

A RECEPTACLE FOR USE IN A GREEN ROOF SYSTEM AND A GREEN ROOF SYSTEM THEREOF

FIELD OF THE INVENTION

The present invention relates to a receptacle advantageously used in tropical climates, and to a green roof system using the receptacles.

BACKGROUND OF THE INVENTION

A city is often referred to as an urban heat island. It is generally warmer than the surrounding rural areas as it has less green space due to the massive build up of buildings and artificial grounds. These surfaces tend to absorb and trap heat before radiating this heat back to the surroundings resulting in a phenomenon commonly known as the "Urban Heat Island Effect".

With economic progress and intensifying land development, most cities have lost substantial green space on the ground. To mitigate the urban heat island effect, there is a need to look for alternate spaces for greenery.

Roof top greening is one of the ways to add extra green space to a built-up city to improve the living environment. It is a way to lighten up the colours of urban landscape and lush greenery without requiring extra space that is scarce in densely populated cities.

Current green roof systems typically consist of providing a waterproofing membrane that is laid over the roof, a root guard material and, a water retention layer, a drainage layer, layering growth medium and a vegetative layer. These layers are usually and normally installed on-site. Workers need to install each of these components, layer by layer onto the main roof.

Singapore public residential buildings have a different roofing system. On the main concrete roof, a secondary roofing system is utilised to act as a heat barrier, minimizing the amount of heat absorbed by the main roof and thereby reducing the

heat transmitted into the residential units directly below this main roof. The secondary roofing system consists of ferro cement roof slabs sitting on concrete stools, sandwiching an air gap between them and the main concrete roof. On hot days, the surface of the ferro cement roof slabs could exceed 60°C. The air in the air gap acts as an insulator, thereby minimizing the heat transfer onto the main roof.

Although the secondary roofing system is effective in terms of insulating the top most residential units, the glare and heat that are radiated from the ferro cement roofing slabs can be unbearable for occupants in nearby buildings that are taller. This is especially evident especially for occupants of units that are of the same, or relatively the same height as the roof of the lower block.

On a roof of typical public housing, the roof serves to accommodate mechanical services such as water tanks and piping lines, and even electrical services. This makes the implementation of the typical lay-out green roof system difficult due to the obstructions.

Typically, in present green roof systems, plants are planted on-site and coverage could be less than 60% at the first instance. Full coverage may only be achieved after 9 months to a year. With the tropical weather condition, the set backs are:

- during extremely hot days, studies have shown that the exposed growth medium is as hot as the concrete surfaces. Thus no benefits from the green roof system are experienced.
- on days with heavy downpour, growth medium could be washed off or eroded by heavy rainfall since there is insufficient vegetation or roots to hold the growth medium in place.

The prior art provides for various green roof trays and systems. JP 11155369 discloses a cultivation tray having drain holes at opposed sidewalks to drain out water in the tray. However, this type of tray is not advantageous as the drain holes may be easily blocked by particles, coagulates or debris, leading to ponding of the tray. Furthermore, in tropical climates as described above, where the monsoon seasons attract voluminous quantity of rainfall, this type of tray will not be able to successfully drain off copious amounts of rainfall received. Another disadvantage of this type of tray

is that as the drain holes are provided at a bottom end of the tray, there is no provision to retain any amount of the rainwater received, except where in the instances when the drain holes are blocked. Therefore essentially, the plants on the tray will have to be independently watered. There is no conservation of resources.

Another green roof system is disclosed in PCT/US01/ 22799. In the tray as disclosed in this invention, the tray is provided with ribs having drain holes, to allow fluid to flow underneath the tray, i.e. on the roof itself. While this tray is an improvement from JP 11155369 in so far as it allows retention of a level of fluid, leading to conservation of resources, it suffers from other drawbacks as the provision of drain holes may lead to blockage, and will not be able to successfully drain off the water. A further disadvantage of the tray of this system is that rainwater is allowed to flow underneath the trays. In this way, rainwater may stagnate or pond beneath the trays without being detected over time. This may lead to roof leakage or even lead to the breeding of mosquitoes.

It is an object of the invention to ameliorate one or all of the above problems.

