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(54) Title: FLOWER BOX

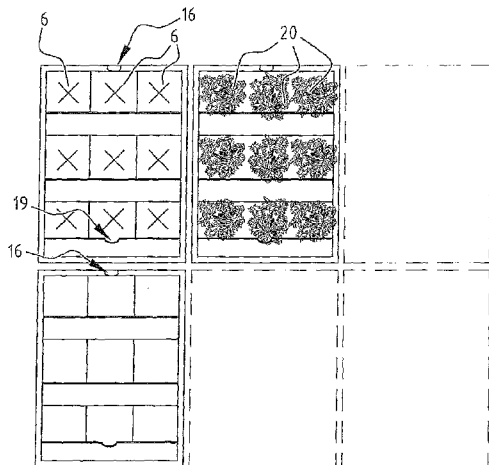


FIG. 4

(57) Abstract: Flower box for vertical green coverage, comprising a box with a bottom and upright walls defining an opening (5) with a first surface area, wherein the box is vertically placeable so that the opening (5) extends in a substantially vertical plane, wherein the flower box further comprises a cover provided for mounting over said opening (5), the cover comprising one or more cover openings (6) extending substantially parallel to the opening (5) and each having a second surface area smaller than the first surface area such that plants can extend through respective cover openings (6).



Flower box

The invention relates to a flower box for obtaining vertical green coverage. Such flower boxes are used to obtain a green outside wall by means of plants. Some varieties of plant are suitable for covering walls, racks or other vertical structures, these being the climbing plants such as ivy. Most plants are however not naturally suitable for covering a vertical surface. The flower box according to the invention does however allow the use of such plants for vertical green coverage.

Different solutions have been devised to cover facades, walls or other vertical structures with non-climbing plants. Most of these solutions require a rigid structure which is erected from the ground against the wall for covering and in which the plants can be planted. This structure is heavy, expensive and is typically made to size per project.

Plants can be planted in different ways in such structures. A first method is via foam. Different types of foam have been envisaged here in which the plants can be planted horizontally (rotated through 90° relative to the conventional upward direction of the plant). Foam is however found not to be an ideal nutrient medium for plants.

Another solution is to place conventional flower boxes (one above another) in the rigid structure. The flower boxes can be tilted here in order to optically reduce the height of the flower box edge, which is visible and thereby substantially reduces the green coverage. Despite the height of these edges being optically reduced, they are however still a significant factor in the appearance of such a green-covered wall.

It is an object of the invention to provide a flower box with a high degree of green coverage, the box providing a climate in which plants can thrive.

The invention provides for this purpose a flower box for vertical green coverage, comprising a box with a bottom and upright walls defining an opening with a first surface area, wherein the box is vertically placeable so that the opening extends in a substantially vertical plane, wherein the flower box further comprises a cover provided for mounting over said opening, the cover comprising one or more cover openings extending substantially parallel to the opening and each having a second surface area smaller than the first surface area such that plants can extend through respective cover openings.

Because the box has a cover with cover openings which can be placed vertically and which are smaller than the flower box opening, plants can be planted through the cover openings in the flower box, and the cover prevents substrate (such as soil in which the plants are planted) from falling out of the flower box when it is placed vertically. The combination of a box and a cover with smaller openings also enables a simple and inexpensive production and assembly of green walls.

The cover preferably comprises a grid and a fabric, wherein the cover openings are formed in the fabric and wherein the grid is placed over the fabric to hold the fabric in place. A fabric is flexible and the openings provided therein can stretch and thereby allow the plant freedom of movement to grow. A grid divides a surface into cells, wherein the cells can be aligned with the openings formed in the fabric, wherein the grid holds the fabric in place. The grid moreover provides space for the plants to protrude through the cover openings in fabric and grid. The plants can thus be given maximum space (the fabric is flexible) while the substrate can be held as well as possible in the box (by the combination of grid and fabric).

The box and the grid are preferably manufactured from plastic. Plastic is water-resistant and is often used for

flower pots. The typical construction of a box and a cover which can be mounted over the opening of the box particularly allows manufacture from plastic in that neither cover nor box have any internal cavities (internal cavities are formed when cover and box are assembled).

