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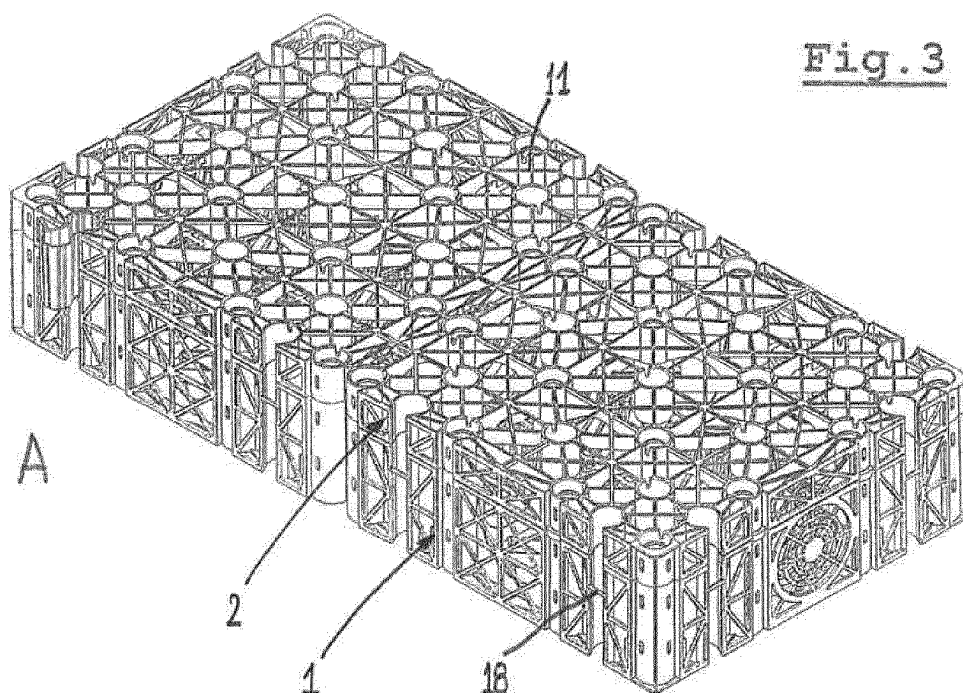
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(54) Irrigation and/or drainage assembly

(57) An irrigation and/or drainage assembly is provided, comprising a box body with a base wall provided with perforations and body side walls provided with perforations extending perpendicularly and integrally connected to said base wall. A separate box cover comprises a top wall provided with perforations and cover side walls extending perpendicularly and integrally connected to said top wall. The box body is provided with a number of body columns extending upwardly from its base wall and having a top end extending above the body side walls and forming coupling members, wherein the base wall

at its lower side is provided with a number of body recesses which are positioned such that, when two box bodies are positioned one on top of the other, the coupling members of the lower of those two box bodies are receivable within the body recesses of the upper of those two box bodies. The box cover is provided with a number of cover columns extending downwardly from its top wall and having a lower end defining cover recesses which are positioned such that, when a box body and a box cover are positioned one on top of the other, the coupling members of the box body are receivable within the cover recesses of the box cover.



EP 2 687 642 A1

Description

[0001] The invention relates to an irrigation and/or drainage assembly, comprising a box body with a base wall provided with perforations and body side walls provided with perforations extending perpendicularly and integrally connected to said base wall.

[0002] A known assembly of this type has such a design that a first box body has to be positioned upside down on top of a second, similar box body for achieving a substantially closed structure (except for the perforations).

[0003] It is an object of the present invention to provide a novel assembly of the type referred to above.

[0004] Thus, in accordance with the present invention such an irrigation and/or drainage assembly is provided which is characterized by a separate box cover comprising a top wall provided with perforations and cover side walls extending perpendicularly and integrally connected to said top wall, wherein the box body is provided with a number of body columns extending upwardly from its base wall and having a top end extending above the body side walls and forming coupling members, wherein the base wall at its lower side is provided with a number of body recesses which are positioned such that, when two box bodies are positioned one on top of the other, the coupling members of the lower of those two box bodies are receivable within the body recesses of the upper of those two box bodies, and wherein the box cover is provided with a number of cover columns extending downwardly from its top wall and having a lower end defining cover recesses which are positioned such that, when a box body and a box cover are positioned one on top of the other, the coupling members of the box body are receivable within the cover recesses of the box cover.

[0005] Due to this design the assembly may be varied in many ways for achieving different structures. When the box cover is positioned on top of the box body (by fitting the coupling members into the cover recesses), a closed structure is obtained of which the height corresponds with the combined height of the box body and cover body and which has a specific internal volume.

