



(51) International Patent Classification:

A01G 9/02 (2006.01) A01G 17/06 (2006.01)
A01G 9/12 (2006.01)

(21) International Application Number:

PCT/AU2010/000730

(22) International Filing Date:

11 June 2010 (11.06.2010)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

2009902655 11 June 2009 (11.06.2009) AU
2009903679 7 August 2009 (07.08.2009) AU

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

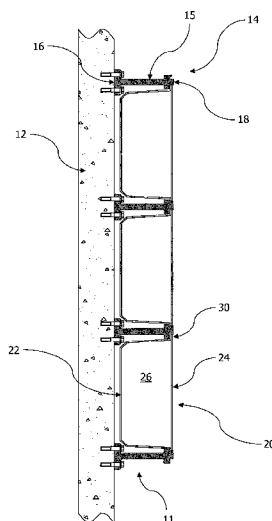
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: VEGETATION SUPPORT SYSTEM

Figure 1



(57) Abstract: A vegetation support system (10) comprises a support frame (11) for mounting to wall (12). The support frame (11) includes upright beams (14) having an inner end (16) and an outer end (18). Growth medium containers (20), having a cavity (26) for receiving a growth medium (28) and an outer panel (24), are mounted to the upright beams (14) such that the cavity (26) is arranged inwardly of the outer end (18) of the upright beams (14) and the outer panel (24) is adjacent to the outer end (18) of the upright beams (14). Apertures (34) are formed in the outer panel (24) of the growth medium container (20) allowing vegetation to be planted through the apertures (34) into the growth medium (28).



Vegetation Support System

Field of the Invention

The present invention relates to a vegetation support system. In particular, the present invention relates to a support system for supporting vegetation on a wall or other building surface.

Background of the Invention

The landscaping of areas with vegetation such as plants and grasses is increasingly becoming a popular element of modern building design for both aesthetic and environmental reasons. However, traditional landscaping of courtyards and ground surfaces occupies a significant footprint and the amount of footprint available for landscaping in modern building designs and fit-outs is typically quite limited due to the expense.

Accordingly, vertical gardens are being used to increase the landscaping area in building fit-outs while occupying negligible footprint. This allows an area to be aesthetically enhanced with vegetation, without wasting any valuable footprint. It also allows architects to meet requirements regarding the percentage of land area that must be green space for a given land area without wasting building footprint, subject to planning guidelines. A further significant advantage arises from the ability to reduce an organisation's environmental or carbon footprint, as all vegetation has a carbon-offsetting effect.

There are a number of different methods to planting a green wall. One such way of erecting a vertical garden involves planting and establishing vegetation in modular containers. The vegetation is initially grown with the container arranged in a horizontal orientation until it is established, which can typically take four to six weeks or longer depending on the type of vegetation being grown. Once established, the modular containers are then transported and installed by hanging the modules on wall mounted brackets.

Another system involves putting up a support structure which is made of felt or similar material. This is fixed to the building and plants are then planted straight into the felt material. This negates the need for offsite growing. However this system is not modular

and does not lend itself readily to maintenance or partial removal and requires heavy reticulation.

In many cases, the vegetation needs to be well-established and rooted into the container to prevent the vegetation and the growing medium from falling out of the container when the container is hung vertically. Some plant species lend themselves to being planted when the containers are mounted vertically and using smaller plants can facilitate plant growth on a vertical surface.

Typically, the structure required to support containers mounted on a wall includes metal frames, brackets, wire mesh and other fixtures that have no aesthetic qualities. As a result, the support structure is only erected when the vegetation is established and the containers are ready to hang and on site, so that the support structure and the containers are immediately obscured by the vegetation. Commonly, the containers and support structure are constructed from metal components and consequently, are highly energy intensive to produce, which is undesirable in a product that is designed to minimise environmental footprint and impact. Further, metal components are prone to corrosion in the hydroponic growing solution environment of such systems.

Having to grow the vegetation in off-site facilities delays installation and represents a significant expense. Further, establishing the vegetation in a horizontal orientation and then erecting it in a vertical orientation, as well as all of the handling involved, can damage the vegetation and affect the appearance of the installation.

A further disadvantage of these systems is that it is either not possible or very difficult and unsightly to mount the containers on curved walls or walls with tapering sections.

Object of the Invention

It is an object of the present invention to substantially overcome or at least ameliorate one or more of the above disadvantages, or to provide a useful alternative.

Summary of the Invention

In a first aspect, the present invention provides a vegetation support system comprising:

a support frame adapted to be mounted against a wall, the support frame including at least one upright beam having an inner end adjacent to the wall and an outer end projecting away from the wall;

at least one growth medium container having a cavity adapted to receive and contain a growth medium and an outer panel, wherein the growth medium container is mounted to the upright beam such that the cavity is arranged inwardly of the outer end of the upright beam and the outer panel is adjacent to the outer end of the upright beam;

apertures formed in the outer panel of the growth medium container allowing vegetation to be planted through the apertures into the growth medium and allowing the vegetation to grow out through the apertures.

In a preferred embodiment, the growth medium container is provided with a plurality of recesses and the upright beams are provided with a plurality of corresponding ribs, wherein the ribs of the upright beams are received in the recesses of the growth medium container to mount the growth medium container to the support frame.

Preferably, the support frame is substantially rectangular and comprises a base section, a pair of the upright beams and a top section, defining a substantially rectangular opening adapted to receive and mount the growth medium container.

Further preferably, the system further comprises a top tank integrally formed with or adapted to be mounted to the support frame above the growth medium container, the top tank adapted to feed fluid into the growth medium container.

More preferably, the system further comprises a bottom tank integrally formed with or adapted to be mounted to the support frame below the growth medium container, the bottom tank adapted to collect residual fluid from the growth medium container.

Optionally, the system further comprises a pump adapted to pump fluid from the bottom tank to the top tank.

In a preferred embodiment, the system further comprises a fabric layer lining an inner surface of the outer panel of the growth medium container, covering the apertures in the outer panel of the growth medium container.

- 5 Preferably, the system further comprises at least one fascia panel adapted to be mounted over the outer panel of the growth medium container, to obscure at least a portion of the outer panel.

10 In a preferred embodiment, the system comprises at least two growth medium containers and a series of at least three upright beams, wherein the growth medium containers are adapted to be mounted between adjacent pairs of the series of upright beams.

15 Preferably, two or more of the growth medium containers are adapted to be mounted between each said adjacent pair of the upright beams to create a vertical series of growth medium containers.

20 The growth medium container is preferably provided with at least one drainage port adapted to drain fluid from the growth medium container. Further preferably, the system further comprises an irrigation system adapted to provide fluid to the growth medium container and to collect fluid draining from the drainage port.

In a preferred embodiment, the system further comprises an irrigation system having:

a network of pipes adapted to deliver fluid to an uppermost growth medium container in each vertical series;

25 drainage ports provided in each growth medium container adapted to drain fluid from each growth medium container, with upper growth medium containers draining into lower growth medium containers in each vertical series;

a fluid collection tank adapted to collect fluid draining from the drainage port of a lowermost growth medium container in each vertical series; and

30 a pump adapted to pump fluid from the fluid collection tank through the network of pipes.

Preferably, the fluid collection tank comprises a plurality of sub-tanks, wherein each sub-tank is arranged beneath the lowermost growth medium container of each vertical series.

In one preferred embodiment, the growth medium container is assembled from an inner module and the outer panel.

- 5 Preferably, the inner module has at least one mounting portion adapted to be secured between the outer end of the upright beam and the outer panel.

Further preferably, the system comprises at least two of said upright beams, the inner module comprising two of said mounting portions, the two mounting portions being disposed
10 along opposite sides of the inner module, wherein the growth medium container is adapted to be mounted between the two upright beams by fastening the two mounting portions to the outer ends of the two upright beams.

Optionally, the mounting portion of the growth medium container is a central mounting
15 portion defining two cavities arranged on opposite sides of the central mounting portion.

In a preferred embodiment, the system comprises multiple upright beams and multiple growth medium containers, wherein each upright beam has at least one transverse hole and each growth medium container has at least one lateral opening, wherein the transverse hole
20 and the lateral opening are aligned when each growth medium container is mounted to the upright beams, allowing growth medium from one growth medium container to connect with growth medium in an adjacent container through the lateral openings of each growth medium container and the transverse hole of each upright beam.

25 Preferably, the beams are hollow and adapted to be filled with growth medium.

Brief Description of the Drawings

A preferred embodiment of the invention will now be described by way of specific example with reference to the accompanying drawings, in which:

30 Figure 1 is a cross-sectional view of a vegetation support system;

Figure 2 is a partial cut-away view of a growth medium container of the vegetation support system of Figure 1;

Figure 3 is a partially exploded view of the vegetation support system of Figure 1 during assembly;

Figure 4 is a cross-sectional view of the vegetation support system of Figure 1, with a fascia panel fitted;

Figure 5 is a perspective view of the vegetation support system of Figure 1, with fascia panels fitted;

Figure 6 is a cross-sectional view of an alternative vegetation support system mounted to a curved wall;

Figure 7 depicts an irrigation system for a vegetation support system;

Figure 8 depicts an alternative irrigation system for a vegetation support system;

Figure 9 depicts a further alternative irrigation system for a vegetation support system;

Figure 10 is a partially exploded perspective view of an alternative vegetation support system;

Figure 11 is a front view of the vegetation support system of Figure 10;

Figure 12 is a side view of the vegetation support system of Figure 10;

Figure 13 is a plan view of the vegetation support system of Figure 10;

Figure 14 is a partial cut-away view of a beam of the vegetation support system of Figure 10;

Figure 15 is a cross-sectional view of the vegetation support system of Figure 10;

Figure 16 is an exploded view of an alternative embodiment of a vegetation support system;

Figure 17 is a schematic illustration of the irrigation system of the vegetation support system of Figure 16; and

Figure 18 is a schematic illustration of an alternative irrigation system of the vegetation support system of Figure 16.

Detailed Description of the Preferred Embodiments

Fig. 1 is a horizontal cross-sectional view of a wall-mounted vegetation support system 10 mounted to a building wall 12. The system 10 includes a support frame 11 comprising a plurality of longitudinally extending upright mounting beams 14, each having a longitudinally extending web 15 joining an inner end 16 and an outer end 18. The inner end 16 is adapted to be mounted against the wall 12, using wall fasteners 17 such as bolts or screws, so that the beam 14 extends substantially vertically in the longitudinal direction and so that the

beam 14 projects substantially perpendicularly from the wall 12 to the outer end 18. The beams 14 are typically formed from a recycled plastic material.

