



US 20020100224A1

(19) **United States**

(12) **Patent Application Publication**  
**Martin**

(10) **Pub. No.: US 2002/0100224 A1**

(43) **Pub. Date: Aug. 1, 2002**

(54) **ROOF DRAIN**

(52) **U.S. Cl. .... 52/14; 52/39**

(75) **Inventor: Rene Martin, Sillery (CA)**

(57) **ABSTRACT**

Correspondence Address:

**Allison C. Collard**  
**Collard & Roe, P.C.**  
**1077 Northern Boulevard**  
**Roslyn, NY 11576 (US)**

(73) **Assignee: 2857-1107 QUEBEC INC.**

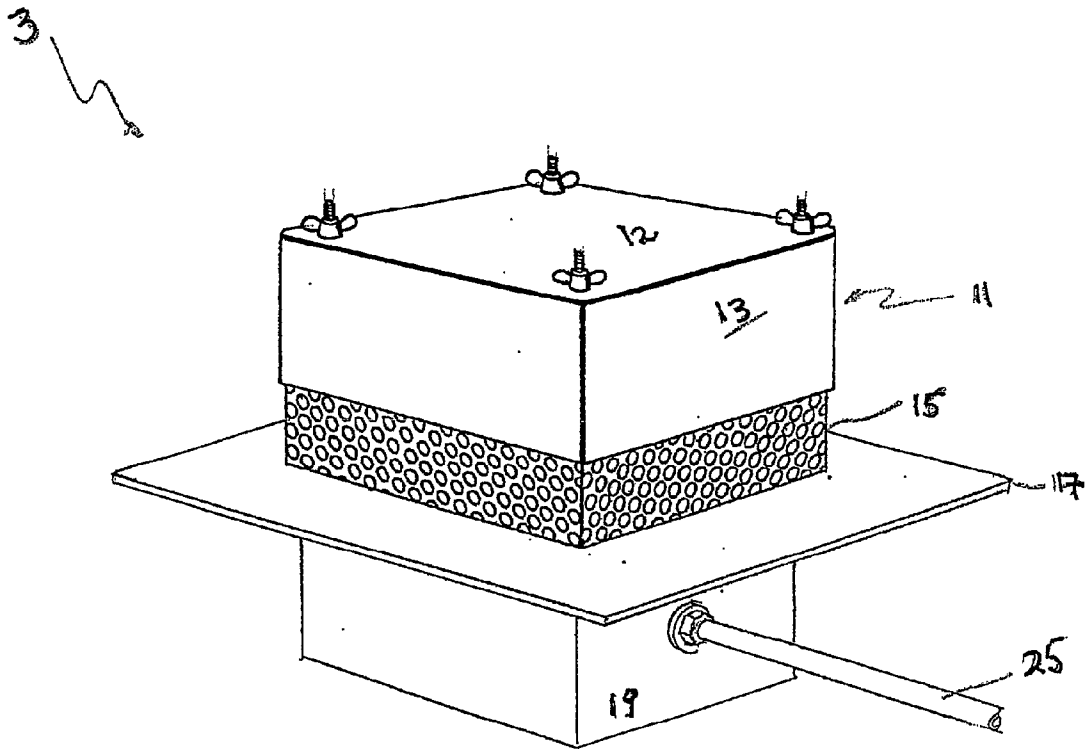
(21) **Appl. No.: 09/770,953**

(22) **Filed: Jan. 26, 2001**

A flat roof structure having a recess with a surrounding area in which is mounted a drain for evacuating standing water on the flat roof. The drain including a housing extending upwardly and outwardly from the flat roof, a sump extending downwardly and inside the flat roof, a liquid pump for draining the water collected from the flat roof, a discharge line connected to the liquid pump and being located in the sump of the drain. The discharge line passing through one of the four walls of the sump, thus allowing it to extend under the flat roof and inside the building. The drain also including a heating element for keeping the standing water collected in the sump in a substantially liquid state within the drain so as to allow continuous discharging of the collected standing water even in sub-zero weather conditions.