[0006] When it is desired to obtain a structure with increased height (and thus increased internal volume), a second box body may be positioned on top of the box body (by fitting the coupling members of the box body into the body recesses of the second box body) and on top of these again a box cover may be positioned. This structure may be enlarged further by stacking any desired number of box bodies on top of each other before finishing with a box cover (it is also conceivable that in certain structures the box cover is omitted).

[0007] In a preferred embodiment of the assembly according to the present invention, the body columns are hollow and the body recesses are defined by the lower end of said body columns. The body columns, in such an embodiment, generally will have a smaller diameter at the top end than the lower end, such that a top end

may be received in a lower end.

[0008] The body columns and cover columns serve a double function: firstly they increase the strength of the assembly against collapsing under an external load and secondly they provide for the coupling between the constitutive parts of an assembly (box body or bodies and box cover).

[0009] In one embodiment the height of the box body is larger than the height of the box cover.

[0010] In a handy embodiment of the assembly according to the present invention, the patterns of the coupling members of the box body, body recesses and cover recesses are such, that two box bodies or a box body and a box cover are positionable one on top of the other in a staggered manner.

[0011] Such a staggered stacking of the parts (box body or bodies and box cover) allows to create assemblies in which multiple box bodies are positioned alongside each other and are kept together by other box bodies or box covers positioned on top thereof in a staggered manner.

[0012] For example, in one special embodiment of the assembly, the box body and box cover may have a rectangular shape with two long sides twice as large as two short sides thereof, wherein said patterns are such that on top of two lower box bodies positioned alongside each other with corresponding long sides, two box bodies or box covers, which are likewise positioned alongside each other with corresponding long sides, are positionable orthogonally with respect to the two lower box bodies such that a fully square structure is obtained. Such a structure may be further extended vertically with additional layers of each two adjacently positioned box bodies, wherein the box bodies of a layer are orthogonally oriented relative to the box bodies of an adjacent layer.

[0013] In another embodiment of the assembly according to the present invention, the cover columns may have an upper end extending through the top wall defining additional cover recesses which are positioned such that, when a box cover in an upside down position is positioned on top of a box body, the coupling members of the box body are receivable within said additional cover recesses of the box cover.

[0014] As such an assembly may be obtained of which the top wall is at a position below the upper end of the assembly (as defined by the upper edges of the cover side walls in such an upside down position of the box cover). Further, irrespective the position of the box cover (upside down or not), it may be used to couple a second box body to the box body in an upside down position (thus obtaining a succession of first box body in a normal position, a box cover and a second box body in an upside down position).

[0015] In a further embodiment of the assembly according to the present invention, the body side walls are provided with body coupling apertures for receiving locking members for locking together adjacently positioned box bodies.

[0016] Such body coupling apertures and locking members will have complementary, cooperating profiles and can be used to couple adjacent box bodies for forming an assembly comprising any desired number of box bodies (and box covers) adjacent each other in a single plane. The pattern of the box bodies may be varied (for example defining a grid of perpendicular horizontal rows or defining a staggered pattern).

[0017] In such an embodiment, it further is conceivable that the body coupling apertures extend perpendicularly to the base wall over the entire height of the body side walls, the locking members have a height which is smaller than the height of the body side walls and wherein the body coupling apertures are provided with division members for defining a lower aperture part with a height sufficient for fully receiving a locking member and an upper aperture part with a smaller height such that a locking member positioned therein extends above the box body.

[0018] Such a design with division members in coupling apertures extending perpendicularly to the base wall, allows to position the locking members in the lower aperture parts for simply locking together adjacent box bodies in a same layer of box bodies, or alternatively in the upper aperture part for also achieving a locking function between a layer and a layer (for example of box bodies) positioned directly on top of it.

[0019] Preferably, then, the cover side walls are provided with correspondingly positioned cover coupling apertures.

[0020] In a special embodiment of the assembly according to the present invention, some of the top ends of the body columns extend further above the box body than other top ends. This may result in a weight reduction.

[0021] For inspection purposes it may be conceivable, that the box body on its base wall is provided with a succession of curved guide ribs defining an inspection channel and wherein two opposite box side walls are provided with weakened break-away parts which can be removed for gaining access to said inspection channel.

[0022] For inspecting the internal volume of the assembly at least one of the break-away parts may be removed and an inspection tool (e.g. camera) may be inserted into the assembly.

[0023] Preferably, when the box body has a rectangular shape with two long sides and two short sides, the curved guide ribs are positioned such that an inspection channel is defined extending between the opposite short sides.

[0024] Hereinafter the invention will be elucidated while referring to the drawing, in which:

Figure 1 shows an embodiment of a box body in four different views;

Figure 2 shows in a similar manner a corresponding embodiment of a box cover in four different views;

Figure 3 shows in a similar manner a corresponding embodiment of an assembly of the box body of figure 1 and the box cover of figure 2 in four different views;

Figure 4 shows a structure of a number of adjacently positioned assemblies, and

Figure 5 illustrates different ways of stacking box bodies in a staggered manner.