The system 10 further includes a plurality of growth medium containers 20, shown in isolation in Figure 2. Each container 20 is formed by mounting an inner module 22 and an outer panel 24 to the outer ends 18 of two beams 14. When the inner module 22 and the outer panel 24 are mounted together, they define a cavity 26 adapted to receive a growth medium 28.

Each inner module 22 is substantially U-shaped in transverse cross-section and has a mounting portion 30 on each side and a central recessed body 32. When the mounting portions 30 of each inner module 22 are mounted to the outer ends 18 of adjacent beams 14, the recessed body 32 of the inner module 22 projects inwardly from the outer ends 18 of the beams 14 towards the wall 12. The outer panels 24 include one or more apertures 34 that allow access to the cavity 26 of the containers 20 through the outer panel 24. A fabric layer 36 of geotextile fabric is arranged on the inner surface of the outer panel 24, covering the apertures 34 and retaining the growth medium 28 in the container 20. The containers 20 are typically thermoformed, vacuum formed or injection moulded from recycled plastic material.

As shown in Figure 3, in order to assemble the vegetation support system 10, the inner ends 16 of the beams 14 are secured to the building wall 12, using wall fasteners 17, with the beams 14 extending vertically in parallel rows, with the outer ends 18 projecting outwardly from, and perpendicular to, the wall 12. The mounting portions 30 of the inner modules 22 are then mounted to the outer ends 18 of the beams 14, using module fasteners 35 such as screws or bolts, so that the recessed bodies 32 project inwardly between the beams 14 toward the wall 12. The outer panels 24 are then mounted to the mounting portions 30 or directly to the outer ends 18 of the beams 14, using adhesive or fasteners such as bolts or screws. In some cases, the module fasteners 35 are used to secure both the inner modules 22 and the outer panels 24 to the outer ends 18 of the beams 14. A growth medium 28 is placed in the cavity 26 of each container 20 and vegetation is then planted in the growth medium 28 via the apertures 34 in the outer panels 24 and small slots in the geotextile fabric layer 36. The vegetation is then propagated to grow out through the apertures 34.

As shown in Figures 4 and 5, one or more fascia panels 38 may be secured over the outer panels 24. The outer panels 24 may be printed with vegetation images to make the initial growth look fuller and to add a camouflaged background to the planting. The geotextile fabric layer 36 may be printed with a similar pattern to those same ends. The fascia panels 38 cover up at least a portion of the outer panels 24 and the apertures 34 and can be decorated with print such as company logos, etc. The fascia panels 38 can also be used to define a particular shape of the vegetation covered area, so that the vegetation covered area can itself describe a company logo or other shape. This gives architects and designers the opportunity to integrate green walls into themed interior and exterior surface designs.

The growing medium 26 can also be contained either in geo-textile fabric bags or in matted coir fibre bags, depending on the type of plant choices. The growing medium 26 is typically a combination of different size coir chips, Perlite™ and other organic or in-organic inert components. Again the combination of growing media will depend on the plant choices and the site location.

As the outer panels 24 provide a flat smooth surface, the vegetation support system 10 can be installed as an aesthetic feature before the vegetation has become established. Custom patterns can be applied to the outer panels 24 to provide a customised aesthetic appearance (such as company logos) to the structure until the vegetation is established. The apertures 34 in the outer panels 24 can also be customised in terms of shape, size and arrangement both to provide an aesthetic decoration before the vegetation is established and to dictate the areas where the vegetation will grow in order to reflect a particular shape pattern or word in the shape of the vegetation itself once established.

For walls that have tapering sections, the rails can be cut to appropriate heights and custom containers can be moulded to follow the tapering of the wall.

Figure 6 depicts an alternative design of an inner module 50 and a front panel 52, which together form a growth medium container 54 defining two cavities 56. The inner module 50 is formed with a vertically extending rear channel 58 that projects between the cavities 56 to give the inner module 50 a substantially W-shaped horizontal cross-section. The rear channel 58 is adapted to receive and be mounted to a beam 60 so that the inner module 50

is adapted to be mounted centrally on a single beam 60, rather than between a pair of parallel beams.

This allows the vegetation support system 10 to be mounted on a curved wall 62. The beams 60 are mounted to project radially from the curved wall 62 and are spaced so that the front panels 52 of the growth medium containers 54 abut one another, providing a smooth continuation of front panel 52 surfaces.

Figure 7 shows one embodiment of an irrigation system 70 having a network of pipes 72 with valves 74 and a pump 75 and adapted to deliver irrigation fluid, such as water, from a fluid reservoir 76 to the uppermost growth medium container 78 of each vertical series. Drainage ports 80 in the inner module of each growth medium container allow excess irrigation fluid to drain through into the next growth medium container in the vertical series. The lowermost growth medium container 82 has a single drainage port 80 connected to the network of pipes 72 that delivers residual fluid back to the fluid reservoir 76.

Figure 8 shows an alternative embodiment of the irrigation system 90 in which the network of pipes 92 extends between consecutive growth medium containers 94 in a vertical series to deliver additional irrigation fluid directly to each growth medium container 94 in addition to the excess irrigation fluid draining from growth medium containers 94 above.

Figure 9 shows a further alternative embodiment of the irrigation system 100, wherein sealed growth medium containers 102 are mounted as the lowermost container of each vertical series of growth medium containers 104. The sealed growth medium containers 102 are connected by pipes 106 to define a fluid reservoir 108. A pump 110 is located in the fluid reservoir 108 and is adapted to pump fluid from the fluid reservoir 108 through a network of pipes 112 to deliver the fluid to the uppermost container of each vertical series of growth medium containers 104. Drainage ports 114 allow excess fluid to drain from an upper container to a lower container and ultimately into the fluid reservoir 108. This allows the fluid reservoir 108 to be concealed within the vegetation support system 10, which obviates the need to accommodate and conceal a separate fluid reservoir.

In an alternative embodiment of the vegetation support system 120, depicted in Figures 10 to 15, a support frame 121 of upright beams 122 is provided with each beam having a

plurality of pairs of transversely projecting ribs 124. Each pair of ribs 124 is spaced at intervals along the longitudinal length of the beam 122. The ribs 124 project substantially horizontally when the beam 122 extends vertically. Each inner module 126 is formed with corresponding recesses 128 in each side that are adapted to receive and engage the ribs 124 in order to mount the inner module 126 to the beam 122.

The beams 122 are also formed with a plurality of transverse holes 130 and the inner modules 126 are formed with corresponding lateral openings 132. The transverse holes 130 and the lateral openings 132 are aligned when two laterally adjacent inner modules 126 are mounted to a common beam 122, so that the cavities of adjacent inner modules 126 are connected through the common beam 122 via their respective lateral openings 132 and the respective transverse hole 130.

As shown in Figure 15, the aligned transverse holes 130 and lateral openings 132 allow the connection of growth medium 134 of two laterally adjacent growth medium containers 136, which in turn allows the growth of vegetation root systems across growth medium containers 136. This assists in achieving more symmetrical root systems, which results in more symmetrical vegetation growth, which in turn assists in achieving more even vegetation coverage across the beams 122.

As shown in Figures 14 and 15, the beams 122 are hollow, allowing growth medium 134 to fill the hollow beams 122 and vegetation root systems to grow into the beams 122, both horizontally across the beams 122 and vertically within the beams 122. This further assists in achieving more symmetrical and well established root systems, which produces more even and healthy vegetation coverage across the surface of the outer panels 125.

Depicted in Figure 16 is an alternative embodiment of a vegetation support system 200. The system 200 comprises a support frame 202 having a base section 204, a top section 206 and a pair of longitudinal upright beams 208 joining the base section 204 and top section 206 to form a substantially rectangular support frame 202, with a substantially rectangular opening 210. The upright beams 208 of the support frame 202 are provided with a plurality of transverse ribs 212, projecting into the opening 210.

The vegetation support system 200 further comprises a substantially rectangular growth medium container 214, having an internal cavity 211 adapted to receive and contain a growth medium in the cavity 211. The growth medium container 214 has an outer panel 216 having a plurality of apertures 218 allowing vegetation to be planted through the apertures 218 into the growth medium received in the cavity and allowing the vegetation to grow out through the apertures 218. The growth medium container 214 further comprises a plurality of recesses 220 corresponding to the transverse ribs 212 provided on the upright beams 208 of the support frame 202. The recesses 220 are adapted to receive and engage the ribs 212 in order to mount the growth medium container 214 in the opening 210.

The vegetation support system 200 may include a single growth medium container 214 or a plurality of growth medium containers 214 arranged in a vertical series similar to the embodiment depicted in Figure 10.

Typically, the growth medium container 214 is formed in the same way as described in relation to the earlier embodiments, with an inner module and an outer panel mounted together on the upright beams 208 of the support frame 202, similar to the embodiments shown in Figures 3 or 10. The growth medium container 214 may be designed so that the outer panel removably slides into the inner module of the growth medium container 214.

Alternatively, the growth medium container 214 can be integrally formed as one unit.

The support frame 202 is adapted to be mounted to a wall so that it extends vertically up the wall and so that the upright beams 208 extend up the wall, each upright beam 208 having a beam depth 215 defining the distance that the upright beam 208 projects outwardly from the wall to the outer end 217 of the upright beam 208. When the growth medium container 214 is mounted to the support frame 202, the cavity 211 is arranged inwardly of the outer ends 217 of the upright beams 208, within the beam depth 215. The outer panel 216 of the growth medium container 214 either covers or is flush with the support frame 202, so that the vegetation support system 200 provides a flat, smooth, uninterrupted outer surface, which can be decorated to provide an aesthetic appearance even before vegetation has been established on the growth medium container 214. The outer panels of the growth medium containers 214 can also be provided in different colours or artistic designs to further enhance their aesthetic appearance.

The vegetation support system 200 further comprises a top tank 222 and a bottom tank 224. In the embodiment, depicted in Figure 16, the top tank 222 is removably mounted in the opening 210 above the growth medium container 214 and the bottom tank 224 is integrally formed with the base section 204 of the support frame 202. The top tank 222 is provided with a pair of recesses 226 that receive a corresponding pair of the transverse ribs 212 on the longitudinal beams 208 to mount the top tank 222 in the opening 210. In alternative embodiments, the top tank 222 may be integrally formed with the top section 206 or the bottom tank 224 may be removably mounted in the opening 210.

As shown in Figures 17 and 18, the top tank 222 is provided with weep holes 234 or drip pores to control the feed of fluid from the top tank 222 into the growth medium container 214. The growth medium container 214 is provided with drainage ports to allow residual fluid to drain into the bottom tank 224. Figure 17 depicts the vegetation support system 200 further comprising a pump 228 and piping 230 adapted to pump fluid from the bottom tank 224 to the top tank 222 to recycle the residual fluid collected in the bottom tank 224. Figure 18 depicts an alternative embodiment of the vegetation support system 200 having a tap 232 for draining the bottom tank 224 and manually replenishing the top tank 222.

