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(71) Applicant *(for all designated States except US)*: **HOLDING P.M.M. HOFF B.V.** [NL/NL]; Franseweg 9, NL-4651 PV Steenbergen (NL).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **HOFF, Petrus Mattheus Maria** [NL/NL]; c/o Holding P.M.M. Hoff B.V., Franseweg 9, NL-4651 PV Steenbergen (NL).

(74) Agent: **JANSEN, C.M.**; Johan de Wittlaan 7, NL-2517 JR Den Haag (NL).

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(54) Title: A PLANT TRAY FOR PROPAGATING PLANTS, A TRAY, A CUP, AND METHODS

(57) Abstract: The invention relates to a plant tray for propagating plants. The tray comprises a cup for retaining a plant growing medium and a seed, a cutting and/or a plant at least partly embedded in the plant growing medium. The cup has a bottom structure that is penetrable for a plant root growing in a downward direction. Further, the tray comprises a spacer extending downwardly, beyond the bottom structure of the cup. Further, there is provided a tray having adjustable cups.

Title: A plant tray for propagating plants, a tray, a cup, and methods

An aspect of the invention relates to a plant tray for propagating plants, comprising a cup for retaining a plant growing medium and a seed , a cutting and/or a plant at least partly embedded in the plant growing medium, the cup having a bottom structure.

In the field of horticulture/agriculture, plant trays are widely used for growing seeds and plants. The plants are placed in plant trays made of cups with open bottoms or closed bottoms, or in the ground.

Trays with open bottoms are used in two ways: they are placed on a surface – being a growing table – resulting in the root tips not being able to grow further and make an angle while being on the end – or on the soil – resulting in root tips growing in the soil which will break once the trays are lifted. Or cups with an open bottom are 'hanged' in such a way so that the root tips growth is stopped by the air ("airpruning") once they come out of the tray below. However, then while being transported in a box, on a car or while planting being placed on the ground the root tips break. This means that the roots have open wounds where funguses find an easy entrance to enter and infect the roots with diseases. Once broken or infected it means that the root has lost its capacity to quickly enter the soil in order to search for water and minerals. Trays with closed bottoms are also used resulting in the root tips not being able to grow further and make an angle while being on the bottom. Both technologies also force to take the plant with its roots out of the cup in order to plant it in the soil, resulting in damaging the root tips. A problem caused by the use of non-biodegradable trays is that the plant with the roots have to be taken out the cup once being planted. However, if the soil-medium has not been grown well through by the roots, the soil falls apart while planting, this way causing the breaking of the roots. In order to prevent the soil falling apart, growers put their plants for a longer growing period in the cup so that the

primary and secondary roots grow well through the soil medium. This results in horizontal and upward growing primary roots – who are only allowed to grow vertically down – and round growing secondary roots, who are only allowed to grow horizontal. It also results in a too long growing period in the cup which results in infection with root diseases.

During the production of the young plant, in cups with a closed bottom or with an open bottom but being placed on a growing table, primary roots grow downwardly towards the bottom of the cup, there they cannot grow further so they turn around – growing horizontal – then they touch the sides of the pot - and start to grow upwardly. In the meantime, secondary roots growing normally in a sideward direction consume the larger part of available growing energy until the cup is entirely traversed by a plant root structure. This way they start to grow downwards, horizontal, rounded and up again, against their own nature. When a plant is placed in the ground, normally the primary roots grow downwardly to contact ground water, however, once the first primary root is being forced through the cup model in a horizontal or even upward growing direction, it does not grow downwards again. The secondary roots who should have grown in a sideward direction, but as a cause of the present model of the cups have grown in each direction also lost their natural way of growing horizontal.

It is essential for the plant to reach the capillary hang water level and/ or the ground water level. Otherwise, irrigation is needed to survive, especially in dry or rocky subsoil.

In a first aspect of the invention it is an object of the invention to provide a plant tray providing improved surviving conditions for a plant after having grown in the tray. Thereto, it is an object of the invention to provide a plant irrigating system having a reduced cost price. Thereto, according to the invention, the bottom structure of the cup is penetrable for a plant root growing in a downward direction, while the tray comprises a spacer extending downwardly, beyond the bottom structure of the cup.

The invention is partly based on the insight that primary roots grow very fast to the bottom part of the tray. As present trays are made of plastic the primary root that is downwardly growing, arriving at the bottom, is not able to penetrate it, and starts to grow in a horizontal direction and mostly even upwardly. Once the root grows horizontally and/or upwardly it is not able anymore to grow downwardly and its function, growing down in the soil searching for water, gets lost. In the occasion that trays have an open bottom structure and the primary root grows downward and remains on the bottom, this root gets easily broken during transport. By providing a bottom structure that is penetrable for a plant root growing downwardly, it is counteracted that the primary root turns and grows upwardly in the cup. Further, by providing a spacer that extends downwardly, beyond the bottom structure of the cup, an air barrier can be formed below the bottom structure, reducing and/or even temporarily stopping the growth of the primary root ("airpruning'). Then, other root components, such as the secondary roots may grow during the plant's stay in the cup. By providing the spacer extending beyond the bottom structure of the cup, the tip of the primary root protruding through the cup's bottom is mechanically protected during transport/storage. Since the primary root tip(s) is/are protected on the bottom side, there is a very low chance that the tip(s) will be damaged during the planting process. This way, the roots will stay intact while planting so that they can immediately fulfill their growing function. Further, since wounding of the roots will hardly or not occur, also the entrance of funguses or microbes into the root structure is counteracted compared to planting according to the classic methods. As a consequence, plants stay more healthy and need less herbicides/fungicides for recovery and less water for growth. Once, the plant with the cup is placed in the ground, the primary root will continue growing, downwardly, to reach the ground water level. In this way, the primary root growth is optimally controlled and prepared for growth in the ground, thereby improving surviving conditions of the plant in the ground, especially in dry and rocky subsoil.

Preferably, a side wall of the cup is provided with a local structure that is penetrable for a plant root growing in a sideward direction, thereby enabling roots to grow through the cups side wall. This enables the secondary roots to follow their nature and grow through the cups side wall. The local structure might even help the primary root system – if there are more developed primary roots then one for instance in the case with cuttings – to penetrate these structures.

For example, the local structure (e.g. providing root gangways) can be formed by e.g. one or more local side wall partitions that are thinner than surrounding side wall sections, and/or one or more local incisions, or a similar structure, being penetrable for a plant root growing in a sideward direction.

In a highly preferred embodiment, the plant root penetrable structure is located at a radially inwardly protruding part of the side wall. Then, also roottips protruding through the side wall are mechanically protected during transport and/or planting.

Another positive effect of embodiments of the plant root penetrable structure (e.g. root gangways) is that if the roots have not penetrated them, the soil medium doesn't dry out because of evaporation which results in a better internal climate, less water use and less remaining minerals as minerals stay behind while the water evaporates resulting in salination of the soil. Then, while the root tips are penetrating the gangways, they open like a door. The same is valid in case the bottom of the tray that exists of a 'lip closure'. By having constructed it in a way that they close like 'lips' they close the cup mechanically until the primary root tips open it.. Through this way the structures in the a side wall partition and the bottom 'lip closure' give the possibility for the roots to penetrate but in the same time they allow the user to use any kind of soil, even loose sand, as the soil cannot leave through the side wall and the bottom.

Besides, as a consequence, the entrance of funguses into the primary root(s)is not only counteracted, but also entrance into the secondary roots

structure is counteracted, thus further improving surviving conditions of the plant.

The plant root penetrable structure (e.g. a respective partition) also helps preventing the root tips from being dried out too quickly during the planting process. Many times growers take out the plants in dry or hot circumstances and plant them. Not only damage the root tips mechanically, but many times they 'burn' because of a sudden draught while taking them from the protected atmosphere inside the cup to the windy, hot and sunny atmosphere outside the cup. Also, while planting, the first hours the root tips are in a dry soil that has a hygroscopic effect on the root tips. This effect is only solved when irrigation starts, but many times the damage between planting and the start of the irrigation already has taken place.

Advantageously, a side wall of the cup has locally a gas permeable structure, so that base material of the plant tray can be saved, exchange of gasses, such as O_2 and CO_2 between the plant growing medium and the atmosphere is stimulated, and the development of fungus is counteracted.

In a preferred embodiment, the plant tray includes an adjustable cup, particularly a cup that can be brought from a relatively flat transport condition to a operation condition for holding the growing medium. For example, the adjustable cup can include at least two cup sections that can be mutually moved from a first state to a second state, wherein inner sides of the cup sections are positioned away from each other when the cup sections are in their first state, wherein the inner sides form a cup's inner side, for retaining the plant growing medium, when the cup sections are in their second state.

For example, the resulting cup can be 100% nestable (i.e. to a compact stack) when respective cup sections are in their first state.

The present patent application also relates to a method.

Another aspect of the patent application relates to an improved tray. Optionally, this second aspect may be combined with the above-described first invention.

JP2003070364 discloses a tray having seedling pots, made using a pulp moulding process. A disadvantage of the know tray is that the pots are relatively low, compared to their width. Besides, the pots all contain relatively large central through-holes in their bottoms, allowing leakage of content (e.g. a plant growing medium) and swift drainage of water during use. Besides, in the known tray, chances are relatively high that a seedling's primary root will encounter the bottom of the seedling pot without finding the through-hole, resulting in horizontal and upward growing primary roots, leading to a too long growing period in the cup and infection with root diseases.

The second aspect of the invention aims to provide an improved tray. Particularly, this aspect aims to solve or at least alleviate the problems that are encountered with the known tray

To this aim, there is provided a tray, wherein the tray has been manufactured by a pulp moulding process, the tray comprising at least one cup, the cup having a bottom structure that is preferably penetrable for a plant root growing in a downward direction,

wherein each cup is adjustable, having at least two cup sections that can be mutually moved from a first state to a second state, wherein inner sides of the cup sections are positioned away from each other when the cup sections are in their first state, wherein the inner sides form a cup's inner side, enclosing a cup's interior space, when the cup sections are in their second state, the moulding process including manufacturing the tray with the cup sections in their first state.

In this way, the tray can be provided with cups having improved shapes, e.g. relatively high cups (with a height that is significantly larger than a cups width), relatively narrow cups, e.g. narrow substantially tapered cups

having inner side walls including relatively small top angles (e.g. smaller than 45 degrees).

In a further embodiment, the bottom structure is penetrable for a plant root growing in a downward direction. This can be achieved in various ways as is described throughout this patent application. For example, the bottom structure can include a small aperture, or a local portion with a relatively small thickness, or a slit, cut or incision, or a 'lip closure' opening, being penetrable for a growing primary plant root.

Also, this second aspect of the invention includes the advantageous manufacturing method as is defined by claim 39.

There is provided a method of manufacturing a tray, for example a tray as described above, the tray comprising at least one cup, preferably at least one row of cups, wherein a pulp moulding process is used,

the method being characterised in that the tray is moulded by the pulp moulding process with cup sections of each cup in a first state, in which first state inner sides of the respective cup sections are positioned away from each other, wherein after the moulding the cup sections of each cup can be adjusted from the first state to a second state for enclosing a cup's interior space of the respective cup.

Further advantageous embodiments according to the inventions are described in the following claims.

By way of example only, embodiments of the present inventions will now be described with reference to the accompanying figures in which

Fig. 1 shows a schematic perspective view of a plant tray according to the invention;

Fig. 2 shows a schematic perspective view of a cup of the plant tray of Fig. 1;

Fig. 3 shows a schematic perspective cross-sectional view of the cup of Fig. 2 accommodating a first plant;

Fig. 4 shows a schematic perspective cross-sectional view of the cup of Fig. 2 accommodating a second plant;

Fig. 5 shows a schematic perspective view of cups of other plant trays according to the invention,

Fig. 6 shows a flow chart of an embodiment of a method according to the invention;

Fig. 7 shows a schematic perspective view of an example of a cup of an embodiment according to the present inventions;

Fig. 8 shows a detail Q of Fig. 7;

Fig. 9 shows the embodiment of Fig. 7 in a folded-open condition;

Fig. 10 shows a tray including a plurality of cups of Figs. 7-9, in a folded-open state;

Fig. 11 is similar to Fig. 10, showing an alternative embodiment of the tray;

Fig. 12 is a front view of a further embodiment of the invention;

Fig. 13 shows a schematic side view of a further plant tray according to the invention;

Fig. 14 shows a schematic top view of the plant tray of Fig. 13;

Fig. 15 shows a schematic perspective view of the plant tray of Fig. 13;

Fig. 16 shows a schematic partial cross sectional side view of two stacked plant trays of Fig. 13;

Fig. 17 shows a schematic perspective view of a cup from the plant tray of Fig. 13;

Fig. 18 shows a schematic perspective view of another cup according to the invention;

Fig. 19a shows a schematic top view of the cup of Fig. 18;

Fig. 19b shows a schematic side view of the cup of Fig. 18, and

Fig. 20 shows a schematic perspective view of a further cup according to the invention.

It is noted that the figures show merely preferred embodiments according to the present inventions. In the figures, the same or corresponding reference numbers refer to equal or corresponding parts.

Figure 1 shows a schematic perspective view of a plant tray 1 according to the invention. The plant tray 1 is applicable for propagating plants and/or seeds. The plant tray 1 has a multiple number of cups 3. The cups are mutually connected, preferably via a detachable connection. Figure 2 shows a schematic perspective view of a single cup 3 of the plant tray 1. During use of the plant tray, the cups 3 retain a plant growing medium 5 and a seed 6 and/or a plant 7 at least partially embedded in the plant growing medium 5 as illustrated in Figures 3 and 4 showing a schematic perspective cross-sectional view of the cup 3 accommodating a first plant and a second plant, respectively. On the upper side, the cup 3 has an opening 8 allowing an accommodated plant 7 to grow in an upward direction UD. The cup 3 further has a bottom structure 9 that is penetrable for a primary root 10 of the plant 7 growing in a downward direction DD. Further, the tray 1 includes a spacer extending downwardly, beyond the bottom structure of the cup 3.

The bottom structure 9 as such can be configured and shaped in various ways, as will be appreciated by the skilled person. For example, the bottom structure can be flat, concave or convex, when viewed in a top view (i.e. in downward direction DD). Also, the bottom structure can be flat, concave (c.f. Fig. 12, described in more detail below) or convex, when viewed from an opposite bottom view (i.e. in an upward direction UD).

The tray 1 is applicable for use in the field of horticulture / agriculture. Plants, such as vegetables, bushes, trees or flowers, can be grown in the cups 3. Thereto, the cups 3 are filled with a plant growing medium, e.g. ground, clay, substrate such as rock wool, perlite, flug sand, coarse granulates and/or peat soil. If biodegradable based materials are used for manufacturing the plant tray 1, in principle any kind of plant growing medium can be used. With the conventional trays the soil has to form a cup model and is not allowed

to fall apart while planting in order not to cause breaking roots, because in the known planting method, the plant plug is taken out of the plastic cup before planting. By using a cup made from biodegradable material, any local soil, even soil that has no adhering structure, may be used. This means that the growth of plants becomes world wide possible on the spot. In case of using non-biodegradable cups, after the plants have grown, the plant growing medium including the root structure, also called root plug, can be removed from the cup for planting in the ground. If biodegradable material is used for manufacturing the cup, the step of removing the plug from the cup can be omitted, thereby advantageously avoiding that damage may occur on the roots of the plant. If when using a bio-degradable cup a seed doesn't germinate and a cup is without a plant, the cup including the soil medium can be mixed and re-used together for the next planting. Small plants or seeds are embedded in the plant growing medium. During use, the tray 1 may be placed on a surface 13, e.g. on a desk, in a stand, or on a floor, for instance in a glass house. After the plants have grown, the plants can be put in another environment, e.g. in the ground.