SUMMARY OF THE INVENTION

According to an embodiment of the invention, there is provided a receptacle for use in a green roof system, said receptacle including four sides, each side having a top end and a bottom end, defining a depth of said receptacle; said depth for receiving at least a plant and growth medium, wherein said receptacle further includes a channel extending therethrough a bottom end of said receptacle, said channel formed by at least two edge panels, forming the sides of the channel, having a height less than said receptacle, said channel further including at least an orifice at an end of said channel, to allow egress of fluid received therein said receptacle.

Preferably, the receptacle further includes at least a compartment on each side of the channel, for retaining a level of fluid received therein the receptacle, said compartments formed by an edge panel and at least two sides of the receptacle. This advantageously forms an internal reservoir, which serves as a source of fluid when there is no rain.

Still preferably, the compartments have at least one internal panel across said compartments, said internal panel of a height substantially equal to the height of the edge panels forming the channel. The internal panel advantageously serves as a base for subsequent layers to be placed on top of the compartment.

Preferably, the height of the internal panels is substantially the same or less than the height of the sides forming the receptacle.

In a preferred embodiment, the internal panels are arranged in a grid like arrangement, in each compartment, forming sub-compartments.

Preferably, the internal panels further include a notch, at a top end of the internal panel, to allow fluid flow within the compartment, so that each sub-compartment within the grid will retain a substantially same level of fluid therein. This will also increase the volume of fluid that may be retained by the compartment, as the level of fluid retained in each sub-compartment will be maximised.

Preferably, the receptacle further includes extended lips, extending from and along opposed sides of a periphery of said receptacle, to aid in the handling of the receptacle.

In a preferred embodiment, a first extended lip is along a top end of the receptacle, and a second lip extends from a position offset from the top end of the periphery of the receptacle.

In another preferred embodiment, the lips extend from all four sides of the receptacle.

Preferably, the lips extend from a top end of the receptacle on a first two adjacent sides of the receptacle, and extend from a position offset from the top end of the receptacle at an opposed two adjacent sides of the receptacle.

In yet another preferred embodiment, the receptacle further includes attachment means, to attach said receptacle to an adjacent receptacle.

Preferably, the attachment means is on the extended lip of the receptacle.

Still preferably, the attachment means is a male member on an extended lip at one end of the receptacle, and a female member on an extended lip of an opposed end of the receptacle.

In another embodiment, the attachment means is a slot along the extended lip.

Preferably, the slot further includes a fastener, to fasten an extended lip of a first receptacle to an extended lip of a second receptacle, thereby interconnecting the first receptacle to a second receptacle.

According to another aspect of the invention, where in use, the receptacle further includes a foraminous layer, to allow fluid flow therethrough, and plant growth medium on top of said foraminous layer, to aid plant growth in the receptacle.

Preferably, the receptacle further includes a pin, to maintain a position of the foraminous layer, to the receptacle.

Still preferably, the receptacle further includes a mesh layer, placed below said foraminous layer, to form a support for the foraminous layer.

In a preferred embodiment, the foraminous layer is a filter layer.

In another embodiment, the foraminous layer and the mesh layer are integral to form an insert.

In another preferred embodiment, the receptacle further includes an orifice at another end of the channel.

In a preferred embodiment, the channel is inclined, to aid the egress of fluid received in the channel.

Preferably, when in use, the layers placed on top of the receptacle are an internal panel, a mesh layer, a foraminous layer and growth or plant medium to promote the growth of plant that may be planted thereupon.

In another embodiment, when in use, the layers placed on top of the receptacle are an internal panel, an insert, and growth, plant or decorative medium.

In yet another embodiment, when in use, the layers further includes a filter sheet, whereby the layers placed on top of the receptacle are an internal panel, an insert, growth, plant or decorative medium, and a filter sheet.

In an embodiment, the receptacle further includes an orifice at another end of said channel, to allow fluid flow therethrough.

According to another aspect of the invention, there is provided a green roof system suitable for use in a tropical climate, including a plurality of receptacles, each receptacle including four sides, each side having a top end and a bottom end, defining a depth of said receptacle; said depth for receiving at least a plant and growth medium, wherein said receptacle further includes a channel extending therethrough a bottom end of said receptacle, said channel formed by at least two edge panels, forming the sides of the channel, having a height less than said receptacle, said channel further including at least an orifice at an end of said channel, to allow egress of fluid received therein said receptacle.

Preferably, the system further includes a fluid supply line, positioned along the lip.

Still preferably, the extended lip further includes a retaining means, to retain a position of the fluid supply line along an extended lip of the receptacle.