The cover preferably comprises at least two cover openings ordered in a pattern. When the cover openings are ordered in a pattern, plants can be planted in this same pattern in the flower box and a uniform green coverage can be obtained.

The box is preferably provided so as to be filled with soil. Soil is generally known as substrate in which plants can thrive. Planting the plants in soil is thereby advantageous since the plants can then grow, albeit vertically, in their natural nutrient medium.

The box preferably has a height, width and thickness, wherein the height and width are smaller than 100 cm, preferably smaller than 60 cm, more preferably about 40 cm, and wherein the thickness is smaller than 20 cm, preferably smaller than 15 cm.

Relatively small flower boxes, for instance a flower box of 40 x 40 x 15, are easy to transport, have an acceptable weight even when filled with soil and plants, and can be used to construct a wall in modular manner, wherein a plurality of modules of for instance 40 x 40 x 15 are placed adjacently of and above one another so as to cover a larger surface area. It will be apparent that flower boxes with a width or height smaller than 40 cm, for instance 20 x 20 or 40 x 20, can also be manufactured according to the invention. The invention is not therefore limited to flower boxes with dimensions of 40 x 40, but gives these only by way of example.

The box is preferably rectangular and at the position of the bottom the box has at least two wall mounting elements so that the flower box can be hung on the wall. The

box is more preferably square. The wall mounting elements at the position of the bottom of the box simplify mounting, thereby making it possible for hobbyists and amateurs to make a green wall via the flower boxes according to the invention. The flower box of the invention does not require a rigid construction made to size for positioning the plants. Because the wall mounting elements are placed at the bottom of the flower box, the flower box automatically comes to lie in the vertical position when the flower box is suspended from a vertical structure via the wall mounting elements.

The grid preferably comprises upright and lying connecting elements, wherein the lying connecting elements drain in the direction of the box. When the lying connecting elements drain in the direction of the box, rain or torrential rain striking the grid will be guided in the direction of the box so that the plants are provided with water. A natural irrigation effect is hereby obtained.

The box preferably comprises lying partitions to enable equal distribution of the contents in the box. Lying partitions prevent the substrate in which the plants are planted, the soil, from falling downward in the box. The soil is distributed evenly over the box by the partitions. The partitions comprise pores or openings allowing passage of water, these openings or pores being small enough to prevent substrate from passing through the partition.

At the position of a first of said upright walls the box preferably has a water collecting zone extending in the box for the purpose of collecting water coming out of the box. The water collecting zone prevents excess water, water which is not absorbed by the substrate, running directly out of the box and thereby soiling or wetting the vertical structure or underlying elements. The water collecting zone further functions as water reservoir for the plants.

At the position of a second of said upright walls opposite the first of the upright walls the box preferably has a water reservoir extending in the box over at least 55%, preferably at least 75%, more preferably at least 90% of the wall and comprising a plurality of perforations distributed over the water reservoir and in the direction of the box, wherein at least one opening is provided in the box for the purpose of filling the water reservoir. The water reservoir, which is located at the top of the box when the flower box is in the vertical position, allows the plants to be provided with water in a controlled manner. This water reservoir simplifies the artificial irrigation of the plants in the flower box according to the invention. When filled, the water reservoir allows water to trickle down in uniformly distributed manner over the full width of the flower box due to gravitational force, so as to thus provide the plants in the flower box with water.

At least one opening is preferably provided at the position of the bottom of the box in order to fill the water reservoir. The bottom of the box is positioned on the rear side of the green wall, against the covered vertical structure. Via this opening an artificial irrigation system can fill the water reservoir in the box so as to thus provide the plants in the box with water.

Said at least one opening preferably comprises an opening provided at the position of the cover. The opening at the position of the cover allows a person standing in front of the wall to provide the plants in the box with water. This is because the cover is oriented in the direction of the front side of the green wall and is therefore accessible to persons. The flower box can be provided with water manually via the opening on the cover.

The water collecting zone preferably has an overflow which debouches at the position of the at least one opening of the lower flower box. When flower boxes are placed in

modular manner in order to cover a larger surface area,
wherein a flower box is placed above a further flower box,
the direct or indirect connection between the water
collecting zone of the upper flower box and the opening for
5 filling the water reservoir of the lower flower box ensures
that the irrigation can run from the upper flower boxes to
the lower flower boxes. This prevents excess water in an
upper flower box being wasted because it flows downward
along the flower box, and this surplus water can be utilized
10 to irrigate a lower flower box.