According to an aspect of the invention, each cup 3 is provided with a spacer 12 providing an air chamber 11 (i.e. a primary root receiving space) located below the bottom structure 9 of the cup 3. The spacer 12 counteracts that the bottom structure 9 of the cups 3 contacts a surface 13 carrying the tray 1. In the embodiment shown in Figures 1-4, the spacer 12 includes four legs 14. However, also another multiple number of legs 14 can be applied, e.g. two, three or five legs, or more. In principle, also a single leg can be used. Optionally, a leg is provided with a foot or a bottom plate providing extra stability to the tray 1. Further, it is noted that the spacer can be implemented in another way, e.g. as a tube extending below the bottom structure 9 of the cups or as a separate module supporting the cup 3. It is also noted that, instead of providing each cup 3 with a spacer, the tray may include a spacer structure that provides for a chamber 11 extending below the bottom structure

9 of all cups 3. Such a spacer structure may e.g. include four legs located at the bottom corners of the tray.

The length of the spacer is chosen such that an air barrier is realized between the bottom structure 9 of the cup 3 and a surface 13 supporting the plant tray 1. As an example, the height of the air barrier can be chosen in a range between circa 0.5 cm to circa 20 cm. In the embodiment wherein the spacer includes legs, also the length of the legs may e.g. range from circa 0.5 cm to circa 20 cm. In a non-limiting embodiment, a height of the air barrier can be relatively large with respect to a height of an interior 4 of the respective cup 3. For example, the height of the air barrier can be at least 10% of the height of an interior spacer 4 of the respective cup 3, and particularly at least 15%.

Alternatively, the height of the air barrier can be smaller than 10% of the height of an interior spacer 4. A minimum height of the air barrier can e.g. be 1 mm, particularly 2 mm. It is expected that an air barrier having a height higher than 0.2 cm, for example at least about 0.5 cm, will lead to better results.

Figures 3 and 4 show embodiments wherein the inner surface 20 of the cup 3 is substantially tapered downwardly. As an example, the lower side of the inner surface 20 is formed as (truncated) cone, a (truncated) pyramid or a rounded tapered structure such as a ball segment. In a horizontal cross section 3CS of the cup 3, the inner surface may be shaped as an oval or circle. However, the cup might also have another contour, in a horizontal cross section, such as a polygon, e.g. a triangle or square, plus, flower or star shape. By applying the tapered construction, an optimal respect ratio between the circumference, the content of the cup and its rigidity can be obtained. Further, the inner surface of the cup may be tubular shaped, preferably having a constant diameter.

During use of the tray, the cup 3 retains the plant growing medium 5. The kernel 6, from which the plant 7 is growing, is located in the plant

growing medium 5. A primary root 10 is growing from the kernel 6 in the downward direction DD. Here, the bottom structure 9 of the cup 3 comprises one aperture 25 allowing the primary root 10 to grow through the bottom 9 of the cup 3.

As an alternative to providing a single aperture, the bottom structure 9 may comprise a multiple number of apertures and/or a material that is penetrable for a growing primary plant root. For example, the bottom material comprises paper material, for instance including cardboard, cellulose, paper foam and/or fiber paper. Further, the bottom structure might include a local portion with a relatively small thickness.

As a further alternative to providing an aperture, the bottom structure 9 may comprise a slit, cut or incision, or a 'lip closure'opening, being penetrable for a growing primary plant root.

Advantageously, a cup bottom made of primary root penetrable material comprises a relatively weak area, e.g. formed by a local constriction of the thickness in the bottom, or by a local through-cut or incision, a 'lip closure'opening, or by applying a weaker material in the relatively weak area. However, it is noted that the bottom of the cup does not need to have at least one hole or at least one relatively weak area. For example, the whole cup may be relatively weak. Alternatively, the cup may be relatively strong, but the material can be weakened during use. For example, a part of water fed to the plant may work its way down through the plant growing medium 5 and may remain on top of the bottom structure 9, thereby attenuating the bottom to such extent that the primary root may relatively easily pierce through it when it grows substantially in the downward direction DD.

Advantageously, the bottom structure 9 is substantially closed before being penetrated by a said primary plant root 10, particularly for preventing plant growing medium 5 escaping via the bottom. To that aim, for example, a said aperture 25 can be relatively narrow. Also, to that aim, very good results can be obtained using a said cup bottom made of primary root

penetrable material comprises a relatively weak area, e.g. formed by a local constriction of the thickness in the bottom, or by a local through-cut, a slit or incision or a 'lip closure' opening.

The plant array can be placed on a closed surface or on an open structure, such as concrete netting or another supporting structure, enabling optimal air ventilation circumstances.

Further, the cup 3 has a side wall 21 provided with gas permeable portions 19, preferably at the top side 16 of the cup 3. The gas permeable portions 19 can facilitate an exchange of gasses, such air, carbon dioxide and/or oxygen, between the growing medium 5 and the exterior 17 of the cup. The gas exchange can counteract fungal grow and/or can promote the growth of the plant 7 and/or roots, such as secondary roots 18 of the plant 7.

The side wall 21 of the cup 3 as shown in Figures 3 and 4 is also provided with a local structure 28 that is penetrable for a plant root growing in a sideward direction. The penetrable structure 28 has preferably a mainly elongated shape that is oriented downwardly to facilitate penetration by further primary plant roots 22 that grow in a direction with a downward component. However, the elongated shape might also be oriented in another direction, e.g. a sideward direction. Further, the penetrable structure 28 may include an opening, a multiple number of openings or a material that is penetrable for growing roots. Optionally, also the gas permeable portions 19 are penetrable for roots, so that secondary roots can grow through the gas permeable portions 19.

According to a further aspect of the invention, the inner surface 20 of the cup 3 is provided with inwardly extending protrusions 23, formed as downwardly extending ribs in the embodiments shown in Figures 1-4. By application of the inwardly extending protrusions, a growth direction of roots is guided. Roots that tend to grow in a circumferential direction are thus stimulated to grow downwardly, so that a more natural and balanced root structure is obtained. Ribs that extend inwardly and downwardly on the inner

surface 20 of the cup 3 counteract that roots grow from a first circumferential section to a further circumferential section. Preferably, the inwardly extending protrusions 23 are mainly evenly distributed in the circumferential direction CD.

In addition, the tray 1 may include a single or a multiple number of downwardly extending ribs 24 attached to an outer surface of the cup 3 to provide a rigid structure.

By providing a cup 3 that has a side wall protruding radially inwardly and outwardly along a circumferential direction, a relatively rigid structure can be obtained. Moreover, specific features can be implemented in a desired part of the cup wide wall 21. As an example, a local structure 28 that is penetrable for a plant root growing in a sideward direction can be provided at an inwardly protruding part of the side wall 21, while a gas permeable structure can be provided at an outwardly protruding part of the side wall 21, as shown in Fig. 2.

It is noted that the cup 3 can be shaped in another way, e.g. without inwardly extending protrusions and/or without a downwardly extending rib attached to an outer surface of the cup. As an example, a cup having a pure circular cross sectional contour can be provided, e.g. for providing a simple design.

The embodiment of the plant tray 1 as shown in Fig. 1-4 comprises a multiple number of cups 3. The cups are arranged in a regular two-dimensional array. As an example, the array includes four cups in a first direction x and six cups in a second direction y to meet standard plant tray sizes, such as the Danish and the European sized trays. Apparently, the tray may include another number of cups in the x-direction and/or the y-direction. Further, in principle, a single cup array can be provided according to the invention.

In the shown embodiment of Fig. 1, the cups 3 are detachably connected to each other. The connection can be realized by perforated lines 35,

as shown, or otherwise, e.g. by pre-folding and/or providing local thin connecting lines, also called hinges. After growing, the cups can be disconnected. Alternatively, the cups are connected to each other in a solid way. Then, the plants can be removed from the cups, so that the tray can be reused for a new set of plants and/or seeds.

In an advantageous manner, the plant tray 1 according to the invention may comprise intermediate portions 30 interconnecting the individual cups 3 and including a water guiding structure for guiding water from the intermediate portions towards the cups 3, as shown in e.g. Fig. 1 and 2. The intermediate portions 30 are not flat but include tilted sections 31, 32 guiding water that is incident on the plant tray 1 towards the cups 3. The tilted sections 31, 32 form a corrugated pattern having local minima and local maxima. In the shown embodiment, the intermediate portions 30 include apertures 33 at local minima, so that in principle all water droplets may flow downwardly from the corrugated pattern. Then, the intermediate portions 30 may dry so that mechanical features of the tray do not deteriorate. Advantageously, the apertures 33 are located above the outer surface of the cup side wall 21, and above the local structures 28 that are penetrable for a plant root growing in a sideward direction, so that tips of outwardly growing roots 18 can be moisturized. As a consequence, less irrigation water is needed for growing the plant(s).

Figure 5 shows a schematic perspective view of cups 3 of other plant trays 1 according to the invention. On the left hand side a cup 3a is shown wherein both the local side wall structure 28 that is penetrable for a plant root growing in a sideward direction and the local side wall structure 19 that is gas permeable, include a mainly elongated portion oriented in a sideward direction. Instead of the strip shaped legs shown in Fig. 1-4, the legs 14 of the left hand side cup spacer are pillar shaped. On the right hand side a further cup 3b is shown. Here, both the local side wall structure 28 that is penetrable for a plant root growing in a sideward direction and the local side wall

structure 19 that is gas permeable, include a mainly elongated portion oriented in the downward direction. Further, the spacer now includes two legs 14a,b having a curved strip shape.

Figure 12 depicts another advantageous, non-limiting embodiment of the invention. The embodiment of Fig. 12 differs from the examples shown in Figures 1-5 in that the bottom structure 309 of each cup 303 as such is shaped to define the spacer. In this embodiment, the bottom structure as such has a concave lower side (faced away from the cup's interior), thereby also defining the respective air chamber below the bottom structure. In this embodiment, e.g., a first part of the bottom structure (for example a central part) can be penetrable by the plant root (e.g. in a manner as is described above). Another part of the bottom structure (e.g. enclosing a penetrable first bottom structure part) acts as a spacer, and extends towards a lower edge of the cup, downwardly beyond the first –penetrable- part of the bottom structure. For example, in this advantageous embodiment, the respective tray 301 is nestable. Also, in this example, the concave bottom structure may be formed to define a relatively small spacer, e.g. having a height that is about 1 cm or smaller, and for example at least about 0.2 cm. The resulting nestable tray configuration can provide a desired minimum airpruning, i.e. stopping further growth of a primary root after having penetrated the bottom.

Further, the plant tray may comprise a body including plant protecting and/or plant nutrition material. The body can be formed separately, e.g. as a ball or as a ring enclosing the cups. The ring may be added when positioning the cup in the ground, after growing in a conditioned space. As an example, the ring may be formed by connecting two ring members to each other, e.g. using a snap connection. Further, the body can be integrated with the plant tray.

The plant protecting / plant nutrition material may include aromatic substances, flavourings, such as camphor, chili or garlic, (artificial) fertilizer or micorrizhae, anti-fungal material and/or an insecticide, e.g. nicotine or borax

for chasing away harmful animals such as termites, and/or fungi. Further, the plant protecting / plant nutrition material may include seeds, symbiotic bacteria, eggs, fungi and/or spores that may germinate after leaving the base material, thereby improving the biodiversity of the irrigating system. Further, the plant protecting / plant nutrition material may include material that damages harmful animals. Such material may include glass grindings, sand grindings, metal grindings, cement, lime, silicon, rubber or any material that damages harmful animals without poisoning. As an example, the cups might include a first plant protecting / plant nutrition material and the intermediate portions 30 may include a second plant protecting / plant nutrition material. The number of seeds, fungi and/or spores can be determined before integrating in a base material.

Advantageously, the plant tray may include biodegradable material. As an example, paper material and/or biodegradable plastic can be used.

By using paper material and/or biodegradable plastic, the plant irrigating system can be manufactured in a very cheap way. Further, the environmental impact decreases. Some cardboard, paper foam and/or fiber paper types easily tear, thereby counteracting any theft of the system. The paper material may include cardboard, cellulose, such as paper tissue, paper foam and/or fiber paper.

As an example, the fiber paper may include coconut fiber, cotton fiber, banana fiber, jute fiber, wool fiber, straw fiber, grass fiber, hemp fiber, kenaf fiber, wheat straw paper, sunflower stalks fiber, rags fiber, mulberry paper and/or kozo.

The biodegradable plastic can be made of renewable raw materials, but it can also be based on petroleum based plastics including an additive making it biodegradable.

Generally, petroleum based plastics are known as hydro-carbons. During a biodegradation process, microbes are enabled to metabolize the molecular structure of the plastic and to produce inert humus material, water

and biogases, such as CH_4 and CO_2. An example of a biodegradable additive is the commercially available substance, known as EcoPure including organic compounds for opening the polymer chain of the hydro-carbons, and attractants stimulating microbial colonization on the plastics. The biodegradation occurs at the atomic level and is anaerobic or aerobic. As an example, a biodegradable additive can be applied for a wide variety of plastics, such as PVC, PE, PP, PS, PC, PET and PA.

Renewable raw materials for forming a biodegradable plastic may include wood fiber, e.g. 60%, combined with a plastic, e.g. 40%. When a suitable biodegradable additive is added, the material is made biodegradable.

Alternatively, other biodegradable material can be used, such as bamboo, sugarcane, hay, pulp or elephant excrement. Further, pre-pressed material can used, such as pre-pressed sawdust, peat, peat moss, rice chaff etc.

Preferably, material forming the plant tray includes water impermeable material and/or is provided with a liquid impermeable coating, e.g. on the inner and/or outer side. Further, the forming material can be coated with a biodegradable layer, preferably having a pre-determined thickness so that a desired degree of degradedness can be set. Alternatively or additionally, the degradedness of the biodegradable layer can be set by including a dosed amount of conserving material. Further, the degradedness can be set by localizing specific parts at specific heights with respect to the ground level. In general, material in the collection structure will degrade later than material in the reservoir, due to the position relative to the ground.

Preferably, the base material of the plant tray includes specific material that is bound to the base material for a specific time period and is then disseminated into the environment, due to degradable properties of the base material. By setting the degradedness of the base material, the degree of dissemination of the specific material can be determined. In this respect it is noted environmental parameters, such as wind, moisture etc may influence the degradedness of the base material.

Figure 6 shows a flow chart of an embodiment of the method according to the invention. After growing a plant in the plant tray, the plant can be planted in the ground. The planting process includes the step of providing 100 a plant tray comprising biodegradable material, the tray including a cup 3 retaining a plant growing medium and a plant embedded in said medium, and the step of placing 110 the cup 3 on the ground, without removing the plug from the cup, i.e. without removing the plant growing medium and a root structure of the plant.

Preferably, the method includes the step of removing a cup from the plant tray that includes a multiple number of cups, before placing the cup on the ground. Advantageously, the cup can be placed in a hole in the ground. Similarly, the method may include the step of covering a side wall of the cup at least partly with ground, so that the plug is embedded in the ground.

Figures 7-10 depict a further advantageous embodiment, including the aspects of the both inventions.

As in Figures 3 and 4, the embodiment shown in Figures 7-10, 12 includes cups, 103, wherein the inner surface of each cup 103 is substantially tapered downwardly. The lower side of the inner surface can be formed as (truncated) cone, a (truncated) pyramid or a rounded tapered structure such as a ball segment.

Preferably, (as in the earlier embodiments as shown in Figures 1-6, 12), the cups are relatively high compared to their (maximum) width. For example, a height H of each cup 3, 103 (the height H excluding the length of the spacer, if any) can be significantly larger than a maximum width W of the cup's interior, for example by a factor of at least 1.5 and particularly by a factor of at least 2. Double arrows W and H in Fig. 10 indicate the height and width, respectively (the cup shown being in a first state, as explained below). Particularly, the cup's height is the distance between the bottom 9, 109 of the cup and the top side 16, 116 of the cup, measured along a cup's central axis. In

this example, the maximum width W of the cup's interior is the width measured at the top side, i.e. in a direction normally with respect to the cup's central axis (i.e. the width of the top opening, leading into the cup).

In a further embodiment, said cup height H can be at least 5 cm, for example at least 10 cm. As is mentioned before, the maximum width W can e.g. be at most about half the height H (and may e.g. be at least about 1 cm).