Preferably, the system further includes conduits, dimensioned to be received by the orifice of the receptacle.

Preferably, in connection, a first receptacle is interconnected to a second receptacle by connecting a conduit between an orifice of a first receptacle, to an orifice of a second receptacle, to allow fluid flow from a first receptacle to a second receptacle.

Still preferably, the receptacles are arranged so that fluid flow from a first receptacle to a subsequent receptacle is directed to a drainage outlet of the roof.

DESCRIPTION OF FIGURES

In order that the invention might be more fully understood, embodiments of the invention will be described by way of example only, with reference to the accompanying drawings, in which:

Figure 1 shows a first embodiment of a receptacle of the present invention;

Figure 2 shows a second embodiment of the receptacle, having additional internal panels, forming a grid like arrangement;

Figure 3 shows a cross-sectional view A-A of the receptacle of Figure 2;

Figure 4A shows a top view of a third embodiment of the receptacle, suitable for use in a green roof system formed by interconnecting the receptacles;

Figure 4B shows a cut away view of the receptacle showing the extended lips at opposed ends of the receptacle;

Figure 4C shows a cut away view of two interconnecting receptacles;

Figure 4D shows a perspective view of the receptacle, suitable for use in a green roof system formed by interconnecting the receptacles;

Figure 4E shows a cut away view of two interconnecting receptacles being attached by a slot and fastening means;

Figure 5 illustrates how a channel of a first receptacle is connected to a channel of a second receptacle;

Figure 6 shows a fourth embodiment of the receptacle;

Figures 7A and 7B show variations of the arrangement of the channel, within the receptacle;

Figure 8 shows a sixth embodiment of the receptacle, having a notch at an internal panel;

Figure 9A shows a seventh embodiment of the receptacle, where the channel has a depression;

Figure 9B shows how a conduit is placed on the depression of the channel;

Figure 10A shows another embodiment of the layers placed on top of the receptacle;

Figure 10B shows a growth medium erosion guard suitable for use in the present invention;

Figure 10C shows a cut away view of the receptacle, showing a pin used in the present invention;

Figure 10D shows a cut away view of interconnecting receptacles, having a void therebetween;

Figure 10E shows a cover used in the present invention;

Figure 11 shows another embodiment of the receptacle, having lips extending from all four sides of the receptacle;

Figure 12 shows the arrangement of the receptacles in a green roof system;

Figure 13A shows a top view of an insert to be used in a receptacle of the present invention;

Figure 13B shows a bottom view of an insert to be used in a receptacle of the present invention;

Figure 14 shows an arrangement of layers on top of the receptacle when in use; and

Figure 15 shows an alternative arrangement of layers on top of the receptacle when in use.

The attached drawings are not necessarily drawn to scale.

DETAILED DESCRIPTION OF THE INVENTION

Reference will now be made in detail to the preferred embodiments of the invention, examples of which are illustrated in the accompanying drawings. The preferred embodiments of the invention are not intended to limit the invention in its broadest aspect to these embodiments. On the contrary, the invention is intended to cover alternatives, modifications and equivalents, which may be included within the spirit and scope of the invention as defined by the appended claims. Furthermore, in the following detailed description of the embodiments, numerous specific details are set forth in order to provide an understanding of the present embodiments.

In the following paragraphs, the description of the invention has been provided as usage in a green roof system. However, it is to be understood that the invention may also be applied in other fields, or in other usages. This invention has particular advantage in being used in situations where a user wishes to contain and maintain an amount of fluid, without any electronic means.

Figure 1 shows an embodiment of a receptacle, for use in a green roof system. The receptacle 100 is formed by four sides; 10, 20, 30, 40, each side having a top end 11, 21, 31, 41, and a bottom end 12, 22, 32, 42. The top end and the bottom end forming a depth of the receptacle.

The receptacle 100, further includes a channel 50 extending therethrough a bottom end of the receptacle. According to the invention, the receptacle further includes an

orifice 51 at one end of the channel, to allow fluid received in the channel 50 to be drained from the channel 50. The channel 50 is formed by two edge panels, 52, 53, having a height less than the height of the sides 10, 20, 30, 40 of the receptacle 100. Therefore, as seen in Figure 1, the edge panels form a compartment with the sides of the receptacle. Specifically, a first compartment 60, is formed by an edge panel 52, and side panels 10, 30 and 40. A second compartment 70, is formed by an edge panel 53, and side panels 10, 20, 30. The compartments 60 and 70 are able to retain a level of fluid, for the subsistence of plants that will be housed within each receptacle 100, thereby forming an internal reservoir. Any fluid overflowing from the reservoir will inadvertently be directed into the channel 50. Plants and growth medium are placed on top of the compartments 60 and 70, and the channel 50. As a reader skilled in the art will appreciate, the volume of fluid to be retained may be varied, by varying the height of the edge panels, or the size of the receptacle, or by varying the size of the channel.