**Publication Classification**

(51) **Int. Cl.<sup>7</sup> ..... E03F 5/14**



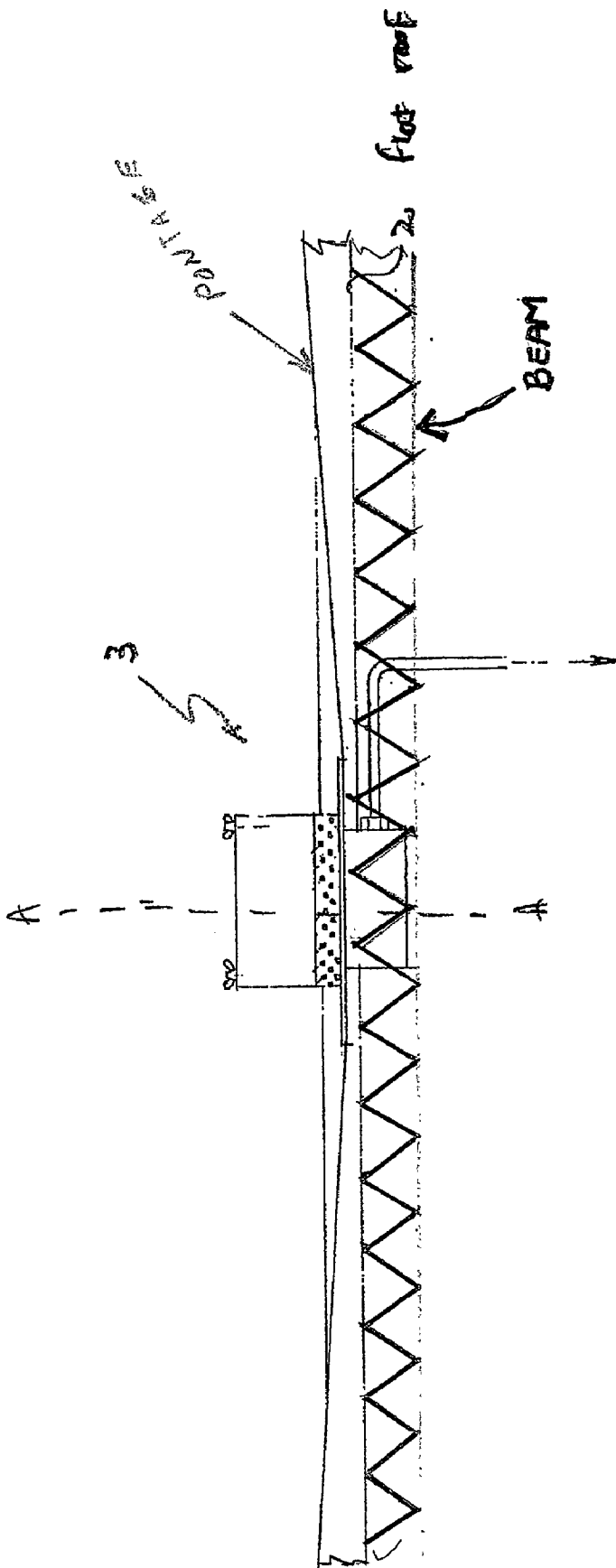


FIG. 1

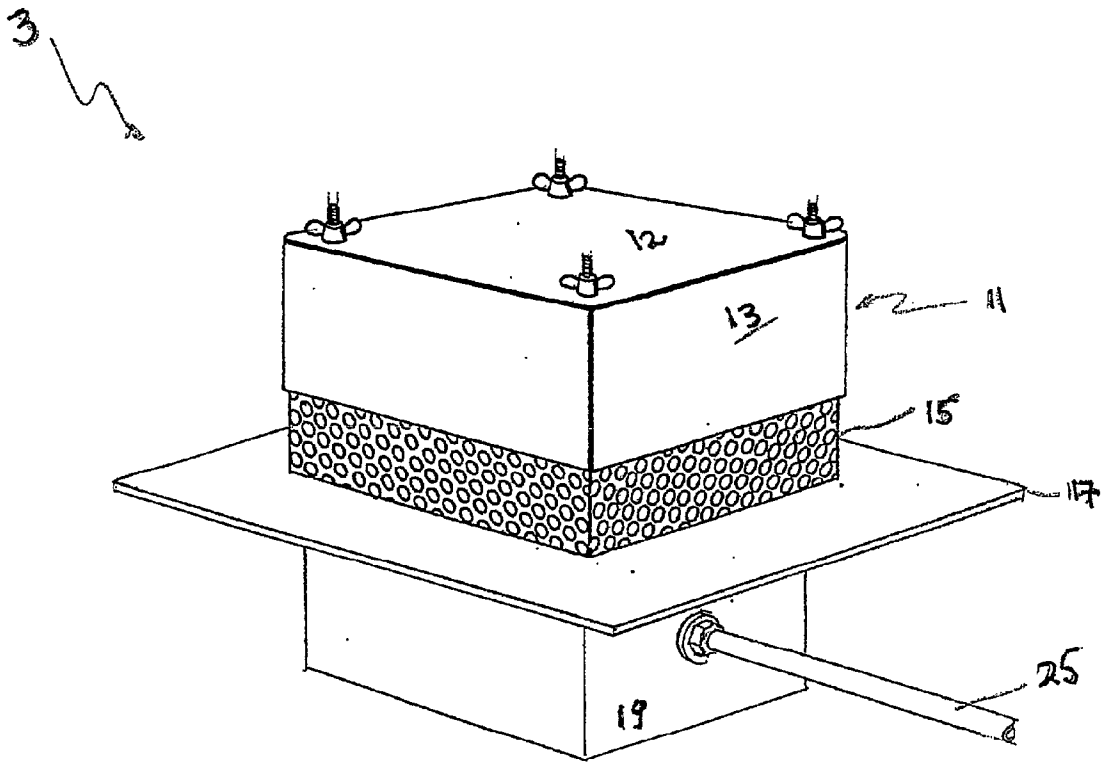


FIG. 2

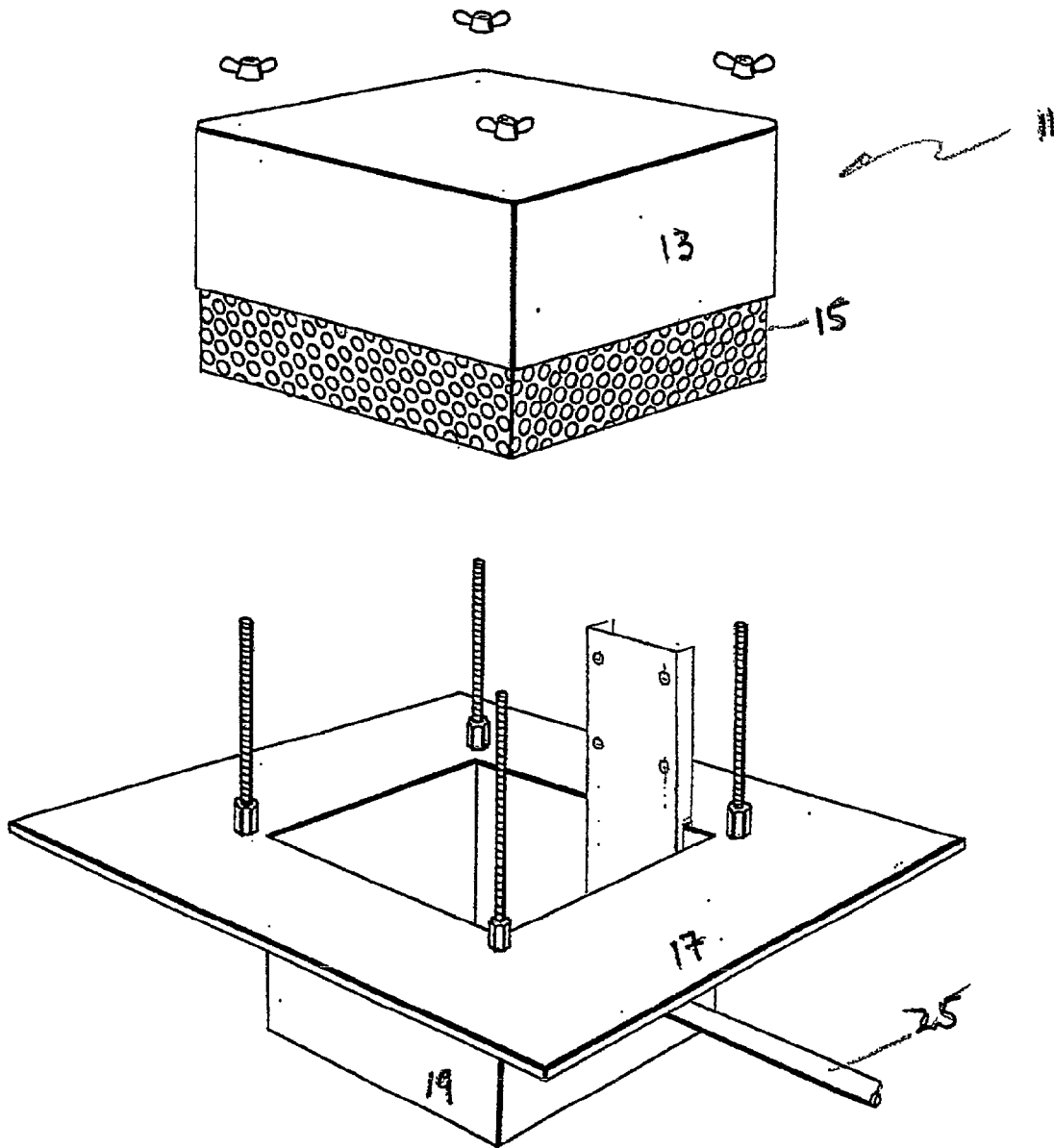


FIG. 3

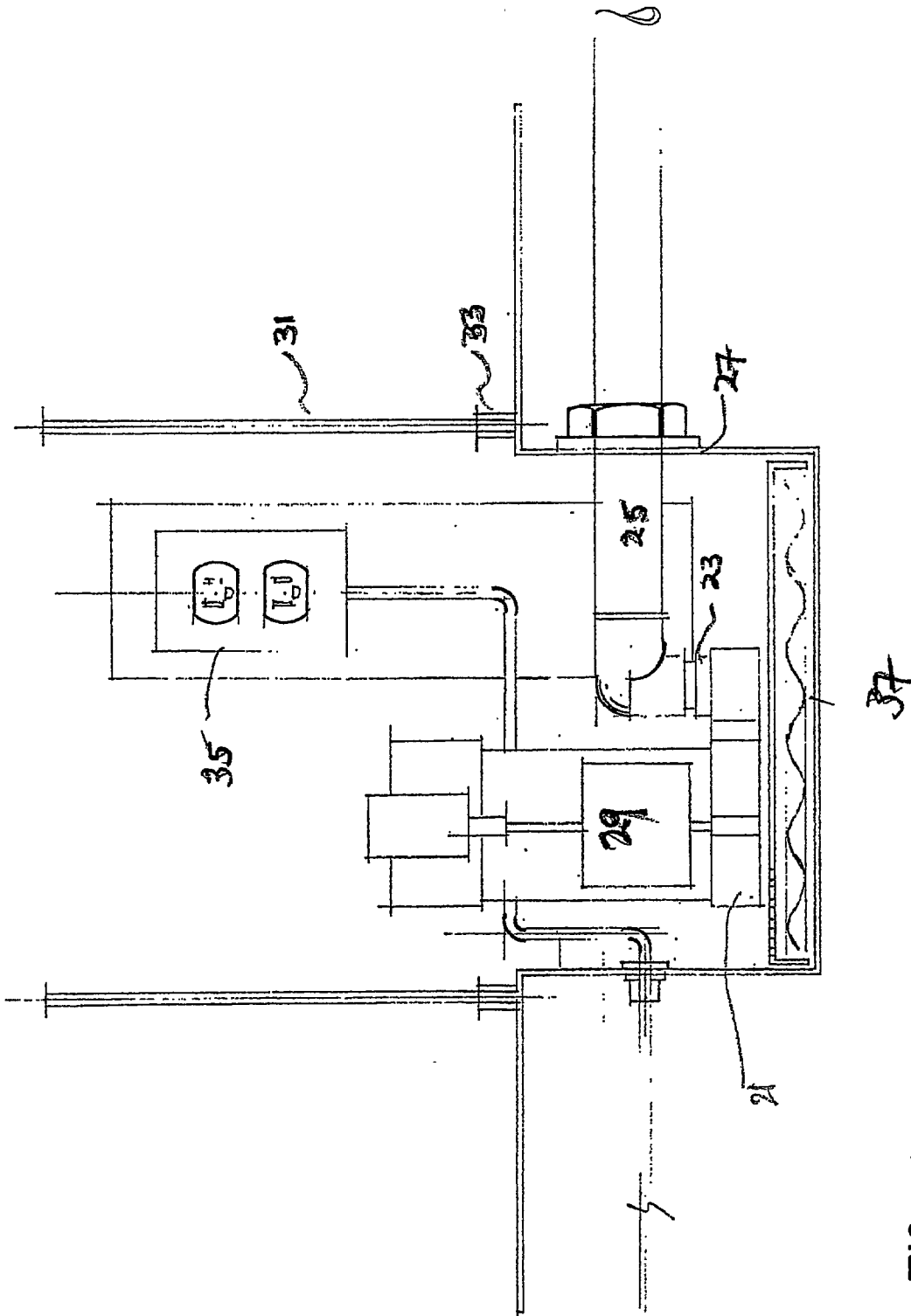


FIG. 4

## ROOF DRAIN

### FIELD OF THE INVENTION

[0001] The present invention generally relates to a flat roof structure comprising a drain having a discharge line extending under the flat roof.

### BACKGROUND OF THE INVENTION

[0002] There are numerous buildings having a flat roof. Such a structure present some inconvenience since it is predisposed to hold and accumulate rain, snow and various other things like fallen leaves and debris thereon. The so accumulated rain, snow or debris may contribute and even speed up the formation of low spots. Indeed snow or rain may easily