Also, from the drawings it follows (as in the earlier embodiments as shown in Figures 1-6, 12), that the cups 3, 103 are relatively narrow, wherein the inner sides of the cups include relatively small angles φ (see Fig. 10) when viewed in a longitudinal cross-section. For example, the afore-mentioned angle φ can be smaller than about 45 degrees, for example an angle in the range of 0 to about 30 degrees.

Also, from the drawings it follows (as in the earlier embodiments as shown in Figures 1-6, 12), that each cup 3, 103 can be particularly narrow at its bottom 9, 109. As an example, the cup's internal width K at the bottom (see Fig. 10), measured a direction normally with respect to the cup's central axis, can be at most 50% of said maximum width W, and particularly at most 20% of said maximum width W.

The embodiment shown in Figures 7-10 differs from the examples discussed with respect to the figures 1-6, 12 in that the cup 103 is adjustable, having at least two cup sections 103x, 103y (only two, in this extra advantageous embodiment) that can be mutually moved from a first state to a second state. The first state of the cup 103 is shown in Fig. 9. Figure 10 shows a further embodiment, of a tray 101 having a plurality of cups with their cup sections in the first state. One major advantage is that the trays are nestable, at least when they are in their first (folded open) state. Also, a major advantage is that the tray, having the present extra advantageous (e.g. relatively elongated tapered) cup shape, can be made utilizing a pulp moulding process (known per se to the skilled person). An example of the manufacturing method is described below.

The adjustable cup 103 can be configured in various ways. For example, the cup sections can be provided by separate sections, that are not interconnected when they are in the first state, wherein the sections can be joined to form the cup 103. In the present example, the cup sections 103x, 103y are already interconnected before being brought into the second (operating) condition, as will be described below.

In the present example, inner sides of the cup sections 103x, 103y (i.e. respective cup wall sections 121x, 121y) are positioned away from each other when the cup sections 103x, 103y are in their first state (see Fig. 9). After the cup sections 103x, 103y have been brought in their second state (see Fig. 7), the inner sides (i.e. the cup wall sections 121x, 121y) together form a cup's inner side, for retaining the plant growing medium.

When the cup 103 is in its first condition (i.e. the sections 103x, 103y are in their first state), it occupies relatively little space, which is very useful for storage and/or transportation. Thus, a large number of plant trays can be jointly stored, and transported to a final destination, using a minimum of space, leading to considerable savings in storage and transportation costs. When the plant trays have arrived in their final destination, the respective cups can be assembled, i.e. the respective cup sections can be adjusted to their second state to form the cups, e.g. to be used in a method as is described above.

From the drawing it particularly follows that the cup wall, of this example, is divided into two wall sections 121x, 121y, opposite longitudinal wall edges joining each other when the cup 103 is in the second state (cf. Fig. 7), the longitudinal wall edges being spaced-apart from each other (and e.g. extending in line with each other, in the same plane, as in Fig. 9) when the cup 103 is in its initial first state. In the example, the two wall sections 121x, 121y basically are two cup halves, of the same shape and dimensions. The adjustable cup may also include adjustable wall sections having mutually different shapes and dimensions. In addition, the adjustable cup may also

include more than two adjustable wall sections, for example three or four such sections.

The present cup sections of each cup 103 are interconnected by interconnecting profiles 151, for example winglets, that are made in one piece with the walls of the cup sections 103x, 103y. The present interconnecting profiles 151 may have e.g. a wall thickness that is about the same as a thickness of cup wall sections 121x, 121y.

In this example, each of the cup sections 103x, 103y is provided with two parallel interconnecting profiles 151, extending in opposite directions from the respective wall section, the two interconnecting profiles 151 of the first cup section 103x being integrally connected to the interconnecting profiles of the second cup section 103y. In an alternative embodiment, each of the cup sections 103x, 103y can e.g. be provided with a single interconnecting profile for attaching the cup sections to each other.

From the drawing it follows that the present interconnecting profiles 151 protrude laterally from respective cup wall sections 121x, 121y (radially with respect to a cup's centre line). In this case, the interconnecting profiles 151 extend along the entire height of the respective cup wall sections 121x, 121y. Also, in this embodiment (which includes both the first and second invention) the interconnecting profiles 151 extending downwardly, beyond the bottom structure of the cup, and provide respective spacer sections 112x, 112y forming the cup's spacer 112 when the cup sections 103x, 103y are in the second state.

It is noted that in this example, the bottom structure 109 of the cup 3 is provided by bottom structure sections 109x, 109y of the respective cup sections 103x, 103y. The bottom structure sections 109x, 109y form the bottom structure after the cup sections have been adjusted to their second position. In that condition, the resulting bottom structure 109 is penetrable for a plant root growing in a downward direction, as has been described above. The present bottom structure sections 109x, 109y are spaced-apart (e.g. with external sides

facing one another as in Fig. 9) when the cup sections are in their first position.

The interconnecting profiles 151 may be configured to pivotally connect the respective cup sections to each other. In the example, to this aim, the profiles 151 are provided with hinge/folding lines 150.

Also, preferably, the cup sections 103x, 103y are integrally provided (e.g. in one piece) with a locking structure 155, 156 for locking the cup sections together when they are in the second state. The locking structure 155, 156 can be part of the interconnecting profiles 151, and can e.g. be a clamping structure or a different type of locking means. In the example, interconnecting profiles 151 include clamping protrusions 155 and clamping through-holes 156 (having reinforced edges), cooperating with each other to hold respective profiles 151 and the cup sections 103x, 103y together when the profiles 151 have been joined (cf. Fig. 8).

As follows from Fig. 10, the configuration described above regarding figures 7-9 can be used with great advantage in a plant tray 101, including a plurality of adjustable cups.

In Fig. 10, the cup sections 103x, 103y of all cups are all in their first state, providing a very compact, relatively flat configuration, for example for storage and/or transport of the plant tray. When the tray of the present embodiment is in the flat state, it is nestable; i.e, that a plurality of trays can be stacked onto each other, with cup sections (in their first state) of the trays nesting in each other. In the resulting stack, respective spacer parts 151 of different trays extend in parallel levels (each level being associated with a respective tray), thereby allowing a compact packing. In this example, in each row, the cup sections of mutually different cups 103 are integrally (in one piece) connected to each other by respective interconnection profiles 151 extending there-between.

In this non-limiting embodiment, the tray 101 includes at least two rows (particularly two) of cups 103. In the non-limiting example, each row

includes five adjustable cups 103. The tray 101 can also include another number of rows of adjustable cups (for example one, three, four or more). Similarly, each rows can include another number of adjustable cups (starting with only one cup).

The cups 103 in the tray 101 are preferably detachable interconnected. To this aim, the respective interconnection profiles 151 can be provided with weakening lines, tearing lines, perforations or intermediate slits 152 (as in the drawing), as will be appreciated by the skilled person. Also, weakening lines, tearing lines, perforations or intermediate slits 154 (as in the drawing) can be provided between adjoining cup rows.

According to a further embodiment, the tray 101, or assembly of adjustable cups 103, can be manufactured in a very economical and efficient manner by a pulp moulding process, for example (but not limited to) wood pulp, paper pulp, or pulp including wood and/or paper material.

An alternative example of a tray 201 only includes the second invention, and is shown in Figure 11, providing similar advantages as the tray shown in Fig. 10 regarding compactness and nestability during storage and transport, the tray's cup(s) is/are not provided with the spacer(s) 112.In this alternative example, bottom sections 209x, 209y of each cup 203 can e.g. be pivotally connected with one another. Also, in this embodiment, the interconnecting profiles 251 extend e.g. towards but not beyond the bottom structure of the cup. In this example, the cup sections 203x, 2037 of each cup, and their respective interconnection profiles 251, are pivotally connected, via a hinge/folding line 150 extending there-between, for adjusting the cups between the respective folded-out and folded-in conditions..

It is observed that the example shown in Fig. 11 includes a single row of cups 103. Again, the tray 201 can also include another number of rows of adjustable cups.

Besides, according to a further embodiment, there can be provided a combination of embodiments according to Figures 10 and 11. For example, the

tray can be provided with one or more rows of first cups that all include a spacer, and with one or more rows of second cups which do not include a spacer (in the latter rows, the cup sections of each cup can be directly interconnected via hinge or fold lines 250)..

An aspect of the invention also provides a method of manufacturing a tray, for example a tray 101, 201 as is described above. The tray comprises at least one cup, preferably at least one row of cups. A pulp moulding process is used to manufacture the tray 101, 201.

The manufacturing includes the tray 101, 201 being moulded by the pulp moulding process with cup sections of each cup in the first state, in which first state inner sides of the respective cup sections are positioned away from each other (as in Figures 9, 10, 11). After the moulding, the cup sections of each cup can be adjusted from the first state to the second state for enclosing a cup's interior space of the respective cup (see the example of Fig. 7).

The pulp moulding process can be carried out in various ways. An example, wherein pulp is poured and subsequently pressed into a mould, is described in JP200370364, included herein in its entirety by reference.

Alternatively, a mould can be used to scoop a layer of pulp from a pulp batch, for example a pulp bath. In the latter pulp moulding method, a pressing step (i.e. after pulp has been applied to the mould) can be left out.

The pulp as such can include various materials. Preferably, the pulp consists of biodegradable material. For example, in an extra advantageous embodiment, the pulp that is used mainly consists (for example by at least 90%, e.g. at least 99%) of wood pulp, paper pulp, or a combination of paper pulp and wood pulp. The pulp can include other materials as well, for example one or more of the materials that have been mentioned above. The pulp may also include other materials, such as pulverized rock particles.

In a further embodiment, the pulp contains liquid (e.g. water) when it is applied to the mould, wherein the pulp can be dried (i.e. the liquid is removed from the pulp) during and/or after the moulding.

The mould that is used can e.g. be configured to form all cup sections of each cup in their first state. Preferably, the method includes providing the tray with folding sections 150, 250 (e.g. hinge lines or perforation lines), for mutually folding the cup sections towards each other.

Preferably, the method includes providing the tray 101, 201 with locking structures, for mutually locking the cup sections to each other when they are in their second state.

Optional tray structures, e.g. said inwardly extending protrusions (forming root guiding structures), and/or said locking structures and/or said structures that are penetrable by a plant root, can be applied after the moulding, and particularly when the cup sections are still in their first state and therefore easily accessible (e.g. by a cutting device, a punch and/or another tool, suitable to mechanically act on the moulded pulp). The mould that is used can also be configured to provide one or more such structures as part of the moulding process itself.

Similarly, said folding sections 150, 250 (e.g. hinge lines or perforation lines) can be formed in the pulp material during (as part of) the moulding process itself, or there-after with the cup sections of each cup still in their first state.

Fig. 13 shows a schematic side view of a further plant tray 400 according to another aspect of the invention. Figs. 14 and 15 show a schematic top view of the plant tray and a schematic perspective view of the plant tray, respectively, of Fig. 13.

The plant tray 400 is suitable for propagating plants. The plant tray 400 comprises a multiple number of cups 401 for retaining a plant growing medium and a seed, a cutting and/or a plant at least partly embedded in the plant growing medium. The cups 401 are arranged in a regular matrix. However, the matrix can also be less regular or irregular. Further, the cups could also be arranged in a single row. In principle, the tray could include a single cup.

Fig. 17 shows a schematic perspective view of a cup from the plant tray of Fig. 13. The cups 401 have a bottom structure 402 that is penetrable for a plant root growing in a downward direction, as disclosed earlier in the specification.

Further, the plant tray 400 comprises a multiple number of spacers 403 extending downwardly, beyond the bottom structure 402 of the cups 401, wherein the multiple number of spacers 403 are located offset at lateral corners 404 of cups 401. The plant tray further comprises a web 405 extending in a plane substantial transverse T with respect to the downward direction DD and interconnecting upper portions 406 of the cups 401 to upper portions 407 of the separate spacers 403. The web preferably includes interconnection profiles between the individual cups 401 and the spacers 403, to enable easy removal of individual cups 401.

Advantageously, by providing spacers that are located off set at lateral corners of the cups, the tray may include air barriers below the bottom structure of the cups 401, while, on the other hand, the tray may be nestable, thus saving much space during storage and transport. Further, the tray is ready for use since no assembling steps have to be carried out before use.

In the shown embodiment, lateral corners of the cups 401 are partially removed, at the upper portions, so as to provide spaces to be occupied by the spacers. In an alternative embodiment, the lateral corners are not removed. Then, space for the spacers 403 is provided in another way, e.g. by providing a greater distance between the individual cups 401. In the shown embodiment, each spacer is surrounded, in the lateral direction, by four cups. As the person skilled in the art understands, also other configurations are possible, in principle, e.g. wherein a spacer is surrounded by three cups, in the lateral direction.

In another embodiment, the tray includes a regular matrix of cups and spacers wherein the spacers are located at a position where a cup is missing. The spacer is then called a “blind cup”.

Further, the web 405 is preferably flat and at the top level of the cups 401. However, in principle, the web may also be curved. Also, the tray can be formed without web, e.g. when using individual connection elements interconnecting the individual cups and spacers.

Fig. 16 shows a schematic partial cross sectional side view of two stacked plant trays of Fig. 13. Here, the right part of the view shows a cross section where a first cup 408 of the upper tray is received in a second cup 409 of the lower tray.

In order to facilitate the nestable design of the tray, the cups 401 and the spacers 403 are tapered downwardly. As an example, the cups and spacers are formed as (truncated) cones, (truncated) pyramids or as a rounded tapered structure such as a ball segment. Further, the body axes of the cups and the spacers are substantially aligned. Alternatively, the spacers are formed as wall segments extending in a lateral direction between the cups and in a downward direction beyond the bottom structure of the cups. The wall segments may be integrally formed extending from one lateral side of the tray to the opposite lateral side of the tray, or may be formed by wall parts leaving ventilation openings. In a specific example, the lower edge of the wall segments or not flat but curved thus forming ventilation apertures.

Preferably, the spacers are located in a regular pattern to provide a stable arrangement.

In order to be compatible with standard sizes of transport systems, the outer dimensions of the plant tray preferably match dimensions of the so-called Danish transport unit and plant boxes.

The cup 401 shown in Fig. 17 is suitable for retaining a plant growing medium and a seed, a cutting and/or a plant at least partly embedded in the plant growing medium. The cup has a bottom structure 402 and a side wall 410.

According to a further aspect of the invention, the side wall 410 of the cup 401 includes a corrugated profile 411. The corrugated profile is

provided, at a laterally outwardly protruding location 412, with a local structure that is penetrable for a plant root growing in a sideward direction. By applying the penetrable structure at laterally protruding locations 412, the so-called secondary roots may follow their nature and may grow through the cups side wall at different locations, optionally initially being guided by the inwardly protruding parts of the corrugated profile.

The corrugated profile is mainly V-shaped. However, also other corrugated profiles can be applied, e.g. a waveform.

The laterally outwardly protruding locations of the cup shown in Fig. 17 are substantially lying on a polygone. However, in other variants, the laterally outwardly protruding locations may lay on a rectangle, square, oval or circle.

Preferably, also the bottom structure is penetrable for a plant root growing in a downward direction. As an example, the bottom structure includes a corrugated profile that is provided, at a downwardly protruding location, with a local structure that is penetrable for a plant root growing in a downward direction, functioning similar as the corrugated profile of the side wall.

Fig. 18 shows a schematic perspective view of another cup 501 according to the invention. Again, the side wall 510 includes a corrugated profile 511. The corrugated profile 511 is provided, at a laterally outwardly protruding location 412, with a local structure that is penetrable for a plant root growing in a sideward direction. Here, the laterally outwardly protruding locations 512 of the cup substantially lie on a square.

Figs. 19a show a schematic top view and a side view, respectively, of the cup of Fig. 18. As can be clearly seen, the bottom structure of the cup is also provided with a corrugated profile 513. The corrugated profile includes a first, relatively long profile 513 and shorter profiles 514 arranged transverse to the first profile 513.

Fig. 20 shows a schematic perspective view of a further cup according to the invention. Again, the laterally outwardly protruding locations 512 of the cup substantially lie on a polygon.