If fluid is added to the growth medium container 214 at a rate greater than the inherent percolation rate of the growth medium, a temporary perched water table is created at the top of the growth medium container 214. This causes a hydraulic pressure which escapes through the apertures 218, dripping down the outer panel 216 and by surface tension, down the stems of the vegetation to the tips of the leaves before dripping onto the floor.

The embodiment of the vegetation support system 200, depicted in Figures 16 to 18, controls the rate at which the fluid is released to the growth medium container 214 by the size and number of weep holes 234 in the bottom of the top tank 222. This allows the feed of fluid to the growth medium container 214 to be controlled in order to mitigate leaking and dripping from the vegetation and outer panel 216. Additionally, the distribution of the weep holes 234 ensures the even delivery of fluid over the growth medium surface. This concept of controlled delivery of fluid to the growth medium container 214 via a top tank 222 with weep holes 234 can equally be applied to any of the forgoing embodiments described.

The support frame 202 is typically a single piece moulded unit, which allows easier installation for a domestic user as they do not need to worry about getting the correct spacing between the beams of the support frame.

- 5 Nourishment for the vegetation in the vegetation support system 200 is typically provided using slow release fertilisers mixed into the growth medium. Alternatively, nutrients diluted in water can be used to feed the vegetation.

- 10 Air holes are provided in the lower and side surfaces of the growth medium containers 104, 214 to allow air to penetrate into the growth medium containers 104, 214.

Although the invention has been described with reference to specific examples, it will be appreciated by those skilled in the art that the invention may be embodied in many other forms.

The claims defining the invention are as follows:

1. A vegetation support system comprising:

a support frame adapted to be mounted against a wall, the support frame including at least one upright beam having an inner end adjacent to the wall and an outer end projecting away from the wall;

at least one growth medium container having a cavity adapted to receive and contain a growth medium and an outer panel, wherein the growth medium container is mounted to the upright beam such that the cavity is arranged inwardly of the outer end of the upright beam and the outer panel is adjacent to the outer end of the upright beam;

apertures formed in the outer panel of the growth medium container allowing vegetation to be planted through the apertures into the growth medium and allowing the vegetation to grow out through the apertures.

2. The vegetation support system of claim 1, wherein the growth medium container is provided with a plurality of recesses and the upright beams are provided with a plurality of corresponding ribs, wherein the ribs of the upright beams are received in the recesses of the growth medium container to mount the growth medium container to the support frame.

3. The vegetation support system of claim 1 or 2 wherein the support frame is substantially rectangular and comprises a base section, a pair of the upright beams and a top section, defining a substantially rectangular opening adapted to receive and mount the growth medium container.

4. The vegetation support system of any one of the preceding claims further comprising a top tank integrally formed with or adapted to be mounted to the support frame above the growth medium container, the top tank adapted to feed fluid into the growth medium container.

5. The vegetation support system of claim 4 further comprising a bottom tank integrally formed with or adapted to be mounted to the support frame below the growth medium container, the bottom tank adapted to collect residual fluid from the growth medium container.

6. The vegetation support system of claim 5 further comprising a pump adapted to pump fluid from the bottom tank to the top tank.

7. The vegetation support system of any one of the preceding claims further comprising a fabric layer lining an inner surface of the outer panel of the growth medium container, covering the apertures in the outer panel of the growth medium container.

8. The vegetation support system of any one of the preceding claims further comprising at least one fascia panel adapted to be mounted over the outer panel of the growth medium container, to obscure at least a portion of the outer panel.

9. The vegetation support system of any one of the preceding claims, comprising at least two growth medium containers and a series of at least three upright beams, wherein the growth medium containers are adapted to be mounted between adjacent pairs of the series of upright beams.

10. The vegetation support system of claim 9, wherein two or more of the growth medium containers are adapted to be mounted between each said adjacent pair of the upright beams to create a vertical series of growth medium containers.

11. The vegetation support system of any one of the preceding claims wherein the growth medium container is provided with at least one drainage port adapted to drain fluid from the growth medium container.

12. The vegetation support system of claim 11 further comprising an irrigation system adapted to provide fluid to the growth medium container and to collect fluid draining from the drainage port.

13. The vegetation support system of claim 10 further comprising an irrigation system having:

a network of pipes adapted to deliver fluid to an uppermost growth medium container in each vertical series;

drainage ports provided in each growth medium container adapted to drain fluid from

each growth medium container, with upper growth medium containers draining into lower growth medium containers in each vertical series;

a fluid collection tank adapted to collect fluid draining from the drainage port of a lowermost growth medium container in each vertical series; and

5 a pump adapted to pump fluid from the fluid collection tank through the network of pipes.

14. The vegetation support system of claim 13 wherein the fluid collection tank comprises a plurality of sub-tanks, wherein each sub-tank is arranged beneath the lowermost growth medium container of each vertical series.

10 15. The vegetation support system of any one of the preceding claims wherein the growth medium container is assembled from an inner module and the outer panel.

16. The vegetation support system of claim 15, wherein the inner module has at least one mounting portion adapted to be secured between the outer end of the upright beam and the outer panel.

15 17. The vegetation support system of claim 16, comprising at least two of said upright beams, the inner module comprising two of said mounting portions, the two mounting portions being disposed along opposite sides of the inner module, wherein the growth medium container is adapted to be mounted between the two upright beams by fastening the two mounting portions to the outer ends of the two upright beams.

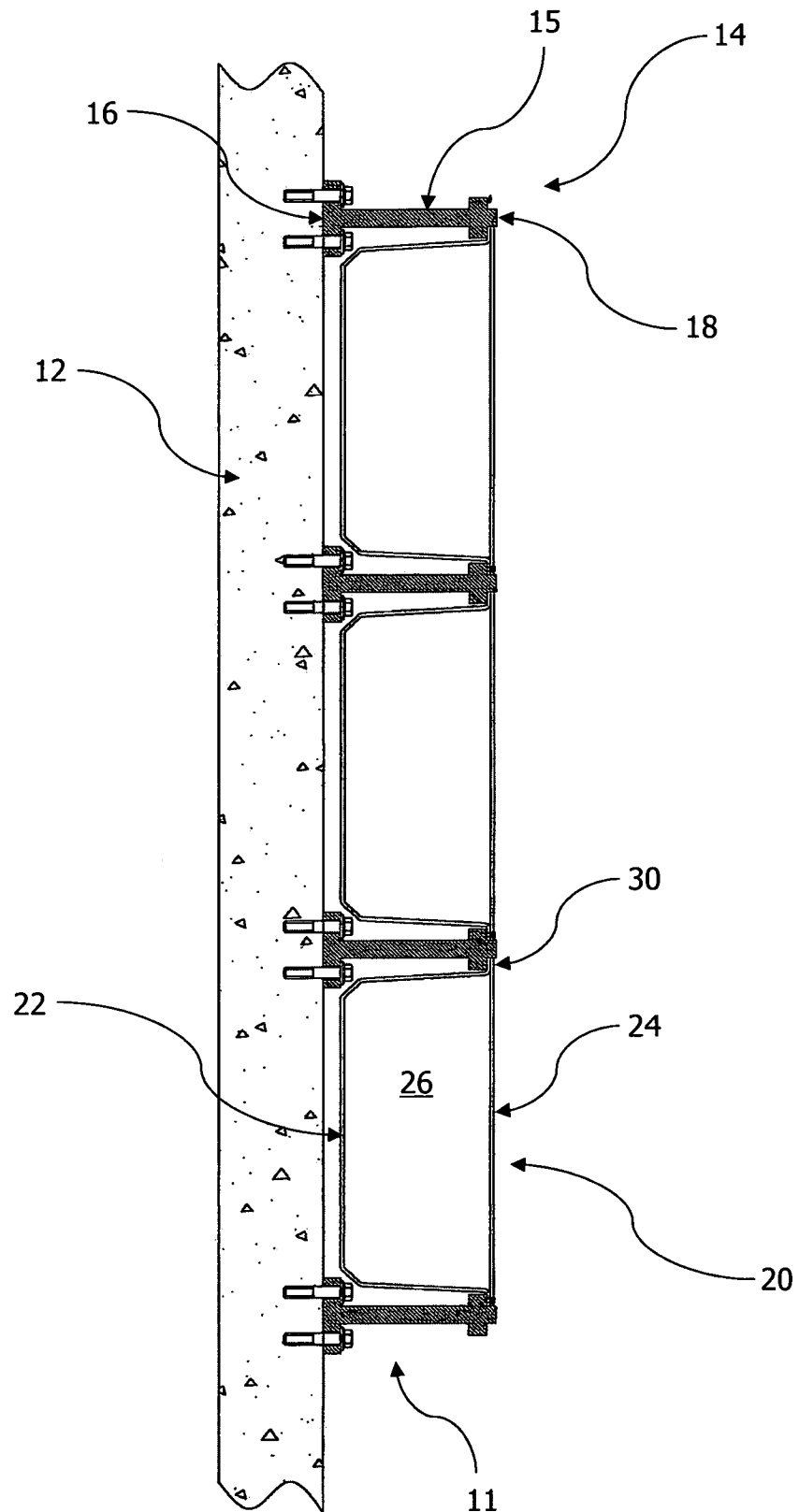
20 18. The vegetation support system of claim 16, wherein the mounting portion of the growth medium container is a central mounting portion defining two cavities arranged on opposite sides of the central mounting portion.

