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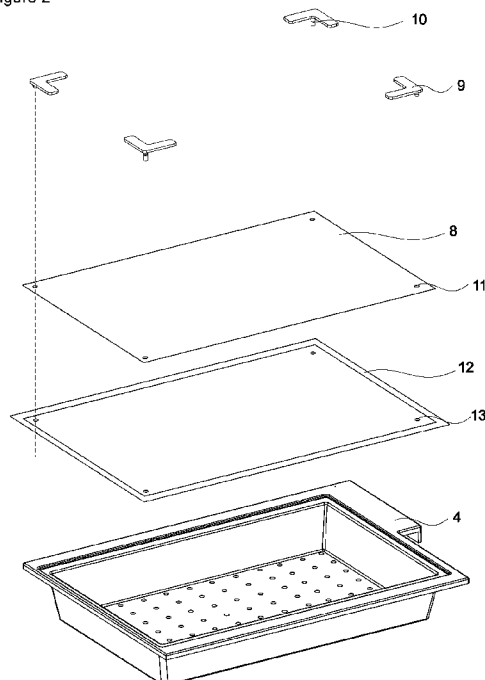
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(54) Title: A PLANT GROWING CABINET

Figure 2



(57) Abstract: The present invention relates to a plant growing cabinet (1) comprising a body (3) in which at least one plant growing unit (2) is provided, a plant growing tray (4) with a base of perforated structure, placed on the plant growing unit (2), a liquid chamber (5) in which the liquid solution is stored required by the plants placed in the body (3), a transmission tube (6) enabling transmission of the liquid solution from the liquid chamber (5) to the plant growing unit (2), and a discharge tube (7) enabling discharging the liquid solution from the plant growing unit (2) to the liquid chamber (5).

Description**A PLANT GROWING CABINET**

- [0001] The present invention relates to a plant growing cabinet used for growing plants. The present invention particularly relates to a domestic type plant growing cabinet.
- [0002] Hydroponic cultivation is a method of agriculture based on growing plants without soil, depends on the principle of giving water and the nutrients required by the plants, to the root environment in required amounts, and is practiced in water or solid medium culture. The plants to be grown in soilless agriculture applications are cultivated in an enclosed environment in which the levels of water, light, and humidity and the proportion of carbon dioxide in the air, which has a significant part in growing of a plant, is maintained constant. During growing of a plant, all these elements are optimized according to the phase of the plant's growth, and the plant is thus enabled to grow more rapidly and is protected from harmful outer environment elements (e.g. high levels of humidity, light intensity). During watering, the micro particles contained in turf or similar mixtures used in plant growing cabinets may pass through the plant growing tray in which the plant and the turf mixture is disposed, to the plant growing unit provided under the plant growing tray by means of holes involved in introducing a nutrient liquid into the plant growing tray and collect on its base.
- [0003] Blockages may occur during discharging of the liquid back to the main reservoir or during transmission of the liquid to the plant growing unit in connection with watering, and as a consequence the liquid collecting on the plant growing tray may cause the roots of the plants to deteriorate, and may therefore lead to irreversible permanent damages on the plants. Another problem experienced is blockage of liquid solution transmission lines. In this case the plants are not able to sufficiently receive the liquid solution they require, and may dry as a consequence, causing irreparable damages on the plants.
- [0004] State of the art U.S. patent document no. US2014190078 discloses a domestic type plant growing cabinet.

- [0005] The aim of the present invention is to prevent dust, soil, fiber and similar materials released from turf mixtures in plant growing cabinets from mixing in liquid transmission and discharge lines of a plant growing cabinet.
- [0006] The plant growing cabinet realized to achieve the aim of the present invention and disclosed in the first claim and the dependent claims, is provided with plant growing units positioned in a body. Plant growing trays in which plants are planted, containing a turf mixture in which plants are grown, are placed into said plant growing units. According to the humidity level of said turf mixture, liquid solution is transmitted from a liquid chamber provided in the plant growing cabinet into said plant growing units. Said liquid solution is pumped into the plant growing unit and is collected therein. The base of the plant growing trays placed in the plant growing unit is of perforated structure and is configured to transmit the liquid collecting in the plant growing unit to the turf mixture. When the humidity of the turf mixture reaches a predetermined value, the liquid solution remaining in the plant growing unit is discharged to the liquid chamber by means of the discharge line. The filter placed so as to cover almost completely the base of the plant growing tray inhibits direct contact of the turf mixture to the plant growing tray. During liquid discharge, the micro-particles contained in the turf mixture go with the current towards the perforations on the base of the plant growing tray. The liquid solution and nutritious minerals can pass through the filter thanks to the fine mesh structure thereof, but the micro-particles released from the turf mixture stick to the filter and become filtered. The filter can be removed and washed, and can be remounted before placing a new turf mixture into the plant growing tray upon harvesting the plants growing in the plant growing tray. By means of the filter, the turf mixture is unable to reach the discharge tube, liquid chamber and the transmission tube, respectively, thereby preventing blockages before they form, and improving spare part costs.
- [0007] In the mentioned embodiment of the invention, the plant growing cabinet comprises a fastening member making it difficult to detach the filter from the plant growing tray by being placed on the filter. The fastening member