The cups shown in Figs 18-20 comprise a spacer extending downwardly, beyond the bottom structure. However, in principle, the cups can also be provided without downwardly extending spacers, e.g. if the cups form a part of the above-described plant tray provided with separate spacers, or if no air barriers are needed when using the cups.

Preferably, the cups include biodegradable material, so that in the context of propagating plants, the plants have not to be removed from the cups when planting them in larger cups. Then, a method for propagating plants may include the step of placing a first cup from a plant tray according to any of the claims 1-26, 31-38, 43-48 and 56 into a second cup from a plant tray according to any of the claims 1-26, 31-38, 43-48 and 56, wherein the first cup includes a plant growing medium and a plant having a root structure that extends through the plant growing medium, and wherein the size of the first cup is smaller than the size of the second cup such that the first cup fits into the second cup.

When putting the first cup into the second cup, damage of the root structure of the plant is advantageously minimized to a very low degree, also potential damage to root-hair, since the first cup remains in place according to the Baboesjka principle, and the primary root maintains growing downwardly, without winding, twisting, and/or even turning to a growth direction upwardly.

The cups shown in Figs. 18-20 are intended for use in a plant pot or a flower vase. Then, a method for retaining plants and/or flowers may comprise the step of placing a cup from a plant tray according to any of the claims 1-26, 31-38, 43-48 and 56, into a plant pot or flower vase, the cup containing a plant and/or a flower.

According to an aspect of the invention, the cup and/or plant tray described above is manufactured from a paper material and/or a biodegradable

plastic. The paper material may include cardboard, cellulose, such as paper tissue, paper foam and/or fiber paper.

As an example, the fiber paper may include coconut fiber, cotton fiber, banana fiber, jute fiber, wool fiber, straw fiber, grass fiber, hemp fiber, kenaf fiber, wheat straw paper, sunflower stalks fiber, rags fiber, mulberry paper and/or kozo.

The biodegradable plastic can be based on petroleum based plastics or renewable raw materials, both including a biodegradable additive.

Generally, petroleum based plastics are known as hydro-carbons. During a biodegradation process, microbes are enabled to metabolize the molecular structure of the plastic and to produce inert humus material, water and biogases, such as CH_4 and CO_2. An example of a biodegradable additive is the commercially available substance, known as EcoPure including organic compounds for opening the polymer chain of the hydro-carbons, and attractants stimulating microbial colonization on the plastics. The biodegradation occurs at the atomic level and is anaerobic or aerobic. As an example, a biodegradable additive can be applied for a wide variety of plastics, such as PVC, PE, PP, PS, PC, PET and PA.

Renewable raw materials for forming a biodegradable plastic may include wood fiber, e.g. 60%, combined with a plastic, e.g. 40%. When a suitable biodegradable additive is added, the material is made biodegradable.

Pulp as such can include various materials. Preferably, the pulp consists of biodegradable material. For example, the pulp that is used mainly consists (for example by at least 90%, e.g. at least 99%) of wood pulp, paper pulp, or a combination of paper pulp and wood pulp. The pulp can include other materials as well, for example one or more of the materials that have been mentioned above.

Alternatively, the pulp contains liquid (e.g. water) when it is applied to a mould, wherein the pulp can be dried (i.e. the liquid is removed from the pulp) during and/or after the moulding process.

Preferably, material forming the cup and/or plant tray includes water impermeable material and/or is provided with a liquid impermeable coating, e.g. on the inner and/or outer side. Further, the forming material can be coated with a biodegradable layer, preferably having a pre-determined thickness so that a desired degree of degradedness can be set. Alternatively or additionally, the degradedness of the biodegradable layer can be set by including a dosed amount of conserving material. Further, the degradedness can be set by localizing specific parts at specific heights with respect to the ground level. In general, material in a structure contacting the ground will degrade later than material located there-above, due to the position relative to the ground.

Preferably, the base material of the cup and/or plant tray includes specific material, additives, that is bound to the base material for a specific time period and is then disseminated into the environment, due to degradable properties of the base material. By setting the degradedness of the base material, the degree of dissemination of the specific material can be determined. In this respect it is noted that environmental parameters, such as wind, moisture etc. may influence the degradedness of the base material.

As an alternative, the additives are attached to the cup and/or plant tray, e.g. in a pocket or in an adhesive layer at an outer surface of the cup and/or plant tray, such that the additives can disseminate after placing the cup and/or plant tray on the soil.

After placing the cup and/or plant tray and the young plant, the additives can immediately disseminate into the soil structure. Especially, the additives can then penetrate into the soil containing roots of the young plant, thus improving surviving conditions for the young plant.

Since lower structures of the cup and/or plant tray may covers the soil, additives can immediately spread in the soil directly below the cup and/or plant tray. As an example, mycorrhizae or other fungi, more generally hydrophilic additives, can immediately disseminate and/or multiply under the

influence of the extreme high humidity under the reservoir. The air below the cup and/or plant tray can even be saturated with moisture, thus improving the circumstances for the roots to grow. In this respect it is noted that in certain circumstances no sunlight may enter below the cup and/or tray. Further, temperature conditions are relatively moderate since the soil directly under the cup and/or plant tray will not become extremely hot or extremely cold. Due to the heat capacity of the cup and/or plant tray, and any water in it, the temperature under the reservoir mainly follows the temperature course of the environmental air avoiding the extremes.

The additives can thus be integrated with the base material of the cup and/or plant tray for facilitating growth of a young plant. Further, additives can be included in a coating layer that is provided on the cup and/or plant tray, either on the outer side or the inner side, or both sides. The coating layer can be provided on the cup and/or plant tray using a known coating process, such as spraying or immersing. The additives are then attached at the surface of the cup and/or plant tray. The additives can also be provided by impregnating the structure with a carrier material including the additives. Then, the whole cup and/or plant tray, or a substantial part of it, is penetrated by the additives.

At least one of the above-mentioned techniques, e.g. the immersing process, can be carried out at the spot where the cup and/or plant tray is to be placed and the young plant is to be planted, thereby providing a system that is in principle suitable for application everywhere on Earth, while the last processing step, e.g. the immersing process, makes the system especially dedicated for use at the location of interest. In addition, by providing additives a relatively short time before actually placing the cup and/or plant tray, the additives can immediately start penetrating the subsoil and a ball of soil that carries at least a part of the root structure of the root structure, of the young plant. The additives are then not spoiled during transport and/or storage.

In a specific embodiment according to the invention, the additives are attached to the surface of the cup and/or plant tray by applying an adhesive, preferably a biodegradable adhesive, such as a resin or a syrup. The adhesive can be provided on the surface of the cup and/or plant tray in various manners, e.g. by applying a submersing, spraying and/or dripping process.

In a preferred embodiment according to the invention, a lower part of the cup and/or plant tray surface is provided with additives, e.g. by applying an adhesive as described above. As an example, the outer bottom part is at least partially provided with additives. When nesting plant trays, e.g. for the purpose of storage or transport, the additives are brought inside the reservoir of a lower reservoir. In a specific example, the lower part of the cup surface (bottom structure) is provided with protrusions or with a relief so that additives are easily transferred from the outer bottom of a cup to the inner bottom of a nested cup located therebelow.

By providing the additives only to the lower part of the outer cup surface, additives and adhesives are consumed very efficiently, so that spoil of material is counteracted. Further, it is counteracted that the cup and/or plant tray become dirty. In this respect it is noted that application of heat can be heated for additives that are sensitive to heat, such as fungus. Further, under influence of the gravity force, the additives flow to the lowest area of the outer cup surface, thereby contacting also the inner side of the cup receiving the upper cup, when nested. By dosing an immersing process, the dosing of additives can be performed.

The additives may include aromatic substances, flavourings, such as camphor, chili, pepper or garlic, (artificial) fertilizer or mycorrhizae, anti-fungal material and/or an insecticide, e.g. nicotine or borax for chasing away harmful animals such as termites, and/or fungi. Similarly, the additives may include animal urine or excrements such as elephant excrements, baits such as sugar, honey and/or syrup, and/or dried plant parts, such as dried Melaleuca species, dried Taxodidium species and/or dried Juniperus species. As an

example, dried Taxodidium distichum and/or dried Melaleuca species can be used for chasing away termites.

Further, the additives may include seeds, symbiotic bacteria, eggs, nutrients and/or spores that may germinate after leaving the base material, thereby improving the biodiversity of the irrigating system.

In addition, the additives may include material that damages harmful animals. Such material may include glass grindings, sand grindings, metal grindings, cement, lime, silicon, rubber or any material that damages harmful animals, preferably without poisoning.

The additives may influence soil characteristics. As an example, an acid degree can be increased or decreased. As a further example, a salt degree can be reduced.

The cup and/or plant tray may include a combination of different additives. As an example, a first part of a plant tray, e.g. a cup might include a first additive, while a second part of the system, e.g. a spacer may include a second additive. The number of additives such as seeds, fungi and/or spores can be determined before integrating in a base material.

Thus, the additive may serve as plant protecting material and/or plant nutrition material.

As an example, the additive may include at least one element of a group consisting of glass grindings, chili pepper (piri piri), Ricinus Communis seed (castor-oil plant), Neem tree (leaf), camphor, Asafoetida, Acidum Boricum (boracic acid), Glucono-Delta-Lacton (also known as E575), Kalium carbonate (E501), Potassium (ash), Magnesium sulfate (called in Dutch “bitterzout”), ginger, black pepper, gypsum, ureum (fertilizer), Canabis Sativa (leaf), Canabis seed, Canabis oil, Melaleuca Alternifolia oil (Tea tree), Datura seed (thorn-bush apple), cement, animal excrements, such as sheep manure or goat manure. By integrating the specific material in the base material, the base material serves as an agent for the specific material that disseminates in a dosed manner.

By using paper material and/or biodegradable plastic, the cup and/or plant tray can be manufactured in a very cheap way. Further, the environmental impact decreases. Some cardboard, paper foam and/or fiber paper types easily tear, thereby counteracting any theft of the cup and/or plant tray. The paper material may include cardboard, cellulose, such as paper tissue, paper foam and/or fiber paper.

According to an aspect of the invention, a paper material carrier is provided including specific material for dissemination into the environment caused by a biodegrading process of the paper material, e.g. due to moisture. The specific material may include the specific materials described above in relation to the base material of the cup and/or plant tray.

Further, additives can be included in a coating layer provided on the cup and/or plant tray, simplifying the manufacturing, storing and distributing process. Advantageously, the structure is provided with a colour top layer, the specific colour indicating the type of additives that are provided on the structure. As an example, yellow systems are applicable for sand type soils, green systems are applicable for rocky type soils, pink systems are applicable for soils having a high pH degree, and gray systems are applicable for soils having a low pH degree. By colouring systems having additive composition dedicated to a particular soil and/or plant, the applicability of the system is even further recognizable. Preferably, the coating is bio-degradable.

It is noted that cups and/or plant trays provided with a particular additive composition can be made distinguishable also in other ways, e.g. by providing marks on the outer surface.

According to an aspect of the invention, there is provided a method of manufacturing the above described cup and/or plant tray.

In order to breed young plants successfully in different soil species on Earth including conditioned spaces such as offices, houses etc., it might be desirable to change the composition of the soil since not all soil types match soil conditions that enable optimal growth of a young plant. Changing a soil's

composition can be performed by a pre-treatment process, before actually planting the plant. Then, the plant can be planted and a plant facilitating system, such an irrigating system, can be placed to improve growth conditions for the young plant, especially in areas that are exposed to relatively extreme weather conditions, such as dry or rocky subsoil.

However, pre-treating the soil might be expensive and/or complex.

According to an aspect of the invention, the soil composition is changed without pre-treating the soil. Thereto, a further method according to the invention includes the steps of selecting a young plant, retrieving information from a soil structure wherein the young plant is to be planted, providing a cup and/or plant tray for facilitating growth of a young plant, wherein the cup and/or plant tray includes disseminatable additives dedicated to the young plant and/or to the soil structure where the young plant is to be planted.

By including disseminatable additives in the cup and/or plant tray, the ground composition can be changed, e.g. in terms of acid degree, salt degree and/or lime degree, by simply placing the plant irrigating system near the plant. The process of pre-treating the soil can now be omitted, thereby saving effort and costs.

Further, by including disseminatable additives, such as an aromatic substance, a flavouring such as camphor, chili, pepper or garlic, a fertilizer, mycorrhizae, anti-fungal material, an insecticide, fungi, animal urine or excrements such as elephant excrements, baits such as sugar, honey and/or syrup, and/or dried plant parts, such as dried Melaleuca species, dried Taxodidium species and/or dried Juniperus species, the environment can be influenced, e.g. by chasing away harmful animals, thereby further increasing growing conditions for the young plant. Specifically, by including animal urine or excrements, harmful animals can be chased away. On the other hand, by including baits, specific animals such as bees can be attracted to the young plant.

By selecting seeds, symbiotic bacteria, eggs, nutrients and/or spores as additives, the young plant can be provided with organic material that is beneficial and dedicated to the specific plant species. Also harmful animal damaging material, such as glass grindings, sand grindings, metal grindings, cement, lime, silicon and/or rubber can be included in the additives.

The cup and/or plant tray can be made from biodegradable material and/or pulp to reduce manufacturing costs and keep environmental impact low. By using biodegradable material the additives, if integrated with the base material which then serves as an agent, can be disseminated in a dosed manner.

By coating the cup and/or plant tray with a coating layer including additives dedicated to the young plant and/or to the soil structure where the young plant is to be planted, a standardized plant irrigating system can be made suitable for use in a specific area on Earth by applying a last manufacturing step. The coating step can be performed centrally in a manufacturing site or locally, near or at the specific planting area. It is noted that also the standardized plant irrigating system can be provided with additives.

Further, the cup and/or plant tray can be provided with a colour. Here, a first cup and/or plant tray having a first additive composition can be provided with a first colour while a second cup and/or plant tray having a second additive composition, different from the first additive composition, can be provided with a second colour, different from the first colour. Thereby, the cup and/or plant tray is optically easily distinguishable for their purpose.

The colour can be provided by applying a coloured top layer on the cup and/or plant tray, e.g. by a painting process. However, the colour can also be provided otherwise, e.g. by penetrating the cup and/or plant tray with coloured particles. As an example, if the cup and/or plant tray is made from pulp, the material can be soaked through by a colour (dye) stuff.

By colouring the cup and/or plant tray, a person applying the system can easily determine which system can be used in a specific area or for breeding a specific plant. Preferably, the specific colour of the system can be chosen such that the person handling the cup and/or plant tray directly associates the cup and/or plant tray with an intended soil type or other area circumstances where the young plant is to be planted. As an example, a yellow cup and/or plant tray might be intended for use in a sand desert, while a gray cup and/or plant tray might be intended for use in rocky soils. By colouring the cup and/or plant tray with a colour that is naturally associated with a particular soil type, the application of the different cups and/or plant trays is made so simple, that a chance of taking a wrong cup and/or plant tray is almost zero. The cup and/or plant tray can also be used by less skilled persons, or even by illiterate persons.

The top layer and the coating layer discussed above can be integrated. However, the layers can also be applied separately, or only one of the layer types can be applied.

The invention is not restricted to the embodiments described herein. It will be understood that many variants are possible.

It is noted that the spacer(s) can be either integrated with the plant tray and/or or cups (e.g., each spacer can be made in one piece with the plant tray), or can be manufactured separately to be assembled as a separate module to the plant tray.

Other such variants will be apparent for the person skilled in the art and are considered to fall within the scope of the invention as defined in the following claims.

Claims

1. A plant tray for propagating plants, comprising a cup for retaining a plant growing medium and a seed, a cutting and/or a plant at least partly embedded in the plant growing medium, the cup having a bottom structure that is penetrable for a plant root growing in a downward direction, wherein the tray further comprises a spacer extending downwardly, beyond the bottom structure of the cup.

