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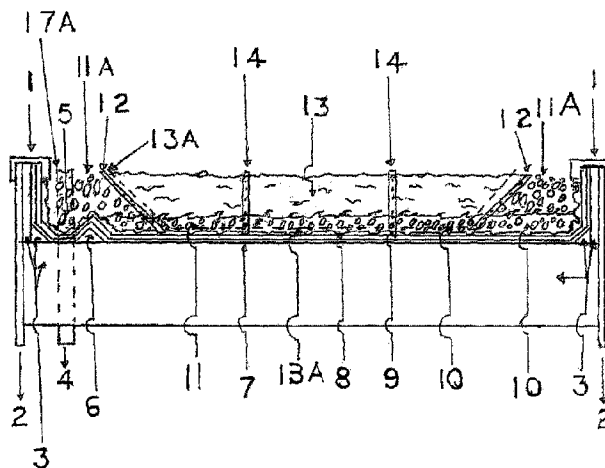
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(54) Titre : TOIT VERT PLAT AUTO-ARROSANT PERMANENT QUATRE SAISONS

(54) Title: PERMANENT FOUR SEASON SELF-WATERING FLAT GREEN ROOF



(57) **Abrégé/Abstract:**

All commonly called green roofs were prone to damage from the sun, mold, accumulated snow, ice expansion, torrential rains and being walked on plus needed frequent watering but this invention solves all of the above mentioned problems in the following ways: a structurally reinforced permanent rain water catchment reservoir that is formed by dams and a walkable hard, mold resistant, multi-layered, waterproof floor containing soil which continually moisturizes the vegetation plus the following angled walls, eavestroughs, dams, ice-deflector, and ice fracturing panels prevent ice expansion damage plus the gravel in the oversized eavestroughs slows rain overflow preventing soil erosion while the overflow eavestrough spouts remove winter surface meltwater runoffs plus all parts are covered either by soil or gravel preventing sun damage plus the low fascia walls allows wind to blow the snow off this walkable green roof plus optional roosts and electrical fence.

Abstract

All commonly called green roofs were prone to damage from the sun, mold, accumulated snow, ice expansion, torrential rains and being walked on plus needed frequent watering but this invention solves all of the above mentioned problems in the following ways: a structurally reinforced permanent rain water catchment reservoir that is formed by dams and a walkable hard, mold resistant, multi-layered, waterproof floor containing soil which continually moisturizes the vegetation plus the following angled walls, eavestroughs, dams, ice-deflector, and ice fracturing panels prevent ice expansion damage plus the gravel in the oversized eavestroughs slows rain overflow preventing soil erosion while the overflow eavestrough spouts remove winter surface meltwater runoffs plus all parts are covered either by soil or gravel preventing sun damage plus the low fascia walls allows wind to blow the snow off this walkable green roof plus optional roosts and electrical fence.

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Description

Title: Permanent Four Season Self-Watering Flat Green Roof

Technical Field: This type of roof is commonly called a green roof. A green roof is a roof, which has vegetation growing on it.

Background of the invention

Green roofs have long been known and are starting to be more widely used. Green roofs of two types have existed for decades. One type is a building completely buried underground or has three-quarters of the building covered with soil. The problem with this style is the building must have significant structural dexterity to hold this weight and creates a claustrophobic, cave – style home or it is a building with sloped roofs with sod and/ or other vegetation and the problem with this design is that it requires daily watering and can be easily eroded away. The other type have flat roofs usually consisting of trays that are susceptible to sunlight and ice expansion damage and might include pipes and valves to water flow which are also easily damaged by ice expansion when the water freezes. These trays usually have drought resistant non-native plants in them and are placed on top of tar and gravel or EPDM flat roofs. The problem is that standing water on these roof types causes a mold, which breaks down the waterproof material within a few years. The tar and gravel and EPDM flat roofs cannot be walked on repeatedly without causing significant damage to these roofs, thus causing them to leak. These tar and gravel or EPDM flat roofs often have a type of perimeter wall around them. This in turn causes significant amounts of snow to accumulate on top of them in winter, which if not removed, by using significant labour, can and has caused the roof to collapse, which has happened in the past. It should also be noted that if just soil is placed on top of the tar and gravel or EPDM

Flat roofs with perimeter walls, that when the soil freezes in winter, it will cause leaks and /or significant structural damage as this freezing soil expands due to ice formation.

The term “green roof” is commonly used in the trade. Typical green roofs of these past types are shown in the following patent examples:

D1

Patent# CA2416457

Inventor: Mischo, Donald J., country U.S.A.

Title: Modular Green Roof including Panels with Complimentary Edge Systems

D2

Patent# CA2596564

Inventor: Mackenzie, David S., country U.S.A.

Title Modular Planting System for Roof Applications

D3

Patent# CA2809383

Inventor: Meyer, Molly, country U.S.A.

Title: Vegetated Roof System

D4

Patent#CA2871124

Inventor: Lamhart, James H., Jr. Nash, Timothy J., country U.S.A.

Title: Storm water control for Vegetative and Non-vegetative Based Roof System

This invention “ Permanent Four Self-Watering Flat Green Roof “ solves all of the above-mentioned problems as will be explained below in the Summery of the Invention.