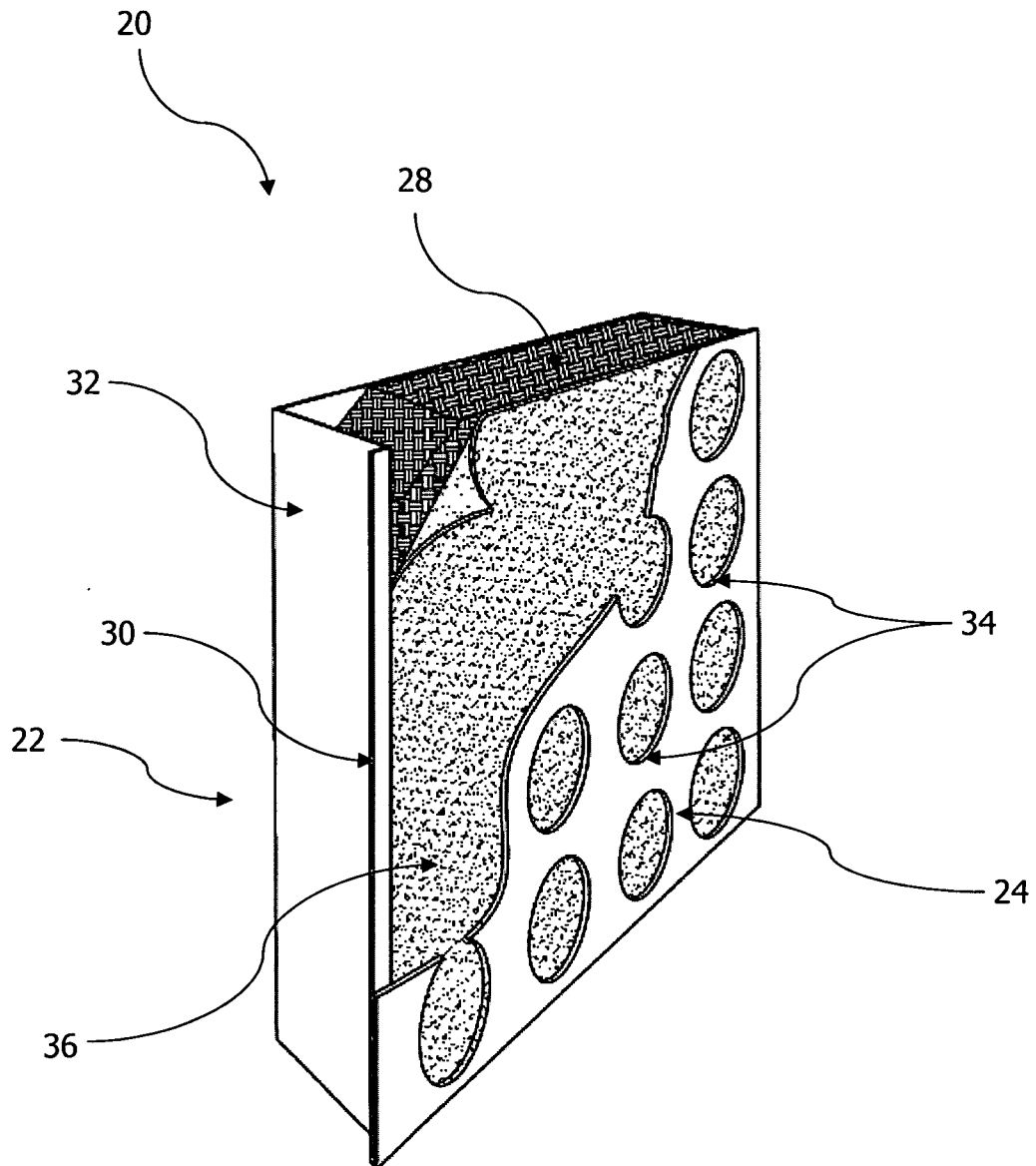
25 19. The vegetation support system of any one of the preceding claims, comprising multiple upright beams and multiple growth medium containers, wherein each upright beam has at least one transverse hole and each growth medium container has at least one lateral opening, wherein the transverse hole and the lateral opening are aligned when each growth medium container is mounted to the upright beams, allowing growth medium from one

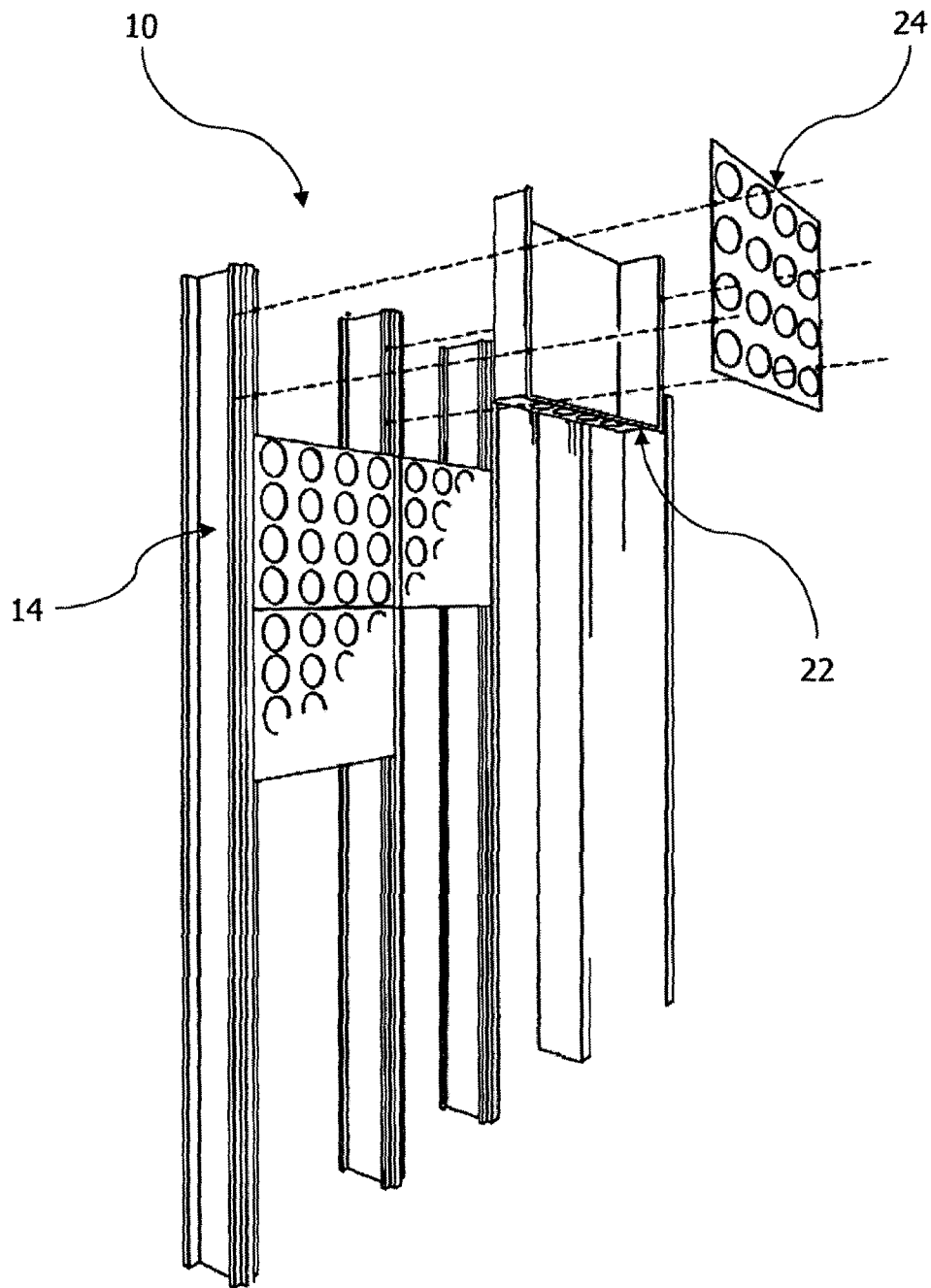
growth medium container to connect with growth medium in an adjacent container through the lateral openings of each growth medium container and the transverse hole of each upright beam.

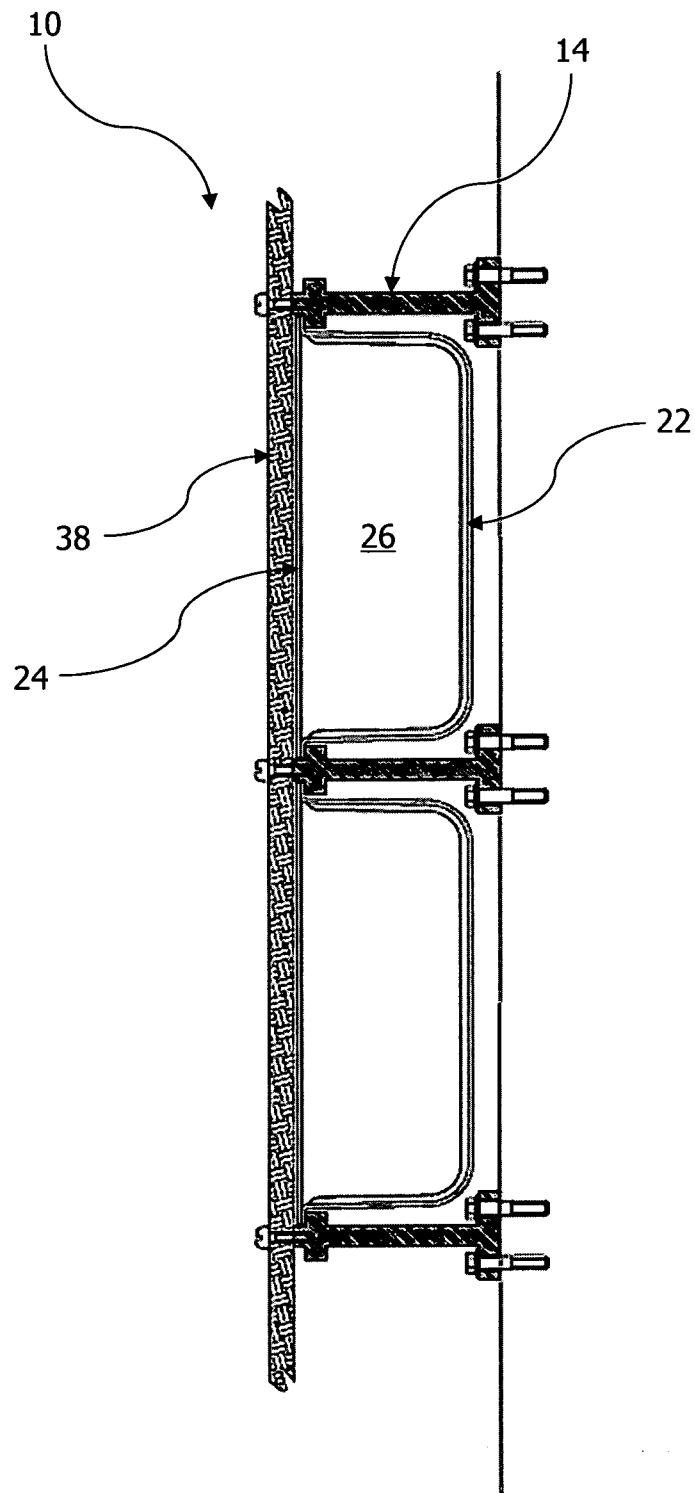
20. The vegetation support system of claim 19, wherein the upright beams are
5 hollow and adapted to be filled with growth medium.