2. A plant tray according to claim 1, wherein the bottom structure of the cup is closed.

3. A plant tray according to claim 1 or 2, wherein the inner surface of the cup is substantially tapered downwardly.

4. A plant tray according to any of the preceding claims, wherein the inner surface of the cup is formed as a cone, a pyramid or a rounded tapered structure such as a ball segment.

5. A plant tray according to any of the preceding claims, wherein the bottom structure includes a corrugated profile.

6. A plant tray according to any of the preceding claims, wherein the spacer includes a single or a multiple number of legs.

7. A plant tray according to any of the preceding claims, wherein the spacer defines an air chamber located below the bottom structure of the cup.

8. A plant tray according to any of the preceding claims, comprising a multiple number of spacers extending downwardly, beyond the bottom structure of the cup, wherein the multiple number of spacers include four spacers located offset at lateral corners of the at least one cup.

9. A plant tray according to any of the preceding claims, wherein the plant tray has been manufactured by a pulp moulding process.

10. A plant tray according to any of the preceding claims, wherein the tray mainly consists of moulded pulp selected from: wood pulp, paper pulp, pulp including wood and/or paper material, and/or biodegradable pulp.

11. A plant tray according to any of the preceding claims, comprising additives for disseminating aromatic substance, flavourings, anti-fungal material and/or at least one insecticide for chasing away harmful animals and/or fungi.

12. A plant tray according to any of the preceding claims, wherein a side wall of the cup has locally a structure that is penetrable for a plant root growing in a sideward direction.

13. A plant tray according to claim 12, wherein the plant root penetrable structure includes a mainly elongated portion oriented downwardly.

14. A plant tray according to claim 12 or 13, wherein the plant root penetrable structure is located at a radially inwardly protruding part of the side wall.

15. A plant tray according to any of the preceding claims, wherein a side wall of the cup has locally a gas permeable structure.

16. A plant tray according to claim 15, wherein the gas permeable structure includes a mainly elongated portion oriented sidewardly.

17. A plant tray according to any of the preceding claims, wherein a penetrable structure includes an aperture, incision, cut, and/or slit.

18. A plant tray according to any of the preceding claims, wherein the cup has in a cross section, when viewed downwardly, an oval shaped or circular shaped contour.

19. A plant tray according to any of the preceding claims, wherein the inner surface of the cup is provided with inwardly extending protrusions.

20. A plant tray according to any of the preceding claims, further comprising a downwardly extending rib attached to an outer surface of the cup.

21. A plant tray according to any of the preceding claims, comprising biodegradable material.

22. A plant tray according to any of the preceding claims, comprising a body including plant protecting and/or plant nutrition material.

23. A plant tray according to any of the preceding claims, comprising a multiple number of cups.

24. A plant tray according to claim 23, comprising intermediate portions interconnecting the individual cups and including a water guiding structure for guiding water from the intermediate portions towards the cups.

25. A plant tray according to claim 23 or 24, wherein the cups are removably connected to each other.

26. A plant tray according to any of the preceding claims, wherein the cup has at least two cup sections that can be mutually moved from a first state to a second state, wherein inner sides of the cup sections are positioned away from each other when the cup sections are in their first state, wherein the inner sides form a cup's inner side, for retaining the plant growing medium, when the cup sections are in their second state.

27. A plant tray according to claim 26, wherein the cup sections of each cup are pivotally connected to each other.

28. A plant tray according to claim 26 or 27, wherein the cup sections are integrally provided with a locking structure for locking the cup sections together when they are in the second state.

29. A plant tray according to any of claims 26-27, wherein the cup sections of a cup are interconnected by interconnecting profiles, the interconnecting profiles including spacer sections forming the cup's spacer when the cup sections are in the second state.

30. A plant tray according to any of claims 26-29, including a plurality of cups, each cup having at least two cup sections that can be mutually moved from the respective first state to the respective second state, wherein the cup

sections are all in their first state for example for storage and/or transport of the plant tray.

31. A plant tray according to claim 30, wherein the plant tray has been manufactured by a pulp moulding process.

32. A plant tray according to any of the preceding claims, wherein the tray is nestable.

33. A plant tray according to any of the preceding claims, wherein each cup has a concave bottom structure, the concave bottom structure having a section that is penetrable for a plant root growing in a downward direction, and the concave bottom structure having a section that acts as the spacer extending downwardly, beyond the section that is penetrable for the plant root.

34. A method of planting a plant, comprising the steps of:

- providing a plant tray comprising biodegradable material, the tray including a cup retaining a plant growing medium and a plant embedded in said medium, and
- placing the cup on the ground.

35. A method according to claim 34, further comprising the step of removing a cup from the plant tray that includes a multiple number of cups, before placing the cup on the ground.

36. A method according to claim 34 or 35, wherein the cup is placed in a hole in the ground.

37. A method according to claim 34, 35 or 36, further comprising the step of covering a side wall of the cup at least partly with ground.

38. A tray, wherein the tray has been manufactured by a pulp moulding process, the tray comprising at least one cup, the cup having a bottom structure that is preferably penetrable for a plant root growing in a downward direction,

characterised in that each cup is an adjustable cup, having at least two cup sections that can be mutually moved from a first state to a second state,

wherein inner sides of the cup sections are positioned away from each other when the cup sections are in their first state, wherein the inner sides form a cup's inner side, enclosing a cup's interior space, when the cup sections are in their second state, the moulding process including manufacturing the tray with the cup sections in their first state.

39. A tray according to claim 38, wherein the cup sections of each cup are pivotally connected to each other.

40. A tray according to any of claims 38-39, wherein the cup sections are integrally provided with a locking structure for locking the cup sections together when they are in the second state.

41. A tray according to any of claims 38-40, wherein a height (H) of each cup is significantly larger than a maximum width (W) of each cup, for example by a factor of at least 1.5 and particularly by a factor of at least 2.

42. A tray according to any of claims 38-41, wherein the cup sections of a cup are interconnected by interconnecting profiles.

43. A tray according to any of claims 38-42, wherein the tray mainly consists of moulded pulp selected from: wood pulp, paper pulp, pulp including wood and/or paper material, and/or biodegradable pulp.

44. A tray according to any of claims 38-43, wherein each cup is defined by only two mutually adjustable cup sections, particularly two cup halves.

45. A tray according to any of claims 38-44, wherein each of the cup sections integrally includes two parallel interconnecting profiles, extending in opposite directions from the respective wall section, wherein the two interconnecting profiles of the first cup section are integrally connected to the interconnecting profiles of the second cup section.

46. A method of manufacturing a tray, for example a tray according to any of claims 1-33, 38-45, the tray comprising at least one cup, preferably at least one row of cups, wherein a pulp moulding process is used, characterised in that the tray is moulded by the pulp moulding process with cup sections of each cup in a first state, in which first state inner sides of the

respective cup sections are positioned away from each other, wherein after the moulding the cup sections of each cup can be adjusted from the first state to a second state for enclosing a cup's interior space of the respective cup.

47. The method according to claim 46 wherein a mould is used that is configured to form all cup sections of each cup in their first state.

48. The method according to claim 46 or 47, wherein the tray is provided with folding sections, for mutually folding the cup sections towards each other.

49. The method according to any of claims 46-48, wherein the tray is provided with locking structures, for mutually locking the cup sections to each other when they are in their second state.

50. A plant tray according to claim 8, further comprising a web extending in a plane substantial transverse with respect to the downward direction and interconnecting upper portions of the at least one cup to upper portions of the spacers.

51. A plant tray according to claim 8 or 50, wherein the at least one cup and the spacers are tapered downwardly.

52. A plant tray according to any of the preceding claims 8 or 50-51, comprising cups arranged in a row or a matrix.

53. A plant tray according to any of the preceding claims 8 or 50-52, wherein the spacers are located in a regular pattern.

54. A plant tray according to any of the preceding claims 8 or 50-53, wherein a spacer is surrounded, in the lateral direction, by four cups.

55. A cup for retaining a plant growing medium and a seed, a cutting and/or a plant at least partly embedded in the plant growing medium, the cup having a bottom structure and a side wall that includes a corrugated profile, wherein the corrugated profile is provided, at a laterally outwardly protruding location, with a local structure that is penetrable for a plant root growing in a sideward direction.

56. A cup according to claim 55, wherein the corrugated profile is mainly V-shaped.

57. A cup according to claim 55 or 56, wherein the laterally outwardly protruding locations are substantially lying on a rectangle, square, polygone, oval or circle.

58. A cup according to any of the preceding claims 55-57, wherein the bottom structure is penetrable for a plant root growing in a downward direction.

59. A cup according to any of the preceding claims 55-58, wherein the bottom structure includes a corrugated profile that is provided, at a downwardly protruding location, with a local structure that is penetrable for a plant root growing in a downward direction.

60. A cup according to any of the preceding claims 55-59, further comprising a spacer extending downwardly, beyond the bottom structure.

61. A plant tray according to any of the claims 8 or 50-54, comprising a cup according to any of the claims 55-60.

62. A method for propagating plants, comprising the step of placing a first cup from a plant tray according to any of the claims 1-33, 38-45, 50-54 and 61 into a second cup from a plant tray according to any of the claims 1-33, 38-45, 50-54 and 61, wherein the first cup includes a plant growing medium and a plant having a root structure that extends through the plant growing medium, and wherein the size of the first cup is smaller than the size of the second cup such that the first cup fits into the second cup.

63. A method for retaining plants and/or flowers, comprising the step of placing a cup from a plant tray according to any of the claims 1-33, 38-45, 50-54 and 61, into a plant pot or flower vase, the cup containing a plant and/or a flower.

64. A cup according to any of the preceding claims 55-60 and/or a plant tray according to any of the claims 1-33, 38-45, 50-54 and 61, wherein the cup and/or the plant tray has been manufactured from paper material and/or biodegradable plastic.

65. A cup and/or a plant tray according to claim 64, wherein the paper material includes cardboard, cellulose, paper foam and/or fiber paper.

66. A cup and/or a plant tray according to claim 64 or 65, wherein the fiber paper includes coconut fiber, cotton fiber, banana fiber, jute fiber, wool fiber, straw fiber, grass fiber, hemp fiber, kenaf fiber, wheat straw paper, sunflower stalks fiber, rags fiber, mulberry paper and/or kozo.

67. A cup and/or a plant tray according to any of the preceding claims 64-66, wherein the paper material includes water impermeable material and/or is provided with a liquid impermeable coating.

68. A cup and/or a plant tray according to any of the preceding claims 64-67, wherein the biodegradable plastic is based on renewable raw materials including a biodegradable additive, or petroleum based plastics including a biodegradable additive.

69. A cup and/or a plant tray according to any of the preceding claims 64-68, that is arranged for disseminating aromatic substance, flavourings, anti-fungal material and/or at least one insecticide for chasing away harmful animals and/or fungi.

70. A cup and/or a plant tray according to any of the preceding claims 64-69, including disseminatable additives dedicated to the plant and/or to the soil structure where the young plant is to be planted.

71. A cup and/or a plant tray according to claim 70, wherein the disseminatable additives are integrated in the base material of the cup and/or plant tray.

72. A cup and/or a plant tray according to any of the preceding claims 64-71, wherein the disseminatable additives modify soil characteristics, such as the acid degree, a salt degree and/or a lime degree.

73. A cup and/or a plant tray according to any of the preceding claims 64-72, wherein the disseminatable additives comprise an aromatic substance, a flavouring such as camphor, chili, pepper and/or garlic, a fertilizer, mycorrhizae, anti-fungal material, an insecticide, fungi, animal urine or

excrements such as elephant excrements, baits such as sugar, honey and/or syrup, and/or dried plant parts, such as dried Melaleuca species, dried Taxodidium species and/or dried Juniperus species.

74. A cup and/or a plant tray according to any of the preceding claims 64-73, wherein the disseminatable additives comprise seeds, symbiotic bacteria, eggs, nutrients and/or spores.

75. A cup and/or a plant tray according to any of the preceding claims 64-74, wherein the disseminatable additives comprise a harmful animal damaging material, such as glass grindings, sand grindings, metal grindings, cement, lime, silicon and/or rubber.

76. A cup and/or a plant tray according to any of the preceding claims 64-75, wherein the cup and/or plant tray is coated with a coating layer including additives dedicated to the young plant and/or to the soil structure where the young plant is to be planted.

77. A method of manufacturing a cup according to any of the preceding claims 55-60 and/or a plant tray according to any of the claims 1-33, 38-45, 50-54 and 61, wherein the method includes the step of manufacturing the cup and/or a plant tray from paper material and/or biodegradable plastic.

78. A method for propagating a plant, comprising the steps of:

- selecting a young plant,
- retrieving information from a soil structure wherein the young plant is to be planted,
- providing the cup and/or the plant tray for facilitating growth of a young plant,

wherein the cup and/or the plant tray includes disseminatable additives dedicated to the young plant and/or to the soil structure where the young plant is to be planted.

79. A method according to any of the preceding claims 77 or 78, comprising the step of providing the cup and/or the plant tray with a colour, wherein a first cup and/or plant tray provided with a first additive composition

has a first colour and wherein a second cup and/or plant tray provided with a second additive composition, different from the first additive composition, has a second colour, different from the first colour.

