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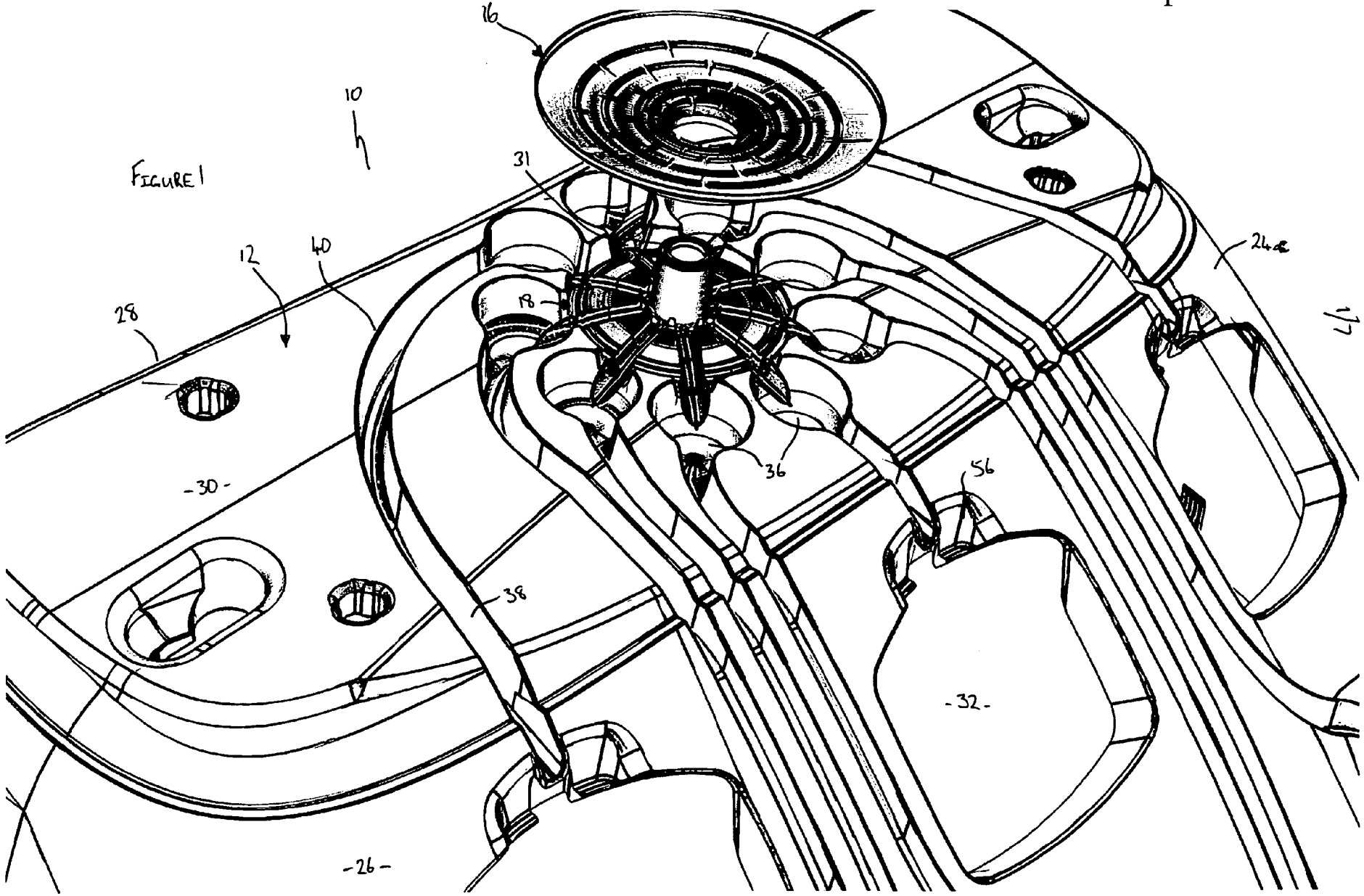
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A plant cultivation apparatus that dispenses a uniform amount of fluid from a fluid reservoir (16) to each of a plurality of plant receptacles by way of an open channel (38) irrigation system, the reservoir (16) comprising a plurality of spaced concentric ribs about a central aperture.

FIGURE 1



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"PLANT CULTIVATION APPARATUS"

FIELD OF THE INVENTION

The invention relates to a plant cultivation apparatus. The invention is particularly suited to a structure where a predetermined amount of fluid automatically metered by a central reservoir is substantially equal to the amount of fluid delivered by way of a substantially open channel configuration to each plant in the plant receptacle.

BACKGROUND TO THE INVENTION

The following discussion of the background to the invention is intended to facilitate an understanding of the present invention. However, it should be appreciated that the discussion is not an acknowledgment or admission that any of the material referred to was published, known or part of the common general knowledge in any jurisdiction as at the priority date of the application.

System for cultivating a plurality of plants in close proximity are commonly termed "plant cultivation apparatus" or "planter" and such planters are arranged to allow as many plants as possible to be cultivated per unit area of land compared with traditional cultivation methods. Such planters generally comprise a rack having an upwardly extending support frame presenting apertures into which plant pots holding individual plants are inserted. These apertures are conveniently arranged in any array so that the plants are in effect stacked in a plane substantially more than 45° to the horizontal – sometimes even substantially vertically. The overall effect is the appearance of a wall of plants. Irrigation systems, such as those known as drippers, are commonly used to provide fluid to the plants contained in the planter.

However, the drawback of most irrigation systems is that the amount of fluid provided to each plant in the planter may differ from the desirable quantity of fluid for such a plant. This may be as a result of factors inherent in the irrigation system, such as blockages, but may also be the result of the plant being provided with an uncontrolled level of fluid from a fluid source. It is therefore important to have some form of metering system for the delivery of fluid to the planter.

In the prior applications filed by the applicant, an open channel irrigation system and a metering system for a plant cultivation apparatus were disclosed. It has since been

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discovered by the applicant that the dispensation of fluid by way of the open channel irrigation system as disclosed in the patent specification is inhibited by the meniscus effect.

Furthermore, the metering system as disclosed in the patent specification relied heavily on using a moving valve to dispense fluid into each chamber having a predetermined fluid capacity. This one to one relationship between valve and chamber increased the chance that the system may fail (at least in part). Considering the nature of the invention, it is also possible that the owner of the plant cultivation apparatus may not notice a failure of one valve in light of the operation of the remaining valves.

