arrangement which can be easily assembled into a new or existing roofing system and which, in a preferred embodiment, can be readily connected to a new or existing drain pipe located below roof deck 14, for example,

drain pipe 24 illustrated in FIG. 1. As will also become more apparent hereinafter, these components, i.e., deck connector 18, drain pipe connector, and drain tube 22, cooperate in a way which allows the arrangement to be assembled in place regardless of reasonable variations in the thickness of roofing system 12, without the necessity of additional components, and also allows the arrangement, specifically the drain tube and roof drain flashing, to be assembled without it being directly fastened through built-up roof 16, specifically membrane 16b.

As stated above, roof drain arrangement 10 includes deck connector 18, drain pipe connector 20, and drain tube 22. Arrangement 10 also includes a strainer 26 which will be discussed hereinafter. However, attention is first directed to deck connector 18 which, as shown in FIG. 1, includes a tubular section 30, preferably cylindrical, and a flange 32 extending radially outwardly from and circumscribing the top end of tubular section 30. As illustrated in FIG. 1, flange 32 is positioned directly on the top surface of deck 14 around an opening 34 through the latter and is fixedly attached to the deck by suitable means such as screws or nails 36. Tubular section 30 extends vertically downwardly through opening 34 and well beyond the top surface of deck 14, preferably beyond the bottom surface thereof. Deck connector 18 may be constructed of any suitable material and is preferably constructed of metal integrally formed to provide sleeve 30 and flange 32.

Drain pipe connector 20 is also tubular in shape and includes a top portion 40, a bottom portion 42, and an intermediate portion 44. Top portion 40 is positioned concentrically within sleeve 30 of deck connector 18, as shown in FIG. 1, and is fixedly connected to the internal surface of the sleeve by suitable means such as, for example, adhesive. The bottom portion 42 of the drain pipe connector is positioned concentrically around the top end of drain pipe 24 and is fixedly attached thereto by suitable means such as, for example, a conventional draw band 46.

The intermediate section 44 of drain pipe connector 20 is preferably bellowed, as illustrated in FIG. 1. In this regard, the entire drain pipe connector is preferably an integral component constructed of a flexible material such as, for example, an elastomer. By providing bellowed section 44, the entire drain pipe connector is not only capable of bending and stretching laterally but is also capable of stretching lengthwise a substantial distance. This provides several distinct advantages. First, it allows the drain pipe connector to be easily connected to the drain pipe regardless of reasonable variations in the distance between the drain pipe and the deck connector or misalignment therebetween, without utilizing additional tubular extensions. Second, should the building settle or otherwise shift causing a change in alignment between the deck connector and drain pipe, drain pipe connector 20 will compensate for the change in alignment without placing any substantial stress on the deck connector or, as will become apparent below, on the drain tube 22.

Drain tube 22 which, like deck connector 18, is preferably constructed of metal or other suitable material includes a tubular sleeve 48, preferably cylindrical, and a flange 50 connected with and circumscribing the top end of the sleeve. The flange, which is a roof drain flashing for the overall arrangement 10, may be an integral part of the sleeve or, as shown, it may be soldered

thereto. As seen in FIG. 1, flange 50 rests in an unconnected fashion on the top surface of built-up roof 16, vertically spaced above flange 32 of deck connector 18. The flange extends completely around an opening 52 through the built-up roof, the opening being located directly above opening 34 in deck 14. Sleeve 48 extends vertically downwardly through opening 52 and includes a bottom portion which is located concentrically within top portion 40 of drain pipe connector 20.

As generally stated previously, arrangement 10 includes resilient means fixedly connected with drain pipe connector 20 for allowing the bottom portion of drain tube 22, i.e., the bottom portion of sleeve 48, to be readily inserted into the top portion of the drain connector and, once inserted, for preventing it from being easily removed. As seen in FIGS. 1 and 4, the means to accomplish this includes a number of resilient gripping elements 54 which preferably comprise an integral part of the drain pipe connector and which completely circumscribe the internal surface of the latter, the gripping elements being axially spaced from one another. Each gripping member is thickest at its base, i.e., where it joins the internal surface of drain pipe connector 20, and tapers down in thickness towards its free end.

Each circumferential gripping element extends a sufficient distance into upper portion 40 of the drain pipe connector so that, when the gripping element is in its normal position (See FIG. 4), its free end is located within the path taken by the drain tube when the latter is inserted into upper portion 40 (See FIG. 1). Hence, as sleeve 48 of the drain tube is inserted into position, as shown in FIG. 1, it engages against the circumferential gripping elements causing the latter to flex downwards, i.e., in the direction of movement of sleeve 48 around the latter. This flexing of the gripping elements allows the sleeve to be readily inserted in place. However, once the sleeve is in position, the circumferential gripping elements now flexed downward prevent the sleeve from being readily removed out the top end of the drain pipe connector.

