

PLANTER FOR GROWING PLANTS

Cross Reference to Related Application(s)

- 5 The present disclosure claims the benefit of Singapore Patent Application No. 10202114132X filed on 20 December 2021, which is incorporated in its entirety by reference herein.

Technical Field

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The present disclosure generally relates to a planter for growing plants. More particularly, the present disclosure describes various embodiments of a planter unit for growing plants, as well as a planter assembly comprising a plurality of planter units.

15 Background

Vertical gardening is popular in urban environments as it is suitable for small spaces. In particular, vertical green walls provide aesthetic pleasure and improved air quality, promote mental health and overall well-being, and may even be used for urban farming.

- 20 However, conventional hanging planters and typical systems that allow these conventional hanging planters to be suspended one below the other are associated with several problems. Some examples of conventional hanging planters are shown in Figures 1A and 1B.

- 25 In the first instance, conventional hanging planters require a water-drainage point, otherwise water will accumulate in the planter leading to salt build-up and increased mosquito breeding. However, conventional hanging planters have open drainage points which often cause water to be splashed or spilled from the sides or from the bottom of the planters. Secondly, the plants are grown in small spaces in conventional
- 30 hanging planters, restricting accessibility to the plants and making maintenance difficult. Thirdly, conventional hanging planters are individually watered which is time-consuming and inefficient. Fourthly, the planters are hung on fixed positions of a frame and lack customizability for aesthetics and to suit the décor.

Therefore, there is a need to provide an improved planter for growing plants that would address or alleviate at least one of the aforementioned problems and/or disadvantages.

5 **Summary**

According to an aspect of the present disclosure, there is a planter unit for growing plants. The planter unit comprises: a body comprising a first portion and a second portion; an open space formed through the first portion and second portion, the first
10 portion partially enclosing the open space for sheltering the plants growing in the open space; a set of fluidic conduits for communicating fluids through the body and for discharging the fluids into the open space; and a set of covers removably coupleable to the second portion to partially cover the open space and form a media chamber within the open space, the media chamber for containing plant growth media for
15 growing the plants.

A planter unit for growing plants according to the present disclosure is thus disclosed herein. Various features, aspects, and advantages of the present disclosure will become more apparent from the following detailed description of the embodiments of
20 the present disclosure, by way of non-limiting examples only, along with the accompanying drawings.

Brief Description of the Drawings

25 Figures 1A and 1B are illustrations of conventional hanging planters.

Figures 2A and 2B are illustrations of a planter unit in accordance with embodiments of the present disclosure.

30 Figures 3A and 3B are illustrations of a lighting device of the planter unit.

Figures 4A and 4B are illustrations of a media chamber of the planter unit.

Figure 5 is an illustration of two connected planter units.

Figures 6A to 6D are illustrations of connectors of the planter units.

5 Figures 7A to 7C are further illustrations of two connected planter units.

Figure 8 is an illustration of the planter unit connected to a pipe.

Figures 9A and 9B are illustrations of a drainage container of the planter unit.

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Figures 10A to 10C are illustrations of a planter assembly comprising planter units supported from the bottom.

Figures 11A to 11D are illustrations of a planter assembly comprising planter units suspended from the top.

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Figures 12A and 12B are illustrations of a planter assembly comprising planter units supported from the top and bottom.

20 Figures 13A and 13B are illustrations of a green screen formed by the planter assembly of planter units.

Figures 14A and 14B are illustrations of interconnected planter units.

25 **Detailed Description**

For purposes of brevity and clarity, descriptions of embodiments of the present disclosure are directed to a planter unit for growing plants, in accordance with the drawings. While aspects of the present disclosure will be described in conjunction with the embodiments provided herein, it will be understood that they are not intended to limit the present disclosure to these embodiments. On the contrary, the present disclosure is intended to cover alternatives, modifications and equivalents to the embodiments described herein, which are included within the scope of the present

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disclosure as defined by the appended claims. Furthermore, in the following detailed description, specific details are set forth in order to provide a thorough understanding of the present disclosure. However, it will be recognized by an individual having ordinary skill in the art, i.e. a skilled person, that the present disclosure may be practiced without specific details, and/or with multiple details arising from combinations of aspects of particular embodiments. In a number of instances, well-known systems, methods, procedures, and components have not been described in detail so as to not unnecessarily obscure aspects of the embodiments of the present disclosure.