To allow growth medium to be placed on top of the compartments, the compartments have additional internal panels, forming a grid like arrangement, as seen in Figure 2.

The grid like arrangement formed by internal panels 61, 62, 63, 71, 72, 73, serve as a structural base for subsequent layers to be placed open. Advantageously, the internal panels also functions to strengthen the receptacle 100.

Figure 3 shows a cross-sectional view A-A of the receptacle 100 of Figure 2. In particular, Figure 3 shows the relevant layers for use as a green roof receptacle. As described previously, the internal panels act as a base for subsequent layers suitable for a plant growth arrangement, to be placed upon. On top of the internal panel 63, is a foraminous layer 65, shown in the form of a filter sheet 64. Next a layer of growth medium or other plant medium 66 is placed on top of the filter sheet 64, and the plants are planted on top of that. The filter sheet 64 advantageously allows fluid received by the receptacle 100 therethrough into the compartments 60, 70 or channel 50, but prevents growth medium or other plant medium 66 through this sheet. Advantageously, the filter sheet allows root penetration. Any roots penetrating through are able to draw fluid directly from the internal reservoir, and therefore, plant growth is not inhibited.

To allow ease of inter-connectability between a first receptacle to a subsequent receptacle, the extended lips are not built along a same height along the periphery of the receptacle. Advantageously, when a first receptacle is to be interconnected with a second receptacle, the side of the receptacle with the extended lip along a top end of the periphery will be placed on top of the side of the second receptacle, with the extended lip along an offset position from the periphery, so that, the receptacle may be connected without any warpage or strain on the extended lip.

As seen in Figure 4A, one side of a first extended lip extends from a top end along the periphery 41, shown as 110, whereas on an opposed side, a second lip extends from a position offset from the top end 21 of the receptacle, shown as 120.

To further illustrate, Figure 4B shows a cut away view along section B-B, of Figure 4A. As can be seen, higher extended lip 110 is positioned along the top section 41, and lower extended lip 120 is located at an offset position, x distance from the top end 21.

Figure 4C illustrates the advantage of the offset positions of the extended lips when in connection between a first receptacle 100, and a second receptacle 200. It is preferred that the offset position of x distance is at least the thickness of the extended lip.

The receptacles are shown in a cut away view, and the profile of the first receptacle is hatched, for ease of reference. As can be easily appreciated, the two receptacles may be easily placed, one next to another, and the resultant effect is that, firstly, the receptacles may be placed close together, thereby maximising useful receptacle space, and secondly, the receptacles will have an exteriorly planar arrangement.

To ensure that the receptacles are maintained in position, the receptacle may further include attachment means, to attach a first receptacle, to a subsequent receptacle.

Figure 4D shows a perspective view of the receptacles, in a connected arrangement. The attachment means 80 are preferred to be positioned on the extended lips, for ease of engaging and disengaging of the receptacles, by a user.

The attachment means 80 is shown in Figure 4D to be in the form of slots 81, and attachment between a first receptacle to a second receptacle is by use of a fastener

300, to fasten the extended lip 120 of the first receptacle, to a extended lip 210 of the second receptacle, so that they are interconnected, forming a green roof system. Figure 4E shows a cut away view of the attachment means 80 in the form of slots 81 and fasteners 300. Advantageously, the slots also serve as a guide, to allow a user to establish an alignment between the first receptacle, to a second receptacle. The attachment means may be provided in plurality along the extended lip region.

To connect the channel 50 of the first receptacle to the channel of the second receptacle, the system further includes conduits 90, dimensioned to be received by an orifice 51 of the receptacle. When connecting the channel of a first receptacle 100 to a second receptacle 200, the conduit 90 is received at one end, by the orifice at a first receptacle, and at another end, by the orifice of the second receptacle, as seen is Figure 5. In this way, fluid received by the receptacle and overflowing from the compartment will enter the channel, which in turn may be directed to other receptacles.