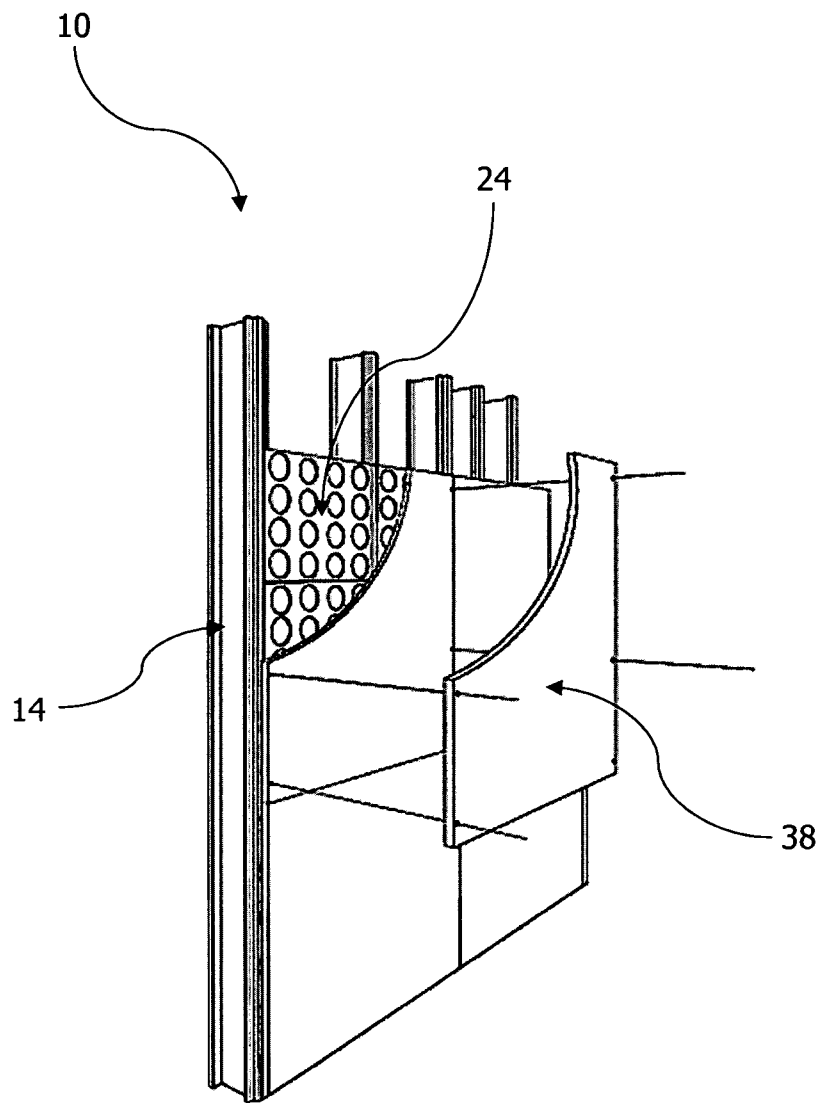
21. The vegetation support system of any one of the preceding claims, comprising multiple upright beams and multiple growth medium containers, wherein the outer panels of the growth medium containers either cover, or abut and are flush with, the outer ends of the upright beams, providing a flat, smooth, uninterrupted outer surface.