In embodiments of the present disclosure, depiction of a given element or consideration or use of a particular element number in a particular figure or a reference thereto in corresponding descriptive material can encompass the same, an equivalent, or an analogous element or element number identified in another figure or descriptive material associated therewith.

References to “an embodiment / example”, “another embodiment / example”, “some embodiments / examples”, “some other embodiments / examples”, and so on, indicate that the embodiment(s) / example(s) so described may include a particular feature, structure, characteristic, property, element, or limitation, but that not every embodiment / example necessarily includes that particular feature, structure, characteristic, property, element or limitation. Furthermore, repeated use of the phrase “in an embodiment / example” or “in another embodiment / example” does not necessarily refer to the same embodiment / example.

The terms “comprising”, “including”, “having”, and the like do not exclude the presence of other features / elements / steps than those listed in an embodiment. Recitation of certain features / elements / steps in mutually different embodiments does not indicate that a combination of these features / elements / steps cannot be used in an embodiment.

As used herein, the terms “a” and “an” are defined as one or more than one. The use of “/” in a figure or associated text is understood to mean “and/or” unless otherwise indicated. The term “set” is defined as a non-empty finite organisation of elements that

mathematically exhibits a cardinality of at least one (e.g. a set as defined herein can correspond to a unit, singlet, or single-element set, or a multiple-element set), in accordance with known mathematical definitions.

- 5 In representative or exemplary embodiments of the present disclosure, with reference to Figure 2A, there is a planter pod or unit 100 for growing plants. Various species of plants in various stages of growth may be grown, such as saplings.

10 The planter unit 100 includes a body 110 having a first portion 112 and a second portion 114. The planter unit 100 further includes an open space 120 formed through the first portion 112 and the second portion 114 of the body 110. More specifically, the first portion 112 partially encloses the open space 120 for sheltering the plants growing in the open space 120.

- 15 In many embodiments, the planter unit 100 is arranged vertically such that the first portion 112 is the upper portion and the second portion 114 is the lower portion. The first or upper portion 112 and the second or lower portion 114 may include aerodynamic surface contours that widen from ends of the respective portions 112, 114 towards the open space 120. The aerodynamic surface contours facilitate airflow
20 around the planter unit 100, especially due to external forces like wind resistance, to minimize damage to the plants. It will be appreciated that the planter unit 100 can be in other arrangements, such as horizontally in a left-right orientation, or obliquely.

25 In one embodiment, the body 110 is integrally formed as a single unit. In another embodiment, the first portion 112 and second portion 114 are separately formed and joined together to form the body 110. Optionally, the first portion 112 and second portion 114 are removably joined together. In another embodiment, the body 110 includes a plurality of body portions, such as at least the first portion 112 and second portion 114, that are removably coupleable together.

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The planter unit 100 further includes a set of fluidic conduits 130 for communicating fluids through the body 110 and for discharging the fluids into the open space 120. For example as shown in Figure 2B, the fluidic conduits 130 communicate fluids such as

water or liquid fertilizer and discharges the fluids to the open space 120 via outlets 132.

In some embodiments as shown in Figures 3A and 3B, the planter unit 100 further includes a set of lighting devices 140 for emitting light. The planter unit 100 may include a set of electrical wires 142 for powering the lighting devices 140. The lighting devices 140 may include grow lights for emitting grow light to enhance growth of the plants. The lighting devices 140 may include aesthetic lights, such as LED lights, for aesthetic lighting of the planter unit 100. The lighting devices 140 may be configured to emit light in any combination of colours.