squeezes the filter by settling particularly on the corners of the filter. The filter is thus inhibited from being dislocated during placement of the turf mixture into the plant growing tray by a user. By this, the turf mixture is prevented from escaping into the liquid solution transmission lines.

- [0008] In the mentioned embodiment of the invention, a pin shaped as a protrusion on the fastening member is provided in the plant growing cabinet. The fastening member settling on the filter by means of the pin, fastens the filter on the perforations disposed on the base of the plant growing tray by squeezing the filter by the pin. By this, the filter is inhibited from being dislocated during placement of the turf mixture into the plant growing tray, thereby eliminating blockages forming in the transmission tube or the discharge tube. The plants are thus avoided from being damaged due to being dehydrated or due to their roots remaining in water as a result of blockage.
- [0009] In the mentioned embodiment of the invention, first holes are provided preferably on the corners of the filter used in the plant growing cabinet. The pin settling on the filter by the first holes enters the perforations disposed on the base of the plant growing tray, thereby fastening the filter in place. Consequently, blockages and therefore water leakages are prevented in the plant growing cabinet, avoiding physical damages on the dwelling of the user.
- [0010] In the mentioned embodiment of the invention, a frame is used to fasten the filter in the plant growing cabinet. The frame is shaped as a square or rectangular casing suitable to be placed in the plant growing unit. The frame is settled by firm-fit engagement in the plant growing tray. The user first places the filter into the frame. The user is thus enabled to place the filter easily into the plant growing tray, thereby providing ease of use.
- [0011] In the mentioned embodiment of the invention, in the plant growing cabinet, second holes are provided on the frame preferably on the corners thereof. Upon the centers of the second holes and the first holes being aligned by a user, the pin enters said holes and the entire structure consisting of the frame, filter and the fastening member is rigidly fixed within the plant growing tray. The user is thus provided ease of use while

avoiding liquid leakage and blockages.

[0012] In the mentioned embodiment of the invention, in the plant growing cabinet, the filter is of a selectively permeable structure. By this, dust, soil and fibers which can be considered as the pulp of the turf mixture are captured on the filter, while water and organic and inorganic molecules dissolved in water permeate therethrough. Said dust, soil and fibers are thus prevented from blocking the liquid solution transmission and discharge lines of the plant growing cabinet.

[0013] In the mentioned embodiment of the invention, the fastening member is "L" shaped in the plant growing cabinet. The location where the fastening member is placed on the frame is "L" shaped and is formed as a recess. The fastening member is thus placed rigidly on the frame.

[0014] In the mentioned embodiment of the invention, in the plant growing cabinet, the braids of the filter are shaped as squares or equilateral quadrangles with each side having a length of less than 0.25 mm. By this, turf mixture likely to cause blockage are prevented from joining the liquid solution cycle.

[0015] The advantage of the present invention is avoiding blockages by preventing turf particles from being introduced to the liquid solution transmission and discharge lines without losing volume in the plant growing tray by means of using a filter and the small volume occupied by the used filter.

[0016] The plant growing cabinet realized to achieve the aims of the present invention is illustrated in the accompanying drawings, wherein:

[0017] Figure 1 is a frontal view of the plant growing cabinet.

[0018] Figure 2 is an exploded view of the plant growing tray, frame, fastening member and the filter.

[0019] The elements in the figures are numbered individually and the correspondence of these numbers are given hereinafter.