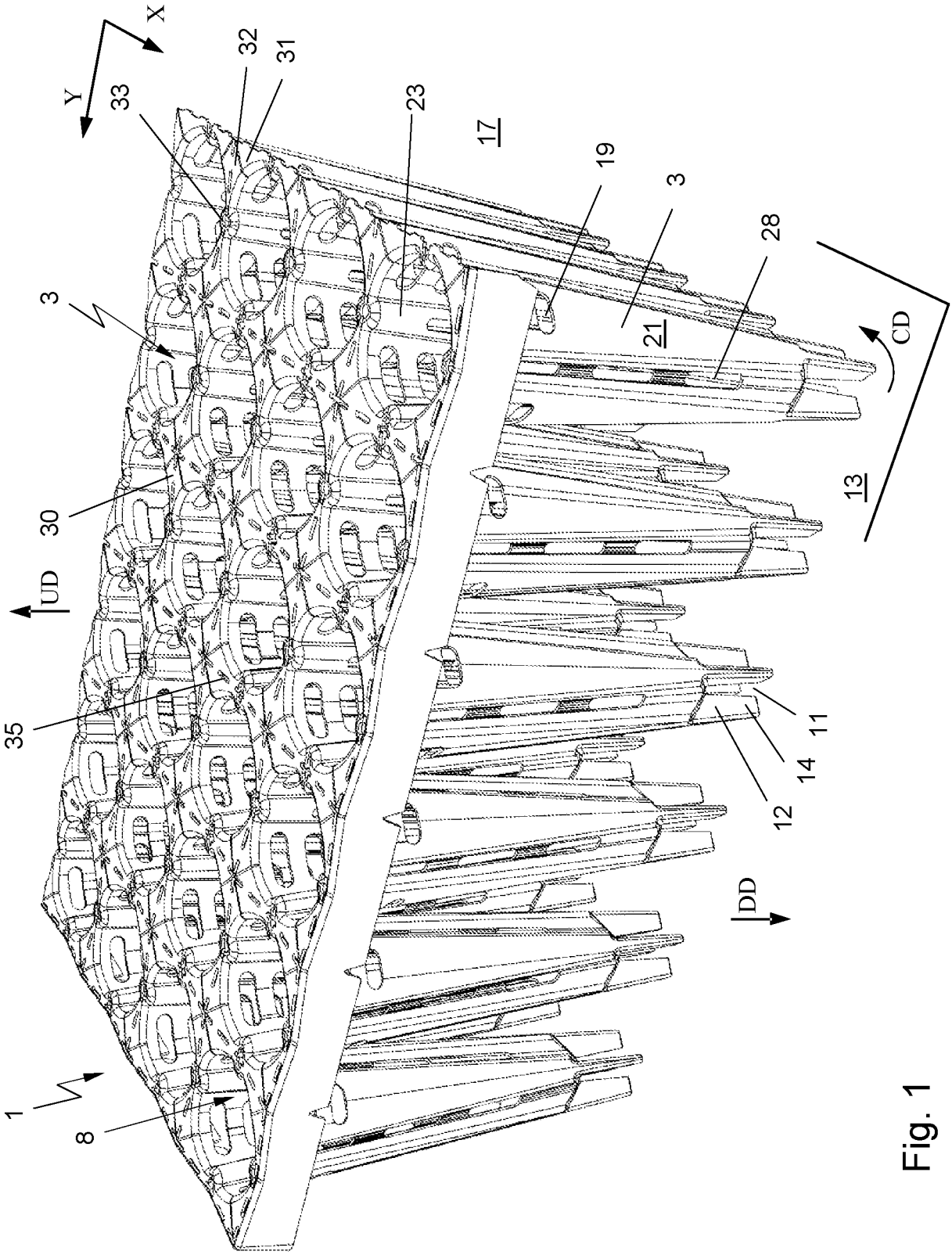

Fig. 1

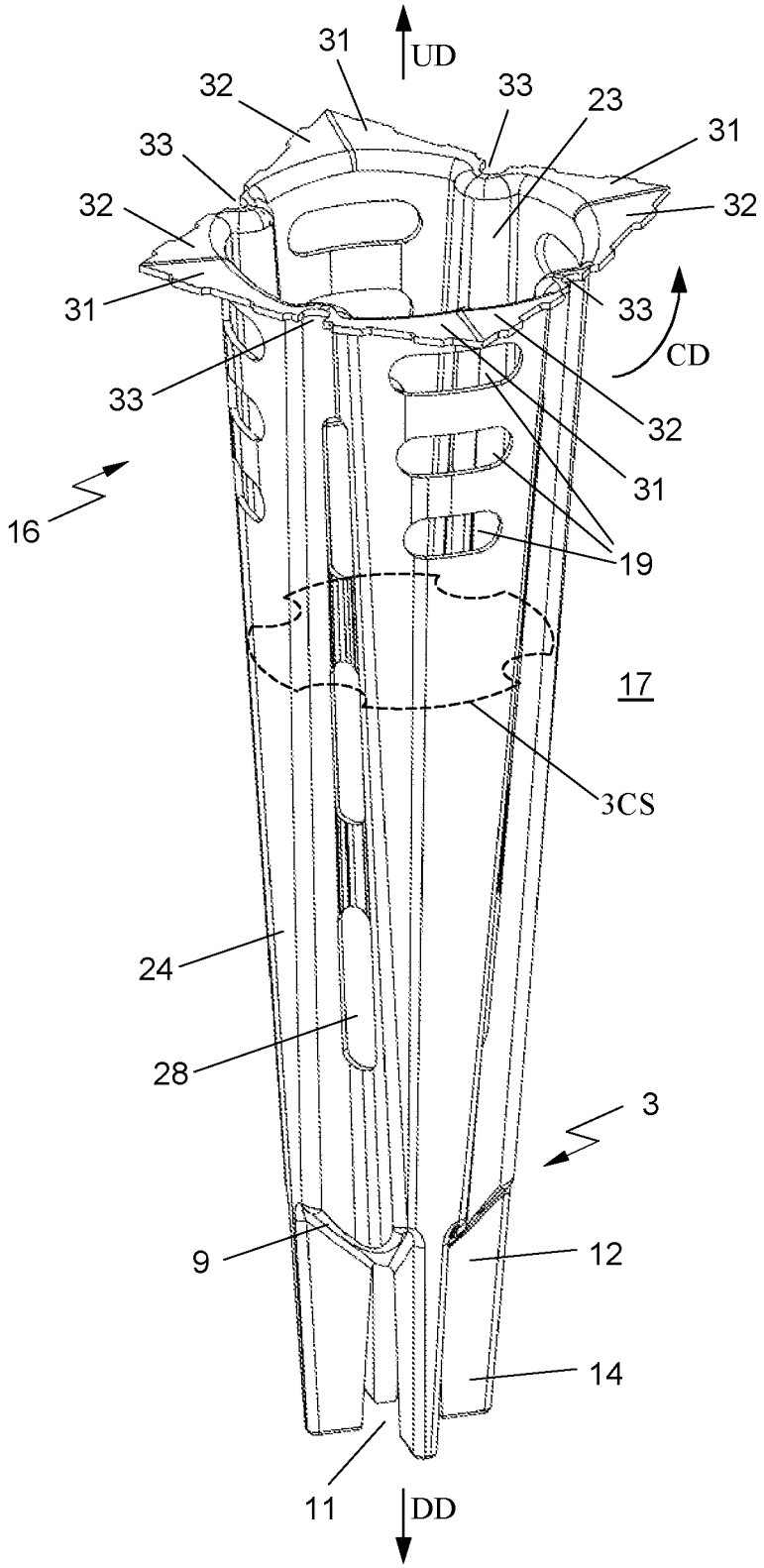
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Fig. 2