It is therefore an object of the present invention to provide a plant cultivation apparatus that ameliorates, at least in part, one or more of the abovementioned defects.

SUMMARY OF THE INVENTION

Throughout this document, unless otherwise indicated to the contrary, the terms "comprising", "consisting of", and the like, are to be construed as non-exhaustive, or in other words, as meaning "including, but not limited to".

In accordance with a first aspect of the invention there is a plant cultivation apparatus that dispenses a uniform amount of fluid from a fluid reservoir to each of a plurality of plant receptacles by way of an open channel irrigation system.

Preferably, the uniform dispensation of fluid is achieved by a saucer having a plurality of spaced ribs of equal size and shape arranged in concentric rings about an aperture.

Preferably, the open channel irrigation system is formed from a plurality of conduits, each conduit extending from the fluid reservoir to a single plant receptacle and having a square cross-section.

More preferably, each conduit has a dividing projection extending along its length.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is an isometric view of a plant cultivation apparatus according to a first aspect of the present invention.

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Figure 2 is an isometric view of a first fluid dispensing unit of a plant cultivation apparatus according to the invention as shown in Figure 1.

Figure 3 is an isometric view of a second fluid dispensing unit of a plant cultivation apparatus according to the invention as shown in Figure 1.

Figure 4 is a first cross-sectional representation of a conduit of a plant cultivation apparatus according to the invention as shown in Figure 1.

Figure 5 is a second cross-sectional representation of a conduit of a plant cultivation apparatus according to the invention as shown in Figure 1.

Figure 6 is an isometric view of a plant cultivation apparatus according to a second aspect of the present invention.

Figure 7 is an isometric view of a plant cultivation apparatus according to a third aspect of the present invention.

Figure 8 a representative figure of a metering system as used in a plant cultivation apparatus according to the invention as shown in Figure 7.

PREFERRED EMBODIMENTS OF THE INVENTION

Particular embodiments of the present invention will now be described with reference to the accompany drawings. The terminology used herein is for the purpose of describing particular embodiments only and is not intended to limit the scope of the present invention. Additionally, unless defined otherwise, all technical and scientific terms used herein have the same meanings as commonly understood by one or ordinary skill in the art to which this invention belongs.

In accordance with a first embodiment of the invention there is a plant cultivation apparatus 10. The plant cultivation apparatus 10 comprises:

- a housing 12;
- a fluid reservoir 14;
- a first fluid dispensing unit 16;
- a second fluid dispensing unit 18; AND

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- a valve 20.

The fluid reservoir 14, first fluid dispensing unit 16, second fluid dispensing unit 18 and valve 20 combined form a metering system 22.

The housing 12 of the apparatus consists of three interconnecting segments 24a, 24b and 24c. When interconnected, the segments 24 define an arcuate front face 26 and a back face 28. The uppermost segment 24c also defines a top face 30 upon which the metering system 22 is detachably mounted.

Segments 24b and 24c have a plurality of apertures 32 formed therein. Each aperture 32 is adapted to receive a plant receptacle 34.

The top face 30 has a plurality of shallow reservoirs 36 formed therein surrounding a cylindrical holding projection 31. The number of reservoirs 36 equals the number of apertures 32. Each reservoir 36 is also in fluid communication with each aperture 32 by way of conduits 38. The conduits 38 are integrally formed as part of the front face 26 of the housing 12.

The majority of conduits 38 include at least one arcuate portion 40. In some instances, each conduit 38 defines a serpentine path from its respective shallow reservoir 36 to its associated aperture 32. Each conduit 38 is open to the atmosphere along its full length. There is a one-to-one relationship, defined by the conduit 38, between shallow reservoir 36 and aperture 32.

The cross section of each conduit 38 is shown in Figure 4. As is shown in that Figure, each conduit comprises a base wall 42 and side walls 44. The side walls 44 are substantially perpendicular to the base wall 42. A dividing projection 46 extends along the full length of the conduit 38 and into the associated shallow reservoir 36. The height of the dividing projection 46 is less than that of the side walls 46.

To ensure that the difference in quantity of fluid delivered to a shallow reservoir 36 and the quantity of fluid delivered to a receptacle 34 received in the shallow reservoir's 36 corresponding aperture 32 is minimal, the arcuate portions of each conduit 38 are banked.

As mentioned above, the segments 24 are able to interconnect to define the housing 12. To facilitate interconnection, with the exception of the uppermost segment 24c,

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each segment 24 includes a projection 48 that surrounds the periphery of the segment 24. The projection 48 is spaced from the periphery of the segment 24 by a distance equal to the thickness of the walls of the segment 24. In this manner, when the segments 24 are stacked one on top of the other, the projection 48 of the lower segment 24 abuts, and is encapsulated by, the walls of the upper segment 24. The tight abutment between projection 48 and segment 24 walls allows the apparatus 10 to be moved in a reasonably rugged fashion without detachment of the segments 24.

As a means of facilitating proper alignment of the segments 24 relative to one another, an alignment groove 50 is etched into the front face 26 of the housing 22. The alignment groove 50 extends across each segment 24 in a manner that only when the segments 24 have been properly connected and aligned will the alignment groove 50 be contiguous.

Each plant receptacle 34 comprises an outwardly extending open end 52 and an inwardly extending root end 54. Located at the outwardly extending end 52 is an inlet port 56. The root end 54 of the plant receptacle 34 has a plurality of drainage holes 58. The plant receptacle 34 is also provided with longitudinal ribs 60 on all sides excluding the side containing the inlet port 56.

As mentioned above, each plant receptacle 34 is adapted to be received within an aperture 32. Retention of the plant receptacle 34 in the aperture 32 is achieved by way of the engagement of the outwardly extending end of the plant receptacle 34 with at least a portion of the peripheral upper edge of the aperture 32. To further facilitate insertion and removal of the plant receptacle 34 from the aperture 32, the plant receptacle 34 tapers inwardly towards the root end. Correct reception is achieved when the inlet port 56 aligns with the conduit 38 associated with the aperture 32 into which the plant receptacle 34 is received.

When received within an aperture 32, the root end 54 of each plant receptacle 34 is encapsulated by the housing 12. Furthermore, when received within an aperture 32, the plant receptacle 34 is positioned in a downwardly inclined manner. This facilitates self-drainage through the drainage holes 58.

