

REVERSIBLE PLANTER BOARD

Field of the Invention

This invention relates to a planter board. More particularly, this invention relates to a planter board that can store water and at the same time allow excess water to be efficiently drained away from the planter board to prevent water stagnation, flooding and/or overflow which potentially cause structural overload, water leakage and damage on the roof. Still more particularly, this invention relates to a planter board that is reversible between a first configuration that provides both water retention and drainage and a second configuration that only provides drainage.

Background of the Invention

In green roof applications, planter boards having many small reservoirs formed in the planter board are commonly used to capture and store water from rainfall; and supply the stored water to the roots of plants embedded in soil over the planter board for a period of time. However, without proper drainage, excess water may cause the water level to rise and thus immerse the head of the roots of plants. It is a problem if the head of the roots of plants get immersed in water for a long period of time. A second problem is that the planter board may be damaged if the board is over-loaded with excessive water.

One possible way of preventing the above problems is to provide channels to facilitate the drainage of excess water from the planter board. Typically, a channel is formed between the reservoirs on the surface of a planter board. Some particular prior art planter boards include drainage holes through the planter board to allow water to drain away from the planter board. Although some prior art planter boards include a water retention feature and/or a drainage feature, no existing planter boards are easily interchangeable between the two applications, i.e. water retention and drainage. Thus, different types of planter boards are needed to provide these different applications. This may increase the overall cost due to the

additional cost for installation, inventory, and manufacturing different types of planter boards.

Summary of the Invention

The above and other problems are solved and an advance in the art is made by the planter board in accordance with this invention. This invention relates to a planter board that provides a simple and efficient way for storing and/or draining water. Furthermore, the planter board in accordance with this invention is reversible between a first configuration that provides both water retention and drainage and a second configuration that only provides drainage, without the need of a different type of planter board for each application. Apart from greening roofs to reduce radiant heat from the hard roof surfaces, the planter board of this invention is also applicable to surrounding of buildings, pavements, landscaped decks, and areas lacking in greenery.

A planter board in accordance with an embodiment of this invention includes reservoirs. Each of the reservoirs has a base and sidewalls extending upward from a top surface of the base to form a cavity with a defined opening through a top end of the sidewalls. Preferably, a reservoir includes eight adjoining sidewalls to provide greater structural integrity. The reservoirs are typically arranged in an array and spaced apart from one another. Apart from storing water, the reservoirs also help to hold the planting media in place.

In further accordance with this embodiment of the invention, the reservoirs are connected by a divider. The divider connects to a portion of the sidewalls of a reservoir at a height that provides a flow path between the divider and the ground or other supporting surface. Preferably, the divider is located substantially midway between the opening and the base of the reservoirs of the planter board. The flow path and hence the water flow rate is defined by the position of the divider and the sidewalls of the reservoirs.

In some embodiments, drainage holes may be defined through the divider allow excess water to flow through the drainage holes to the flow path underneath

the divider. The drainage holes should be of sufficient size to allow water to efficiently enter the flow path. The exact size and shape of the drainage holes are left as a design choice for those skilled in the art. The drainage holes are configured to provide flexibility to the planter board to bend slightly according to the gradient or curvature of the ground or other supporting surface.

The planter board in accordance with this invention may be placed on the ground or other supporting surface in a first configuration or a second configuration. In the first configuration, the base of each of the reservoirs of the planter board rests on the ground or other supporting surface exposing the opening of the reservoirs to allow water to be stored inside the reservoirs and allow excess water to be drained away via the flow path provided by the divider. In the second configuration, the opening of each of the reservoirs rests on the ground or other supporting surface. Thus, the cavities of the reservoirs are enclosed between the base and the ground or other supporting surface. This prevents water from being collected in the reservoirs. However, water is allowed to drain away through the flow path defined by the divider of the planter board. Therefore, the planter board in accordance with this embodiment of the invention is reversible between the first and second configurations for different applications. For example, if an application requires drainage only, the planter board can be placed in the second configuration. But if both drainage and water retention are required, the planter board may be placed in the first configuration. As discussed above, the position of the divider at the midway of the sidewalls is important as this creates an equally spacious flow path in both configurations.