The invention will now be further described on the
basis of an exemplary embodiment shown in the drawing.

In the drawing:

figure 1 shows a box according to an embodiment of the
15 invention;

figure 2 shows a cover according to an embodiment of
the invention;

figure 3 shows a construction of a flower box according
to an embodiment of the invention; and

20 figure 4 shows a modular unit produced with flower
boxes according to the invention.

The same or similar elements are designated in the
drawing with the same reference numerals.

25 Detailed description

In the further description the terms above and under
will be interpreted relative to the vertically placed flower
box, this being the flower box as hung against a wall. The
30 terms front and rear will be interpreted from the viewpoint
in front of the green-covered wall, whereby 'front' is the
green side and 'rear' the wall side of the flower box.

The vertical flower box according to the invention is
constructed from two main elements, being the box shown in
35 figure 1 and the cover (partially) shown in figure 2. As

designated in figure 3 with a reference numeral 4, the cover preferably comprises two elements, being a fabric 3 and a grid 2. The grid is shown in more detail in figure 3. The cover is provided for mounting on the box such that the opening of the box is enclosed by the cover. Shown in the figures is a cover wherein the side walls of the cover wholly enclose the side walls of the box, although it will be apparent that this is not essential to the invention.

The box has an opening 5 extending over a first surface area. The cover has one or more cover openings 6. Each of the cover openings 6 extends over a second surface area. The second surface area, formed by cover openings 6, is smaller than first opening 5. Plants can hereby root in the box and have sufficient space there because first opening 5 is large enough. The plants can extend through second opening 6, typically at the position of their stem, for which an opening with a smaller surface area is sufficient. Because cover opening 6 is small, substrate present in the box and in which the plants are planted is prevented from falling out of the box.

Figure 1 shows a box formed by a bottom 7 which extends upward when the flower box is placed vertically. Bottom 7 comprises upright edges 8. These upright edges 8 define the opening 5 of the box. When the box is placed in the vertical position, bottom 7 of the box forms the rear side of the flower box. Where the word bottom is used in the description it does not refer to the geographically lowest point but is consistently understood to mean this rear side of the flower box defined here as bottom 7.

Figure 2 shows a grid 2 according to the invention comprising edges 9 for mounting the grid on box 1. These edges form a frame inside which a grid is formed, which grid has cells. Each cell here forms a cover opening 6. The cells are preferably formed by lying and upright connecting elements. The lying connecting elements 11 preferably take a

plate-like form, wherein the plate has a length substantially corresponding to the width of the cover, and the plate has a width greater than 0.5 cm, preferably greater than 1 cm, more preferably greater than 1.5 cm. The
5 plate extends over the width of the grid and is positioned for draining in the direction of the box. The front side of the plate is hereby at a higher position than the rear side of the plate.

The grid further comprises upward connecting elements
10 10. These connecting elements 10 extend from the bottom of the grid to the top of the grid. As shown in figure 2, the upward connecting elements can be connected to the lying connecting elements so as to thus extend via the lying connecting elements from the top to the bottom side of the
15 grid.

The grid is preferably embodied from a non-flexible material so that the grid is rigid and thereby has a certain strength. The grid can hereby prevent fabric 3 being pressed away from the box by the pressure of the substrate present
20 in the box. The grid holds the fabric in place. The grid is preferably manufactured from a recycled plastic. The box is preferably also manufactured from a recycled plastic. Other materials can likewise be employed to manufacture the box and/or the grid, such as ceramic material.

Box 1 preferably comprises partitions 12 extending
25 horizontally in the box. The partitions prevent the substrate falling downward when the box is placed vertically. The partitions allow an uniform distribution of substrate in the box.

30 The box is preferably completely filled with substrate in which to plant the plants. This substrate is preferably soil or a combination of soil and manure, or similar materials.