The fluid reservoir 14 has a footprint substantially equal to that of the top face 30. The fluid reservoir 14 has a first aperture 64 provided therein which is used to seat the valve 20 and a second aperture 66 used to seat a solar panel 68. When mounted to the top

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face 30, the position of the first aperture 64 is such that it sits directly above the first fluid dispensing unit 16.

Operation of the valve 20 is controlled by a controller unit 21. The solar panel 68 suppliers power to the valve 20 and to the controller unit 21.

The first fluid dispensing unit 16 is a concave disc as shown in Figure 2. The concave disc also has a sizable aperture 70 provided therein. The structural integrity of the first fluid dispensing unit 16 is increased by strengthening and positioning members 72.

A lip 74 extends around the periphery of the first fluid dispending unit 16 away from the side from which the strengthening and positioning members 72 extend.

In this embodiment, the first fluid dispensing unit 16 has five concentric rings 76. The centre of each ring 76 is the centre of the aperture 70.

Each concentric ring 70 takes the form of a plurality of segmented ribs 78. In each concentric ring 70 in this embodiment there are ten segmented ribs 78. Each segmented rib 78 is of equal size and shape to each other segmented rib 78 in its respective concentric ring 70. Furthermore, each segmented rib 78 is equidistantly spaced from its adjacent segmented ribs 78 in its respective concentric ring 70.

The second fluid dispensing unit 18 takes the form of a hollow cylinder 80 extending from a circular base 82. In this embodiment, the circular base 82 has nine dispensing channels 84 provided therein. Also provided in the circular base 82 near the periphery is a retaining channel 92. The purpose of the retaining channel 92 will be described in more detail below.

The hollow cylinder 80 has a smaller diameter than aperture 70 of the first fluid dispensing unit 16. However, the diameter of the hollow cylinder 80 is sufficient to allow for a secure fit to be formed between the cylindrical holding projection 31 and the hollow cylinder 80.

Each dispensing channel 84 has an outlet 86 that extends beyond the periphery of the circular base 82. The outlet 86 is similar in appearance to the blade portion of a shovel. A dividing projection 90 extends along the length of each dispensing channel 84.

The invention will now be described in the context of its intended use.

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Segment 24a is placed on a flat level surface to form a base. Intermediate segment 24b is then stacked on top of the base segment 24a. This stacking is achieved by first aligning the portions of the alignment groove 50 etched into their respective front faces 26. Once so aligned, the intermediate segment 24b is placed on the base segment 24a in such a manner that the projection 48 of the base segment 24a abuts, and is encapsulated by, the walls of the intermediate segment 24b. The top segment 24c is then stacked on top of the intermediate segment 24b in an identical fashion.

The second fluid dispensing unit 18 is then placed on the housing 12 such that the hollow cylinder 80 securely fits around the cylindrical holding projection 31. At the same time, the second fluid dispensing unit 18 is, if required, rotated such that each of the outlets 86 extend to a position above the approximate centre point of its respective shallow reservoir 36.

The first fluid dispensing unit 16 is then placed on top of the second fluid dispensing unit 18. The position of the first fluid dispensing unit 16 relative to the second fluid dispensing unit 18 is maintained by the retention of some of the strengthening and positioning members 72 in the retaining channel 92. This also centres the aperture 70 relative to the hollow cylinder 80.

The fluid reservoir 14 is then placed on the top surface 30. As mentioned above, this places the valve 20 at a position above the first fluid dispensing unit 16 at a position close to its outer periphery.

Plant receptacles 34 are then positioned with the apertures 32 such that the inlet port 56 of each receptacle 34 aligns with the conduit 38 for the aperture 32 into which it is to be received. The plant receptacles 34 are then inserted into the apertures 32 until contact is made with at least one part of the peripheral upper edge of the aperture 32.

The fluid reservoir 14 is then filled with water or some other fluid. The fluid may include nutrients or other additives that assist in plant growth. The filling of the fluid reservoir 14 may be achieved manually (ie. by hand-filling the fluid reservoir 14) or automatically (ie. by attaching the fluid reservoir 14 to a mains tap).

In accordance with the operational program of the controller unit 21, at predetermined times the controller unit 21 will send an open control signal to valve 20. The open

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control signal causes the valve 20 to move to an open position. This then allows fluid to flow from the fluid reservoir 14 to the first fluid dispensing unit 16.

Fluid flowing to the first fluid dispensing unit 16 is dispensed about the outer concentric ring 70, flowing by force of gravity through the spaces between segmented ribs 78 to the next concentric ring 70. The positions of the segmented ribs 78 are such that the fluid that flows to the first fluid dispensing unit 16 is evenly dispersed when it reaches the aperture 70.

The evenly dispersed fluid that enters the aperture 70 flows down to the second fluid dispensing unit 16. Some of this fluid flows directly into the dispensing channels 84. The remaining fluid is diverted into the dispensing channels 84. The fluid then flows along the dispensing channels 84 to the outlets 86.

It should be noted that the encapsulation of the first fluid dispensing unit 16 and the second fluid dispensing unit 18 by the fluid reservoir 14 causes a positive pressure environment about the first fluid dispensing unit 16 and the second fluid dispensing unit 18. It is this positive pressure environment that allows for the uninterrupted flow of fluid from the fluid reservoir 14 to the shallow reservoirs 36.

The flow of fluid along the dispensing channels 84 and the outlet 86 is facilitated by the dividing projection 90. In particular, the existence of the dividing projection 90 causes a build up of fluid to be formed either side of the dividing channel 90 (hereafter referred to as "dead water"). The friction caused between the dispensed fluid and the dead water is significantly less than the friction caused by dispensed fluid moving along the dividing projection itself.

The fluid is then able to flow from the outlet 86 to the shallow reservoirs 36. The shallow reservoirs 36 then fill up and, once filled, overflow allowing fluid to flow down the conduits 32. However, the applicant has also found that the "dead water" effect caused by the dividing projection extending into the shallow reservoirs 36 assists in preventing a meniscus effect from forming at the point of connection between the shallow reservoir 36 and its attached conduit 38.

The perpendicular sides of each conduit 38 allows for further areas of "dead water" to be created at the point of connection between the base wall 42 and its side walls 44. Yet further areas of "dead water" are formed either side of the dividing projection 46 as

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described above in respect of dividing projection 90. In this manner, each conduit 38 has two channels bounded by areas of "dead water" which allow for the quick and smooth flow of fluid down the conduit 38. The applicant has also found that the addition of the dividing projection 46 also allows fluid to travel relatively quickly along the substantially level areas of the conduit 38 formed on the top surface 30.