[0020] 1. Plant growing cabinet

[0021] 2. Plant growing unit

[0022] 3. Body

[0023] 4. Plant growing tray

[0024] 5. Liquid chamber

[0025] 6. Transmission tube

[0026] 7. Discharge tube

[0027] 8. Filter

[0028] 9. Fastening member

[0029] 10. Pin

[0030] 11. First hole

[0031] 12. Frame

[0032] 13. Second hole

[0033] The plant growing cabinet (1) comprises a body (3) in which at least one plant growing unit (2) is provided, a plant growing tray (4) with a base of perforated structure, placed on the plant growing unit (2), a liquid chamber (5) in which the liquid solution is stored, required by the plants placed in the body (3), a transmission tube (6) enabling transmission of the liquid solution from the liquid chamber (5) to the plant growing unit (2), and a discharge tube (7) enabling discharging the liquid solution from the plant growing unit (2) to the liquid chamber (5).

[0034] The plant growing cabinet (1) of the invention comprises at least one filter (8) placed in the plant growing tray (4), avoiding blockage of the transmission tube and the discharge tube by preventing the turf mixture enabling growing of the plant to be cultivated, from passing through the perforations of the plant growing tray.

[0035] In the plant growing cabinet (1) of the invention, a plurality of plant growing units (2) are positioned in the body (3) so as to be consecutively arranged in vertical position in order to save space. The plant growing tray (4) placed in a plant growing unit (2) acts as a chamber in which turf and similar mixtures are placed, required by the plants to grow and to root. The base of the plant growing tray (4) is of perforated structure. By this, the liquid solution conveyed from the liquid chamber (5) positioned in the body into the plant growing unit (2) by means of the transmission tube (6), is enabled to enter into the plant growing tray (4) and reach the plants by being sucked by the turf mixture. The liquid solution remaining after the turf mixture sucking a sufficient amount of liquid solution, is transmitted to

the liquid chamber (5) by means of the discharge tube (7). The user places the filter (8) in the plant growing tray (4) before placing the turf mixture therein. Direct contact of the turf mixture and the base of the plant growing tray (4) is prevented by means of the position of the filter (8). By this, the particles contained in the turf mixture likely to leave through the perforations disposed on the base of the plant growing tray (4) during watering, are captured by the filter (8) and are unable to reach the discharge tube. Over time, said turf and mixture particles should block the discharge tube (7) or the transmission tube (6), thereby damaging the plant growing cabinet (1). Blockages are prevented thanks to the filter (8), thereby improving spare part costs of the plant growing cabinet (1).

- [0036] The plant growing cabinet (1) of the invention comprises a fastening member (9) squeezing the filter (8) in between itself and the plant growing tray (4) by settling on the filter (8). The fastening member enables the filter (8) to rest stably in the plant growing tray (4) by settling on the filter (8). As a result, the filter (8) does not come loose. By this, the turf mixture is unable to leave through the perforations on the base of the plant growing tray (4) and reach the plant growing unit (2), the discharge tube (7) and the transmission line (6), respectively, thereby avoiding blockages, facilitating usage of the plant growing cabinet (1) and enhancing product perception.
- [0037] The plant growing cabinet (1) of the invention comprises a fastening member (9) having a protrusion shaped pin (10). The pin (10) enables forming a protrusion on the surface of the filter (8) contacting the plant growing tray (4) when the fastening member (9) is placed on the filter (8), thereby enabling the filter (8) to easily rest over the perforations disposed on the plant growing tray (4). The filter (8) is thus prevented from coming loose, thereby preventing the turf mixture from causing blockages in the plant growing cabinet (1).
- [0038] The plant growing cabinet (1) of the invention comprises a filter (8) having at least one first hole (11).
- [0039] The plant growing cabinet (1) of the invention comprises a fastening member (9) squeezing the filter (8) in between itself and the plant growing tray (4) by settling on the first hole (11) by means of the pin (10). The pin

(10) passing through the first hole (11) settles on the perforations of the plant growing tray (4). The filter (8) is thus prevented from coming loose, thereby preventing the turf mixture from causing blockages in the plant growing cabinet (1) and improving spare part costs of the plant growing cabinet (1).

[0040] The plant growing cabinet (1) of the invention comprises a rectangular or square shaped frame (12) in which the filter (8) settles, settling in the plant growing tray (4) by firm-fit engagement. The filter (8) is placed into the frame (12) and the frame (12) is placed into the plant growing tray (4). The frame (12) settles in the plant growing tray (4) by firm-fit engagement. Likewise, the filter (8) settled by firm-fit engagement in the frame (12). The filter (8) is thus prevented from sliding within the plant growing tray (4). In addition, by placing the filter (8) in the frame (12), ease of use is provided in cases when the filter (8) is required to be replaced, thereby enhancing product perception and improving user satisfaction.