accumulate on the surface of the roof, which may settle after a short period. As a result, the natural processes of deterioration of the roof may be speeded up, thereby significantly shortening the lifetime of the roof.

[0003] To overcome the above-identified problem, several types of drains have been devised to operate on a flat roof.

[0004] By way of example, U.S. Pat. No. 3,757,812 (DUNCAN) is concerned with a flat roof drain. The drain is adapted to sit on a roof so as to exhaust water from the roof through a main discharge line leading from the outside surface of the roof. The drain basically comprises a housing having a perforated low area to allow the accumulated water to seep in. The drain further comprises inside the housing, a pump for evacuating the water, a float for sensing the level of the water accumulated within the housing. The float is electrically connected to the pump so to activate or deactivate the pump in accordance with the water level inside the housing. A discharge line is fitted through one side of the housing and extends over the side of a building. A potential problem with such a drain is that since they are exposed on the outside of the roof. When the temperature reaches freezing point, it may cause the water trapped in the discharge lines to solidify thereby causing the lines to jam and/or swell and burst. Further more, being exposed to the outside environment, the discharge lines are more susceptible to be damaged by bad weather, fallen debris or the like.

[0005] U.S. Pat. No. 4,248,258 (DEVITT) is concerned with a flat roof auxiliary drain system. This drain system is solar powered. This system was designed basically to provide a drain that does not require electrical connection to the electrical circuit of the building on which it is installed and to supplement an existing drain system.

[0006] U.S. Pat. Nos. 5,063,959; 5,179,969; and 5,394,657 are concerned with a siphon head for use on a flat roof. Several piping may extend from the siphon head and lead downward through an exterior wall inside the building ultimately to the outlet or drain.

### SUMMARY OF THE INVENTION

[0007] A first object of the present invention is to provide a flat roof structure having a drain that may efficiently exhaust water in sub-zero conditions.

[0008] A second object of the present invention is to provide a flat roof structure having an automated flat roof drain for eliminating accumulated water thereon.

[0009] A third object of the present invention is to provide a flat roof structure having a drain that is easy to maintain.