The box comprises a water reservoir 13 on the upper
35 side. This water reservoir extends along one of the upright

walls of the box. Figure 1 shows a box wherein the water reservoir extends at the top over the whole upright wall. The water reservoir here has perforations 14 in the direction of the box, these perforations being distributed
5 over the width of the water reservoir. The perforations are preferably distributed evenly over the whole width of the water reservoir. The perforations allow water in the water reservoir to trickle down due to gravitational force and thereby enter the box. There the water can soak into the
10 substrate in which the plants are planted. The perforations can be formed as round or elongate openings, as holes or as slots.

The water reservoir is provided for filling via an opening. This opening can be placed on the rear side of the
15 flower box, i.e. at the position of the bottom of the flower box. Such an opening is indicated in figure 1 with a reference numeral 15. Such an opening allows an active irrigation system to be provided on the rear side of the green wall, wherein conduits are connected to rear opening
20 15 of the flower box. Because the irrigation system can be mounted on the rear side of the green wall, it is concealed from view.

The water reservoir preferably comprises a further opening 16 for filling the water reservoir. The further
25 opening is placed on the front side of the flower box, i.e. on the cover of the flower box. This further opening allows a person to provide the flower box manually with water by pouring water into the further opening and thereby filling the water reservoir in the flower box. This second opening
30 is preferably formed as a channel extending between the cover and the water reservoir, wherein the channel has a tongue protruding on the front side of the cover. The tongue forms a funnel for pouring water into the channel connecting the water reservoir to the cover.

The flower box according to the invention preferably comprises a water collecting zone 17 on the underside. This water collecting zone is preferably formed as a collecting tray in which water can be collected when the flower box is in the vertical position. The water collecting zone has for this purpose a front wall 18 which, together with upright walls 8 of the box and bottom 7 of the box, define a collecting tray in which water can be held. The water collecting zone preferably comprises overflow 19 which is preferably positioned symmetrically with further opening 16 for filling the water reservoir. Overflow 19 is placed here on the underside and further opening 16 is placed on the upper side of the flower box. Overflow 19 and further opening 16 are preferably placed in one vertical line so as to fill the water reservoir with water overflowing from a higher flower box. This has the result that when a wall has a modular construction with different flower boxes according to the invention, as shown in figure 4, overflow 19 of a flower box in higher position debouches into opening 16 of a lower flower box so that water flowing via overflow 19 out of the water collecting zone of a flower box in higher position flows into the water reservoir of a flower box in lower position via further opening 16. An efficient irrigation of the different flower boxes in a modular construction can hereby be achieved.

Figure 4 shows a vertical structure such as a wall, having thereagainst a green wall constructed from six flower boxes according to the invention. The six flower boxes according to the invention are placed adjacently so as to cover a larger surface area. The flower box at top left shows here how openings 6 have been formed in the cover. Cover openings 6 are more specifically openings in the fabric, which fabric is held in place by a grid as shown in figure 2. The cover openings through the fabric can be formed as cross-like incisions through the fabric, as shown

in figure 4. Plants with their root ball can be planted in flower box 1 through these cover openings. The stem or central stalk of the plant extends through cover openings 6 so that stalks, leaves and/or flowers of plant 20 are visible on the outer side of the flower box, as shown in figure 4. Cover openings 6 are formed here such that plant 20 can extend through the cover openings while the substrate in box 1 is prevented from falling out of the box through cover openings 6.

Figure 1 shows how a flower box according to the invention can have a recess 21 formed on the rear side of the flower box. This recess 21 allows an irrigation system to be placed behind the flower boxes so that the flower boxes can be provided with water. Recesses 21 allow flexible conduits to be positioned and guided on the rear side of the flower boxes, which flexible conduits can be connected to opening 15 in order to fill the water reservoir.

The flower box according to the invention preferably comprises a wall mounting system 22 on the bottom of box 1, i.e. on the rear side of the box, preferably at the top. This wall mounting system allows the flower box to be hung in simple manner on a vertical structure.

Examples of plants suitable for planting in the flower box for a vertical green coverage are, among others: sedum acre, sedum album, sedum floriferum, sedum hispanicum, sedum reflexum, sedum rupestre, sedum sexangulare and sedum spurium.

The fabric is preferably made from a root barrier. A root barrier is a fabric formed such that roots of plants cannot grow through the fabric. Another example of a fabric suitable for use in the invention is Geotex.