Further as shown in Figure 4A, the planter unit 100 further includes a set of covers 150 removably coupleable to the second portion 114 of the body 110 to partially cover the open space 120 and form a media chamber 122 within the open space 120. The media chamber 122 is used for containing plant growth media for growing the plants. The covers 150 thus protect the roots of the plants and the first portion 112 shelters the shoots and leaves of the plants from the top and sides, while the open space 120 allows the plants to receive light, especially sunlight, for growth. The planter unit 100 is able to protect vulnerable young plants from being damaged by external elements such as strong winds by sheltering the plants appropriately while still exposing them to sunlight for growth.

In one embodiment as shown in Figure 4A, the media chamber 122 is directly filled with the plant growth media, such as soil or a soil-less growth medium. In one embodiment as shown in Figure 4B, the planter unit 100 includes a media pouch 124 lining the media chamber 122. More specifically, the media pouch 124 is removably inserted into the media chamber 122 and filled with the plant growth media. The media pouch 124 is made of a suitable material helps the plant growth media to absorb and retain water for nourishing the plants. For example, the media pouch 124 may be made of, but not limited to, felt, cloth, geotextile, terracotta, or plastic.

The media chamber 122 can be accessed through the removable covers 150. This facilitates maintenance of the planter unit 100, such as to maintain or replace the

plants, without disturbing the rest of the planter unit 100, such as the fluidic conduits 130 or electrical wires 142. In some embodiments, the planter unit 100 is installed in an assembly of multiple planter units 100. The media chamber 122 of any one planter unit 100 in the assembly can be accessed by removing the respective covers 150, without disturbing the other planter units 100 or the rest of the assembly.

In some embodiments, the planter unit 100 includes a set of connectors 160 disposed at the first portion 112 and/or second portion 114 of the body 110. The connectors 160 are configured for connecting the planter unit 100 to another planter unit 100 or structure. Examples of other structures may include cables, rods, pipes, etc. The connectors 160 may be integrally formed with or removably coupleable to the body 110. For example, a connector 160 is removably coupleable to the body 110 by screw thread fasteners as shown in Figure 4B.

In one embodiment as shown in Figure 5, two planter units 100 are connected together in a vertical arrangement. The upper planter unit 100 includes a connector 160, specifically a male connector 162, and the lower planter unit 100 includes a corresponding connector 160, specifically a female connector 164. In this arrangement, the lower planter unit 100 is suspended below the upper planter unit 100, while bearing the weight of the upper planter unit 100. The weight may be borne independent by the connectors 160 and/or by transferring the weight to other structures connected to and below the lower planter unit 100. The bottom of the lower planter unit 100 may include a male connector 162 for connecting to another planter unit 100 or a drainage container 180 described further below, and the top of the upper planter unit 100 may include a hook 161 for hanging or suspending the planter units 100.

In some embodiments, the connectors 160 are configured for flexibly connecting the planter unit 100 to the other planter unit 100 or structure, such that the planter unit 100 is moveable independently of the other planter unit 100 or structure. For example, an upper planter unit 100 is flexibly connected to a lower planter unit 100 via respective male and female connectors 162, 164. The planter units 100 may swing, pivot, or flex relative to each other in one or more degrees of freedom. For example as shown in Figure 6A, the planter units 100 are rotatable relative to each other about a vertical

axis. For example as shown in Figure 6B, the planter units 100 are rotatable relative to each other about a horizontal axis. It will be appreciated that the planter units 100 may be configured for single-axis or multi-axes rotation relative to each other. The flexible connection between the planter units 100 makes them less amenable to damage due to the ability of the connected planter units 100 being able to flex upon encountering an external force such as wind resistance.

In some embodiments as shown in Figures 6C and 6D, the connectors 160 are configured for rigidly connecting the planter unit 100 to the other planter unit 100 or structure, such that the planter unit 100 is moveable together with the other planter unit 100 or structure. For example, two planter units 100 are fixedly connected together using the connectors 160, wherein the connectors 160 are locked by a suitable locking element 166. The locking element 166 may be a positive mechanical lock, a snap-fit lock, or a gravity-assisted lock.