According to the invention, the fluid in the channel is directed to a drainage system on the roof.

Embodiments

Figure 6 shows another embodiment of the receptacle, having another orifice 55 at the other end of the channel 50. In this embodiment, the channel allows ingress and egress of fluid in the channel 50.

In another embodiment, shown in Figures 7A and 7B, the receptacle has a plurality of channels, shown in Figures 7A and 7B as two channels. In Figure 7A, the channels 50, 56 are arranged side by side to each other, forming 3 compartments 60, 70, 130. In Figure 7B, the first channel 50 is arranged transverse to a second channel 56. As can be appreciated by a reader, the arrangement and number of channels provided may be varied in an infinite of permutations without detracting from the spirit of the invention.

In a sixth embodiment of the receptacle, as shown in Figure 8, the internal panels include a notch 66 along a top end of the internal panel, to allow fluid flow within the

compartments so that the fluid level in each sub-compartment will be equally distributed, so as to maximise the fluid retaining volume of the receptacle.

In a seventh embodiment of the receptacle, the channel has a depression 57 along the orifice 51, as seen in Figure 9A. The depression is the thickness of the conduit 90.

Figure 9B illustrates the advantage of the depression of the conduit 90. Figure 9B illustrates the advantage of the depression, when the conduit 90 is received therein. When received, the thickness of the conduit is compensated by the depression 57, so that in effect, fluid flow from a first receptacle to a second receptacle through the conduit is substantially planar. Advantageously, this prevents stagnation of fluids, which may attract the breeding of mosquitoes or other insects or pests.

Figure 10A shows another arrangement of layers on the receptacle, further including a mesh layer 68 on top of the internal panel 63, to provide better stability to the filter sheet 64, placed thereon. A growth medium erosion guard 69 is placed on top of the filter sheet 64, and growth medium 66 is then introduced onto the growth medium erosion guard 69.

The growth medium erosion guard 69, is best seen in Figure 10B, which basically forms a grid, to discourage growth medium or plant material from being washed out of the receptacle 100, especially in instances where heavy rains or influx of fluids are received by the receptacle 100.

In an embodiment, the receptacle further includes retaining means in the form of pins, to retain a position of the filter sheet 64 on the receptacle. Figure 10C shows the cut away view showing the pins 400, on opposed ends of an interior of the receptacle.

Figure 10D shows the cut away view of the receptacle, when interconnected. Inevitably, a void 600 will form between the receptacles. The void 600 may encourage inhabitation of undesirable pests, for example, aphids, insects, birds or rodents.

To prevent this inhabitation, which may lead the void to form a breeding ground for pests, the invention further includes a cover 610, shown in Figure 10E, to conceal the void, and prevent any inhabitation of pests.

Figure 11 shows an eighth embodiment of the receptacle of the present invention. In this embodiment, the extended lips are provided along all four sides of the receptacle. In the figure, along two adjacent sides of the receptacle, are provided extended lip section 500 (hatched), extending from a top end of the receptacle along sides 31 and 41, whereas the other 2 adjacent sides of the lip extend at a position offset from the top end of the receptacle 11, 21, shown as 600 (cross hatched)

Figure 12 shows a green roof system formed by a plurality of receptacles, interconnected to one another. As seen in this figure, the channels are arranged to direct fluid flow into a drainage system of the roof, so as to prevent ponding of water in the system. The system further includes a fluid supply line 91, running along the extended lips of the receptacles, and having a plurality of bores along the fluid supply line so that when fluid is supplied into the line, water may leave the line through the plurality of bores, and onto the plants within the receptacle.

Figures 13A and 13B show a ninth embodiment of the receptacle where the mesh layer and the foraminuos layer are integral, forming an insert 700. When in use, the relevant layers for use with the receptacle are the insert 700, and growth or decorative medium 66 to effect an aesthetic outlook to the receptacle 100.

Specifically, Figure 13A shows a top view of the insert with holes or pores 710 to allow fluid therethrough, and Figure 13B shows a bottom view of the insert 700 with channels to allow flow of fluid received through the holes or pores 710. In the embodiment of Figure 13B, the bottom view of the insert 700 has multiple protrusions 720. These protrusions are advantageously sized so that it may fit the receptacle 100 between the internal panels 61, 62, 63, 71, 72, 73. The circular depressions on the protrusions 720, depicted in Figure 13B is intended as an advantageous embodiment to lighten the eventual weight of the insert 300. It is to be understood that the depressions may be of varying shapes and/ or sizes, and also, that there need not be a depression for the insert to be used advantageously with the receptacle.