[0010] In accordance with the invention these objects are achieved with an improved flat roof structure having a recess with a surrounding area in which is mounted a drain to evacuate water, said drain comprising:

[0011] a quadrilateral housing having four walls and a top, each of the wall comprising a top portion and a lower portion, the lower portion being perforated, said housing protruding upwardly and outwardly from the flat roof,

[0012] a sump beneath the perforated portion of the housing, the sump having four walls coplanar with each corresponding wall of the housing, said sump being extending downwardly inside the recess of the flat roof,

[0013] attaching means for securing the housing to the sump,

[0014] an outwardly projecting collar means mounted above the sump for securing the housing in sealing arrangement within the surrounding area of the recess whereby water on the flat roof enters the sump through the perforated lower portion of the housing,

[0015] a liquid pump located in the drain for evacuating water collected from the flat roof, said liquid pump having an inlet positioned to admit the water accumulated in the bottom of the sump and an outlet located in the sump of the drain, and

[0016] a heating element for keeping the standing water collected in the sump in a substantially liquid state within the drain so to allow continuous discharging of the collected standing water even in sub-zero weather conditions, and

[0017] a discharge line having one end connected to the outlet of a liquid pump for evacuating the standing water collected in the sump.

[0018] The improvement lies in that the discharge line connected to the outlet of the pump located in the sump passes through one of the four walls of said sump and extends inside building under the flat roof.

[0019] A first advantage of the flat roof structure according to the invention is that it allows drainage of standing water on a roof in sub-zero degree Celsius climatic conditions.

[0020] A second advantage of the flat roof structure is that it is provided with a discharge line that is under the roof, thus sheltered from bad weather, debris or any external factors that may damage it.

[0021] A third advantage of the drain according to the invention is that it is adapted to be mounted on an existing roof. Thus, the installation of the drain of the present invention does not require modification of the structure and thereby reducing the overall cost of installation.

[0022] The present invention and its advantages will be more easily understood after reading the following non-restrictive description of preferred embodiments thereof, made with reference to the hereinbelow drawings.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0023] FIG. 1 is a side view of a flat roof structure having a drain according to a preferred embodiment of the present invention.

[0024] FIG. 2 is a perspective view of the drain of FIG. 1.

[0025] FIG. 3 is an exploded view of the drain of FIG. 2.

[0026] FIG. 4 is a cross sectional view of the drain of FIG. 1 along line A-A.

#### DETAILED DESCRIPTION OF THE INVENTION

[0027] As can be seen in FIG. 1, the flat roof structure according to the illustrated embodiment of the invention has a drain that is adapted to be installed on the flat roof 2 of a building 1. Preferably, the drain may be installed on a low area of the flat roof where water tends to accumulate.

[0028] As best seen in FIGS. 2 and 3, the drain 3 basically comprises a housing 11, a collar means 17 and a sump 19. The housing 11 extends upwardly and outwardly from the flat roof surface. The housing 11 forms the top portion of the drain and has four walls and a top 12. Each of the walls comprises a top portion 13 and a lower portion 15. The lower portion is perforated so as to allow water to seep in the sump 19.

[0029] The collar means 17 projects outwardly and is mounted between the housing 11 and the sump 19. It is designed to secure the housing 11 in sealing arrangement within the surrounding roof area, where water on the flat roof 2 enters the sump 19 through the perforated lower portion 15 of the housing 11. The collar 17 may be attached to the sides of the housing 11 and is arranged to project outwardly therefrom.

[0030] The sump 19 extends downwardly and inside the flat roof surface. The sump 19 is located beneath the perforated portion 15 of the housing 11 and beneath the outwardly projecting collar means 17. The sump 19 also has four walls, which are coplanar with each corresponding wall of the housing 11.

[0031] Referring now to FIG. 4, it can be seen that the drain 3 also comprises a liquid pump 29 located within the drain 3 for evacuating the water collected from the flat roof 2. The liquid pump 29 has an inlet arranged to admit the water accumulated in the bottom of the sump and an outlet 23 located in the sump 19 of the drain 3. The outlet 23 is designed to receive a corresponding end of the discharge line 25 for evacuating the standing water collected in the sump 19. It should be noted that the discharge line 25 is located in the sump 19 and passes through one of the four walls 27 of the sump 19.

[0032] As can be further seen in FIG. 4, the drain 3 also comprises a heating element 35 for keeping the standing water collected in the sump 19 in a substantially liquid state within the drain 3. This allows continuous discharging of collected water even in sub-zero degree Celsius weather conditions.

[0033] In the illustrated embodiment, the heating means is a heating cable 37. Preferably, the drain 3 also comprises an activation means to switch on the heating element in sub-zero temperatures.