In accordance with some embodiments of this invention, adjacent planter boards may be connected to form a larger planter board using a locking mechanism, preferably a slot-type locking mechanism. The locking mechanism may include a male connector affixed at an edge of a first planter board mated with a female connector affixed at an edge of a second planter board so that the male and female connectors are securely couple the first planter board to the second planter board.

In accordance with some embodiments of this invention, the planter board is made of a high compressive strength material with the unique configuration and

layout of the reservoirs acting as structural columns, allows the planter board to accommodate substantial loading of up to about 500 kilograms. Preferably, the planter board is made of polypropylene so that the planter board is rugged and resistant to many chemical solvents, bases and acids. Further, the use of polypropylene having the advantages to prevent the roots of plants from piercing through the reservoirs to the waterproofing membrane on the supporting surface.

In accordance with some embodiments of this invention, the size of the planter board is approximately 500 mm (length) x 500 mm (width) x 50 mm (height). The planter board of this dimension is capable of withstanding a load of up to about 500 kilograms, and is able to retain about 4.5 liter of water or other liquid. The planter board of this embodiment of the invention is designed to be lightweight, approximately 1.4 kilograms, and can support a load that is at least 300 to 400 times the weight of the planter board.

Brief Description of Drawings

The above and other features and advantages of a planter board in accordance with this invention are described in the following detailed description and shown in the following drawings:

Figure 1 illustrating a perspective view of a planter board in accordance with this invention;

Figure 2 illustrating a top planar view of the planter board of Figure 1;

Figure 3 illustrating a side view of the planter board of Figure 1;

Figure 4 illustrating an enlarged view of a divider and a drainage hole of the planter board of Figure 1;

Figure 5 illustrating a perspective view of the planter board of Figure 1 with the base of the reservoirs facing upward;

Figure 6 illustrating an enlarged view of a male connector of the planter board of Figure 1; and

Figure 7 illustrating an enlarged view of a female connector of the planter board of Figure 1.

Detailed Description of Invention

This invention relates to a planter board. More particularly, this invention relates to a planter board that can store water and at the same time allow excess water to be efficiently drained away from the planter board to prevent water stagnation, flooding and/or overflow which potentially cause structural overload, water leakage and damage on the roof. Still more particularly, this invention relates to a planter board that is reversible between a first configuration that provides both water retention and drainage and a second configuration that only provides drainage. This invention promotes a healthier plant growth with minimum irrigation required. For clarity, the same component shown in more than one figures is given the same reference numeral throughout this description.

Figure 1 illustrates a perspective view of planter board (100) in accordance with this invention. Planter board (100) includes reservoirs (102). Each of reservoirs (102) has base (104) and sidewalls (106) extending upward from a top surface of base (104) to form a cavity with a defined opening (108) through a top end of sidewalls (106). In some embodiments, reservoirs (102) include eight sidewalls in an octagonal shape. However, the shape of reservoirs (102) and the number of sidewalls (106) of reservoirs (102) may be altered without departing from this invention. Thus, the configuration of reservoirs (102) is left as a design choice to those skilled in the art. Typically, reservoirs (102) are arranged in an array and spaced evenly apart from one another. In the embodiment shown in Figure 1, an eleven by eleven array of reservoirs (102) is included in planter board (100). The arrangement and the number of reservoirs (102) in planter board (100) may be altered and left as a design choice to those skilled in the art. A top planar view and a side view of planter board (100) of Figure 1 are shown in Figure 2 and Figure 3, respectively.

Figure 4 illustrates an enlarged view of divider (402) and drainage hole (404) of planter board (100) of Figure 1. Divider (402) connects adjacent reservoirs (102) by extending outwards from at least a portion of sidewalls (106) of reservoirs (102). A flow path (406) underneath divider (402) is defined by sidewalls (106) of reservoirs (102). Preferably, divider (402) is located substantially midway between opening (108) and base (104) of reservoirs (102)

One or more drainage holes (404) are defined through divider (402) to allow water to enter flow path (406) underneath divider (402). Preferably, drainage holes (404) should be of sufficient size to allow water to efficiently enter flow path (406) to prevent excess water from standing on planter board (100). However, the exact sizing and number of drainage holes (404) are left as a design choice to those skilled in the art.