As shown in Figure 7A, the connectors 160 may include channels 168 for disposing one or more conduits therethrough. The connectors 160 may be configured for rigid or flexible connections between the planter units 100 while having the conduits disposed through the channels 168, such as shown in Figures 7B and 7C. The conduits may include the fluidic conduits 130 and the electrical wires 142. The channels 168 allow the fluidic conduits 130 and electrical wires 142 to extend continuously from one planter unit 100 to another planter unit 100. For example, the fluidic conduits 130 in one planter unit 100 are fluidically connectable to the fluidic conduits 130 of the other planter unit 100 or structure via the connectors 160. The connectors 160 may be configured for preventing leakage of fluids, particularly water or other liquids. Specifically, the connectors 160 may include suitable seals or anti-leaking features to prevent leakage of fluids from the connectors 160 as they flow through the channels 168 from one planter unit 100 to another.

The fluids may flow through the fluidic conduits 130 between the planter units 100 by pressure or gravity. For example, the fluidic conduits 130 in each planter unit 100 may be configured for pressurized drip irrigation such that the plants can be watered in a controlled manner. Alternatively or additionally, the plants may be watered manually

with the assistance of gravity, where watering the upper planter unit 100 allows excess water to flow into the lower planter unit 100. Multiple planter units 100 that are connected together vertically can thus be watered easily from the top. Excess water from the bottom may be recirculated back to the planter units 100 through
5 electromechanical means, such as a motorized pump. It will be appreciated that in a vertical series of planter units 100, water may be pumped upwards from the bottom planter unit 100 to the top planter unit 100, instead of flowing down by gravity.

In some embodiments as shown in Figure 8, the planter unit 100 is connected to
10 another structure such as a pipe 170. More specifically, the planter unit 100 has a connector 160 disposed at the second portion 114 and the connector 160 is configured for connecting to the pipe 170. The connector 160 includes the locking element 166 to fixedly connect the pipe 170 to the bottom of the second portion 114. It will be appreciated that the pipe 170 may be similarly connected to the top of the planter unit
15 100 with the connector 160 being disposed at the top of the first portion 112. The pipe 170 may be configured to feed water and liquid fertilizers, using suitable pressurized means, to the plants and/or to drain water from the planter unit 100.

In some embodiments as shown in Figures 9A and 9B, the planter unit 100 includes a
20 drainage container 180 integrated with or removably coupleable to the body 110 for collecting fluids released from the body 110. For example, excess drain water in the planter unit 100 can flow by gravity and drain into drainage container 180. The drainage container 180 may include a connector 182 that connects to the bottom of the second portion 114, and a bowl 184 for collecting the discharged fluids. For
25 example, the connector 182 may be a female connector 164 and the bottom of the second portion 114 has the corresponding male connector 162 that is engageable with the female connector 164. The drainage container 180 can be detached from the body 110 and the collected water can be disposed of before reattaching the drainage container 180 back to the body 110. The draining of water from the planter unit 100
30 prevents salt build-up inside the planter unit 100 over time. Moreover, the draining is localized which minimizes unsightly spillage from the planter unit 100.

The drainage container 180 may include an insect trap device 186. The insect trap device 186 may be removable from the drainage container 180 for cleaning and replacing. For example, the insect trap device 186 is an anti-mosquito device that is configured to prevent mosquitoes from laying eggs on the water collected in the bowl
5 184. This prevents propagation and reproduction of mosquitos and reduces spread of diseases like dengue.

In various embodiments, there is a planter assembly 200 having a plurality of the planter units 100. In one embodiment as shown in Figures 10A to 10C, the planter
10 assembly 200 includes a base 210 and a plurality of pipes 170 for supporting the planter units 100. More specifically, each pipe 170 is connected between the base 210 and the second portion 114 of the respective planter unit 100. The pipes 170 may be flexible enough to bend into any desired profile, and structural strong enough to support the planter units 100. The pipes 170 may feed water and liquid fertilizers from
15 the base 210 to the plants growing in the planter units 100 and/or to drain water from the planter units 100 into the base 210.