In an advantageous alternative, the surface of the insert 700 is sloped towards the holes or pores 710, to promote flow of fluid received thereupon the receptacle, to be channelled towards the holes or pores 710. The holes or pores 710 are positioned

such that when in use with the receptacle 700, the holes or pores 710 are in alignment with the channel 50. Figure 14 shows the insert 700 when used with the receptacle 100 of the ninth embodiment.

Figure 15 shows another embodiment of the receptacle with the relevant layers for use as a green roof receptacle. The relevant layers are the insert 700, a filter sheet 64 and growth or decorative medium. The advantage of having a further filter sheet 64 is so that any decorative or growth medium placed on top of the insert 700 will not fall through the holes or pores 710, and therefore, the further filter sheet 64, serves to preserve the contents placed on the receptacle. As an additional advantage, the filter sheet 64 allows fluid received, for example rainwater or other fluids, to be received by the channel 50, so that when in arrangement in a green roof system, this fluid may be channelled and directed to a drainage system on the roof.

The receptacle is preferably made from a mouldable material, which is suitable for outdoor exposure, for e.g., HDPP.

The receptacle is preferable dimensioned to be easily handled by a single person, for example 0.5 m x 0.5 m.

The receptacle may be squarish, or rectangular, as long as its form is uniform, to allow ease of interconnecting a first receptacle to the next.

The embodiments have been advanced by way of example only, and modifications are possible within the scope of the invention as defined by the appended claims.

CLAIMS

1. A plurality of receptacles for use in forming a green roof system, comprising:
 - a. each of said receptacles including a bottom member and four side members connected to said bottom member;
 - b. said side members extending upwardly from said bottom member to a first height;
 - c. each of said receptacles including a pair of horizontally extending, spaced apart channel members connected to said bottom member and defining a channel, each of said channel members extending upwardly to a second height, said second height being less than said first height;
 - d. each of said channels extending along its respective bottom member from a first side member to a second side member;
 - e. first and second orifices in said first and second side members in communication with opposite ends of said channels; and
 - f. wherein each of said receptacles includes attachment means for attaching said plurality of receptacles together to form the green roof system.
2. The plurality of receptacles according to claim 1, wherein said receptacle further includes at least a compartment on each side of the channel, for retaining a level of fluid received therein the receptacle, said compartments formed by an edge panel and at least two sides of the receptacle.
3. The plurality of receptacles, according to any one of the preceding claims, wherein the compartments have at least one internal panel across said compartments, said internal panel of a height substantially equal to the height of the edge panels forming the channel.
4. The plurality of receptacles, according to any one of the preceding claims, wherein the height of the internal panels is less than the height of the sides forming the receptacle.

5. The plurality of receptacles, according to any one of the preceding claims, wherein the internal panels are arranged in a grid like arrangement, in each compartment, forming sub-compartments within each compartment.
6. The plurality of receptacles, according to any one of the preceding claims, wherein the internal panels further includes a notch, at a top end of the internal panel, to allow fluid flow within the sub-compartments of a compartment, so that each sub-compartment within the grid will retain a substantially same level of fluid therein.
7. The plurality of receptacles, according to any one of the preceding claims, wherein the receptacle further includes extended lips, extending from and along opposed sides of a periphery of said receptacle, to aid in the handling of the receptacle.
8. The plurality of receptacles, according to claim 7, wherein a first extended lip is along a top end of the receptacle, and a second lip extends from a position offset from the top end of the periphery of the receptacle.
9. The plurality of receptacles, according to any one of claims 7 or 8, wherein the lips extend from all four sides of the receptacle.
10. The plurality of receptacles, according to claim 9, wherein the lips extend from a top end of the receptacle on a first two adjacent sides of the receptacle, and extends from a position offset from the top end of the receptacle at an opposed two adjacent sides of the receptacle.
11. The plurality of receptacles according to any one of the preceding claims, wherein the attachment means is on the extended lip of the receptacle.
12. The plurality of receptacles according to any one of the preceding claims, wherein the attachment means is a male member on a extended lip at one end of the receptacle, and a female member on a extended lip of an opposed end of the receptacle.