Summery of the Invention

This invention provides an improved, permanent, four-season, self-watering, flat green roof that can be cultivated and/or walked on for many decades, unlike past fragile designed green roofs. This invention is designed to repeatedly withstand torrential rains and being frozen solid for many decades without causing any damage to the green roof or its building's reinforced structure, by incorporating the below listed materials and methods of this unique invention.

The unique multi layered way this self-watering green roof is built is the reason for its maintenance free longevity. It starts with a reinforced support structure that is built to hold this mold resistant, permanent, self-watering green roof.

Next the reinforced support structure is covered with a low resin, flat roof sublayer. This includes the perimeter fascia walls, built-in eavestroughs, plus reservoir dam or dams that form the perimeter around the rain water reservoir. These parts are angled to assist in ice expansion deflection, which no other past invention has. The flat roof sub-layer includes the rainwater reservoir floor.

This flat roof sublayer is then covered by the flat roof top layer consisting of double layered, resin saturated combo fibre mat that is then covered by an ultra violet resistant and mold resistant gel coat, which is then in turn covered with waterproofing coating which is also ultra violet and mold resistant. This forms a hard waterproof base that will not mold or become damaged when walked on or permanently exposed to moisture unlike past inventions of this type.

Next a perforated, shock absorbing, covering is applied over the flat roof top layer mentioned above. This allows gravel and or aggregate and sand to be poured onto the above mentioned layers thus preventing any damage to these above mentioned layers.

Then washed gravel and or aggregate is poured around the perimeter of the rainwater reservoir so the excess water can be directed to the oversized eavestroughs thus preventing any rapid water flows which could cause soil erosion.

Next the perforated, diagonal ice deflector panels are placed around the inside of the gravel perimeter at approximately a forty-five degree angle. These diagonal panels also separate the mixed soil from the gravel perimeter. The ice deflector panels, in combination with the vertical ice fracturing panels cause the winter ice expansion to fracture the ice and/or soil to cause it to harmlessly push upwards during winter freezes, thus preventing any cracks to the water proof lining or any structural damage which occurs in all other green roof inventions.

These diagonal ice deflectors and rain water reservoir floor are in turn covered with a

landscape fabric which prevents the soil and/or sand from plugging the perforated holes in the diagonal ice-deflector panels and preventing the sand and/or soil from leaching into the perimeter gravel, thus preventing soil erosion.

This landscape fabric is then covered with gravel and/or sand to the height of the reservoir dam and/or dams while placing the perforated ice-fracturing panels in this gravel and/or sand that covers the reservoir floor. These vertical ice-fracturing panels will cause the expanding ice to fracture along these panels and push the frozen ice, gravel and /or sand and top soil mixture up along the diagonal ice-deflector panels thus preventing any damage to the structures below.

The low fascia walls allow the winds to blow over this flat green roof removing any snow that might attempt to accumulate, which could cause the roof to collapse unlike other past flat green roof inventions.

The oversized angled eavestroughs are also filled with gravel to slow but remove excess water while their vertical perforated drain spouts allow winter surface melt water to run over the top of the soil and frozen eavestrough gravel to harmlessly drain away.

It should be mentioned at this time that the dam's height will be dictated by the local precipitation amounts to guarantee that there is enough water in the rainwater reservoir to continually supply moisture to the vegetation in the reservoir's soil for the vegetation's growing season.

The low fascia walls also incorporate a bird nesting ledge on the fascia's inner lower side and are properly spaced below the soffits so the birds can land on this nesting ledge. This will help prevent predation of the young birds and help the dwindling bird populations to rebound. This bird ledge is not found on other flat green roof inventions.

This bird nesting ledge can also hold an electrical lighting system that will illuminate the soffit and the adjoining exterior wall without being visible from below, thus enhancing security and beauty of the building.

The security system consists of a plug-in solar powered system, conductive fascia cap grounded to the ground with a conductive wire, and an insulated conductive, cap grounded to the ground with a conductive wire, and an insulated conductive, solar powered railing that forms an electrified perimeter fence. This deters critters and thieves from climbing onto this green roof.

Large plants are placed in perforated tubes with overlapping sides held together with stretchable retainer band or bands to allow the tube to expand when frozen.

This completes this permanent, four-season, self-watering, flat green roof's Summery of the Invention, showing it is superior when compared to past green roof inventions.

Brief Description of the Drawings

Fig. 1 is a sectional side-view of the permanent four season self-watering flat green roof showing where the major components are located and/or the way they are assembled.

Fig. 2 is a sectional side-view of the permanent four season self-watering flat green roof showing the direction the freezing ice, soil, gravel, perforated vertical ice fracturing and diagonal ice deflecting panels, will take.

Fig. 3 is a top view of the permanent four season self-watering flat green roof showing the location of some of the major components as seen from above.

Fig. 4 is a partial cross section side view showing the larger eavestrough design and larger washed gravel used in heavier rainfall areas.

Fig. 5 is a partial cross sectional side view showing an angled eavestrough design for cold freezing areas plus the electrified security system powered by a plug-in or PV panel powered system. This figure also shows the perforated, self-watering, and tubular expandable large plant tube and a bird nesting ledge that can also conceal an electrical lighting system. It also shows the location of the eavestrough downspout.

Fig. 6 is a top view showing the layout patterns for soil, reservoir dams, walkways, perimeter gravel and eavestroughs for a large roof. This multi reservoir green roof pattern prevents large uncontrollable ice expansion on a large roof.