To ensure that there is minimal fluid loss as the fluid travels along the conduit 38, all arcuate portions 40 of the conduit 38 are banked at the outer curve. The water is then free to run up the side of the banked outer curve with minimal spillage compared to a conduit 38 having a uniform cross-section along its full-length.

Upon the fluid reaching the aperture 38 it is able to enter the internal area of the plant receptacle 34 due to the alignment of the inlet port 56 with the conduit 38.

Because the conduit 38 is open along its full length, the flow of fluid between the shallow reservoirs 36 and the inlet port 56 is observable by external parties. This provides two benefits in that any obstructions to the flow of fluid can be observed and, if obstructed, corrective action can easily be taken due to the open nature of the conduit 38 at the point of obstruction. The observable flow of fluid may also provide a pleasing visual effect to the observer.

On the expiry of a further predetermined time period, the control unit 21 sends a close signal to the valve 20. The valve 20 then moves back to its original closed position thereby preventing fluid from flowing from the fluid reservoir 14 to the first fluid dispensing unit 16. Ideally, this further predetermined time period equates to the amount of time needed for the valve 20 to dispense the desired amount of fluid to be delivered to each plant receptacle 34 multiplied by the number of plant receptacles 34.

This process then repeats in accordance with the operating program of the control unit 21.

In accordance with a second embodiment of the invention, where like numerals reference like parts, there is a plant cultivation apparatus 200. The plant cultivation apparatus 200 comprises a tabletop housing 202, a fluid reservoir 204, a plurality of plant receptacles 206, a lighting system 208 and a metering system 210.

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The table top housing 202 comprises a large diameter bowl 212 integrally formed with a dome base 214. The inner profile of the tabletop housing 202 has a seating ring (not shown) centrally provided therein for positioning of the fluid reservoir 204.

Also provided in the inner profile of the tabletop housing 202 are a series of dispersion channels (not shown) extending from a central shallow reservoir (also not shown). Each dispersion channel extends into an annular recess 216 formed between the tabletop housing 202 and the fluid reservoir 204 at a position above that of a plant receptacle 206 when inserted therein. In this manner, the inner profile of the tabletop housing 202 is substantially identical to that of the second fluid dispensing unit 18.

In this embodiment, there are six plant receptacles 206. Each plant receptacle 206 is shaped to fit a 60° portion of the annular recess 214 formed between the tabletop housing 202 and the fluid reservoir 204. However, each plant receptacle 206 is of slightly larger size than the annular recess 214 to allow for a secure fit when placed therein.

To also provide for the secure fit of the plant receptacles 206 in the annular recess 214 each plant receptacle 206 has tabs 216. The operation of the tabs 216 in securing the plant receptacle 206 will be described in more detail below.

The fluid reservoir 204 includes the metering system 210. The fluid reservoir 204 is designed to be securely retained in the tabletop housing 202.

Extending through the fluid reservoir 204 are four cylindrical apertures 218. Each cylindrical aperture 218 has a rubber 'O' ring 220 at its upper end. Each 'O' ring 220 frictionally engages a rod support 222 of the lighting system 208.

The lighting system 208 is formed from four rod supports 222 as mentioned above and a circular halo 224. Positioned in the circular halo 224 are a plurality of light emitting diode clusters 226. There is a one-to-one relationship between light emitting diode clusters 224 and plant receptacles 206. Each light emitting diode cluster 224 emits light in the blue and red colour spectrum directly towards its related plant receptacle 206.

The metering system 210 includes a valve (not shown) and a control unit (not shown). The valve is positioned within the fluid reservoir 204 at a position above the aperture in the base thereof. In this manner, the valve controls the egress of fluid through this aperture in accordance with the control procedure programmed into the control unit.

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This embodiment will now be described in the context of its intended use.

The tabletop housing 202 is placed on a level surface. The fluid reservoir 204 is then placed in the tabletop housing 202 such that the fluid reservoir 204 is properly positioned by way of the seating ring. When position so, the fluid reservoir 204 creates a positive pressure environment about the metering system 210.

Each plant receptacle 206 is then placed in the annular recess 214 in turn. In order to place the plant receptacle 206 into the annular recess 214, tabs 216 are pressed towards each other. This action causes the plant receptacle 206 to deform to a size and shape that allows it to fit within the annular recess 214. The plant receptacle 206 is then so inserted, but in a position where the tab 216 that sits adjacent the plant receptacle 206 abuts the outlet of a dispersion channel.

When each of the six plant receptacles 206 are appropriately placed, the lighting system 208 is installed into the fluid reservoir 204. This is done by inserting each of the rod supports 222 into a cylindrical aperture 218. The frictional engagement caused by the rod support 222 against the 'O' ring 220 creates a secure engagement for the lighting system 208. However, the frictional engagement can be overcome to adjust the height of the lighting system 208 when an appropriate level of force in the required direction is applied.

Plants can then be installed into each plant receptacle 206 as would be known to the person skilled in the art. The fluid reservoir 204 is also filled in a manner as would be known to the person skilled in the art.

With the plant cultivation apparatus 200 so assembled, the control unit operates to send a control signal to the valve to move it from a closed position to an open position. When in its open position, the valve allows for fluid to flow from the fluid reservoir 204 to the central shallow reservoir. The positive pressure environment created by the seating of the fluid reservoir 204 on the tabletop housing 202 assists in this free flow of fluid.

From the central shallow reservoir the fluid is uniformly distributed to each of the plant receptacles 206 by way of the dispensing channels. This continues until the control unit operates to send a further control signal to the valve to move it from an open position to a closed position.

At the same time, the light emitting diode clusters 226 are turned on.

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In accordance with a third embodiment of the invention, where like numerals reference like parts, there is a plant cultivation apparatus 300. The plant cultivation apparatus 300 is identical in form and construction to plant cultivation apparatus 10 excepting the following modifications.

The three interconnecting segments 24a, 24b and 24c are enlarged in size so as to accommodate nine receptacles 34 in each segment. As shown in Figure 7 conduits 38 have been modified to accommodate the additional receptacles while still maintaining the one-to-one relationship between receptacle 34 and shallow reservoir 36.

Each interconnecting segment 34 also has a series of perforations 302 provided therein at spaces surrounding the conduits 38 and receptacles 34. These perforations 302 allow wind to pass therethrough and thus prevent the whole plant cultivation apparatus 300 from becoming airborne. Adjacent plant cultivation apparatuses 300 are connected together by way of a connecting plate (not shown) secured to one or more of the perforations 302.