In one embodiment as shown in Figures 11A to 11D, the planter assembly 200 includes a ceiling 220 and a plurality of cables 172 for suspending the planter units
20 100. More specifically, each cable 172 is connected between the ceiling 220 and the first portion 112 of the respective planter unit 100. Further, a cable 172 may suspend a line of planter units 100, wherein the planter line includes a plurality of the planter units 100. For example, the cable 172 is connected to the upper planter unit 100 and the lower planter unit 100 is connected to the bottom of the upper planter unit 100. It
25 will be appreciated that the cables 172 may be in any form suitable for suspending or hanging the planter units 100, such as ropes, strings, chains, or rigid rods or pipes.

In one embodiment as shown in Figures 12A to 12C, the planter assembly 200 includes a structural frame 230 having the base 210 and ceiling 220. The planter
30 assembly 200 includes one or more planter lines, each planter line having a plurality of the planter units 100. Further, in each planter line, the planter units 100 are arranged in series such that the first portion 112 of a planter unit 100 is connected to the second portion 114 of another planter unit 100. Yet further, in each planter line, the fluidic

conduits 130 of the planter units 100 are fluidically connected to each other such that the fluids can communicate through the fluidic conduits 130 from a top planter unit 100 to a bottom planter unit 100.

5 The planter assembly 200 includes a plurality of supporting members 232 for supporting the planter lines. More specifically, in each planter line, a supporting member 232 is connected between the base 210 and the bottom planter unit 100, and another supporting member 232 is connected between the ceiling 220 and the top planter unit 100. Alternatively, a supporting member 232 may pass through the planter
10 units 100 in the same planter line. Water may flow through the supporting members 232, similarly to the pipes 170, to water the plants growing in all the planter units 100 and the water may be drained out at the base 210.

In one embodiment as shown in Figures 13A and 13B, the planter assembly 200 with
15 the structural frame 230 and planter units 100 may be assembled as a green screen or green wall 240. The green screen 240 may be installed indoors as an interior decoration. Moreover, the green screen 240 minimizes visibility restriction as there are spaces between the planter units 100 that offer visibility through the green screen 240. The green screen 240 can be customized by arranging the planter units 100 in various
20 positions so as to suit different aesthetic and décor requirements.

In one embodiment as shown in Figure 14A, the planter assembly 200 includes a plurality of the planter units 100 that are interconnected together. For example, the first portion 112 of the first planter unit 100 is connected to the second portion 114 of
25 the second planter unit 100, the first portion 112 of the second planter unit 100 is connected to the second portion 114 of the third planter unit 100, and the first portion 112 of the third planter unit 100 is connected to the second portion 114 of the first planter unit 100. The connectors 160 may be configured as ball joints to connect the planter units 100. It will be appreciated that any number of planter units 100 may be
30 interconnected together in various configurations and assemblies, such as shown in Figure 14B.

The planter unit 100 or various components thereof may be fabricated by moulding or other known manufacturing methods. Particularly, they may be formed by a manufacturing process that includes an additive manufacturing process. A common example of additive manufacturing is three-dimensional (3D) printing; however, other methods of additive manufacturing are available. Rapid prototyping or rapid manufacturing are also terms which may be used to describe additive manufacturing processes.

As used herein, “additive manufacturing” refers generally to manufacturing processes wherein successive layers of material(s) are provided on each other to “build-up” layer-by-layer or “additively fabricate”, a 3D component. This is compared to some subtractive manufacturing methods (such as milling or drilling), wherein material is successively removed to fabricate the part. The successive layers generally fuse together to form a monolithic component which may have a variety of integral sub-components. In particular, the manufacturing process may allow an example of the disclosure to be integrally formed and include a variety of features not possible when using prior manufacturing methods.

Additive manufacturing methods described herein enable manufacture to any suitable size and shape with various features which may not have been possible using prior manufacturing methods. Additive manufacturing can create complex geometries without the use of any sort of tools, moulds, or fixtures, and with little or no waste material. Instead of machining components from solid billets of plastic or metal, much of which is cut away and discarded, the only material used in additive manufacturing is what is required to shape the part.