Detailed Description

In the particularly advantageous embodiment of this invention illustrated in **Fig. 1** through to **Fig. 6**, there are several methods of building this permanent four season self-watering flat green roof. But all follow the same unique multi layered process to ensure a labour free permanent supply of rain water to the mixed soil while surviving without structural damage for many decades, from torrential rains and water freezing to ice.

In order to create this unique, permanent, four season self-watering flat green roof, **Fig. 1**, this invention must be built in the following multi layers listed below.

First Stage: The flat roof support structure, **3**, is reinforced with more and larger joists, cross members, diagonal cross members, and triangular shaped support wedges, **3**, to easily hold the additional weight.

Second Stage: The fascia, **2**, support structure **3**, is reinforced with a triangular shaped support structure material, **3**, with the longest side angled upwards under the perimeter gravel, **11A**, until it reaches the triangular shaped reservoir dam or dams, **6**, thus assisting in directing any ice expansion harmlessly upwards and away from the support structure, **3**, unlike all past green roof patents where their U-shaped eavestrough resulted in ice expansion damage.

Third Stage: This triangular shaped support structure material, **3**, is also used to help form and reinforce the bottom side of the eavestrough, **5**. This V-shape also causes the runoff water to move more quickly at the bottom of the V helping to remove debris unlike U-shaped eavestrough patent designs, plus if the water freezes and expands, this ice will rise up the sloped structural walls, **3**, without causing structural damage.

Fourth Stage: The reservoir dam or dams, **6**, are triangular shaped materials with the widest side being securely fastened to the flat roof support structure, **3**, and is close to, or part of the eavestrough, **5**. The outer reservoir dam or dams, **6**, sides that slope upwards are at an angle not greater than forty-five degrees. This reservoir dam or dams, **6**, plus below mentioned parts will hold back the rain water to form a rain water reservoir, **10**, while allowing excess water to flow over the top of the reservoir dam, **6**, and exit by means of the eavestrough, **5**, unlike other green roof designs that use pipe and valves which can easily be plugged with debris and/or be broken by freezing water.

Fifth Stage: The height of the reservoir dam, 6, will be determined by how much ,rain water will be held in the rain water reservoir , 10 . This height will be locally determined by how much rain water needs to be retained in the rain water reservoir, 10, to guarantee enough continuous water supply to the plants growing in the mixed soil, 13, between mixed precipitation events.

Sixth Stage: The minimum depth of the reservoir dam, 6, is one-third the depth of the mixed soil, 13, depth. The minimum mixed soil, 13, depth should be one and one-third the depth of the average gardener's shovel.

Seventh Stage: All of the above-mentioned flat roof support structure, 3, parts which includes the eavestroughs, 6 , inner fascia walls, 2 , dam or dams, 6 , reservoir floor support structure, 3 , wall support structure, 3, perimeter floor support structure, 3, are then covered by a low resin, flat roof sublayer. The low resin, flat roof sublayer allows the flat roof top floor layer, 8 , to chemically adhere to the flat roof sublayer, 7.

Eight Stage: This flat roof top floor layer, 8, consists of a double layered combo resin saturated, woven, and/or sewn, and/or tubular, and/or chopped fibre mat that is in turn covered by several layers of waterproofing, ultraviolet, and mold resistant coatings. This produces a hard, firm waterproof layer that resists ice expansion and can be walked on for many decades unlike other green roof patents of the past which have soft, flexible, waterproof coverings that can easily be damaged.

Ninth Stage: This flat roof top floor layer, 8, is then covered by a, shock absorbing, horizontal, perforated, protective roof covering, 9 ,in order to protect the flat roof top floor layer, 8 , from being damaged by the gravel and/or sand being placed on top this horizontal, perforated, protective roof covering, 9 , This also protects the flat roof top floor layer, 8 , by causing expanding freezing water to horizontally shear on top and below this horizontal, perforated, protective roof covering, 9. So the freezing water cannot adhere to the flat roof top floor layer, 8.

Tenth Stage: Next the area between the reservoir dam or dams, 6, and the inner fascia wall, 2, and the section of the horizontal, perforated, protective roof covering, 9, is then covered with large perimeter gravel, 11A. This perimeter gravel, 11A, consists of, but not limited to, being washed gravel and/or aggregate gravel. The size of the stones in this perimeter gravel, 11A, will be larger in heavier rainfall areas than in arid areas. This allows the excess rainwater to reach and exit faster down the eavestrough downspouts, 4. The ability to customize this patent makes it superior to non-customizable green roof patents of the past.

Eleventh Stage: The eavestrough downspout funnel screens, 17A, allows torrential rain and melt water on top of frozen mixed soil, 13, to flow over and off the permanent four season self-watering flat green roof, Fig. 1, in an orderly and controlled method.

deflectPast green roofs did not allow for this, and the water poured over them in an uncontrolled fashion, even forming dangerously large roof icicles.

Twelfth Stage: The eavestrough downspout screen, 17, stops debris from plugging up the eavestrough downspout, 4, unlike other green roof systems.

Thirteenth Stage: Next ultraviolet resistant, perforated, diagonal, ice-deflector panels, 12, are placed on the inside of the perimeter gravel, 11A, which not only deflects ice but separates the perimeter gravel, 11A, from the mixed soil, 13, while allowing water to pass through, which is unique to this invention.