The advantage of the flower boxes according to the invention is that, owing to limited size and their shape (the flower box according to the invention is preferably rectangular), a green wall can be constructed in modular

manner. The lower and upper limits can be determined substantially freely here because the flower boxes do not have to be placed on a rigid structure specifically designed for the purpose. Irrigation of the flower boxes according to the invention is also simple. The simple assembly of the flower boxes according to the invention allows the flower boxes to be assembled by hobbyists or amateurs.

It will be apparent that the foregoing description describes preferred embodiments and examples of the flower box according to the invention. The scope of protection is however defined by the claims. The examples described and referred to above are in no way limitative for the invention.

Claims

1. Flower box for vertical green coverage, comprising a box with a bottom and upright walls defining an opening with
5 a first surface area, wherein the box is vertically placeable so that the opening extends in a substantially vertical plane, wherein the flower box further comprises a cover provided for mounting over said opening, the cover comprising one or more cover openings extending
10 substantially parallel to the opening and each having a second surface area smaller than the first surface area such that plants can extend through respective cover openings.

2. Flower box as claimed in claim 1, wherein the cover
15 comprises a grid and a fabric, wherein said cover openings are formed in the fabric and wherein the grid is placed over the fabric to hold the fabric in place.

3. Flower box as claimed in claim 2, wherein the box
20 and the grid are manufactured from plastic.

4. Flower box as claimed in any of the foregoing claims, wherein the cover comprises at least two cover openings ordered in a pattern.

25

5. Flower box as claimed in any of the foregoing claims, wherein the box is provided so as to be filled with soil.

30 6. Flower box as claimed in any of the foregoing claims, wherein the box has a height, width and thickness, wherein the height and width are smaller than 100 cm, preferably smaller than 60 cm, and wherein the thickness is smaller than 20 cm, preferably smaller than 15 cm.

35

7. Flower box as claimed in any of the foregoing claims, wherein the box is rectangular and has at the position of the bottom at least two wall mounting elements so that the flower box can be hung on a wall.

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8. Flower box as claimed in any of the claims 2-7, wherein the grid comprises upright and lying connecting elements, wherein the lying connecting elements drain in the direction of the box.

10

9. Flower box as claimed in any of the foregoing claims, wherein the box comprises lying partitions to enable equal distribution of the contents in the box.

15

10. Flower box as claimed in any of the foregoing claims, wherein at the position of a first of said upright walls the box has a water collecting zone extending in the box for the purpose of collecting water coming out of the box.

20

11. Flower box as claimed in claim 10, wherein at the position of a second of said upright walls opposite said first of the upright walls the box comprises a water reservoir extending in the box over at least 55%, preferably at least 75%, more preferably at least 90% of the wall and comprising a plurality of perforations distributed over the water reservoir and in the direction of the box, wherein at least one opening is provided in the box for the purpose of filling the water reservoir.

30

12. Flower box as claimed in claim 10, wherein said at least one opening comprises an opening provided at the position of the bottom of the box.

13. Flower box as claimed in claim 10 or 11, wherein said at least one opening comprises an opening provided at the position of the cover.

5 14. Flower box as claimed in claims 10 and 11-13, wherein the water collecting zone has an overflow which debouches at the position of the at least one opening of a lower flower box.