13. The plurality of receptacles, according to any one of the preceding claims, wherein the attachment means is a slot along the extended lip.
14. The plurality of receptacles, according to claim 13, wherein the slot further includes a fastener, to fasten a extended lip of a first receptacle to a extended lip of a second receptacle, thereby interconnecting the first receptacle to a second receptacle.
15. The plurality of receptacles, according to any one of the preceding claims, where in use, the receptacle further includes a foraminuos layer, to allow fluid flow therethrough, and plant growth medium on top of said foraminous layer, to aid plant growth in the receptacle.
16. The plurality of receptacles according to claim 15, wherein the receptacle further includes a pin, to maintain a position of the foraminous layer, to the receptacle.
17. The plurality of receptacles, according to any one of claims 15 or 16, wherein the receptacle further includes a mesh layer, placed below said foraminous layer, to form a support for the foraminous layer.
18. The plurality of receptacles, according to any one of claims 15 to 17, wherein the foraminous layer is a filter layer.
19. The plurality of receptacles according to claim 17, wherein the foraminuos layer and the mesh layer are integral.
20. The plurality of receptacles, according to any one of the preceding claims, wherein the channel is inclined, to aid the egress of fluid received in the channel.
21. The plurality of receptacles according to claims 1 to 18 and 20, when in use, the layers placed on top of the receptacle are an internal panel, a mesh layer, a foraminous layer and growth or plant medium to promote the growth of plant that may be planted thereupon.

22. The plurality of receptacles according to claims 1 to 17, 19 and 20, when in use, the layers placed on top of the receptacle are an internal panel, an insert, and growth, plant or decorative medium.
23. The plurality of receptacles according to claim 23, when in use, the layers further includes a filter sheet, whereby the layers placed on top of the receptacle are an internal panel, an insert, growth, plant or decorative medium, and a filter sheet.
24. The plurality of receptacles according to claim 23, including an erosion guard on top of the filter sheet.
25. A green roof system according to any one of the preceding claims, wherein the system further includes a fluid supply line positioned along an extended lip of the receptacle.
26. A green roof system according to any one of the preceding claims, wherein the extended lip further includes a retaining means to retain a position of the fluid supply line along the extended lip.
27. A green roof system according to any one of any one of the preceding claims, wherein the system further includes conduits dimensioned to be received by the orifice of the receptacle.
28. A green roof system according to any one of the preceding claims, wherein in connection, a first receptacle is interconnected to a second receptacle by connecting a conduit between an orifice of a first receptacle, to an orifice of a second receptacle, to allow fluid flow from a first receptacle to a second receptacle.
29. A green roof system according to any one of the preceding claims, wherein the slot further includes a fastener, to fasten an extended lip of a first receptacle to a extended lip of a second receptacle, thereby interconnecting the first receptacle to a second receptacle.

30. A green roof system according to any one of the preceding claims, wherein the receptacles are arranged so that fluid flow from a first receptacle to a subsequent receptacle is directed to a drainage outlet of the roof.
31. A green roof system according to any one of the preceding claims, wherein a void will form between adjacent receptacles and said void is covered by a cover.
32. A plurality of receptacles for use in forming a green roof system, comprising:
 - a. each of said receptacles including a bottom member and four side members connected to said bottom member;
 - b. said side members extending upwardly from said bottom members to a first height;
 - c. each of said receptacles including a pair of horizontally extending, spaced apart channel members connected to said bottom member and defining a channel, each of said channel members extending upwardly to a second height, said second height being less than first height;
 - d. each of said channels extending along its respective bottom member from a first side member to a second side member;
 - e. first and second orifices in said first and second side members in communication with opposite ends of said channels;
 - f. wherein each of said receptacles includes attachment means for attaching said plurality of receptacles together to form the green roof system;
 - g. wherein said receptacle further includes at least a compartment on each side of the channel, for retaining a level of fluid received in the receptacle, said compartments formed by an edge panel and at least two sides of the receptacle;
 - h. wherein the compartments have at least one internal panel across said compartments, said internal panel of a height substantially equal to the height of the edge panels forming the channel;
 - i. including a void between adjacent receptacles and said void is covered by a cover; and
 - j. when in use, the layers placed on top of the receptacle are an internal panel, an insert, and growth, plant or decorative medium and including an erosion guard on top of the filter sheet.