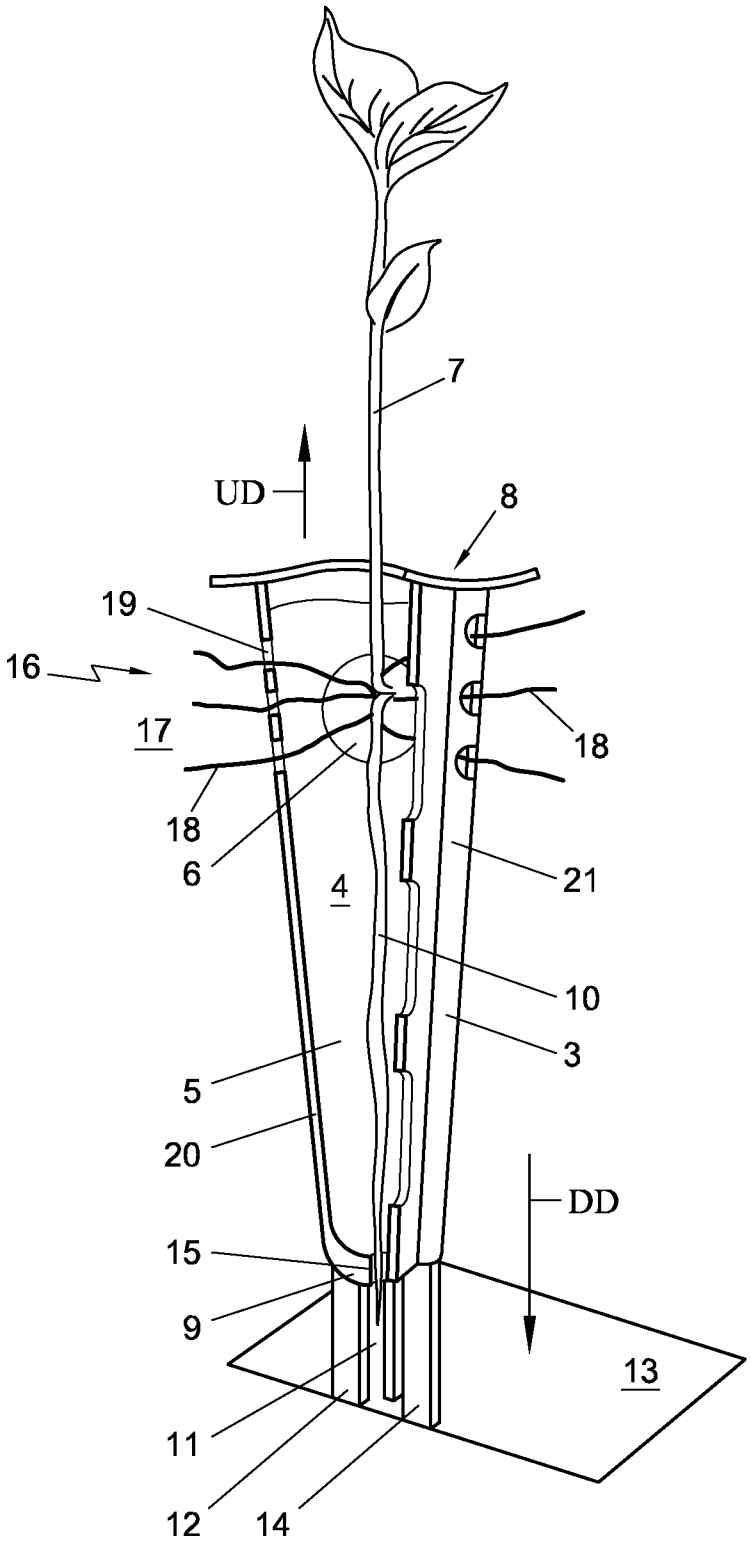

Fig. 3

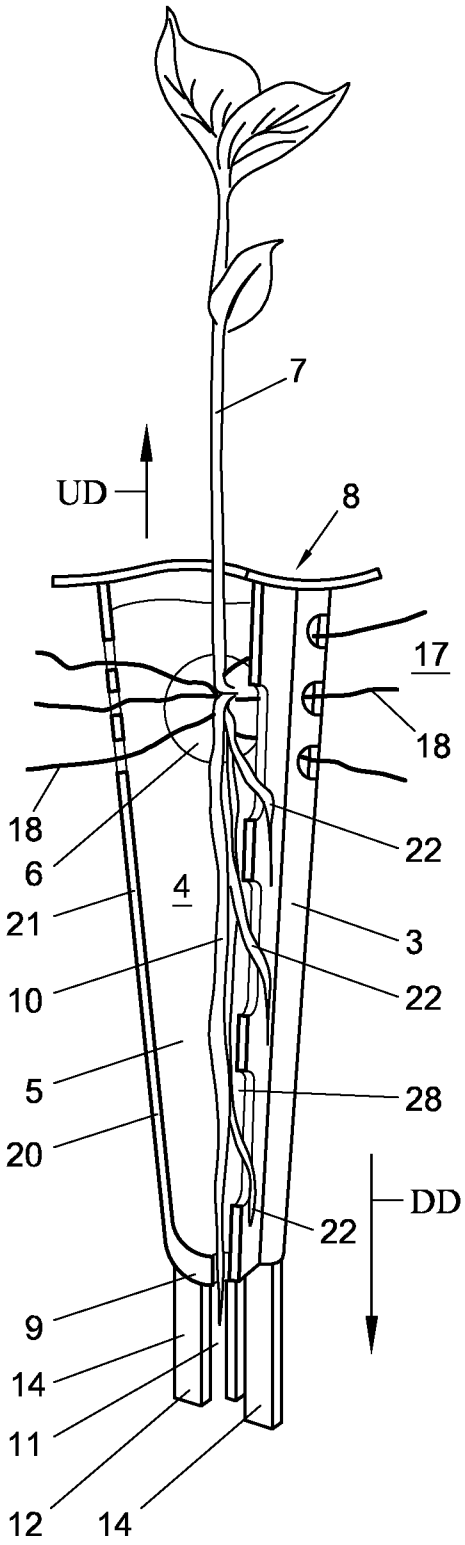

Fig. 4

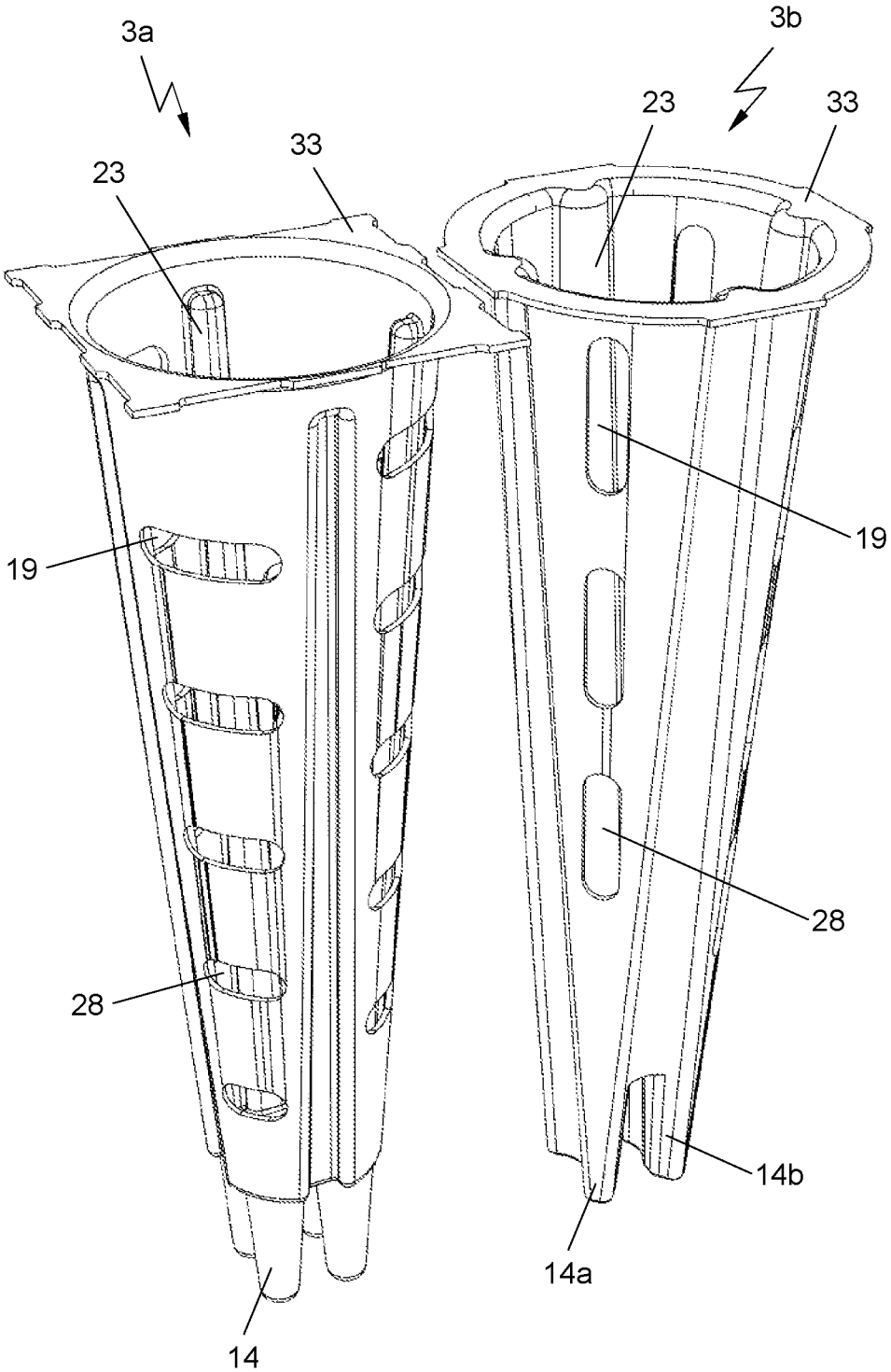

Fig. 5

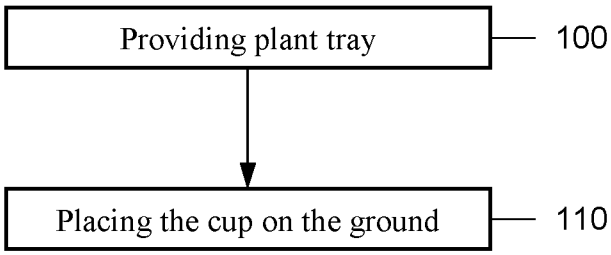

Fig. 6

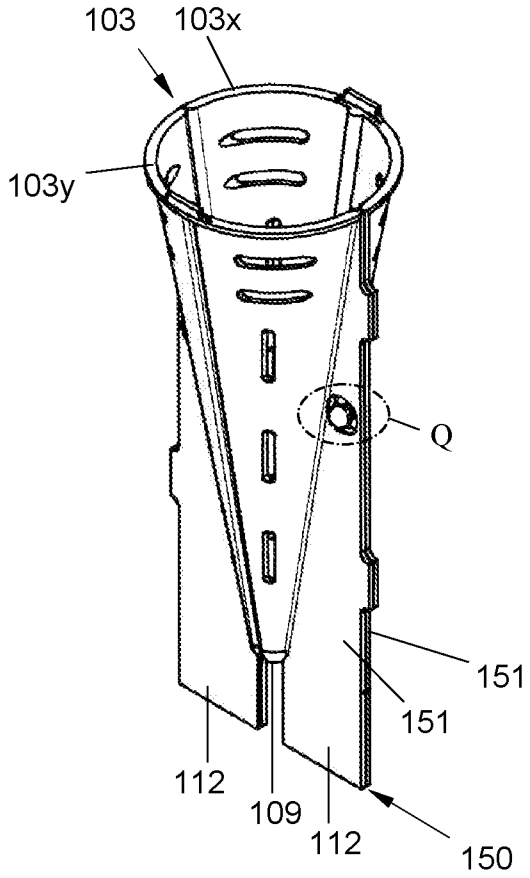

Fig. 7

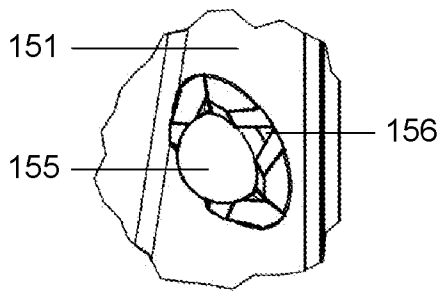

Fig. 8

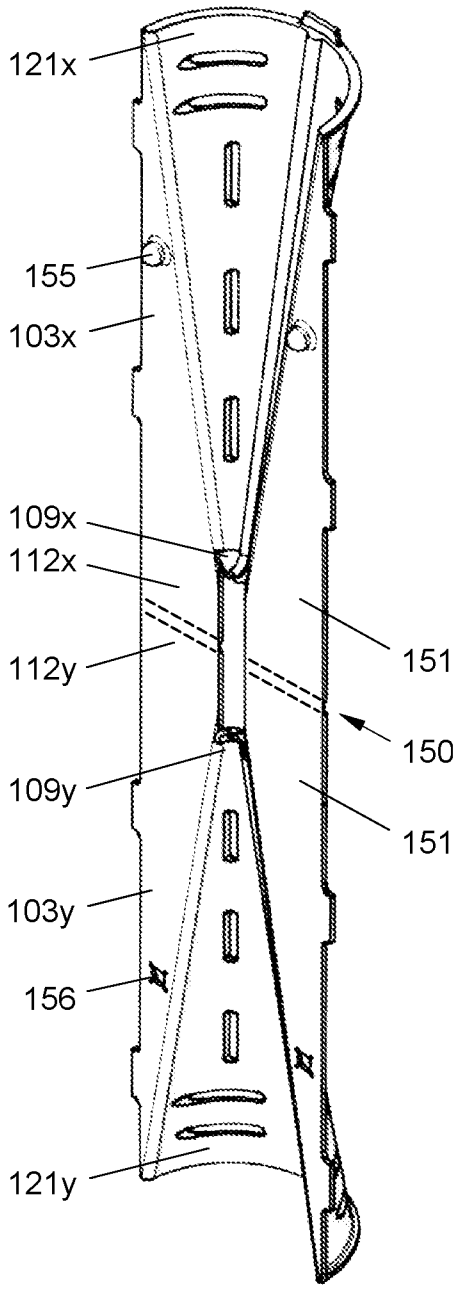

Fig. 9

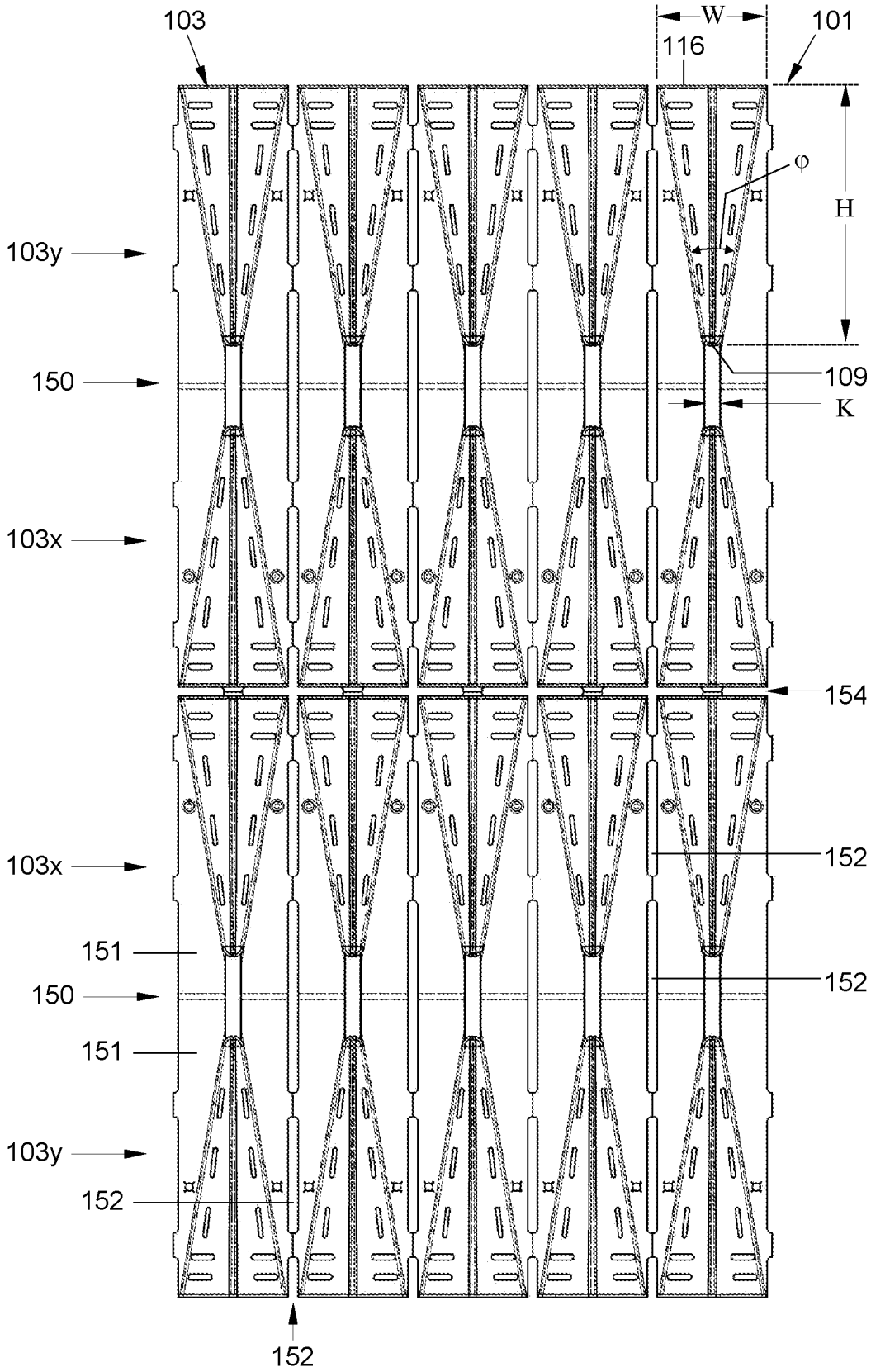
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Fig. 10

