INTERNET OF THINGS INDOOR GARDEN

FIELD OF INVENTION

The present invention relates to an indoor garden system wherein the cultivation of different plants in a garden system is automated with different growing/cultivation conditions, with or without a SMART/IOT system.

BACKGROUND

The cultivation of plants in an indoor environment poses many problems such as how to optimise use of space, cultivating a variety of plants to be aesthetically pleasant and planning their display and enabling their re-arrangement periodically are factors which works against each other, causing frustration to the indoor gardener.

Another factor restricting the creativity of the indoor gardener is the lack of a system of water and re-cycling of water.

Under normal circumstances it would be difficult to organise and arrange a variety of plants which can be placed in light weight containers, which are relatively low costs, space efficient, modular to fit limited space and yet allow frequent changes of plants/containers and re-cycle and re-use water and plant nutrients. This is because different plants have different physical and nutrition needs.

It is desirable that all the critical disadvantages presently faced by an indoor gardener be overcome by a system for growing a variety of plants indoors which is flexible in arrangement of plants/containers, and therefore space efficient.

It is desirable that such receptacles be stackable and configurable to minimise wastage of space, yet allow for aesthetic display and flourishing of plants.

It is also desirable that such an indoor garden system allows for easy supply of plant nutrients and water and even a controlled environment so as to allow such plants to flourish.

Such an indoor garden system should ideally be controlled by a SMART/IOT System to enable the indoor gardener to control operations of the indoor garden system remotely.

Summary of Invention

A first object of the Invention is tp provide an indoor garden system, consisting of: -

a. One or more Grower Components; said Grower Component being arranged to form an Indoor Garden by stacking one of the Grower Components on another Grower Components;

b. A Climate control component which monitors and adjust the internal climate and cultivation conditions of the Indoor Garden;

c. A Water Tank, said water tank connected to the Climate Control Component;

d. A Climate Control Sphere which may either fully or partially enclose the Indoor Garden;

e. An Operating Controls System with a database on cultivation conditions and which uses WIFI for remote access to climate control and operating controls system, which may or may not be linked to the Internet.

Preferably the Grower Component of the Indoor Garden System is a cell of a hexagon structure.

Advantageously, the Grower Component contains soil and nutrients and inhabited by a plant or other type of flowering plant.

Preferably the Climate Control Component of the Indoor Garden System consist of a plurality of sensors for monitoring and adjustment of Ph/Electric Conductivity, temperature, Humidity, Air Flow, Lighting conditions of the indoor garden by communications with the Operating Controls System.

Preferably the Climate Control Component of the Indoor Garden System includes a mist emitter which produces a mist of water vapor with the water from the Water Tank to control the internal atmosphere of the Indoor Garden.

Preferably the Climate Control Sphere of the Indoor Garden System is the volume of mist in the atmosphere over the Indoor Garden System produced by the mist of water vapor from the mist emitter.

Preferably the Operating Controls System of the Indoor Garden System remotely monitors and controls cultivation and climate conditions of the Indoor Garden using WIFI.

Preferably the Operating Controls System of the Indoor Garden System may be remotely monitored and controlled using a Computer using WIFI.

Alternatively, the Operating Controls System of the Indoor Garden System may be remotely monitored and controlled using a Mobile Phone using WIFI.

BRIEF DESCRIPTION OF THE DIAGRAMS

For a better understanding of the invention, its advantages, and the objects attained by its use, reference should now be made to the accompanying drawings. The accompanying drawings illustrate one or more embodiments of the invention and

together with the description herein, serve to explain the workings and principles of the invention. The diagrams by no means restrict the invention to only what is shown.

Fig. 1 shows a perpsective view of a plurality of the proposed Grower components.

Fig. 2 shows a perspective view from the top of a plurality of the proposed Grower components.

Fig. 3 shows a cross section view of a plurality of Proposed Grower components.

Fig. 4 is a perspective view from the side of a plurality of Proposed Grower components with its unique honeycomb design/arrangement.

Fig. 5 is another perspective view from the side of a commercialized arrangement of a plurality of Proposed Grower components with its unique honeycomb design/atrangement.

Fig. 6 is a perspective view from the top and side of a plurality of Proposed Grower components (in the form of Hexagon cells) and forming an unique honeycomb design/arrangement.

Fig. 7 show a cross section view of a plurality of Proposed Grower components which would be enclosed in an internal dome.

Fig. 8 is a cross section view of a commercialized arrangement of a plurality of Grower components with its unique honeycomb design/arrangement, which would be enclosed in an internal sphere, which is the volume of mist in the atmosphere over the Indoor Garden System produced by the mist of wter vapor from the mist emitter.

Fig. 9 is a cross section of the main embodiment of the indoor garden system consisting of a water tank, an elevation and a plurality of grower components in a honey comb arrangement.

Fig. 10A is a cross section of the indoor garden system without the elevation function.

Fig. 10B is a cross section of the indoor garden system with the elevation function.