In a first configuration, base (104) of each of reservoirs (102) rests on the ground or other supporting surface, as shown in Figures 1 and 4. In a second configuration, opening (108) of each of reservoirs (102) rests on the ground or other supporting surface, as shown in Figure 5, to enclose reservoirs (102) to prevent water from being collected in reservoirs (102). Similar to the first configuration, a flow path (506) is formed underneath divider (402) in the second configuration. The area of flow path (406; 506) in either configuration is approximately 13mm to 22mm to provide sufficient area for the desired water flow, and at the same time aeratation the planting layer placed on top of planter board (100). Flow path (406; 506) provides an efficient way to drain away water from planter board (100).

In some embodiments, divider (402) includes at least one drainage hole (404). In both the first and second configurations, drainage hole (404) at divider (402) allows excess water to flow through drainage hole (404) to flow path (406; 506) and to be drained away from planter board (100) via flow path (406; 506). Therefore, the drainage feature is available in both configurations. However, the water retention feature is only available in the first configuration as opening (108) of each of reservoirs (102) are facing downward and resting on the ground or other supporting surface in the second configuration. Therefore, planter board (100)

provides a convenient and efficient way to have two different applications using one type of planter board.

Planter board (100) in accordance with this invention may include a male connector (600) and/or a female connector (700) on one of the edges of planter board (100). Preferably, male connector (600) and female connector (700) are affixed at a portion of sidewalls (106) of reservoirs (102) located at an edge of planter board (100). Figure 6 illustrates an enlarged view of a male connector (600) affixed at an edge of planter board (100). Figure 7 illustrates an enlarged view of a female connector (700) affixed at an edge of planter board (100). Male connector (600) comprises a planar member (602) with a surface connected to a supporting leg (604). Supporting leg (604) is affixed at an edge of planter board (100). Female connector (700) includes two arms (702) which are L-shaped in cross section and affixed at an edge of planter board (100). Two L-shaped arms (702) of female connector (700) create an aperture (704) for receiving planar member (602) of male connector (600). In such arrangement, a secured locking mechanism is formed by male connector (600) and female connector (700), and thus two planter boards can be easily aligned and combined to form a larger planter board.

The above embodiments provide a description of features and advantages of a planter board in accordance with this invention. It is envisioned that those skilled in the art can and will design alternative methods that infringe on this invention as set forth in the following claims.

Claims:

1. A planter board comprising:
 - a plurality of reservoirs wherein each of said plurality of reservoirs comprises a base and sidewalls extending upward from a top surface of said base to form a cavity with a defined opening through a top end of said sidewalls; and
 - a divider for connecting adjacent ones of said plurality of reservoirs wherein said divider extending from said sidewalls of each of said plurality of reservoirs at a height substantially midway between said opening and said base such that a flow path is formed between said divider and a supporting surface when said planter board is placed in a first configuration in which said base of each of said plurality of reservoirs rests on said supporting surface and a second configuration in which said opening of each of said plurality of reservoirs rests on said supporting surface.
2. The planter board of claim 1 wherein said divider having a drainage hole through said divider.
3. The planter board of claim 2 wherein said drainage hole allows liquid to flow through said drainage hole to said flow path when said planter board is in said first configuration and said second configuration.
4. The planter board of claim 2 wherein said drainage hole is configured to provide flexibility to said planter board.
5. The planter board of claim 1 further comprising:
 - a male connector affixed at an edge of said planter board for connecting said planter board to a second planter board having a female connector.
6. The planter board of claim 5 wherein said male connector and said female connector form a slot-type locking mechanism.

7. The planter board of claim 1 further comprising:
 - a female connector affixed at an edge of said planter board for connecting said planter board to a second planter board having a male connector.
8. The planter board of claim 7 wherein said female connector and said male connector form a slot-type locking mechanism.
9. The planter board of claim 1 wherein said plurality of reservoirs are arranged in an evenly spaced array.
10. The planter board of claim 1 wherein said planter board is made of a high compressive strength material.
11. The planter board of claim 1 wherein said planter board is made of polypropylene.
12. The planter board of claim 1 wherein said planter board is in a dimension of about 500 mm x 500 mm x 50 mm.
13. The planter board of claim 1 wherein said planter board able to retain about 4.5 liter of liquid.
14. The planter board of claim 1 wherein said planter board able to support a load of up to about 500 kilograms.
15. The planter board of claim 1 wherein said sidewalls comprise eight adjoining sidewalls.