Fourteenth Stage: These perforated, diagonal, ice-deflector panels, 12, and the rainwater reservoir, 10, floor are then covered with a landscape fabric, 13A, which prevents the mixed soil, 13, and plant roots from passing through the horizontal, perforated, protective flat roof floor covering, 9, on the rain water reservoir, 10, floor and the perforated , diagonal, ice-deflector panels, 12, while allowing water to pass through.

Fifteenth Stage: This landscape fabric, 13A, is then covered with gravel and/or sand, 11, up to the height of the reservoir dam or dams, 6, This separates the plant roots growing in the mixed soil, 13, mentioned below, from the water in the rain water reservoir, 10. If the roots were in the water it would cause them to rot.

Sixteenth Stage: Mixed soil, 13, is then placed on top of this reservoir gravel and/or sand, 11, bed. This mixed top soil, 13, consisting of top soil, natural fertilizers, and water absorbing fibres that will be favourable to the type of plants growing in this mixed soil, 13. The water in the rainwater reservoir, 10, that is mixed with the reservoir sand and/or gravel, 11, will be absorbed by the mixed soil, 13, and used by the plants on a continuous basis during the plants growing cycle.

Seventeenth Stage: Fig. 1,, shows an eavestrough design, 5, for moderate rainfall areas while Fig 4, shows a larger size eavestrough, 5, design for torrential rainfall areas where water does not freeze and Fig. 5, shows an eavestrough, 5, designed for areas where water freezes. This angled eavestrough, 5, uniquely helps guide the expanding freezing water upwards so it doesn't damage the flat the flat roof support structure, 3.

Eighteenth Stage: Fig. 2, shows the deliberate guided direction of freezing water's expansion, 15. The perforated vertical ice-fracturing panels, 14, in conjunction with the perforated, diagonal, ice-deflector

panels, 12, create a section between them that becomes a pressure relief area, 16, allowing itself to be pushed upward by the surrounded, expanding, freezing water as the ice driven moving vertical perforated ice-fracturing panels, 12A, are pushed toward each other. This will uniquely prevent ice expansion damage to the permanent, four season self-watering flat green roof, Fig. 1, unlike all past green roof inventions, especially those with fixed ninety degree retaining walls.

Nineteenth Stage: Large plants, 20, or plants with very aggressive roots, should be housed in the expandable, large plant tube, 18, which has overlapping expandable sides, 18A, held in place by stretchable retainer bands, 18B, to allow the expandable, large plant tube, 18, to uniquely expand during freezing, unlike other green roof containers. It should be noted that the section of the expandable plant tube, 18, is placed in the gravel and/or sand bed, 11, and the mixed soil, 13, in the rainwater reservoir, 10. The bottomless, expandable plant tube, 18, that is in the mixed soil, is perforated to allow water to pass through. Landscape fabric, 13A, is placed around the inner perimeter of the expandable, large plant tube, 18, to prevent the mixed soil, 13, from leaching out, plus preventing the large plant roots, 20, from spreading in to the rest of the reservoir mixed soil, 13. The section of the expandable large plant tube, 18, that is above the surrounding mixed soil, 13, is not perforated to prevent the mixed soil, 13, inside the expandable, large plant tube, 18, from drying out, which is unique to this invention.

Twentieth Stage: The fascia walls, 2, that are close to the height of the perimeter gravel, 11A. This allows the wind to blow the snow off the, permanent four season self-watering flat green roof, Fig. 1, so dangerously high and heavy snowbanks do not form, unlike all other perimeter green roof walls, whose height causes a wind vortex, which in turn creates large snowbanks on those green roofs, which in turn requires manual labour to remove them, unlike this invention.

Twenty-First Stage: These fascia walls, 2, have a bird nesting ledge, 21, on the fascia wall's, 2, inner side that is properly spaced below the soffit, 29, and the adjoining exterior building wall, 28, to allow a person's favourite local birds, 22, to land and nest on this bird nesting ledge, 21. Over seventy-five per cent of all birds, 22, are killed in their first eight weeks of life by domestic cats and other predators. This bird nesting ledge, 21, will greatly reduce these needless killings and help to increase the dwindling bird population.

Twenty-Second Stage: This bird nesting ledge, 21, can also be used to hide and hold a string of electrical lights that would light up the soffit, 29, and the exterior building wall, 28, without the lights being visible from below, thus improving the building's security and beauty, which is unique to this applied for patent.

Twenty-Third Stage: The fascia, 2, can also incorporate a plugin or solar PV panel to power a unique electrified security system. The electrically charged wire, 25, is separated from the upper, outer side of the conductive, fascia, top cap, 1, by insulated fasteners, 25A. This conductive, fascia, top cap, 1, is grounded by an electrical ground

cable, 23. If a conductive, guard railing, 24, is used, then you can also run an electrically charged wire, 25, to the conductive, guard railing, 24, provided you use a custom designed guardrail insulator, 24A.