Note that the circumferential gripping elements not only hold sleeve 48 in place within the top section 40 of drain pipe connector 20, but also hold flange 50 in place against the top surface of built-up roof 16 without requiring any direct fastening to the built-up roof. In this regard, while the gripping elements have been described as completely circumscribing the internal surface of upper section 40 and while this is preferred as they form a watertight seal between the drain tube and drain pipe connector, it is to be understood that they could be discontinuous or of other configurations so long as they allow the drain tube to be readily assembled and, once in place, prevent the drain tube from being displaced.

As stated previously, arrangement 10 also includes a strainer 28 located over and around the top end of drain tube 22. This strainer may be of any conventional type including suitable openings 60 allowing water to drain therethrough and a flanged surface 62 which rests on that portion of flange 50 adjacent to and circumscribing the top opening in drain tube 22.

While there are a number of ways to hold strainer 28 in the position just described, in accordance with a preferred way, arrangement 10 includes a number of metal hooks 64. Each of these hooks is soldered at one end to the top surface of flange 50 and extends through an

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opening in the flange 62 and over the top surface of the latter, as illustrated best in FIG. 3. In actual practice, each hook 64 is constructed of a pliable metal which can be readily bent into a U-shaped configuration from a straight configuration. In this way, the metal can be initially bent into an L-shaped configuration, shown by dotted lines in FIG. 3, one portion of the L being soldered to flange 50 and the other being positioned through the opening in flange 62. Thereafter, the unsoldered portion of the L is bent back over the flange, as indicated by the arrow in FIG. 3.

Arrangement 10 also includes a gravel stop 66 extending circumferentially around strainer 28 to prevent gravel, typically provided on top of a builtup roof, from reaching and plugging up the openings 60 in strainer 28. While any suitable gravel stop may be provided, gravel stop 66 preferably comprises an integrally formed raised portion of flange 50, as best seen in FIGS. 1 and 3. As seen best in FIG. 2, gravel stop 66, which is shown essentially square in configuration but which is not limited to this configuration, does not extend continuously around strainer 28 but is rather discontinuous. More specifically, openings 68 are provided between sections of the gravel stop and extend down to the level of the flat portion of flange 50, thus allowing water at levels below the top of the gravel stop to pass through the openings and into the strainer.

What I claim is:

1. In a roofing system including a horizontal roof deck and a built-up roof thereon, a roof drain arrangement comprising:
 - a. a vertically extending tubular deck connector extending downwardly from the top surface of said deck through an opening therein, said tubular deck connector including horizontal flange means located at its top end fastened to the top surface of said deck;
 - b. a tubular drain pipe connector having a top vertically extending end portion located concentrically within at least a portion of said tubular deck connector and fixedly connected with an internal circumferential surface thereof, said tubular drain pipe connector extending out the bottom end of said tubular deck connector;
 - c. a vertically extending tubular drain member having a bottom portion located concentrically within said top portion of said tubular drain pipe connector,

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said tubular drain member including horizontal flange means vertically spaced above said flange means of said tubular deck connector such that said built-up roof is located therebetween;

- d. resilient means fixedly connected with the internal surface of the top end portion of said tubular drain pipe connector for allowing said bottom portion of said tubular drain member to be readily inserted within said top end portion of said drain pipe connector and, once inserted, for preventing its removal out the top end of said drain pipe connector; and

- e. a strainer located over and around the top end of said tubular drain member.

2. An arrangement according to claim 1 wherein said tubular drain pipe connector is constructed of a flexible material and wherein said resilient means is integrally formed with said tubular drain pipe connector.

3. An arrangement according to claim 2 wherein said resilient means comprises at least one resilient ring concentric with said tubular drain pipe connector and extending into said drain pipe connector, said ring having an axial thickness which decreases in the direction of the axis of said drain pipe connector.

4. An arrangement according to claim 3 wherein said tubular drain pipe connector includes a longitudinally belloyed section.

5. An arrangement according to claim 1 wherein the horizontal flange means of said tubular drain member includes an integrally formed raised section extending completely around said strainer, said raised section comprising discontinuous segments defining openings therebetween for the passage of water.

6. An arrangement according to claim 1 including hook means fixedly connected with the flange means of said tubular drain member and interlocked with said strainer for holding said strainer in place over and around the top end of said tubular drain member.

7. An arrangement according to claim 1 wherein said flange means of said drain member rests against said built-up roof in an unfastened manner.

8. An arrangement according to claim 2 wherein said resilient means comprises at least one resilient ring concentric with said tubular drain pipe connector, said ring forming a watertight seal between said drain pipe connector and said tubular drain member.

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