Also, unlike the interconnecting segments 24 of the first embodiment of the invention, the interconnecting segments 24 of this embodiment do not define a back face 28. Rather the structure of the interconnecting segments 24 have been designed to allow the resulting structure to be mounted to a wall or placed in a back-to-back configuration as shown in Figure 7.

The additional modification to this embodiment of the invention relates to the valve 20 and fluid reservoir 14. In this embodiment, the valve 20 is replaced with valve systems 304. Each fluid reservoir 14 has three valve systems 304. In this embodiment, the three valve systems 304 are controlled by a single control unit 21.

Each valve system 304 comprises a sealing element 306 and a spring bias 308. The operation of the spring bias 308 is controlled by the control unit 21. The spring bias 308 defaults to a closed position.

The sealing element 308 is connected to the spring bias 308. Each sealing element has a plurality of sealing projections 310 extending from the side opposite the side connected to the spring bias 308.

The fluid reservoir 14 has a series of triangular apertures 312 provided therein. When the fluid reservoir 14 is placed on the top surface 30, each triangular aperture 312

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aligns with a conduit 38. In a similar manner, each valve system 308 is located within the fluid reservoir 14 such that each sealing projection 310 aligns with a triangular aperture 312.

The outcome of this configuration is that when each valve system 304 is biased to their closed position, each triangular aperture 312 is sealed by a sealing element 308 thereby sealing the fluid reservoir 14. Oscillation of each valve system 304 between its open and closed position thereby controls the dispensation of fluid from the fluid reservoir 14 to the conduits 38.

It should be appreciated by the person skilled in the art that the above invention is not limited to the embodiment described. In particular, the following modifications and improvements may be made without departing from the scope of the present invention:

- The plant cultivating apparatus may be adapted to grow herbs, shrubs and trees.
- To facilitate access, the fluid reservoir 14 may have a removable lid 20. Access to the internals of the fluid reservoir 14 is important for cleaning and/or refilling of the fluid reservoir 14 as well as dosing the fluid stored in the fluid reservoir 14 with additives.
- The fluid reservoir 14 may have a level indicator 24 to provide a visual indication of the maximum recommended capacity of fluid to be stored in the fluid reservoir 14 at any given time.
- The means by which power is supplied to the valve 20 may take alternative forms to those already described, such as mains power, rechargeable batteries or capacitors. Power may also be supplied by renewable sources other than the solar cell system described above. Power provided to the controller may be regulated by way of a voltage regulator. Alternatively, or cumulatively, the power may also be filtered by way of a power filter.
- In a further modification to the power system, the plant cultivation apparatus 10 may have a primary power source and a secondary power source. In its preferred commercial embodiment, the primary power source takes the form of 2xAA size batteries and the secondary power source takes the form of the

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solar panel 68. In configurations where one of the power sources are rechargeable, the power system may be further adapted to allow such a power source to recharge from power stored in the other power source.

- The fluid reservoir 14 may be adapted to receive fluid by way of mains taps or by a yet further water reservoir.

- Control unit 21 may be re-programmed *in-situ* by means of a keypad or remote control. The control unit 21 may provide an override function to allow for manual activation of the valve 20 as and when required.

- The control unit 21 may work on a simple timed operation cycle or may be more complex. For instance, the control unit 21 may have a variety of programmed operational procedures recorded thereon which are triggered by various environmental conditions in which the plant cultivation apparatus 10, 200, 300 is situated. For instance, the control unit 21 may be connected to a temperature sensor, the control unit 21 operable to dispense fluid by way of the valve 20 on the temperature exceeding a pre-determined temperature. In another alternative configuration, the predetermined fluid dispensing program executed by the control unit 21 may be arranged to commence on detection that the sun has risen. The operational procedures programmed into the control unit 21 may also be written with reference to the watering requirements of the particular plants cultivated by way of the plant cultivation apparatus 10, 200, 300.

- An external control system in data and command communication with the control unit 21 may control the control unit 21. Data and command communication between the control unit 21 and external control system may be by way of wireless or wired means. The control unit 21 may have any preset metering programs reprogrammed by way of the external control system.

- The conduit 38 may be open along a portion of its length rather than its full length. In this manner, a visual assessment of the flow of fluid at the open portions of the conduit 38 (and at the point of delivery to the aperture 32) will identify any blockages within the enclosed portions of the conduit 38. One

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specific implementation of this alternative configuration involves enclosing each arcuate portion 40 of the conduit 38 thereby removing the need to bank an open conduit 38 at this position.

- In other alternative configurations of the second embodiment the conduits 38 may be moulded or pressed onto the housing 12. Yet other configurations may see the conduits 38 affixed to the housing 12 in some manner, for example by a clip-on arrangement.

- The root end 54 of the plant receptacle 34 may be permeable to liquids. Similarly, the housing 12 is preferably impermeable to moisture when the plant cultivation system 10, 200, 300 is used in a humid environment.

- The housing 12 may be made out of such materials as fibreglass, plastics, metals (with a preference for stainless steel or aluminium) and terracotta.

- It should be appreciated by the person skilled in the art that other array configurations may be used than those shown in the embodiments described above. Furthermore, as the number of receptacles 34 for each row in the array are determined by the number of apertures 32 provided in a segment 24, it is possible that the plant cultivation apparatus 10, 300 may be configured such that the number of apertures 32 in one row (segment 24) differs from the number of apertures 32 in another row (segment 24). Yet further, the apertures 32 may be in differing alignment to one another in the array.

- Intermediate segment 24b may be configured so as to allow other intermediate segments 24b of the same configuration to be stacked thereon. In this manner, the height of the plant cultivation system 10, 300 may be increased. Furthermore, when dealing with plants that may grow larger than the ordinary spacing between one aperture 32 and the next, intermediate segments 24b having no apertures 32 provided therein may be used to further space apertures 32 from each other.

- It is desirable that the impression given by the plant cultivation system 10 is a wall of plants. In this respect, alternative configurations not beyond the reach of the person skilled in the art may see the base segment 24a eliminated in

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favour of a wall mounting system for the intermediate and top segments 24b, 24c.