Twenty-Fourth Stage: This unique guard post insulator, 24A, is an electrical, insulating material that is slightly larger than the conductive guard rail post mount, 24B, and extends down into the pre-drilled countersunk holes which is part of the pre-drilled fastener holes. These fastener holes are filled with flexible, waterproof, insulating caulking before the fasteners, 24C, are screwed into these pre-drilled holes to hold and completely seal these holes. These fasteners, 24C, are screwed through the conductive guardrail post mount, 24B, and the guardrail insulator, 24A, and then into the flexible caulking predrilled countersunk holes to completely seal these holes and insulate the electrified conductive guardrail post, 24, from the grounded conductive fascia top cap, 1.

Twenty-Fifth Stage: This outer perimeter, electrical security system will deter critters and burglars from climbing on to the permanent four season self-watering flat green roof, **Fig. 1**. This unique electrified security system can easily be turned off when the owner is on the permanent four season self-watering flat green roof, **Fig.1**. The electrical shock from this system will not cause permanent damage to the critters or burglars.

Twenty-Sixth Stage: Light coloured, shiny gravel, should be used in the eavestroughs, 5, gravel perimeter, 11A, and the gravel walkway, 11B, in hot climates to reflect sunlight, thereby keeping the gravel cooler.

Twenty-Seventh Stage: Dark, dull coloured gravel should be used in the eavestroughs, 5, gravel perimeters, 11A, and the gravel walkways, 11B, in the cold ice prone climates. The dark colour will cause this gravel to retain heat from sunlight and help melt ice quicker than light, shiny coloured gravel.

Twenty-Eighth Stage: Large roofs, **Fig. 6**, in areas of torrential rains or areas that freeze should make their mixed soil beds, 13, no larger than around ten metres, 27, by ten metres, 27, with one metre, 26, gravel walkways, 11B, and half metre wide gravel perimeters, 11A, to allow for drainage and ice expansion. When fresh water freezes, it's volume increases by approximately nine per cent. The larger a mixed soil bed, 13, is the more powerful and destructive its expansion during freezing can be. The above mentioned dimensions will prevent any flat roof support structure, 3, damage unlike other green roof designs that do not allow for ice expansion.

The above mentioned steps, one through twenty-eight, show a process that is unique to this permanent four season self-watering flat green roof, **Fig. 1**. This above mentioned process also shows how this invention solves the problems of structural damage from ice expansion, torrential rains, snowbank buildups, mold, and the inability to walk on a green roof. All past flat green roofs patents suffer from one or more of the above mentioned problems.

**The Embodiment of the Invention in Which an Exclusive
Property is Claimed are Defined as Follows:**

- 1. *A permanent* four season self-watering flat green roof,
comprising: a series of adjoining layers including:**

**A flat support structure layer configured to support a weight of
the flat green roof;**

**A low resin sub layer disposed to overlie the flat green roof
support structure, including perimeter fascia walls extending up
to a conductive fascia top cap, a water reservoir having at least
one reservoir dam configured to hold water therein, and an
eavestrough positioned in an area between the at least one
water reservoir dam and the perimeter fascia walls;**

**A flat roof top layer configured to cover the flat roof sub layer,
the flat roof top layer comprising, in succession, a resin
saturated fibre mat, a gel coat, and a water proofing coating;**

A perforated protective roof covering to cover the roof top layer;

**A root retaining landscaping fabric configured to cover the
perforated protective roof covering;**

**A perimeter of gravel filling to the eavestrough and extending
substantially from the perimeter fascia walls to the at least one
water reservoir dam;**

**A layer of gravel and / or sand arranged to cover a floor of the
water reservoir, the layer of gravel and / or sand having a depth
substantially equal to a highest point of the at least one water
reservoir dam;**

A mixed top soil layer covering the water reservoir layer of gravel and / or sand;

At least one plant tube filled with mixed top soil and embedded into the gravel and / or sand and the mixed top soil layers;

At least one downspout funnel in fluid communication with the eavestrough and configured to drain the water therefrom;

At least one perforated ice-deflector panel extending upwardly from a floor of the water reservoir and positioned diagonally against the perimeter of gravel;

At least one perforated vertical ice-fracturing panel extending upwardly from the water reservoir;

The at least one ice-deflector panel and at least one vertical ice-fracturing panel defining an adjoining pressure relief area there between;

A roof top electrical security and lightening protection system and a bird nesting ledge.

- 2. The permanent four season self-watering flat green roof as claimed in claim 1, wherein part of the support structure comprises a triangular support structure configured to reinforce the side of the eavestrough opposite the at least one of the water reservoir dams and wherein the reservoir dam has a triangular shape to provide the eavestrough extending there between with a substantially V-shape cross section.**

- 3. The permanent four season self-watering flat green roof as claimed in Claim 2, wherein part of the flat roof support structure comprises at least one of the water reservoir dams configured with the triangular shape to hold precipitation therein on the water reservoir side.**
- 4. The permanent four season self-watering flat green roof as claimed in Claim 1, wherein the at least one tube has is circular in shape and has overlapping sides that are held together by stretchable retainer band or bands in order to render the at least one plant tube expandable, thereby allowing the mixed top soil inside the plant tube to expand when frozen and allowing the placement of the at least one plant tube such that a plant contained therein does not interfere with plants located outside thereof.**
- 5. The permanent four season self-watering flat green roof as claimed in Claim 1, wherein the flat roof top layer is configured for the purpose of water proofing and chemically bonding to the flat roof low resin sub layer by covering the flat roof low resin sub layer with, in succession, the resin saturated mat, the gel coat, and the water proofing coating.**
- 6. The permanent four season self-watering flat green roof as claimed in Claim 1, wherein the root retaining landscaping fabric retains roots, prevents gravel, sand and / or mixed top soil from escaping and plugging up the perforated protective roof covering and is configured to cover the perforated roof covering that is configured to cover and protect all of the flat roof top layer including the inner fascia walls, the at least one reservoir dam and the floor of the water reservoir.**