**Figure 1**

**Figure 2**

**Figure 3**

**Figure 4**

**Figure 5**

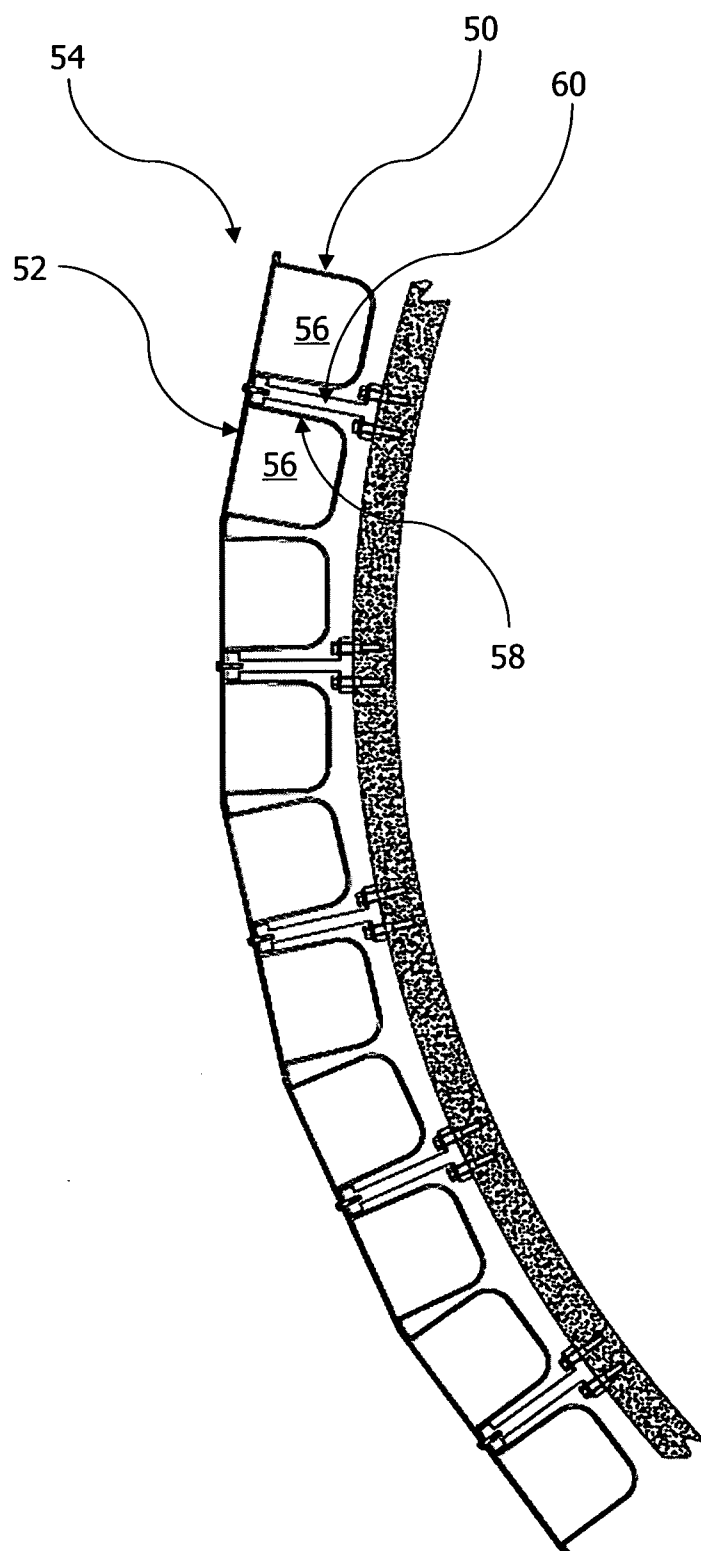
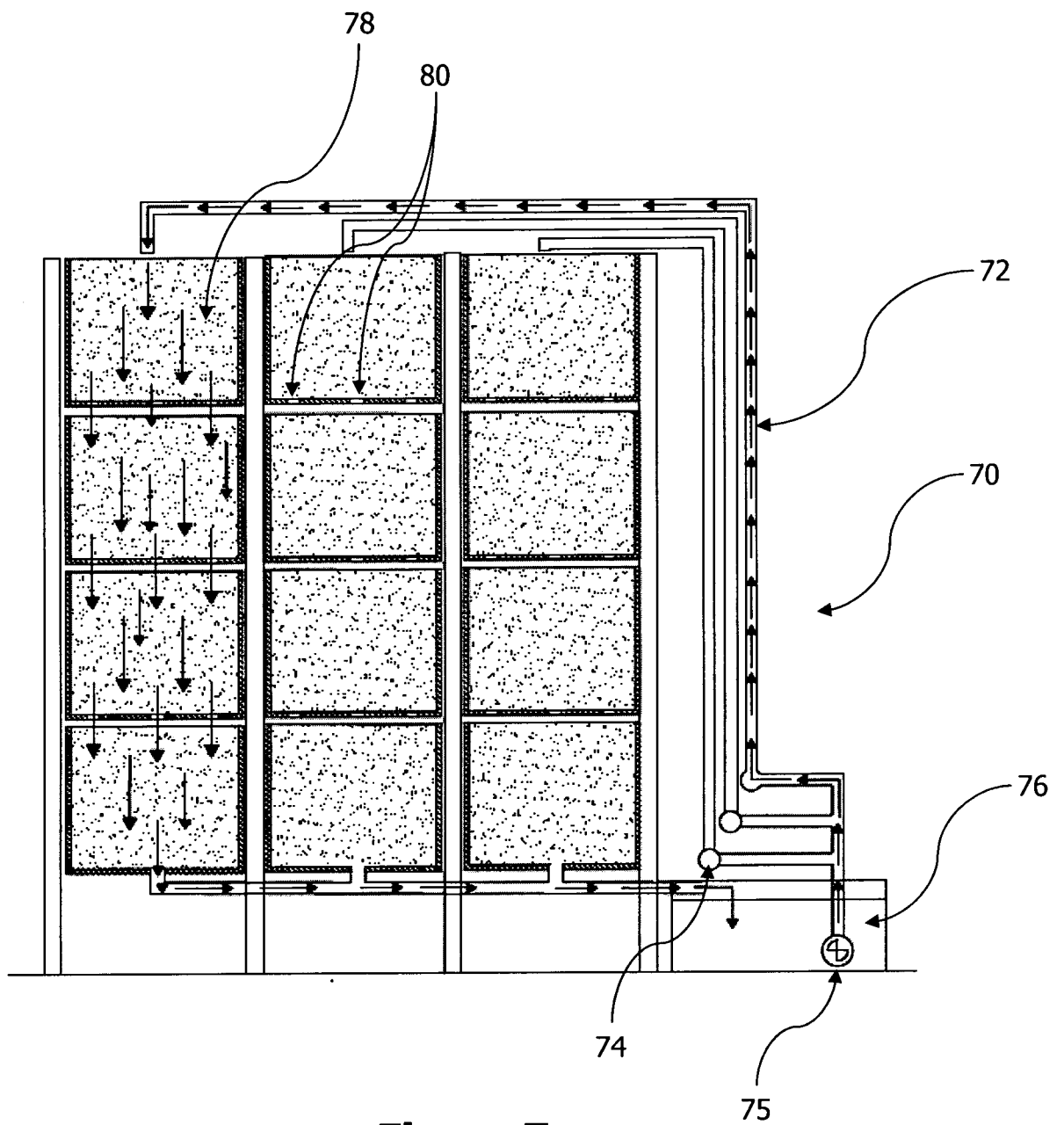
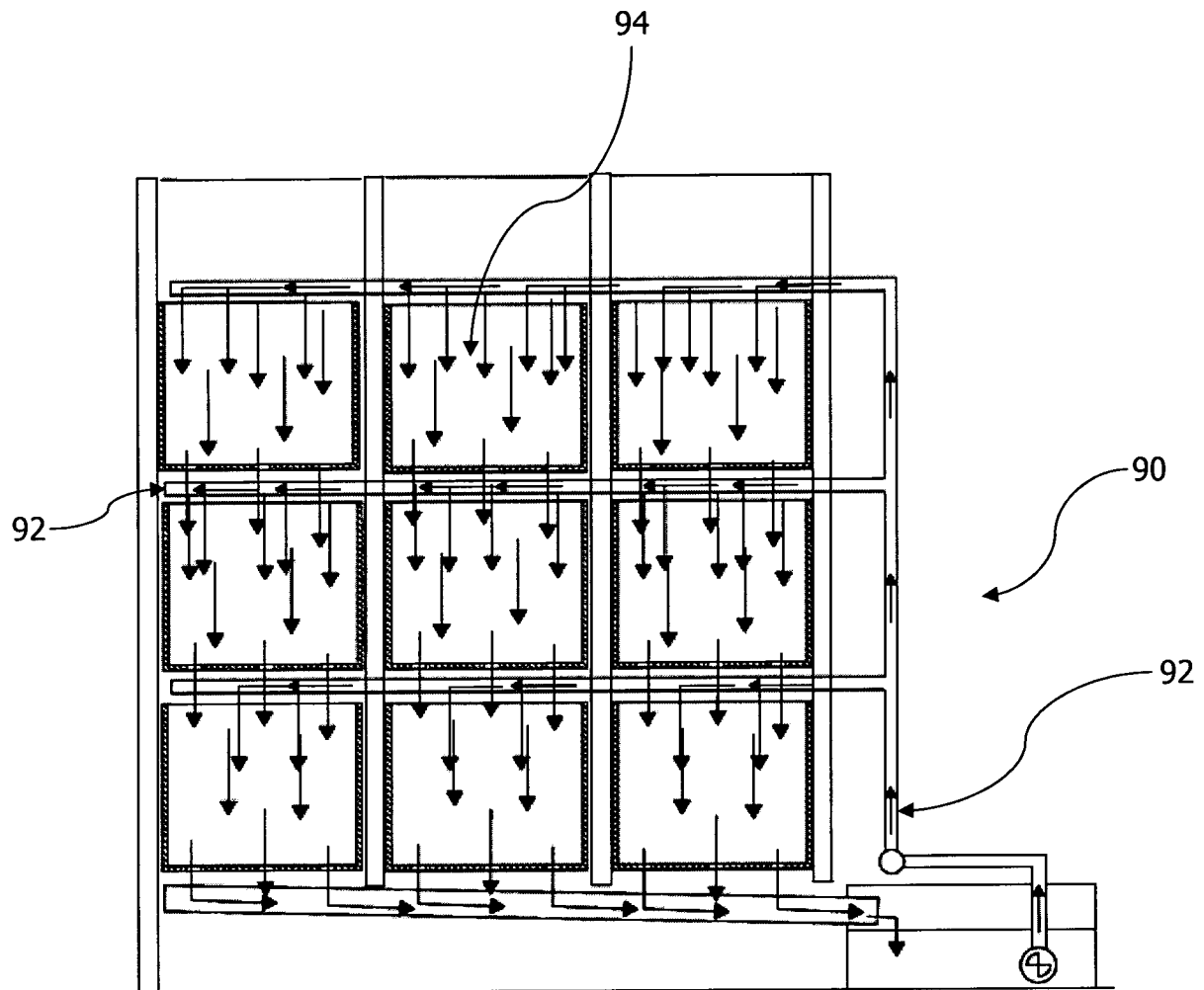
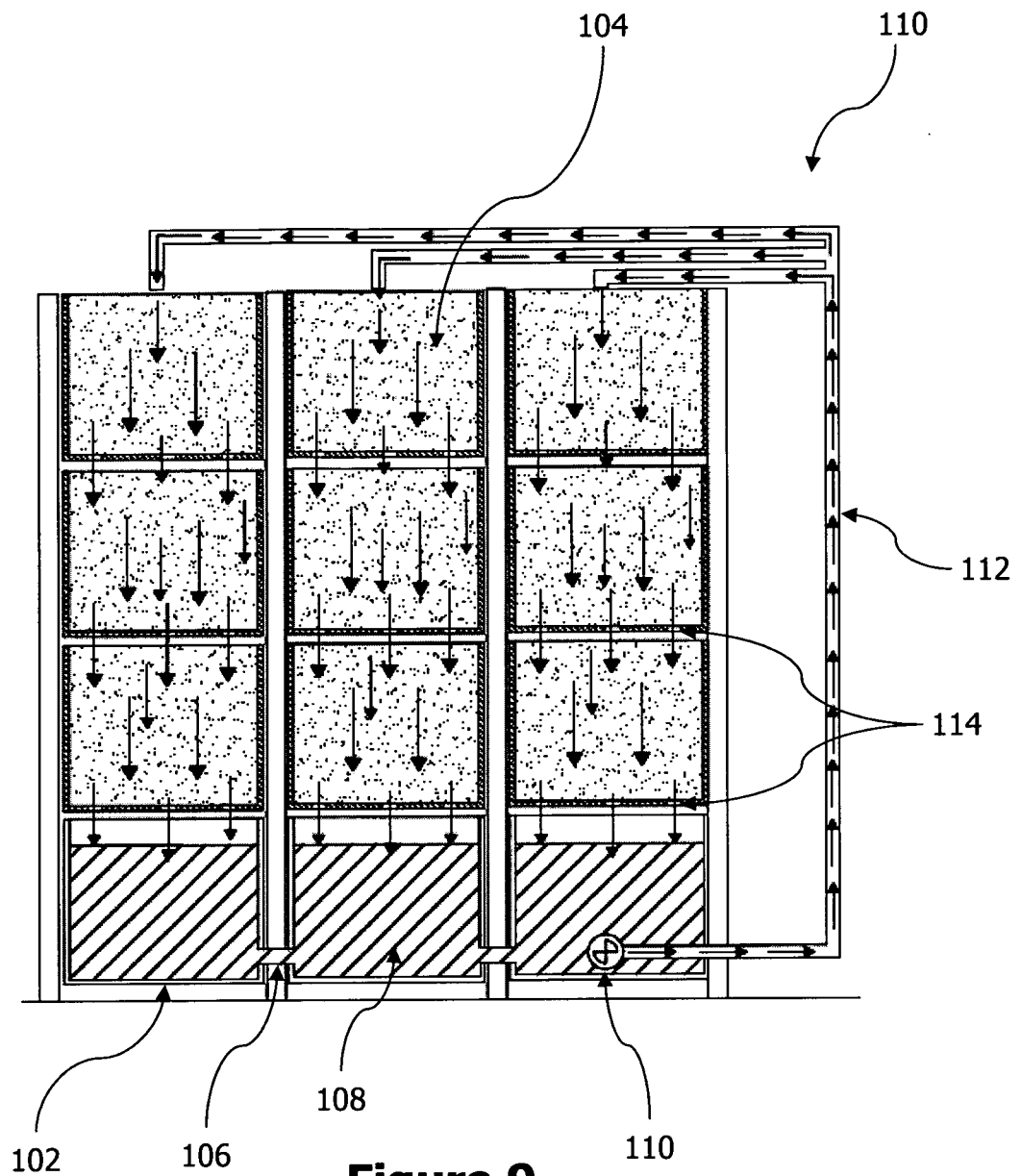
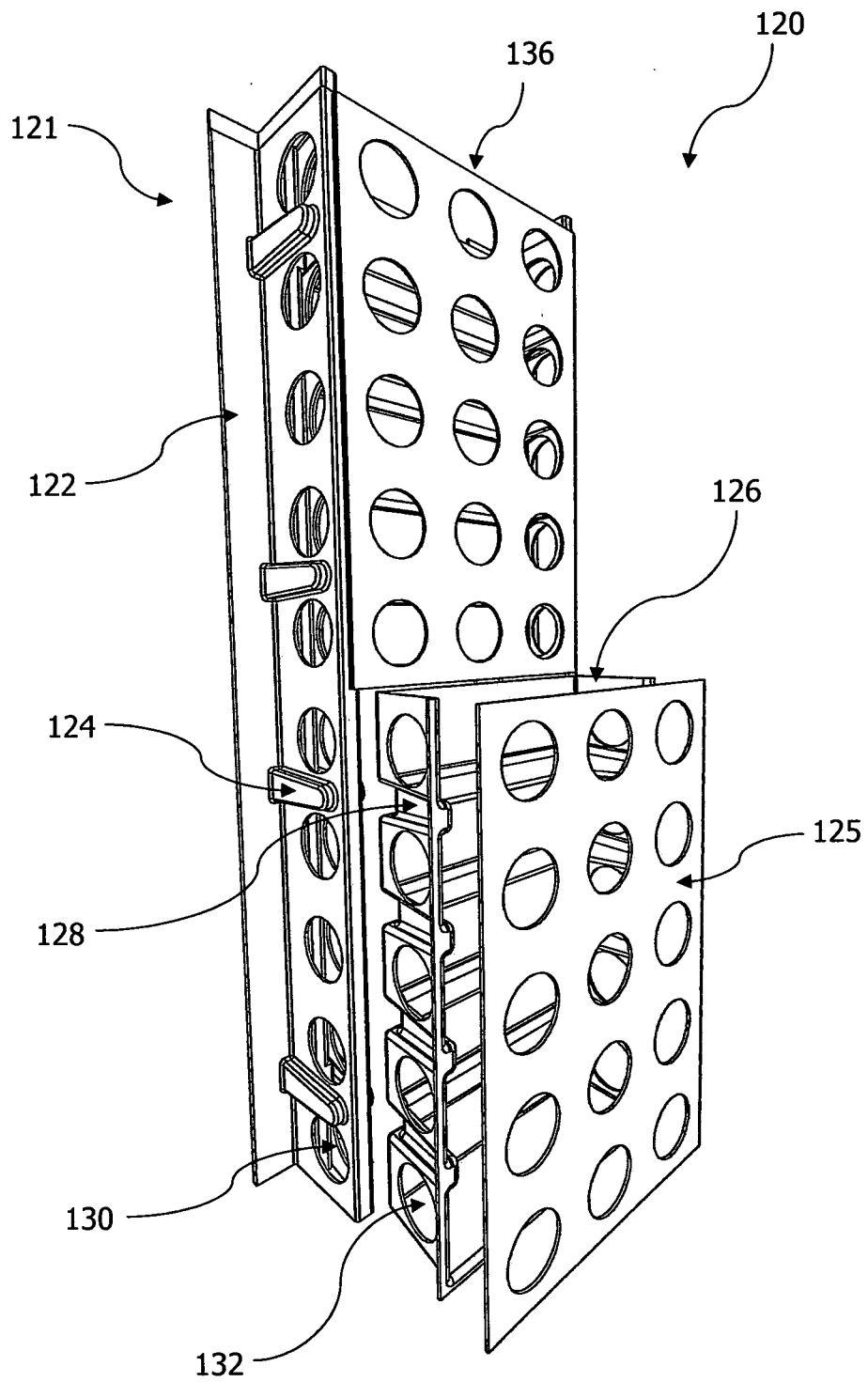