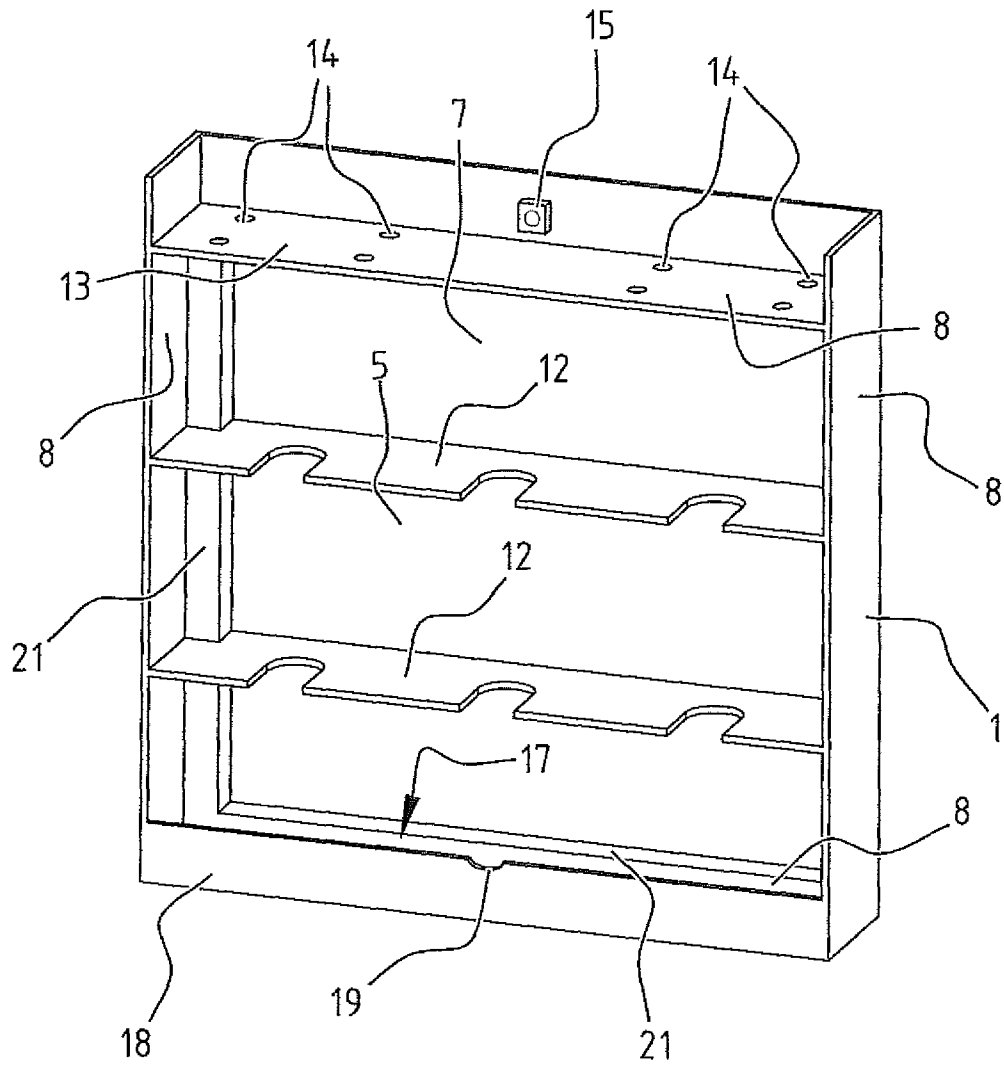
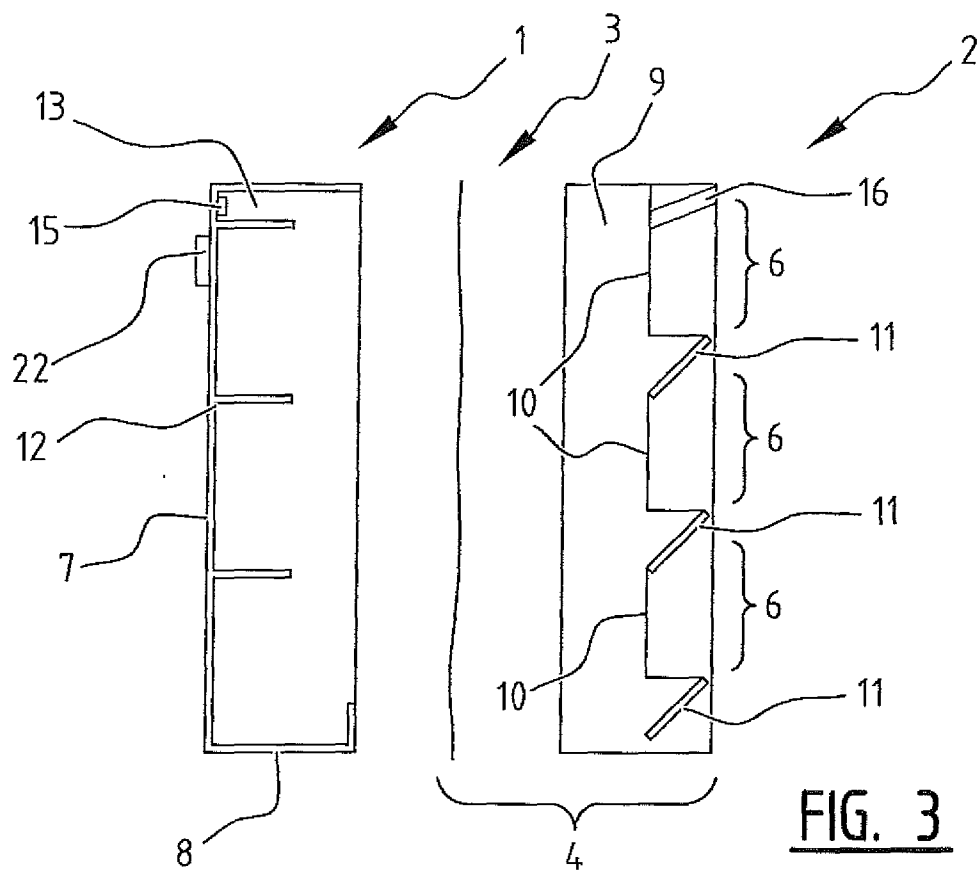