- 7. The permanent four season self-watering flat green roof as claimed in Claim1, wherein the perimeter of gravel fills the eavestrough to the top of the fascia's conductive top cap and extends to the top of at least one of the water reservoir's dams.**
- 8. The permanent four season self-watering flat green roof as claimed in Claim 1, wherein the downspout funnel is oriented vertically, perforated, and has a downspout funnel screen, and wherein the downspout funnel is surrounded by the perimeter gravel filling the eavestrough such that it is in fluid communication with the eavestrough to drain water there from.**
- 9. The permanent four season self-watering flat green roof as claimed in Claim1, wherein at least one of the perforated ice-deflector panels is positioned to extend upward from the floor of the water reservoir up to the top of the gravel filled eavestrough at a diagonal angle not greater than 45degrees.**
- 10. The permanent four season self-watering flat green roof as claimed in Claim 1, wherein the mixed top soil covers the gravel and / or sand in the water reservoir to a depth equal to the top height of the gravel in the eavestrough.**
- 11. The permanent four season self-watering flat green roof as claimed in Claim 1, wherein the lightning protection system consists of an electric ground wire connected to the conductive fascia top cap which forms a ground and has no electricity in this system until hit by a lightening strike which is then directed into the ground.**

- 12. The permanent four season self-watering flat green roof as claimed in Claim 1, where at least one of the perforated , vertical ice-fracturing panels extends vertically up from the bottom of the water reservoir to the top of the mixed top soil in the water reservoir.**
- 13. The permanent four season self-watering flat green roof as claimed in Claim 1, wherein the pressure relief area located between at least one of the perforated ice-fracturing panels and at least one of the ice-deflector panels and consists of the mixed top soil and the gravel and / or sand.**
- 14. The permanent four season self-watering flat green roof as claimed in Claim 1, wherein the roof top electrical security system consists of an insulated fastener system separating the grounded conductive top cap from a rail post and a guard rail system that is connected to an electrically charged wire.**
- 15. The permanent four season self-watering flat green roof as claimed in Claim 1, wherein the bird nesting ledge consists of a ledge parallel to the ground and is connected to a lower inner section of the fascia wall and extends towards a close exterior wall and is of a large enough size for a bird to nest on.**