Suitable additive manufacturing techniques in accordance with the present disclosure include, for example, Fused Deposition Modelling (FDM), Selective Laser Sintering (SLS), 3D printing such as by inkjets and laserjets, Stereolithography (SLA), Direct Selective Laser Sintering (DSLS), Electron Beam Sintering (EBS), Electron Beam Melting (EBM), Laser Engineered Net Shaping (LENS), Electron Beam Additive Manufacturing (EBAM), Laser Net Shape Manufacturing (LNSM), Direct Metal Deposition (DMD), Digital Light Processing (DLP), Continuous Digital Light Processing

(CDLP), Direct Selective Laser Melting (DSLM), Selective Laser Melting (SLM), Direct Metal Laser Melting (DMLM), Direct Metal Laser Sintering (DMLS), Material Jetting (MJ), NanoParticle Jetting (NPJ), Drop On Demand (DOD), Binder Jetting (BJ), Multi Jet Fusion (MJF), Laminated Object Manufacturing (LOM), and other known
5 processes.

The additive manufacturing processes described herein may be used for forming components using any suitable material. For example, the material may be metal, plastic, polymer, composite, or any other suitable material that may be in solid, liquid,
10 powder, sheet material, wire, or any other suitable form or combinations thereof. More specifically, according to exemplary embodiments of the present disclosure, the additively manufactured components described herein may be formed in part, in whole, or in some combination of materials suitable for use in additive manufacturing processes and which may be suitable for the fabrication of examples described herein.

As noted above, the additive manufacturing process disclosed herein allows a single component to be formed from multiple materials. Thus, the examples described herein may be formed from any suitable mixtures of the above materials. For example, a component may include multiple layers, segments, or parts that are formed using
20 different materials, processes, and/or on different additive manufacturing machines. In this manner, components may be constructed which have different materials and material properties for meeting the demands of any particular application. In addition, although the components described herein are constructed entirely by additive manufacturing processes, it should be appreciated that in alternate embodiments, all
25 or a portion of these components may be formed via casting, machining, and/or any other suitable manufacturing process. Indeed, any suitable combination of materials and manufacturing methods may be used to form these components.

Additive manufacturing processes typically fabricate components based on 3D
30 information, for example a 3D computer model (or design file), of the component. Accordingly, examples described herein not only include products or components as described herein, but also methods of manufacturing such products or components

via additive manufacturing and computer software, firmware or hardware for controlling the manufacture of such products via additive manufacturing.

The structure of the product may be represented digitally in the form of a design file.

- 5 A design file, or computer aided design (CAD) file, is a configuration file that encodes one or more of the surface or volumetric configuration of the shape of the product. That is, a design file represents the geometrical arrangement or shape of the product.

- 10 Design files can take any now known or later developed file format. For example, design files may be in the Stereolithography or “Standard Tessellation Language” (.stl) format which was created for Stereolithography CAD programs of 3D Systems, or the Additive Manufacturing File (.amf) format, which is an American Society of Mechanical Engineers (ASME) standard that is an extensible markup-language (XML) based format designed to allow any CAD software to describe the shape and composition of
15 any 3D object to be fabricated on any additive manufacturing printer. Further examples of design file formats include AutoCAD (.dwg) files, Blender (.blend) files, Parasolid (.x_t) files, 3D Manufacturing Format (.3mf) files, Autodesk (3ds) files, Collada (.dae) files and Wavefront (.obj) files, although many other file formats exist.

- 20 Design files can be produced using modelling (e.g. CAD modelling) software and/or through scanning the surface of a product to measure the surface configuration of the product. Once obtained, a design file may be converted into a set of computer executable instructions that, once executed by a processor, cause the processor to control an additive manufacturing apparatus to produce a product according to the
25 geometrical arrangement specified in the design file. The conversion may convert the design file into slices or layers that are to be formed sequentially by the additive manufacturing apparatus. The instructions (otherwise known as geometric code or “G-code”) may be calibrated to the specific additive manufacturing apparatus and may specify the precise location and amount of material that is to be formed at each stage
30 in the manufacturing process. As discussed above, the formation may be through deposition, through sintering, or through any other form of additive manufacturing method.