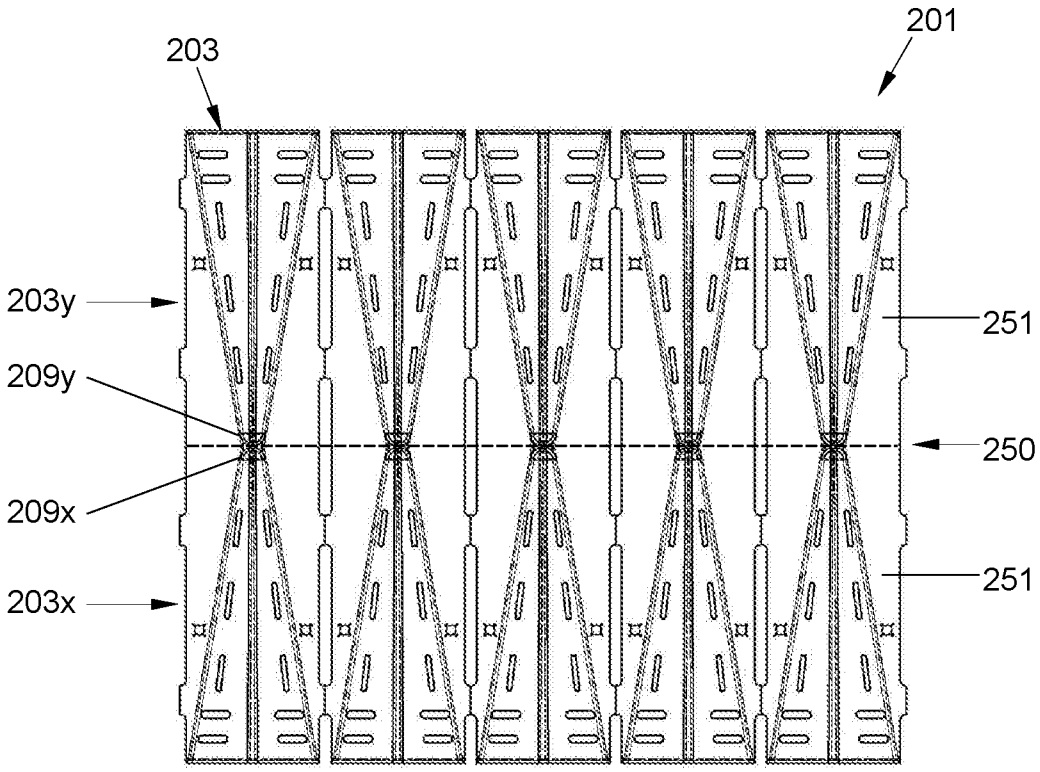

Fig. 11

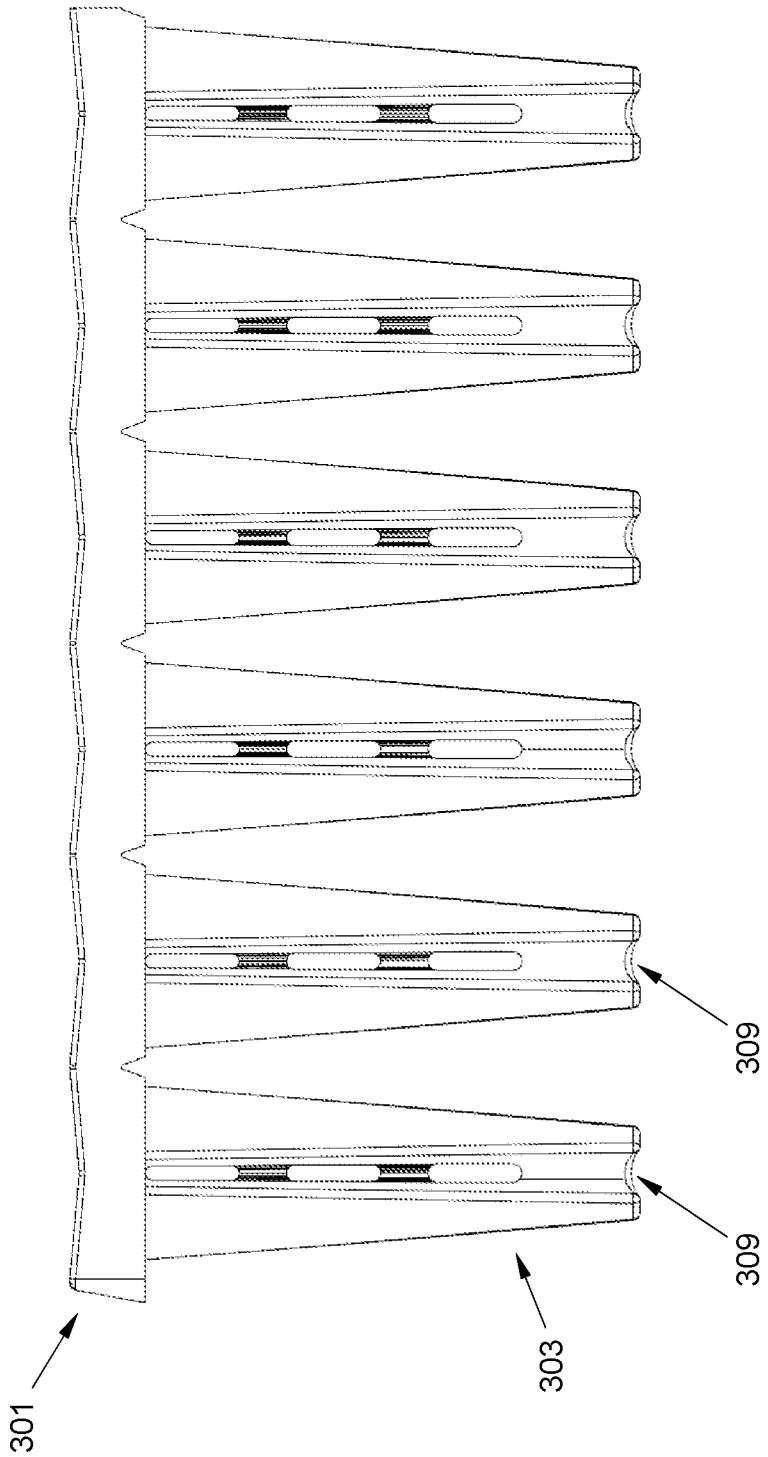

Fig. 12

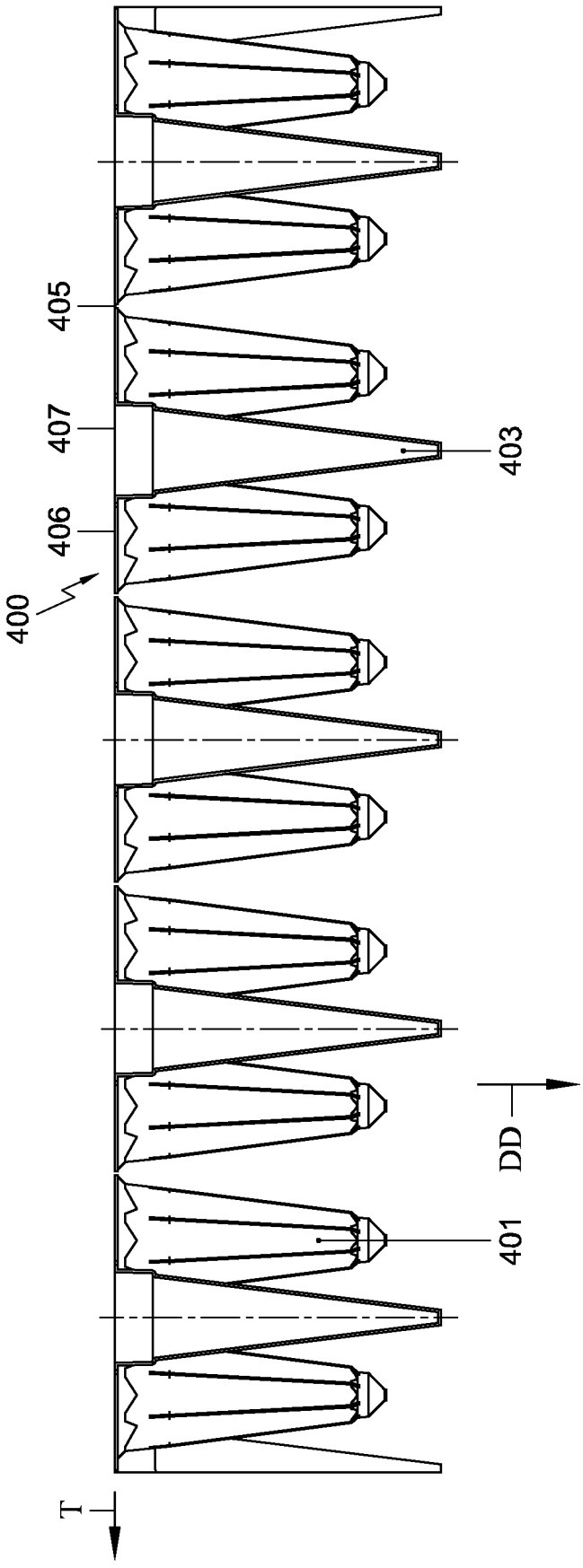

Fig. 13

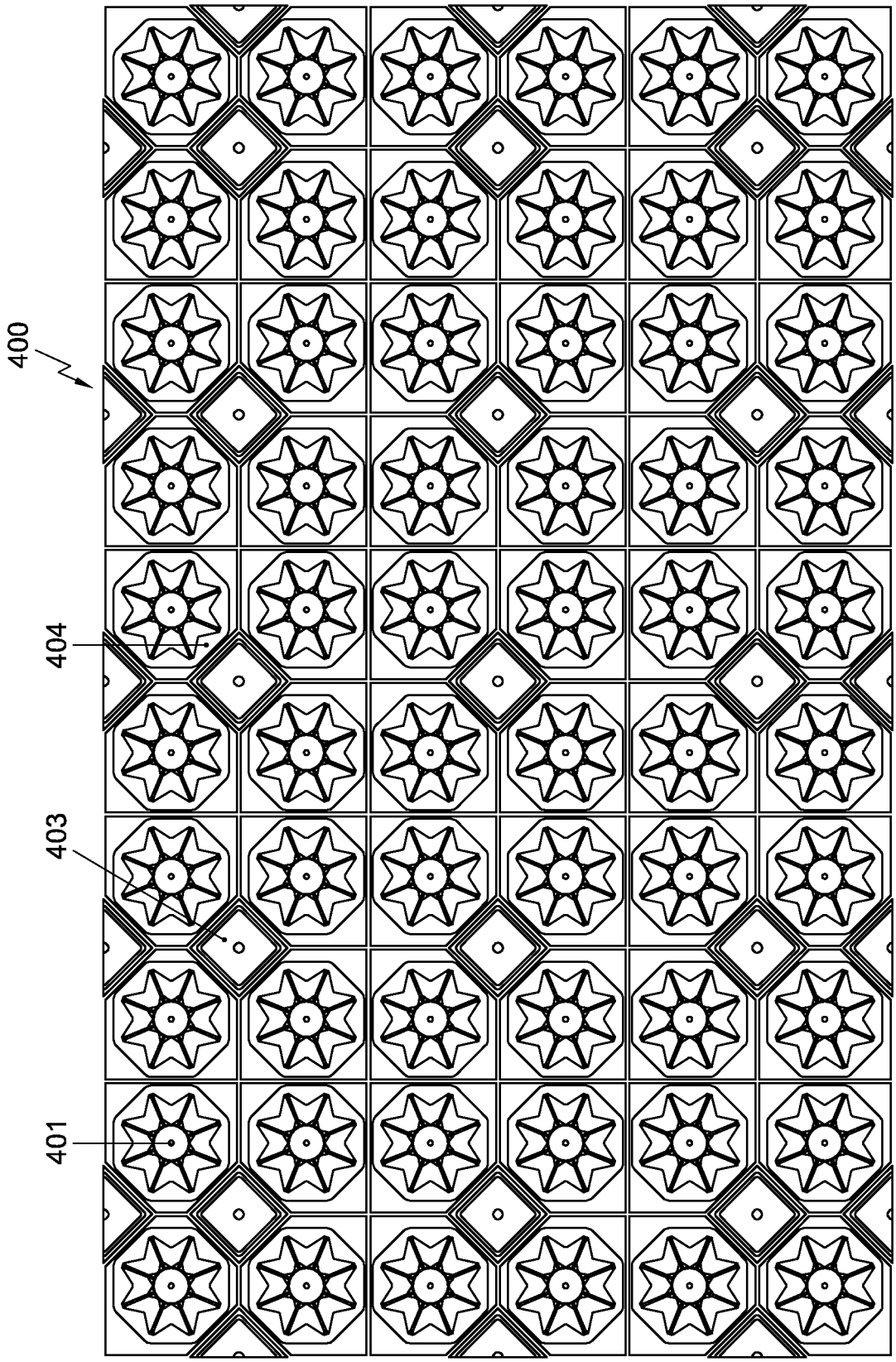

Fig. 14

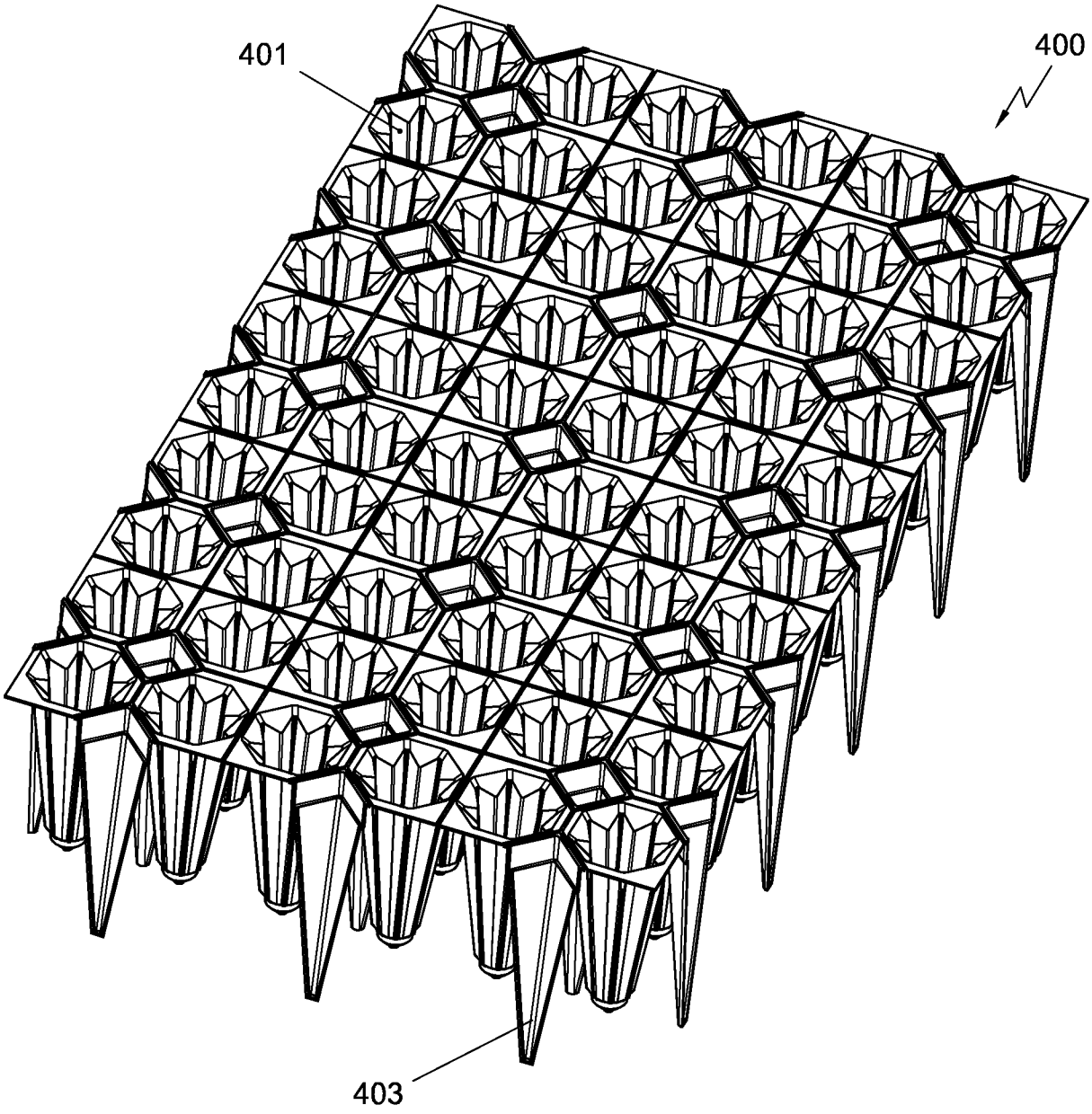

Fig. 15

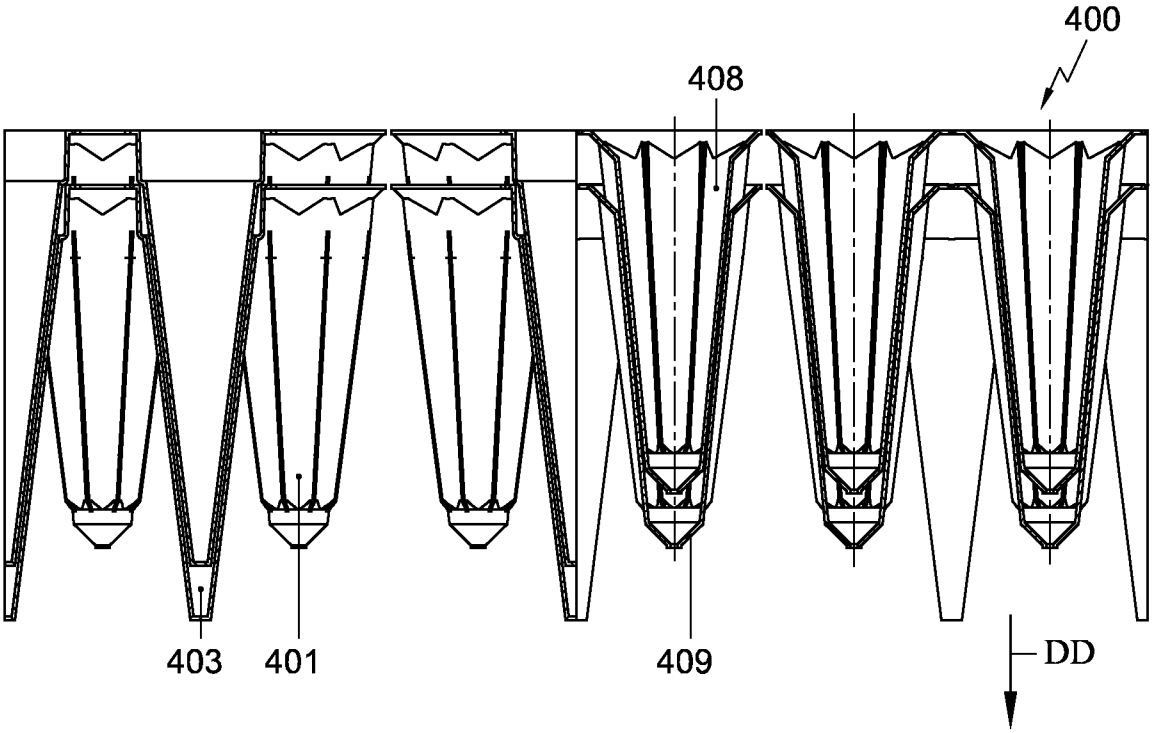

Fig. 16

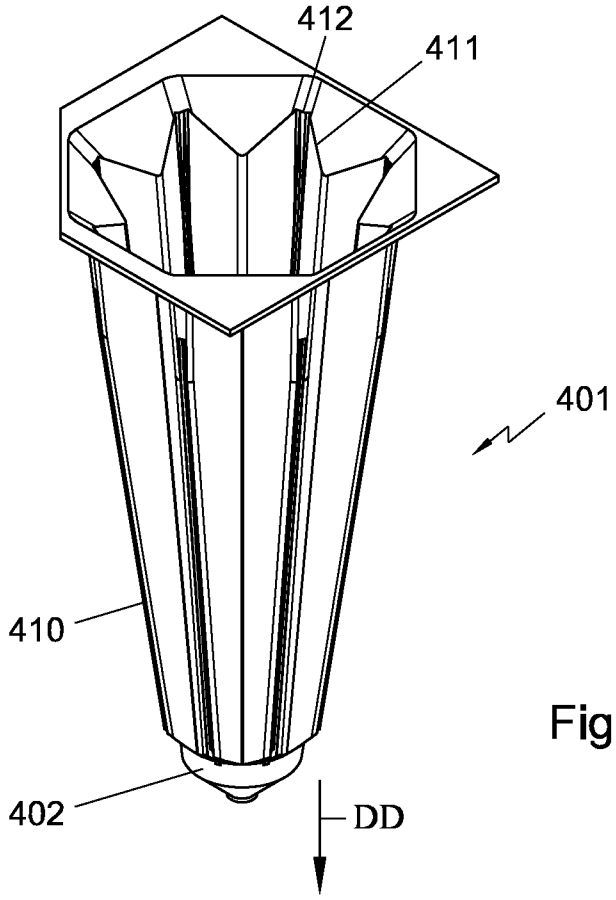

Fig. 17

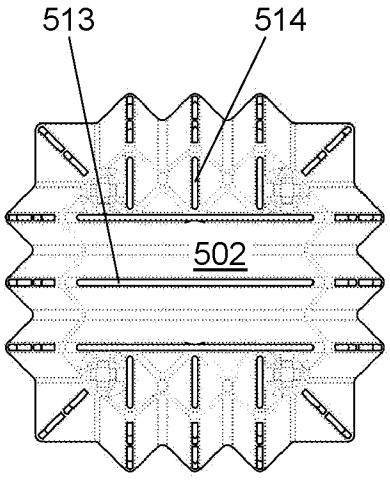

Fig. 19a

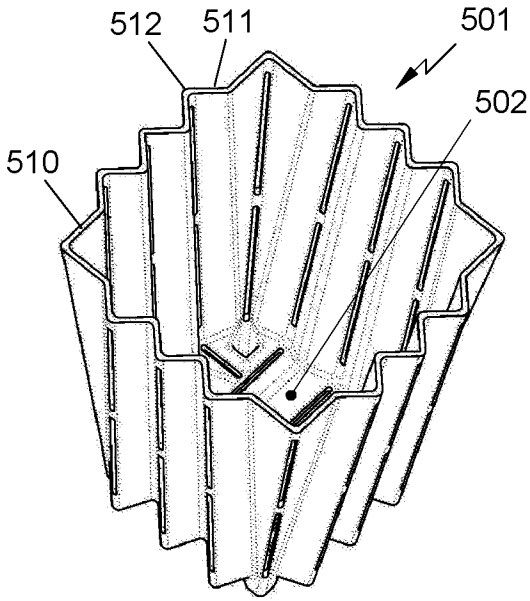

Fig. 18

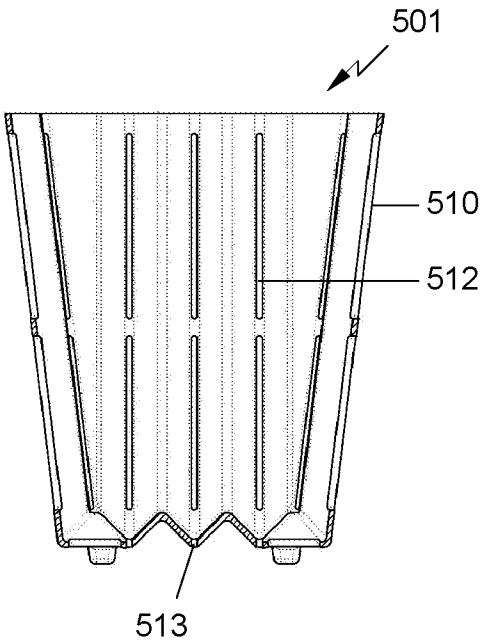

Fig. 19b

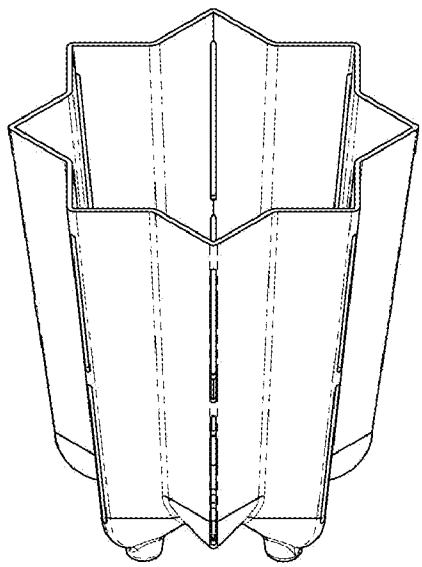

Fig. 20