Figure 6

**Figure 7**

**Figure 8**

**Figure 9**

**Figure 10**

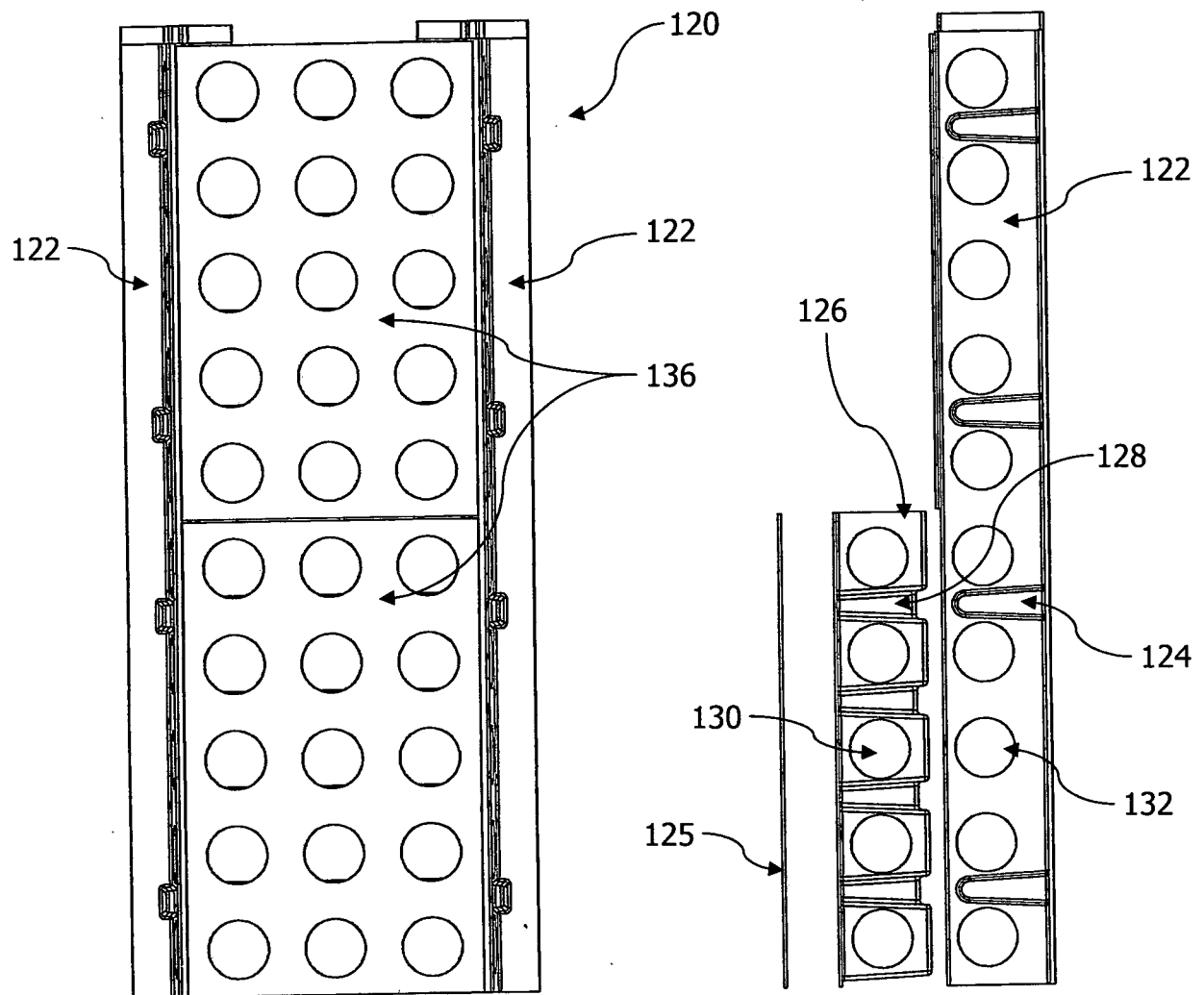


Figure 11

Figure 12

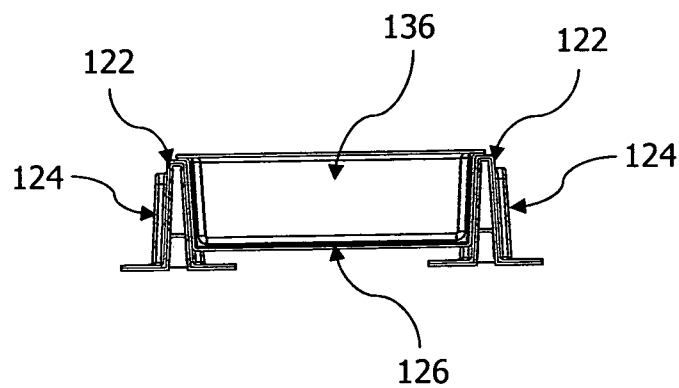
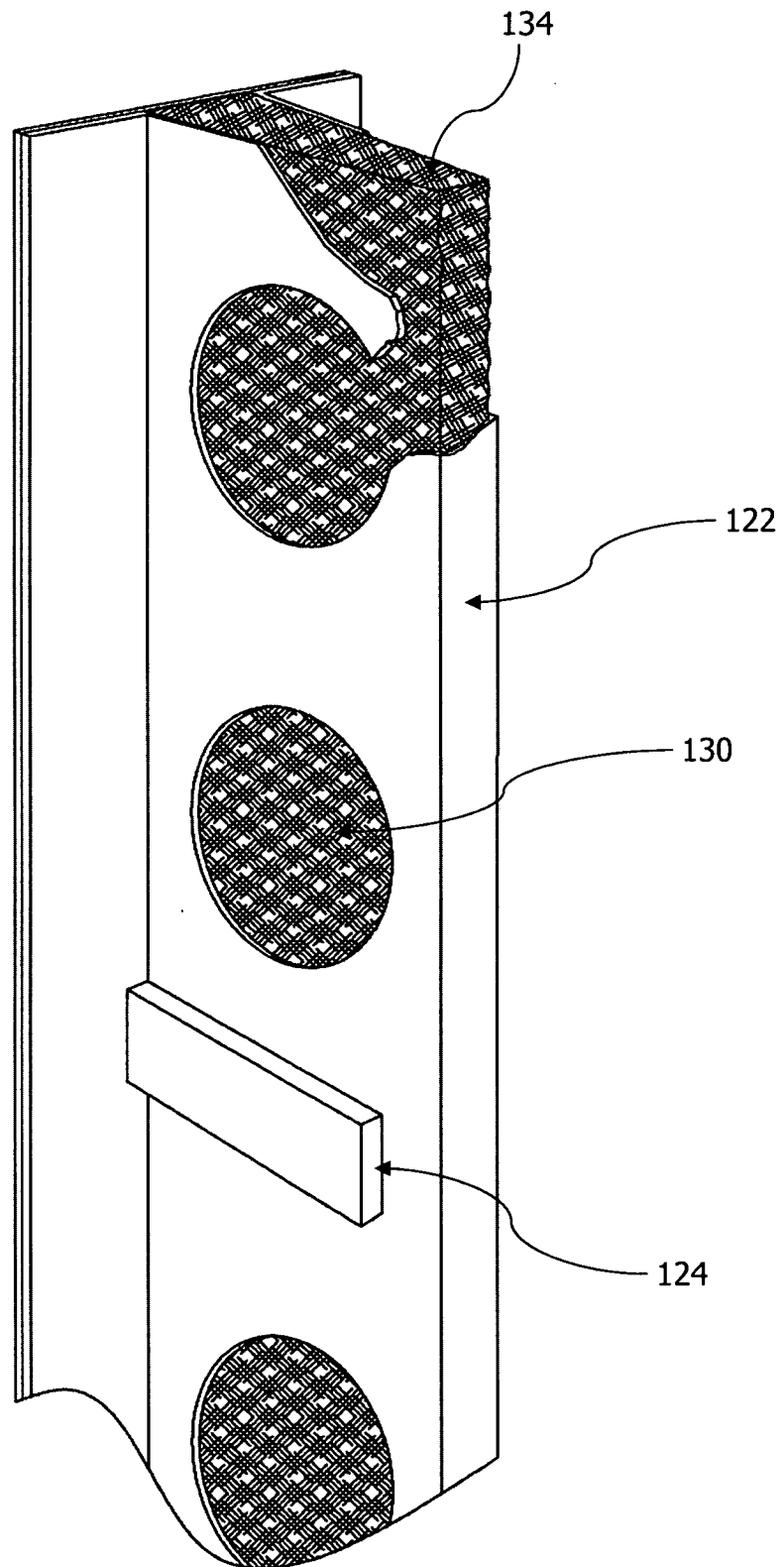
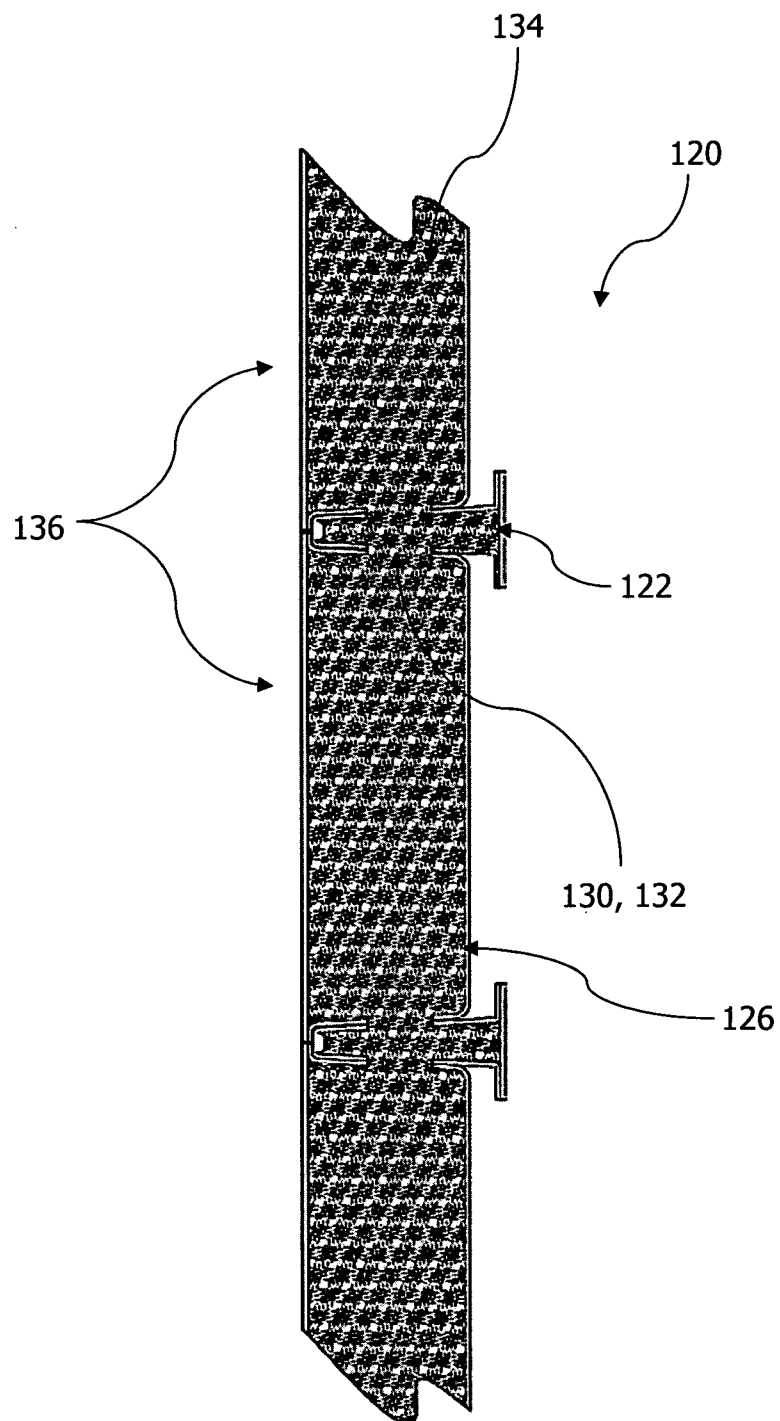