Fig. 11 is a perspective view of a second embodiment of the indoor garden sysem consisting of a water tank, an elevation and a plurality of grower components enclosed in a Climate control Cabinet.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

The inventive indoor garden system consists of one or more grower components arranged in a honeycomb configuration for optimal space utilisation and display. The grower components have an elevation which delivers mist to the indoor garden system within an enclosed climate controlled environment, described herein as the Climate Control Sphere.

The indoor garden system sits on a water tank, which sends water to the elevation for emission of mist and also which receives surplus water from the grower components, thus re-cycling the water.

The indoor garden system may also contain a motor and a control system and wifi to link the indoor garden system to the Internet and through the Internet to other devices to enable users in a different location to remotely control the operations of the indoor garden system. The control system runs software designed for the operation of the indoor garden system including cultivation parameters such as pH/electric conductivity, temperature, humidity, air flow, lighting conditions, mist emitting timing, which may be linked to a computer system and connections to the Internet and other devices including

mobile phones using WIFI. The software may also be operated using mobile phone apps.

The grower components are described with reference to Figs. 1, 2 and 3. Referring to Fig. 1, a perpsective view of a plurality of Proposed Grower components is shown. The Proposed Design of the Grower Component shown in Fig. 1 and subsequent drawings are for illustrative purpose only and would be in other forms suitable for ease of arrangement and to allow re-configuration of the indoor garden.

Fig. 2 show perspective view from the top of a plurality of Proposed Grower components. Each Grower component is a hexagon cell in structure. The hexagon cell structure allows other hexagon cells to be stacked on top of each other. The hexagon cell structure also allows other hexagon cells to be fittingly placed next to each other. The use of hexagon cells structure allows the grower component to be cofigure to any height or width to meet any space constraint in an indoor environment. The use of hexagon cells would basically allow the indoor gardener to re-configure any arrangement of plant display, thus giving flexibility to indoor space planning and aesthetics.

The hexagon cell design would enable the Grower Component to be light weight but offers a rigid and sturdy structure, allowing the weight of the Grower Component (with the soil and plant in it) to be easily removable and stack into another configuration, by a single person including a female person.

Fig. 3 shows a cross section view of a plurality of Proposed Grower components.

While Fig. 4 is a perspective view from the side of a plurality of Proposed Grower components with its unique honeycomb design/arrangement, Fig. 5 shows a commercialized arrangement of a plurality of Proposed Grower Components with another unique honeycomb design/atrangement.

Fig. 6 is a perspective view from the top and side of a plurality of Proposed Grower components (in the form of Hexagon cells) and forming another unique honeycomb design/arrangement.

Fig. 7 show a cross section view of a plurality of Proposed Grower components which would be enclosed in an internal dome.

Fig. 8 is a cross section view of a commercialized arrangement of a plurality of Grower components (Hexagon cells) with its unique honeycomb design/arrangement, which would be enclosed by an mist of water vapor forming an internal sphere. The internal sphere is the outcome of use of an aero-ponics system which emits a fine mist of water vapour into the internal atmosphere within the internal sphere, thus offering water to the plants in the form of the water mist. This approach would save/optimize water as a resource, even though the water is taken from a tank, which forms part of the indoor garden system.

Fig. 9 is a cross section of the main embodiment of the indoor garden system consisting of a water tank, an elevation and a plurality of grower components (hexagon cells) in a honey comb arrangement. The dimensions are given herein for ilustrative purpose to show how such an inventive indoor garden system may be planned in a confined space such as a living room in an apartment or even a balcony. As such, the dimensions is not meant to be restrictive for the invention.

Since the Grower component is a hexagon cell structure, the indoor garden system is thus modular and re-configurable and scalable. Depending on the occasion, the indoor garden may be expanded to include more grower components and new plants or flowers, and when not needed, or to minmise maintenance requirements, certain grower components (hexagon cells) may be taken away and stored or displayed in another section of the apartment. The plants and flowers in each grower component may even be maintained separately as individual planters.

Fig. 10A is a cross section of the indoor garden system without the elevation function.

Fig. 10B is a cross section of the indoor garden system with the elevation function. The elevation is to allow the delivery of water droplets in the form of a fine mist to form the climate control sphere. Typically the mist emisison has a radius on a 2 dimension 180 degrees to a narrowed 120 degrees.

Fig. 11 is a perspective view of a second embodiment of the indoor garden sysem consisting of a water tank, an elevation and a plurality of grower components enclosed in a Climate control Cabinet.

Operations of the indoor Garden system

The Indoor Garden system consists of these main components: -

a. One or more Grower Components;
b. Climate control component which may or may not enclose the Grower Components;
c. Climate Control Sphere which may either fully or partially enclose the Indoor Garden System
d. Water Tank
e. Operating Controls Systems with database on cultivation conditions and using WIFI for remote access to climate control and operating controls system, which may or may not be linked to the Internet

A typical Product Dimension for an Indoor garden system is given herein for illustration purpose: -

- Entire Indoor Garden System
  L × W × H - 40cm × 40cm × 84cm

- Honeycomb (Removable and Modular to fit other designs)
  L × W × H - 40cm × 40cm × 34cm

- Elevation
  L × W × H - 40cm × 40 cm × 30cm

- Water Tank
  L × W × H - 40cm × 40cm × 20cm

Grower Component

The basic unit of the Indoor Garden System is the Grower Component which is a hexagon cell structure. The Grower Component thus allows other Grower Components to be added or removed to form the indoor garden desired by the indoor gardener. The Indoor Garden System is therefore scalable and may be re-configured to meet the requirements of the people in the indoor environment.