- The plant cultivation apparatus 10 allows for the segments 24 to be arranged on the front and back faces 26, 28 of the housing 12. In small size arrangements of the apparatus, this arrangement may require segments 24 to be stacked such that the apertures 32 alternate between the front and back faces 26, 28 to avoid contact between the downwardly inclined nature of the plant receptacles 34 when received within such apertures 32. Of course, in larger size arrangements, apertures 32 may be provided on both the front and back faces 26, 28 without need to address this problem.

- The plant receptacles 34 may be integrated with the apertures 32.

- The upper portion of the conduit 38 in each segment 24 may be of slightly expanded width compared to the rest of the conduit 38. In this manner, the slight expansion in width compensates for any minor misalignments in the stacking of the segments 24 in a way that such misalignments do not result in a loss of fluid.

- The conduit 38 may be banked in a manner that the banked portion of the conduit 38 protrudes from the front face 26 of the housing 12. However, for aesthetic considerations, the conduit 38 may also be banked in a manner so as to be flush with the front face 26 of the housing 12 as shown in Figure 5.

- The housing 12 may include a sump for receiving fluid that has drained from plants contained in the plant receptacles 34. The sump is ideally positioned below the plurality of receptacles 34. Piping means operatively connect the sump with the fluid reservoir 14 to allow for recycling of the fluid to the fluid reservoir 14. The plant cultivation apparatus 10, 200, 300 may equally be provided with a liquid filter operatively mounted between the sump and the fluid reservoir 14 for filtering solids from the fluid being recycled to the fluid reservoir 14 from the sump.

- The plant cultivation apparatus 10, 200, 300 may include a heater adapted to heat the fluid in the fluid reservoir 14 or the fluid in the shallow reservoirs 36 to a predetermined temperature. Alternatively, a heater may be included and

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positioned within the housing 12 in such a manner as to increase the effective humidity of the housing 12.

- The housing 12 and fluid reservoir 14 may form one integral unit.
- The mechanism by which plant cultivation apparatuses 300 may be interconnected with each other may vary from that describe above. For instance, a hook and eye configuration may be used to connect adjacent plant cultivation apparatuses 300.

It should be further appreciated by the person skilled in the art that the features described above, where not mutually exclusive, can be combined to form yet further embodiments of the invention.

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We Claim:

1. A plant cultivation apparatus that dispenses a uniform amount of fluid from a fluid reservoir to each of a plurality of plant receptacles by way of an open channel irrigation system.

2. A plant cultivation apparatus according to claim 1, where the uniform dispensation of fluid is achieved by a saucer having a plurality of spaced ribs of equal size and shape arranged in concentric rings about an aperture.

3. A plant cultivation apparatus according to claim 1 or claim 2, where the open channel irrigation system comprises a plurality of conduits, each conduit extending from the fluid reservoir to a single plant receptacle and having a square cross-section.

4. A plant cultivation apparatus according to claim 3, where each conduit has a dividing projection extending along its length.