[0041] The plant growing cabinet (1) of the invention comprises a frame (12) having at least one second hole (13). The frame (12) is square or rectangle shaped and has second holes (13) on its corner points.

[0042] The plant growing cabinet (1) of the invention comprises a fastening member (9) settling on the second hole (13) by means of the pin (10) and squeezing the frame (12) in between itself and the plant growing tray (4). The pin (10) passes through the second holes (13) of the frame (12) and settles on the perforations disposed on the base of the plant growing tray (4). The frame (12) is thus immovably fastened. In addition, the pin (10) passes through the first holes (11) while passing through the second holes (13), and the fastening member (9) thus groups the filter (8) and the frame (12), thereby creating a sturdy structure. By fastening the filter (8) firmly in place, the turf mixture is prevented from causing blockages in the plant growing cabinet (1), and spare part costs of the plant growing cabinet (1) are improved.

[0043] The plant growing cabinet (1) of the invention comprises a filter (8) formed by a selectively permeable membrane. The selective permeability of the filter (8) allows water molecules to easily pass through the filter (8) and

dust, soil, fiber and similar materials released from the turf mixture are caught on the filter (8). Blockages are thus prevented, improving spare part costs of the plant growing cabinet (1).

- [0044] The plant growing cabinet (1) of the invention comprises an "L" shaped fastening member (9). The "L" shape of the fastening member (9) enables the fastening member (9) to squeeze the filter (8) at the corners of the plant growing tray (4). By means of the fastening member (9) acting as a gusset, the filter (8) can be easily fastened to the plant growing tray (4), thereby facilitating maintenance of the plant growing cabinet (1).
- [0045] The plant growing cabinet (1) of the invention comprises a filter (8) having a mesh structure consisting of squares or equilateral quadrangles having a side length varying in the range of 0 to 0.25 mm. Dust, soil, fibers and similar materials contained in the liquid solution transmitted and discharged through the transmission tube (6) and the discharge tube (7), cause blockages. By means of the micro-mesh structure of the filter (8) particles with a diameter larger than a side of the mesh structure, are unable to escape through the filter (8), thereby preventing blockages and improving spare part costs of the plant growing cabinet (1).
- [0046] Thanks to the invention, damages likely to occur in a plant growing cabinet (1) due to blockages in a transmission tube (6), discharge tube (7) and a plant growing unit (2), are avoided by means of the filter (8) used in plant growing cabinets (1).

Claims

1. A plant growing cabinet (1) **comprising**
 - a body (3) in which at least one plant growing unit (2) is provided,
 - a plant growing tray (4) with a base of perforated structure, placed on the plant growing unit (2),
 - a liquid chamber (5) in which the liquid solution is stored, required by the plants placed in the body (3),
 - a transmission tube (6) enabling transmission of the liquid solution from the liquid chamber (5) to the plant growing unit (2), and a discharge tube (7) enabling discharging the liquid solution from the plant growing unit (2) to the liquid chamber (5), **characterized by**
 - at least one filter (8) placed in the plant growing tray (4), avoiding blockage of the transmission tube and the discharge tube by preventing the turf mixture enabling growing of the plant to be cultivated, from passing through the perforations of the plant growing tray.
2. A plant growing cabinet (1) according to claim 1, **characterized by** a fastening member (9) squeezing the filter (8) in between itself and the plant growing tray (4) by settling on the filter (8).
3. A plant growing cabinet (1) according to claim 2, **characterized by** the fastening member (9) having a protrusion-shaped pin (10).
4. A plant growing cabinet (1) according to any one of the preceding claims, **characterized by** the filter (8) having at least one first hole (11).
5. A plant growing cabinet (1) according claim 4, **characterized by** the fastening member (9) settling on the first hole (11) by means of the pin (10) and squeezing the filter (8) in between itself and the plant growing tray (4).
6. A plant growing cabinet (1) according to any one of the preceding claims, **characterized by** a rectangular or square shaped frame (12) in which the filter (8) settles, settling in the plant growing tray (4) by firm-fit engagement.
7. A plant growing cabinet (1) according claim 6, **characterized by** the frame (12) having at least one second hole (13).
8. A plant growing cabinet (1) according claim 7, **characterized by** the fastening member (9) settling on the second hole (13) by means of the pin (10) and squeezing the frame (12) in between itself and the plant growing tray (4).