FIG. 1

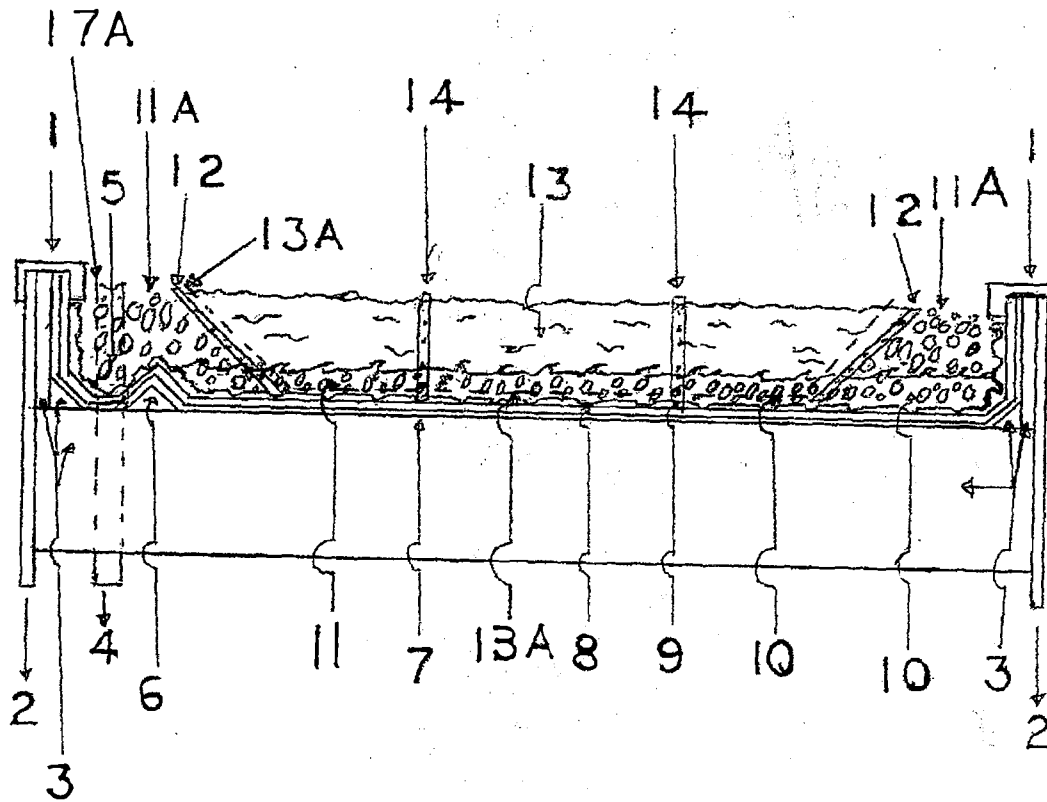


FIG. 2

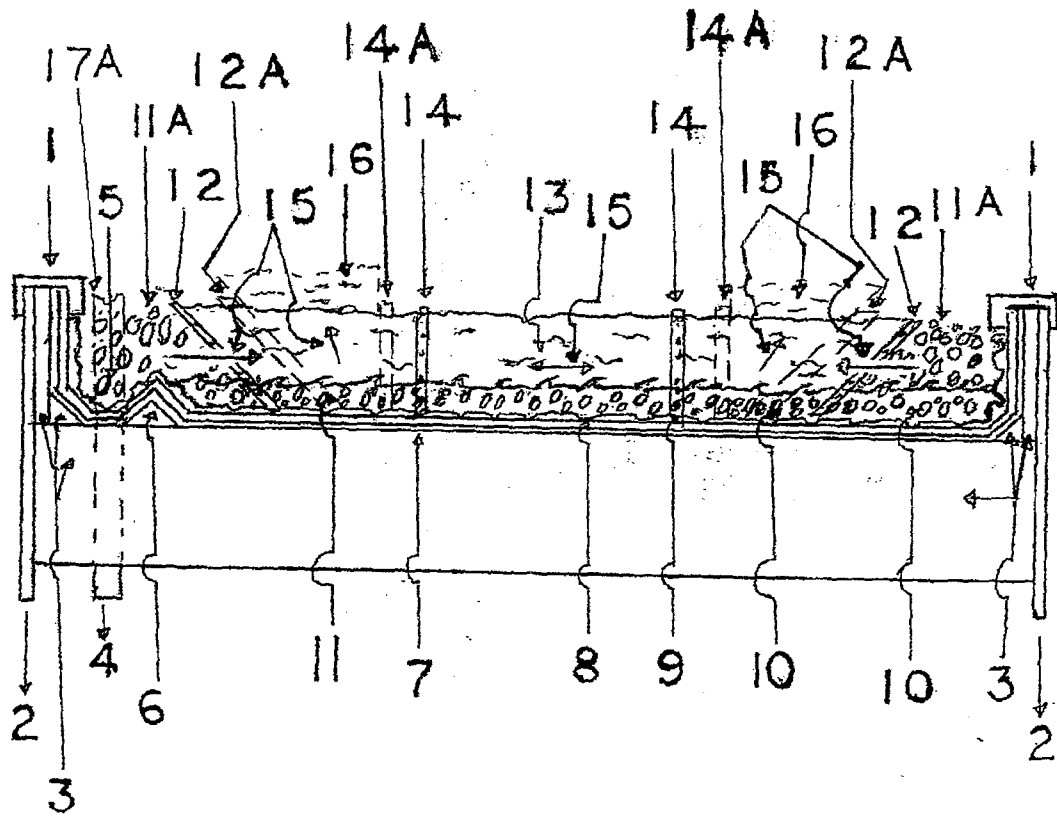


FIG. 3

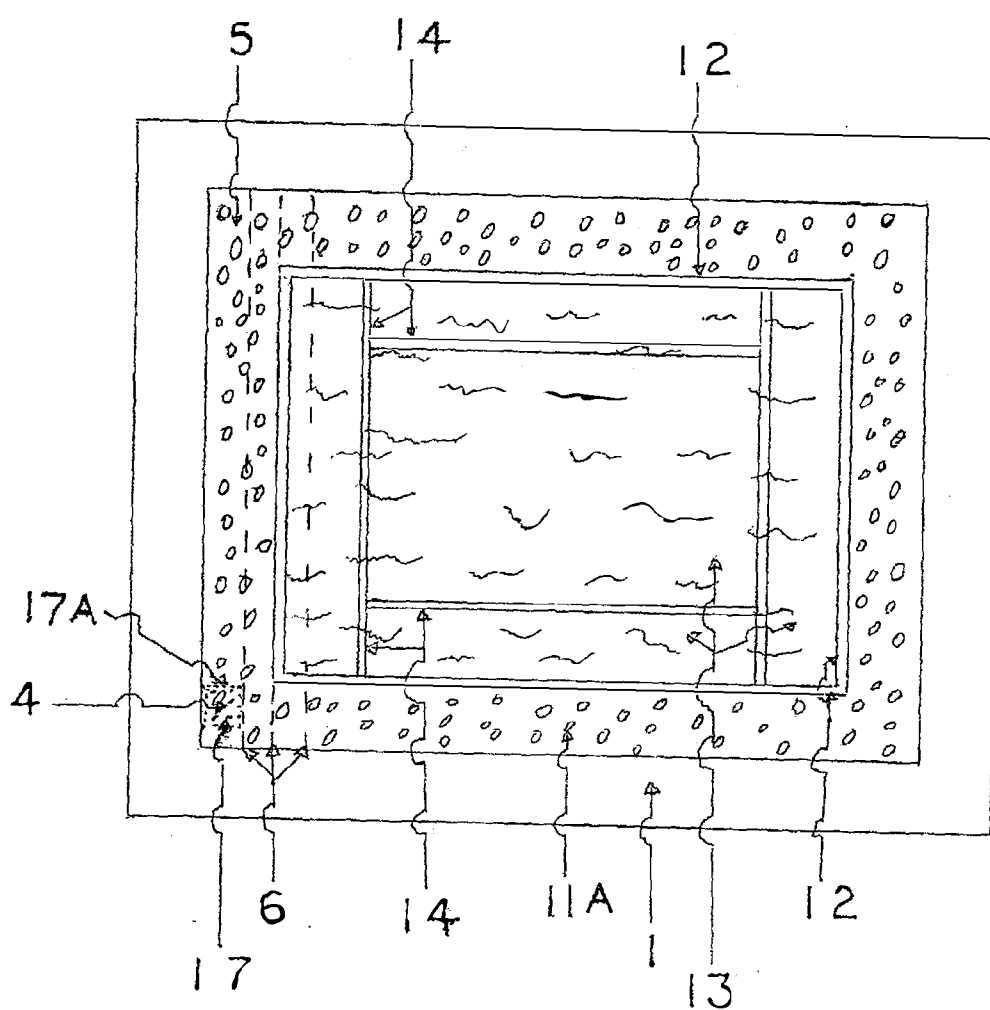