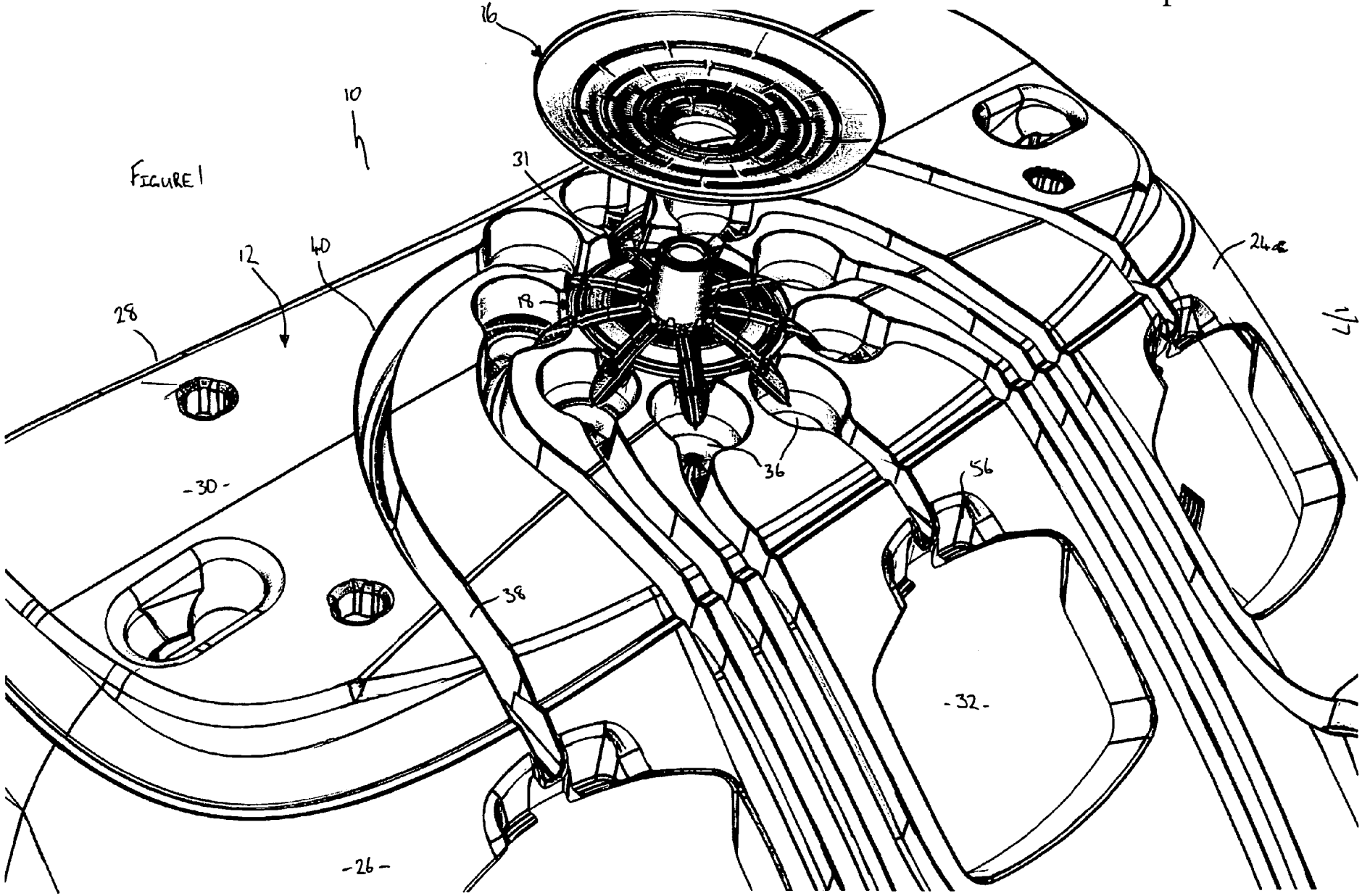


FIGURE 1

2008100902 15 Sep 2008

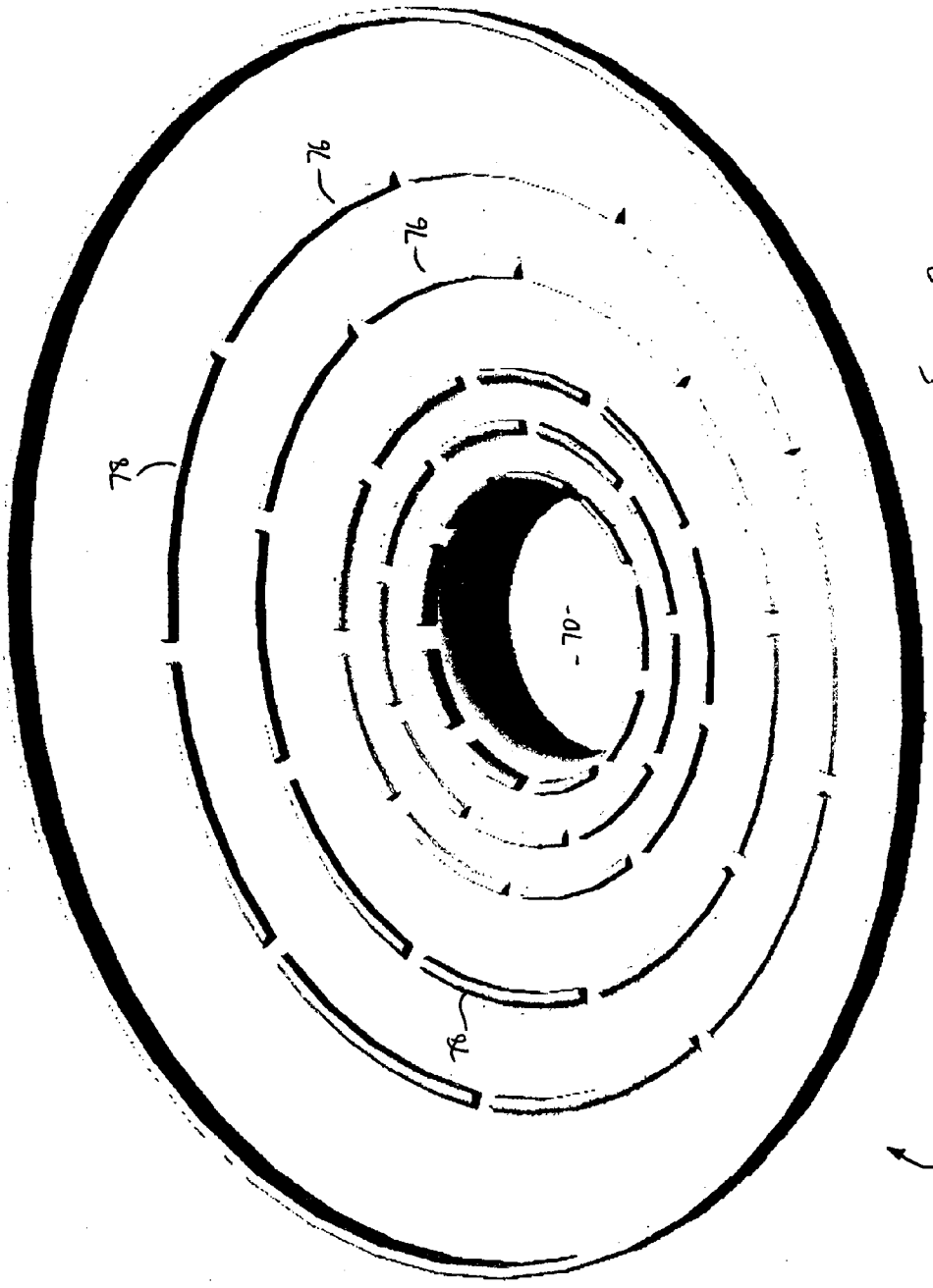


FIGURE 2

2008100902 15 Sep 2008

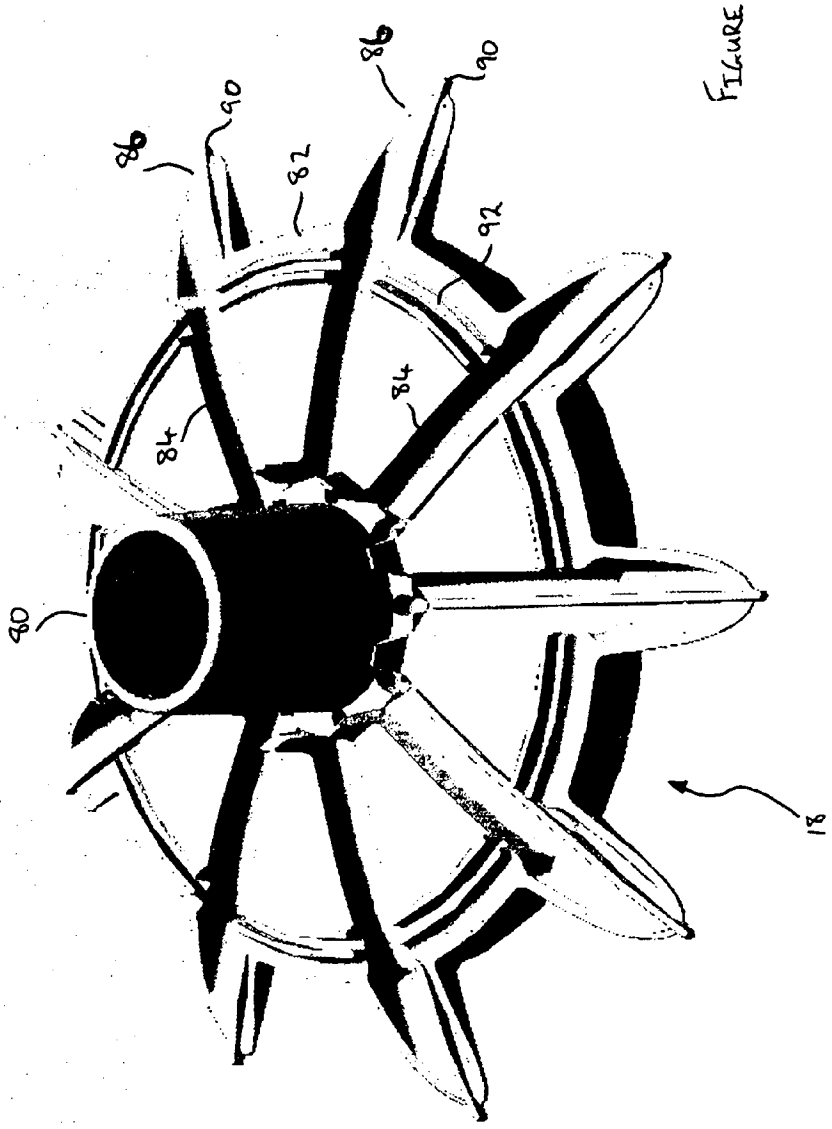


FIGURE 3

2008100902 15 Sep 2008

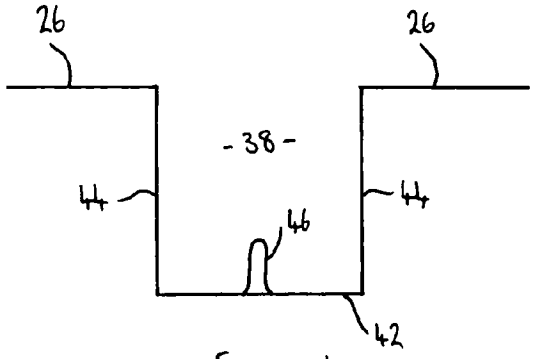