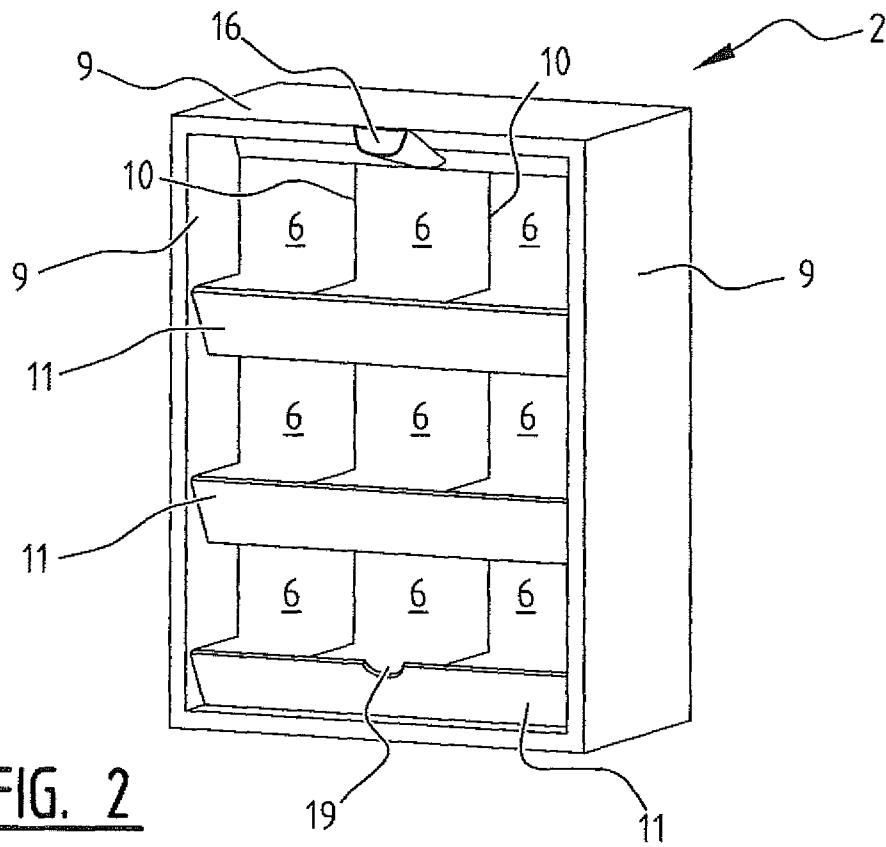