The code or instructions may be translated between different formats, converted into a set of data signals and transmitted, received as a set of data signals and converted to code, stored, etc., as necessary. The instructions may be an input to the additive manufacturing system and may come from a part designer, an intellectual property (IP) provider, a design company, the operator or owner of the additive manufacturing system, or from other sources. An additive manufacturing system may execute the instructions to fabricate the product using any of the technologies or methods disclosed herein.

Design files or computer executable instructions may be stored in a (transitory or non-transitory) computer readable storage medium (e.g., memory, storage system, etc.) storing code, or computer readable instructions, representative of the product to be produced. As noted, the code or computer readable instructions defining the product that can be used to physically generate the object, upon execution of the code or instructions by an additive manufacturing system. For example, the instructions may include a precisely defined 3D model of the product and can be generated from any of a large variety of well-known CAD software systems such as AutoCAD®, TurboCAD®, DesignCAD 3D Max, etc. Alternatively, a model or prototype of the product may be scanned to determine the 3D information of the product. Accordingly, by controlling an additive manufacturing apparatus according to the computer executable instructions, the additive manufacturing apparatus can be instructed to print out the product.

In light of the above, embodiments include methods of manufacture via additive manufacturing. This includes the steps of obtaining a design file representing the product and instructing an additive manufacturing apparatus to manufacture the product according to the design file. The additive manufacturing apparatus may include a processor that is configured to automatically convert the design file into computer executable instructions for controlling the manufacture of the product. In these embodiments, the design file itself can automatically cause the production of the product once input into the additive manufacturing apparatus. Accordingly, in this embodiment, the design file itself may be considered computer executable instructions that cause the additive manufacturing apparatus to manufacture the product.

Alternatively, the design file may be converted into instructions by an external computing system, with the resulting computer executable instructions being provided to the additive manufacturing apparatus.

5 Given the above, the design and manufacture of implementations of the subject matter and the operations described in this specification can be realized using digital electronic circuitry, or in computer software, firmware, or hardware, including the structures disclosed in this specification and their structural equivalents, or in combinations of one or more of them. For instance, hardware may include processors,
10 microprocessors, electronic circuitry, electronic components, integrated circuits, etc. Implementations of the subject matter described in this specification can be realized using one or more computer programs, i.e., one or more modules of computer program instructions, encoded on computer storage medium for execution by, or to control the operation of, data processing apparatus. Alternatively or in addition, the program
15 instructions can be encoded on an artificially generated propagated signal, e.g., a machine-generated electrical, optical, or electromagnetic signal that is generated to encode information for transmission to suitable receiver apparatus for execution by a data processing apparatus. A computer storage medium can be, or be included in, a computer-readable storage device, a computer-readable storage substrate, a random
20 or serial access memory array or device, or a combination of one or more of them. Moreover, while a computer storage medium is not a propagated signal, a computer storage medium can be a source or destination of computer program instructions encoded in an artificially generated propagated signal. The computer storage medium can also be, or be included in, one or more separate physical components or media
25 (e.g., multiple CDs, disks, or other storage devices).

Although additive manufacturing technology is described herein as enabling fabrication of complex objects by building objects point-by-point, layer-by-layer, typically in a vertical direction, other methods of fabrication are possible and within the
30 scope of the present subject matter. For example, although the discussion herein refers to the addition of material to form successive layers, one skilled in the art will appreciate that the methods and structures disclosed herein may be practiced with any additive manufacturing technique or other manufacturing technology.