FIG. 4

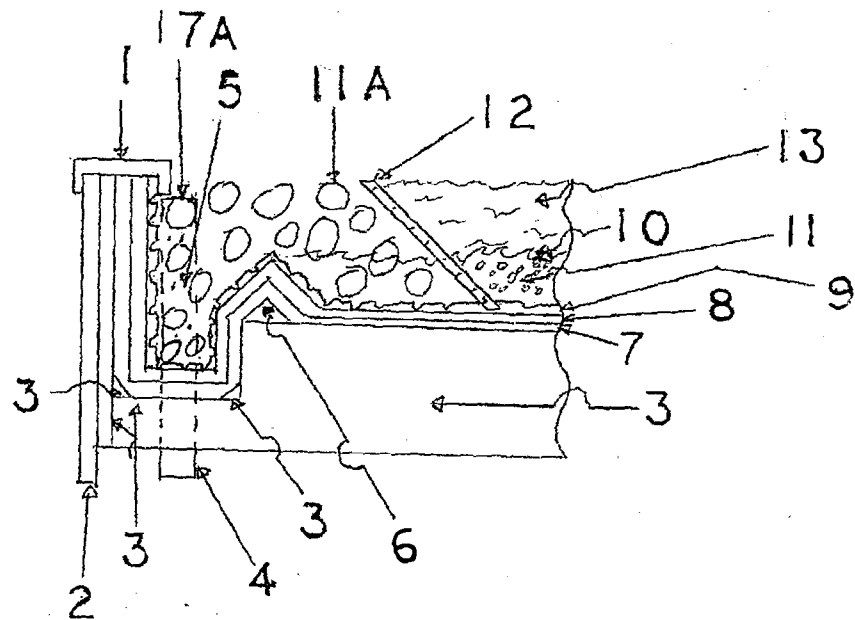


FIG. 5

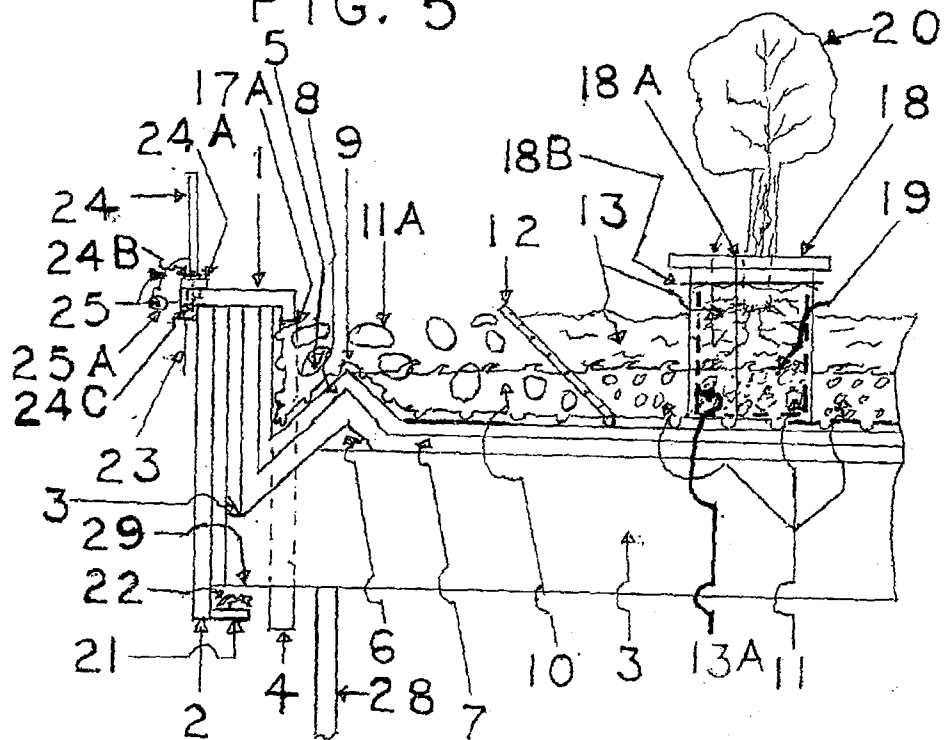


FIG. 6