FIGURE 4

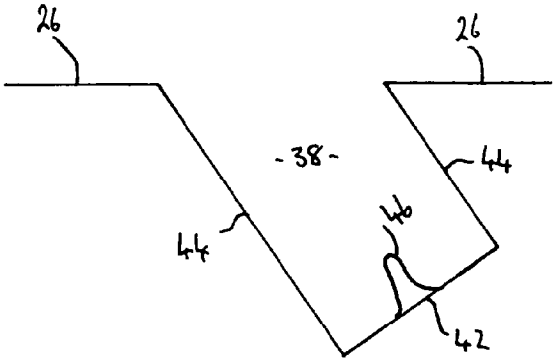


FIGURE 5

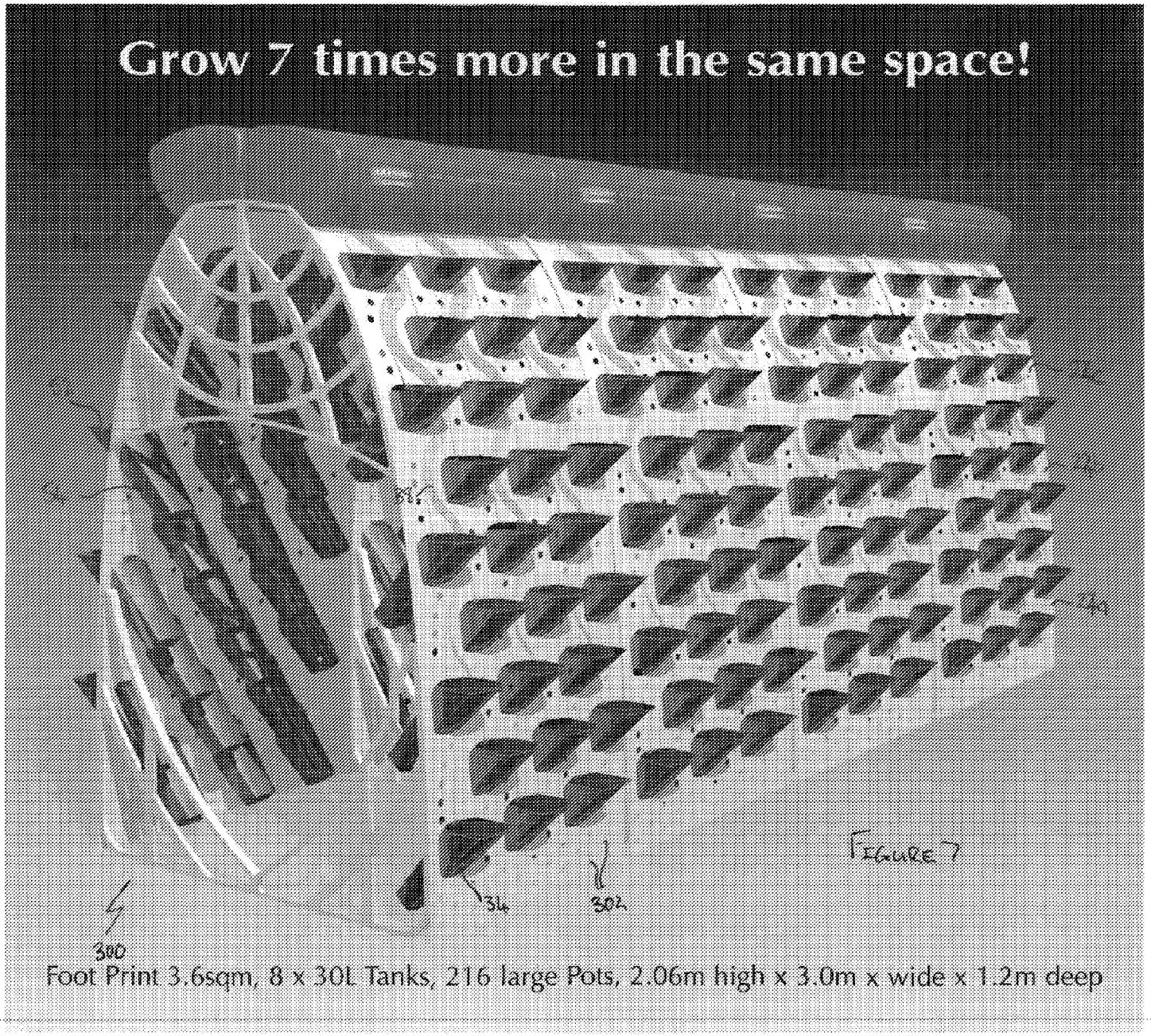


FIGURE 6

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314
302
FIGURE 7
Foot Print 3.6sqm, 8 x 30L Tanks, 216 large Pots, 2.06m high x 3.0m x wide x 1.2m deep

617