In the foregoing detailed description, embodiments of the present disclosure in relation to a planter unit for growing plants are described with reference to the provided figures. The description of the various embodiments herein is not intended to call out or be limited only to specific or particular representations of the present disclosure, but merely to illustrate non-limiting examples of the present disclosure. The present disclosure serves to address at least one of the mentioned problems and issues associated with the prior art. Although only some embodiments of the present disclosure are disclosed herein, it will be apparent to a person having ordinary skill in the art in view of this disclosure that a variety of changes and/or modifications can be made to the disclosed embodiments without departing from the scope of the present disclosure. Therefore, the scope of the disclosure as well as the scope of the following claims is not limited to embodiments described herein.

Claims

1. A planter unit for growing plants, the planter unit comprising:
 - a body comprising a first portion and a second portion;
 - 5 an open space formed through the first portion and second portion, the first portion partially enclosing the open space for sheltering the plants growing in the open space;
 - a set of fluidic conduits for communicating fluids through the body and for discharging the fluids into the open space; and
 - 10 a set of covers removably coupleable to the second portion to partially cover the open space and form a media chamber within the open space, the media chamber for containing plant growth media for growing the plants.
2. The planter unit according to claim 1, wherein the first portion and second
15 portion comprise aerodynamic surface contours that widen from ends of the first portion and second portion towards the open space.
3. The planter unit according to claim 1 or 2, wherein the body is integrally formed
20 as a single unit.
4. The planter unit according to claim 1 or 2, wherein the first portion and second
portion are separately formed and joined together to form the body.
5. The planter unit according to any one of claims 1 to 4, further comprising a set
25 of connectors disposed at the first portion and/or second portion, the connectors for connecting the planter unit to another planter unit or structure.
6. The planter unit according to claim 5, wherein the connectors are integrally
formed with or removably coupleable to the body.
- 30 7. The planter unit according to claim 5 or 6, wherein the connectors are configured for flexibly connecting the planter unit to the other planter unit or structure,

such that the planter unit is moveable independently of the other planter unit or structure.

8. The planter unit according to claim 5 or 6, wherein the connectors are configured for rigidly connecting the planter unit to the other planter unit or structure, such that the planter unit is moveable together with the other planter unit or structure.

9. The planter unit according to any one of claims 5 to 8, wherein the connectors comprise channels for disposing one or more conduits therethrough.

10. The planter unit according to any one of claims 5 to 9, wherein the fluidic conduits are fluidically connectable to fluidic conduits of another planter unit via the connectors.

11. The planter unit according to any one of claims 5 to 10, wherein the connectors are configured for preventing leakage of fluids.

12. The planter unit according to any one of claims 1 to 11, further comprising a drainage container integrated with or removably coupleable to the body for collecting fluids released from the body.

13. The planter unit according to claim 12, wherein the drainage container comprises an insect trap device.

14. The planter unit according to any one of claims 1 to 13, further comprising a set of lighting devices for emitting light.

15. The planter unit according to claim 14, wherein the lighting devices comprise grow lights for emitting grow light to enhance growth of the plants.

16. The planter unit according to claim 14 or 15, wherein the lighting devices comprise aesthetic lights for aesthetic lighting of the planter unit.

17. A planter assembly for growing plants, the planter assembly comprising:
one or more planter lines, each planter line comprising a plurality of the
planter units according to any one of claims 1 to 16;

wherein in each planter line, the planter units are arranged in series such
that the first portion of a planter unit is connected to the second portion of
another planter unit.

18. The planter assembly according to claim 17, wherein in each planter line, the
fluidic conduits of the planter units are fluidically connected to each other such that the
fluids can communicate through the fluidic conduits from a top planter unit to a bottom
planter unit.

19. A computer program comprising computer executable instructions that, when
executed by a processor, cause the processor to control an additive manufacturing
apparatus to manufacture the planter unit according to any one of claims 1 to 16.

20. A method of manufacturing a product via additive manufacturing, the method
comprising:

obtaining an electronic file representing a geometry of the product
wherein the product is the planter unit according to any one of claims 1 to 16;
and

controlling an additive manufacturing apparatus to manufacture, over
one or more additive manufacturing steps, the product according to the
geometry specified in the electronic file.