[0034] Electric power is supplied to the liquid pump 29 and the heating element through an electric plug 35, which may be mounted on one of the walls of the housing 11.

[0035] The housing 11 may be fixed to the sump 19 by attaching means, which preferably are four threaded rods 31 and nuts 33 mounted on each of the four corners of the housing.

[0036] As mentioned hereinabove, the drain system in the flat roof structure of the present invention is characterized in that the discharge line 25 as well as any duck or pipe for evacuating water is arranged to be connected to the drain 3 through the sump thereby allowing such arrangement to extend under the flat roof 2 and inside the building 1. This arrangement maximises the drainage efficiency especially in cold weather, since it allows the drain system to be constantly maintained in above freezing point.

[0037] Another advantage of having such a system is that the piping is protected from the external environment.

[0038] Although the present invention has been explained hereinabove by way of a preferred embodiment thereof, it should be pointed out that any modifications to this preferred embodiment within the scope of the present invention is not deemed to alter or change the nature and scope of the present invention.

1. A flat roof structure having a recess with a surrounding area in which is mounted a drain to evacuate water, said drain comprising

a quadrilateral housing having four walls and a top, each of the wall comprising a top portion and a lower portion, the lower portion being perforated, said housing protruding upwardly and outwardly from the flat roof,

a sump beneath the perforated portion of the housing, the sump having four walls coplanar with each corresponding wall of the housing, said sump being extending downwardly inside the recess of the flat roof,

attaching means for securing the housing to the sump,

an outwardly projecting collar means mounted above the sump for securing the housing in sealing arrangement within the surrounding area of the recess whereby water on the flat roof enters the sump through the perforated lower portion of the housing,

a liquid pump located in the drain for evacuating water collected from the flat roof, said liquid pump having an inlet positioned to admit the water accumulated in the bottom of the sump and an outlet located in the sump of the drain, and

a heating element for keeping the standing water collected in the sump in a substantially liquid state within the drain so to allow continuous discharging of the collected standing water even in sub-zero weather conditions, and

a discharge line having one end connected to the outlet of a liquid pump for evacuating the standing water collected in the sump,

the improvement wherein the discharge line connected to the outlet of the pump located in the sump passes through one of the four walls of said sump and extends inside building under the flat roof.

2. A flat roof structure according to claim 1, wherein the heating means is a heating wire.

3. A flat roof structure according to claim 1, comprising activation means to switch on the heating element in sub-zero temperatures.

4. A flat roof structure according to claim 1, wherein the attaching means comprises four threaded rods and nuts respectively mounted on the four corners of the housing.

5. A flat roof structure according to claim 1, further comprising an electric plug on one of the walls of the housing for providing electric power to the liquid pump and the heating element.

6. A flat roof structure having a recess with a surrounding area in which is mounted a drain to evacuate water, said drain comprising

a quadrilateral housing having four walls and a top, each of the wall comprising a top portion and a lower portion, the lower portion being perforated, said housing protruding upwardly and outwardly from the flat roof,

a sump beneath the perforated portion of the housing, the sump having four walls coplanar with each corresponding wall of the housing, said sump being extending downwardly inside the recess of the flat roof,

attaching means for securing the housing to the sump, the attaching means comprising four threaded rods and nuts respectively mounted on the four corners of the housing,

an outwardly projecting collar means mounted above the sump for securing the housing in sealing arrangement

within the surrounding area of the recess whereby water on the flat roof enters the sump through the perforated lower portion of the housing,

a liquid pump located in the drain for evacuating water collected from the flat roof, said liquid pump having an inlet positioned to admit the water accumulated in the bottom of the sump and an outlet located in the sump of the drain,

activation means to switch on the heating element in sub-zero degree celsius temperature,

a heating element for keeping the standing water collected in the sump in a substantially liquid state within the drain so to allow continuous discharging of the collected standing water even in sub-zero weather conditions, the heating element comprising a heating wire,

an electric plug on one of the walls of the housing for providing electric power to the liquid pump and the heating element, and

a discharge line having one end connected to the outlet of a liquid pump for evacuating the standing water collected in the sump,

the improvement wherein the discharge line connected to the outlet of the pump located in the sump passes through one of the four walls of said sump and extends inside building under the flat roof.

\* \* \* \* \*