FIG. 1



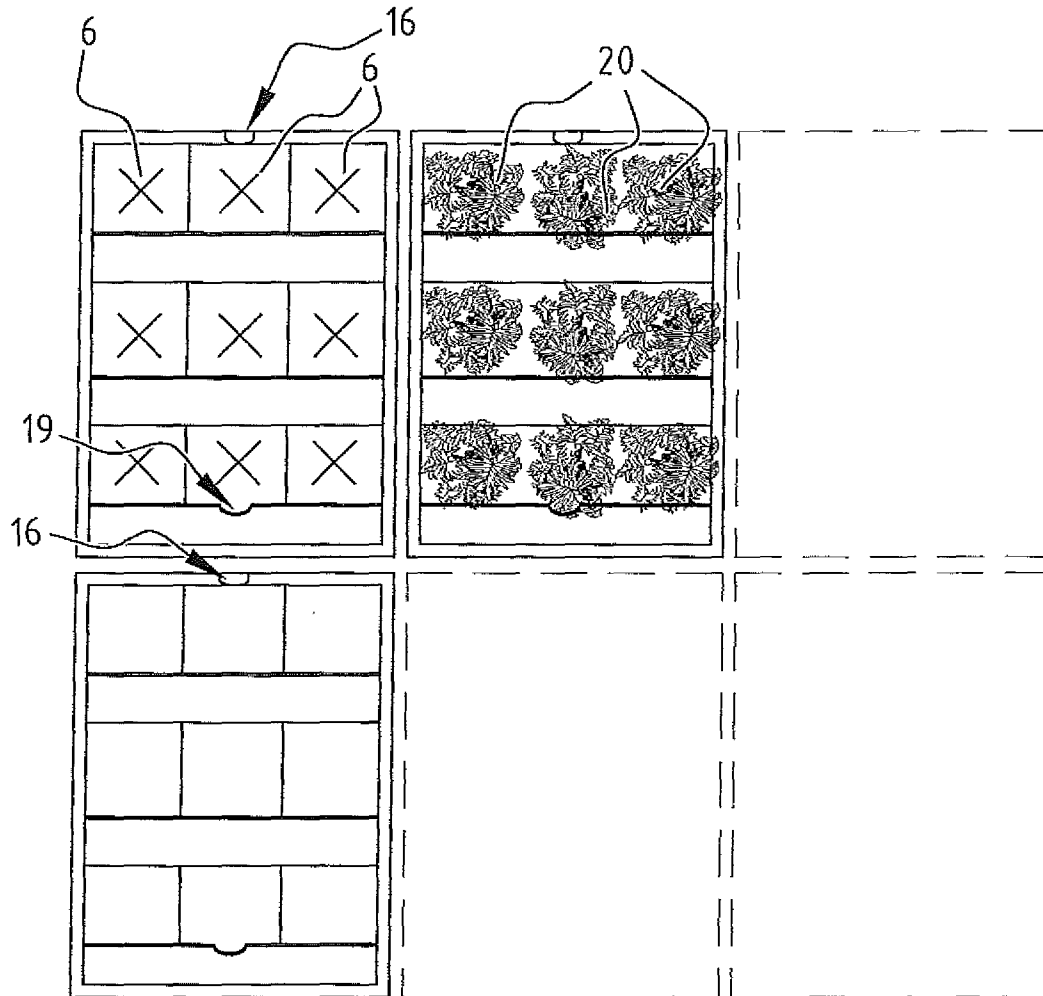


FIG. 4

INTERNATIONAL SEARCH REPORT

International application No
PCT/BE2013/000035

A. CLASSIFICATION OF SUBJECT MATTER INV. A01G9/02 ADD.		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) A01G E01F A01K		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal, WPI Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y X Y X Y Y	US 2007/199241 A1 (PELESZEZAK PASCAL [FR]) 30 August 2007 (2007-08-30) paragraphs [0033], [0043], [0041], [0036], [0046]; figures 1,2 ----- US 7 788 848 B1 (KOUMOUDIS SOTIRI [US]) 7 September 2010 (2010-09-07) figures 1a,1e column 7, lines 3-43 column 8, lines 10-11 ----- WO 2011/095570 A1 (SEMINCKX MICHEL [BE]) 11 August 2011 (2011-08-11) figures 1-3 ----- GB 2 458 904 A (WOLFENDEN IAN [GB]) 7 October 2009 (2009-10-07) figure 1 ----- -/--	1,2,4-6, 9 3,8 1,3-7,9, 10,13,14 3,11,12 1,4-7,9 8 11,12
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.		<input checked="" type="checkbox"/> See patent family annex.
* Special categories of cited documents :		"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"O" document referring to an oral disclosure, use, exhibition or other means	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family	
Date of the actual completion of the international search <p align="center">24 September 2013</p>	Date of mailing of the international search report <p align="center">01/10/2013</p>	
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer <p align="center">Nédélec, Morgan</p>	

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