The Grower Component is integrated with an aero-phonics mist emitter which allows water to be sprayed into a fine mist over the plants forming the Climate Control Sphere.

Climate Control Component

The climate control component may be an enclosure or opened space in an indoor environment. The climate control component allows the indoor gardener to control the cultivation conditions such as pH/Electric conductivity, Temperature, Humidity, Air Flow, Lighting conditions, timing of mist emission. The cultivation conditions are transmitted to the Operating Control System of the Indoor Garden System through its connectivity using WIFI.

The Climate Control component is thus controllable remotely using the Internet by communications using a Computer or Tablet or even using a Mobile Application on a Mobile Phone.

Climate Control Sphere

The entire indoor garden system may be either fully enclosed or partially enclosed by a climate control sphere which is the volume of water vapor produced by the mist emitter. taking water from of an aero-ponics system which includes the water tank .

An elevation function may also be used with the climate control dome.

The climate control sphere could also be in the form of an enclosed cabinet as shown in Fig. 11.

Water Tank

The water tank allows water to be pumped into an aero-phonics mist emitter which in turn introduce a fine mist into the surrounding of the indoor garden system thus watering the plants and flowers in the Grower Components.

Operating Controls system

The Operating controls system includes control system, a motor to pump water into the aero-phonics mist emitter, and other devices to control lighting and sensor to monitor pH/Electric conductivity, temperature, humidity, air flow and lighting conditions. Also included is WIFI for communications to the Internet to the indoor gardener or communications to a mobile device directly. As such, the Operating controls system includes database on cultivation conditions and SMART/IOT integration.

While a few embodiments of the indoor garden system have been described, it should be apparent, however, that various modifications, rearrangements, substitutions. alterations and adaptations to those embodiments may occur to persons skilled in the art with the attainment of some or all of the advantages of the present invention. Accordingly, it should be clearly understood that the present invention is not intended to be limited by the particular features and structures hereinbefore described and depicted in the accompanying drawings. It is therefore intended to cover all such modifications, alterations and adaptations without departing from the scope and spirit of the present invention as defined by the appended claims.

ADVANTAGEOUS EFFECTS OF THE INVENTION

The present invention allows an indoor garden system to be designed and built to fit any confined space inside a building, be it an office or an apartment. It is re-configurable; thus, it is flexible and scalable in design and layout. The basic unit of the indoor garden system being the grower component has a hexagon structure thus allowing other grower components to be added on top and to each other easily and aesthetically.

Finally, the low cost in producing and selling the hexagon cell structure allows indoor gardeners to build up the indoor garden system progressivley accoridngly to the user's budget.

Thus this present invention gives it a massive advantage over other types of planters and offer more enjoyment to the users at the end of th eday.

CLAIMS

1. An indoor garden system, consisting of :-

a. One or more Grower Components; said Grower Component being arranged to form an Indoor Garden by stacking one of the Grower Components on another Grower Components;

b. A Climate control component which monitors and adjust the internal climate and cultivation conditions of the Indoor Garden;

c. A Water Tank, said water tank connected to the Climate Control Component;

d. A Climate Control sphere which may either fully or partially enclose the Indoor Garden;

e. An Operating Controls System with a database on cultivation conditions and which uses WIFI for remote access to climate control and operating controls system, which may or may not be linked to the Internet.

2. A Grower Component of the Indoor Garden System as claimed in Claim 1 being a cell of a hexagon structure.

3. A Grower Component of the Indoor Garden System as claimed in Claim 1 which contains soil and nutrients and inhabited by a plant or other type of flowering plant.

4. A Climate Control Component of the Indoor Garden System as claimed in Claim 1 consisting of a plurality of sensors for monitoring and adjustment of Ph/Electric Conductivity, temperature, Humidity, Air Flow, Lighting conditions of the indoor garden by communications with the Operating Controls System.

5. A Climate Control Component of the Indoor Garden System as claimed in Claim 1 including a mist emitter which produces a mist of water vapor with the water from the Water Tank to control the internal atmosphere of the Indoor Garden.

6. A Climate Control Sphere of the Indoor Garden System as claimed in Claim 1 which is the volume of mist in the atmosphere over the Indoor Garden System produced by the mist of water vapor from the mist emitter.

7. An Operating Controls System of the Indoor Garden System as claimed in Claim 1 in which the Operating Controls System by remotely monitors and controls cultivation and climate conditions of the Indoor Garden using WIFI.

8. An Operating Controls System of the Indoor Garden System as claimed in Claim 1 which may be remotely monitored and controlled using a Computer using WIFI.

9. An Operating Controls System of the Indoor Garden System as claimed in Claim 1 which may be remotely monitored and controlled using a Mobile Phone using WIFI.