Figure 13

**Figure 14**

**Figure 15**

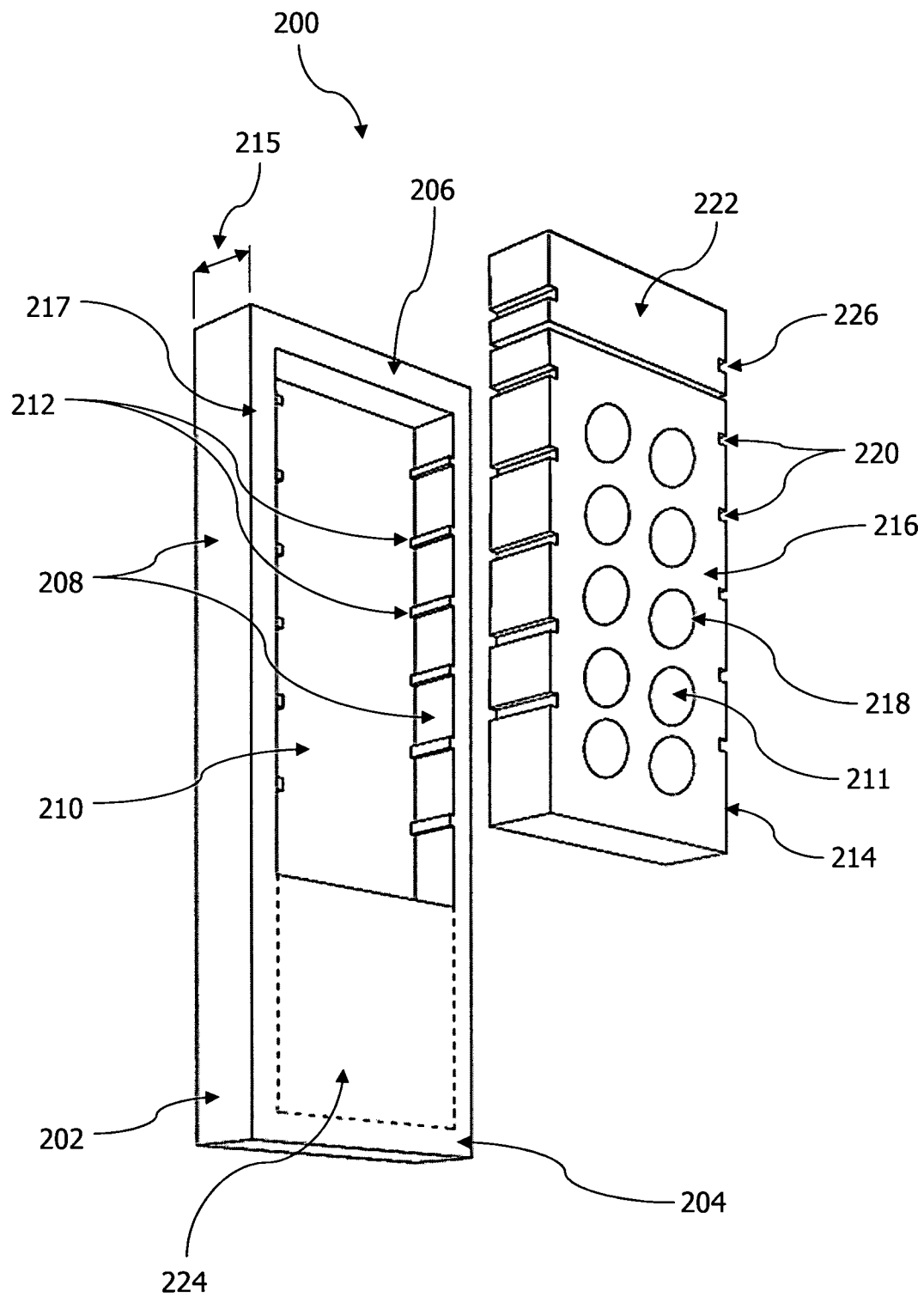
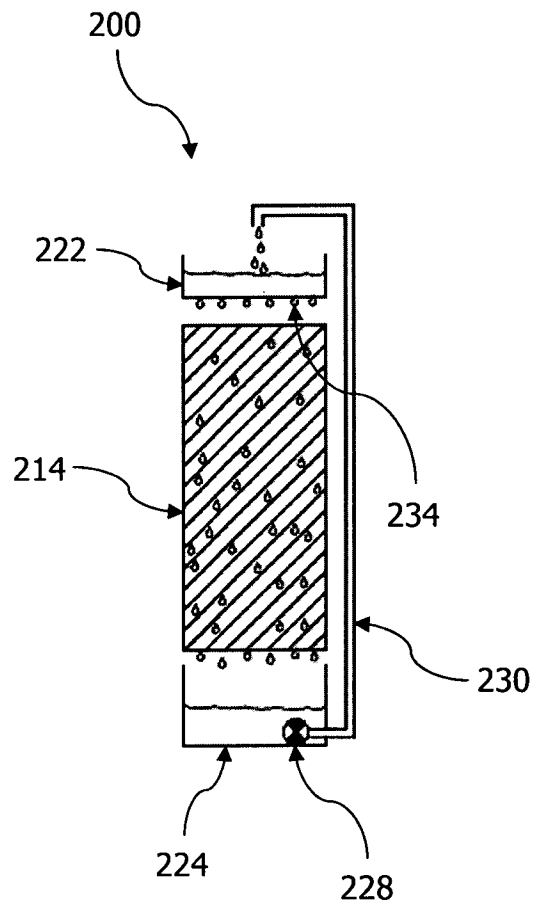
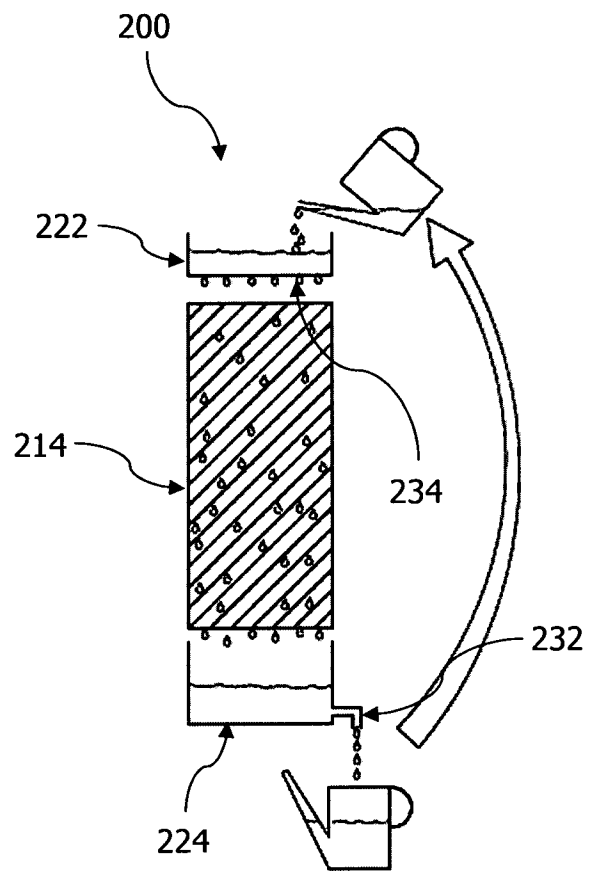


Figure 16

**Figure 17****Figure 18**

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU2010/000730

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.

A01G 9/02 (2006.01)

A01G 9/12 (2006.01)

A01G 17/06 (2006.01)

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)

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)

EPODOC, WPI: IPC MARKS A01G9/-, A01G17/- + Keywords (Vegetable, Vegetation, Plant, Flower, Crop, Grass, Trellis, Lattice, Frame, Aperture, Hole, Opening, Cavity and like terms)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 100860638 B1 (SONG WOONG HO) 26 September 2008 Figures 2, 4 and 5; Abstract (see the English translation obtained from KIPO)	1-21
A	GB 2239155 A (CADDY) 26 June 1991 Figure 1, Claims	1-21
P, X	GB 2458904 A (WOLFENDEN) 7 October 2009 Figures 6, 7; page 16, Paragraph 3	1-21

☐ Further documents are listed in the continuation of Box C

☒ 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	"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
"E" earlier application or patent but published on or after the international filing date	"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
"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)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 20 September 2010	Date of mailing of the international search report 29 SEP 2010
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. +61 2 6283 7999	Authorized officer GOBINDA NATH AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No : +61 2 6283 2126

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU2010/000730

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member
KR	100860638	NONE
GB	2239155	NONE
GB	2458904	WO 2009122210
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.		
END OF ANNEX		