9. A plant growing cabinet (1) according to any one of the preceding claims,
characterized by the filter (8) formed by a selectively permeable membrane.
10. A plant growing cabinet (1) according to the claims 2 to 9, **characterized by** the
"L" shaped fastening member (9).
11. A plant growing cabinet (1) according to any one of the preceding claims,
characterized by filter (8) having a mesh structure consisting of squares or
equilateral quadrangles having a side length varying in the range of 0 to 0.25
mm.

Figure 1

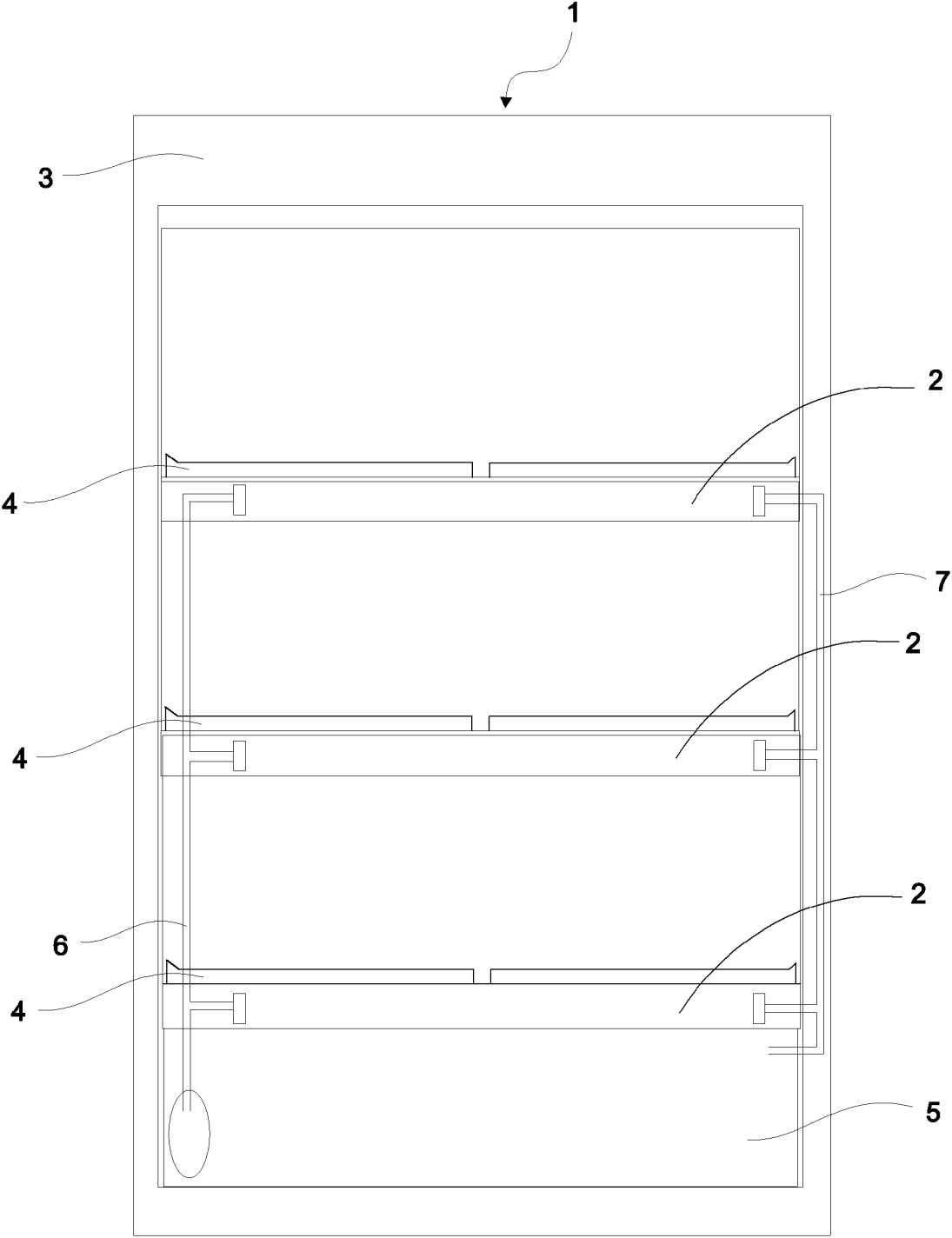
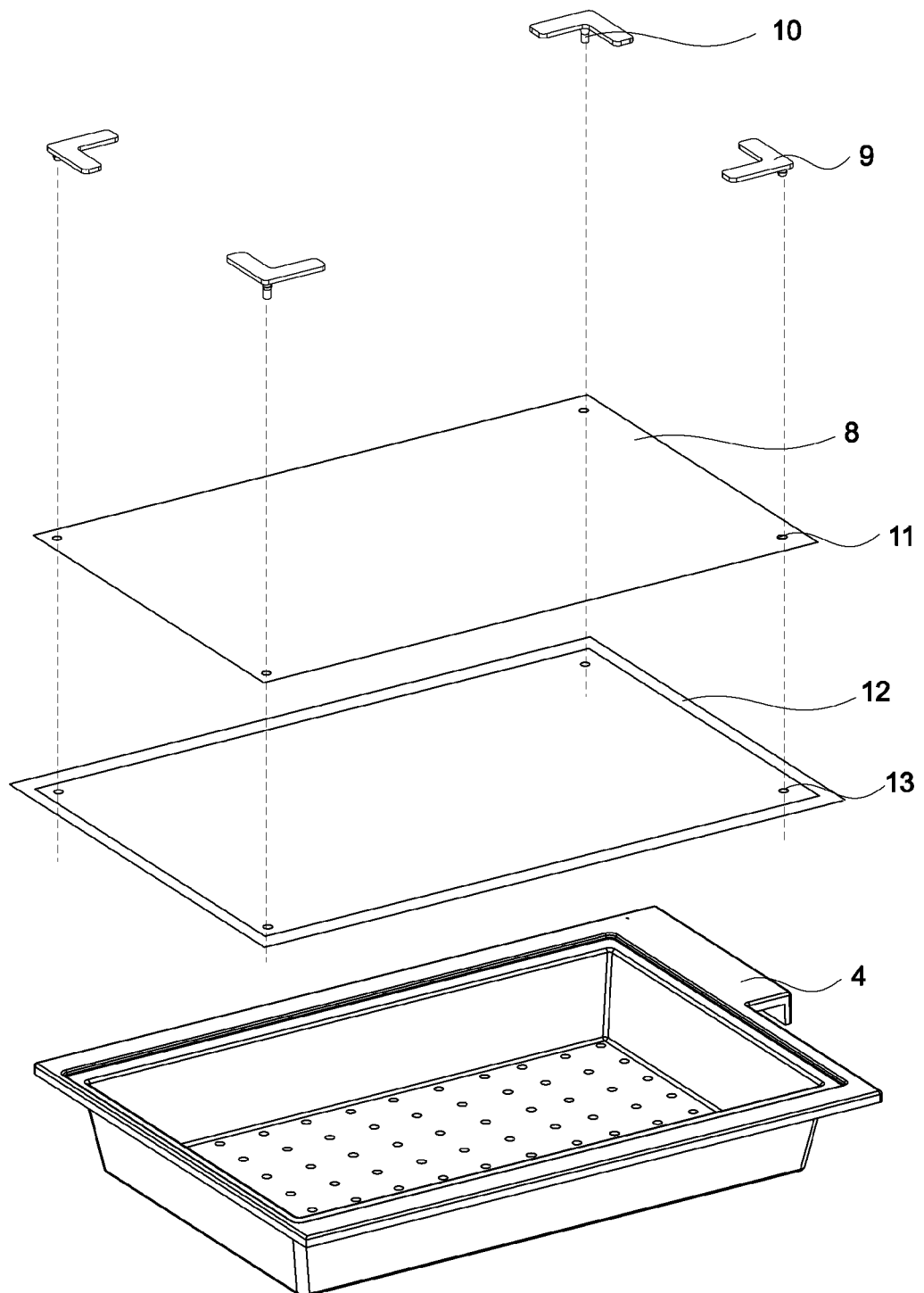


Figure 2



INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
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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

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

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Y	WO 2012/050529 A1 (LEE ALAN SIAN GHEE [SG]; GREAVES HENRY [AU]) 19 April 2012 (2012-04-19) page 6, lines 1-17; figures 5,6 -----	1,2,4,9, 11
Y	US 2017/215344 A1 (MEYER MOLLY [US]) 3 August 2017 (2017-08-03) paragraphs [0034], [0035] -----	1-4,9,11
Y	US 1 031 771 A (BUTTSCHAU WILLIAM J [US]) 9 July 1912 (1912-07-09) page 6, lines 13-24; figure 1 ----- -/-	2-8,10



Further documents are listed in the continuation of Box C.



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INTERNATIONAL SEARCH REPORT

International application No

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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