[0025] An irrigation and/or drainage assembly according to the present invention (shown in figure 3) primarily comprises a rectangular box body 1 (illustrated in figure 1) and a rectangular box cover 2 (illustrated in figure 2). Firstly referring to figure 1 (in which figure 1A shows a perspective view, figure 1B a top plan view and figures 1C and 1D different side elevational views), the box body 1 is provided with a base wall 3, two opposite long body side walls 4 and two opposite short body side walls 5, each extending perpendicularly and integrally connected to said base wall. The base wall 3 and body side walls 4,5 each are provided with multiple perforations for the passage of water.

[0026] The box body 1 further is provided with a number of (hollow) body columns 6,7 extending upwardly from its base wall 3 and having top ends extending above the body side walls for forming coupling members 8,9. The base wall 3 at its lower side is provided with a number of body recesses 10 (in the present embodiment defined by the lower, hollow end of the body columns 6,7) which are positioned such that, when two box bodies 1 are positioned one on top of the other, the coupling members 8,9 of the lower of those two box bodies are receivable within the body recesses 10 of the upper of those two box bodies.

[0027] In the illustrated embodiment, the top ends defining the coupling members 8 of the body columns 6 extend further above the box body 1 than the top ends defining the coupling members 9 of the body columns 7.

[0028] Referring to figure 2 (in which figure 2A shows a perspective view in an upside down position, figure 2B shows a top plan view and figures 2C and 2D different side elevational views), the separate box cover 2 comprises a top wall 11 and cover side walls 12 extending perpendicularly and integrally connected to said top wall. The top wall 11 and cover side walls 12 (which in correspondence to the side walls of the box body comprise two long walls and two short walls) each are provided with multiple perforations for the passage of water.

[0029] The box cover 2 is provided with a number of cover columns 13 extending from its top wall 11 (in the normal position of the box cover 2 -as shown in figure 3- in which its top wall 11 is positioned on top, extending downwardly therefrom, but in the upside down position of the box cover illustrated in figure 2 extending upwardly from the top wall 11) and having an end defining cover recesses 14 which are positioned such that, when a box body 1 and a box cover 2 are positioned one on top of the other, the coupling members 8,9 of the box body 1 are receivable within the cover recesses 14 of the box cover 2.

[0030] In the illustrated embodiment the cover columns 13 have an opposite end extending through the top wall

11 defining additional cover recesses 14' (figure 2D) which are positioned such that, when a box cover 2 in an upside down position is positioned on top of a box body 1, the coupling members 8,9 of the box body are receivable within said additional cover recesses 14' of the box cover.

[0031] A comparison between figures 1 and 2 shows that in the illustrated embodiment the height of the box body 1 is larger than the height of the box cover 2.

[0032] Figure 3 (in which again figure 3A shows a perspective view, figure 3B shows a top plan view and figures 3C and 3D illustrate different side elevational views) shows the box cover 1 of figure 1 and the box cover 2 assembled to an irrigation and/or drainage assembly according to the present invention. In this figure the box cover 2 has been positioned on top of the box body 1 in its normal position with its top wall 11 on top (but it also may be positioned on top of the box body in its upside down position).

[0033] In the top plan view according to figure 3B the box body and box cover exactly coincide. In the illustrated embodiment, the patterns of the coupling members 8,9 and body recesses 10 of the box body 1 and of the cover recesses 14 of the box cover 2 are such however, that two box bodies or a box body and a box cover are positionable one on top of the other in a staggered manner. This has been illustrated schematically in figure 5. Here, the box bodies 1 and box covers 2 have a rectangular shape with two long sides twice as large as two short sides thereof and said patterns are such that on top of two lower box bodies 1 positioned alongside each other with corresponding long sides, two box covers 2 (or box bodies), which are likewise positioned alongside each other with corresponding long sides, are positionable orthogonally with respect to the two lower box bodies 1 such, that a fully square structure is obtained. An alternative position of a top box cover 2' (or box body) has been illustrated in chain lines. The said patterns may allow a large range of different staggered positions, if needed. As such, an extended, coherent assembly may be obtained with any desired number of box bodies and box covers.

[0034] The body side walls 4,5 are provided with body coupling apertures 15 (among others see figures 1A, 1B and 4) for receiving locking members 16 (illustrated in figures 3B, 3C and 4) for locking together adjacently positioned box bodies 1. The cover side walls 12 likewise are provided with correspondingly positioned cover coupling apertures 17 (see figures 2A and B).

[0035] In the illustrated embodiment of the assembly according to the invention, the body coupling apertures 15 extend perpendicularly to the base wall 3 over the entire height of the body side walls 4,5 and the locking members have a height which is smaller than said height of the body side walls. The body coupling apertures 15 are provided with division members 18 (e.g. see figure 1A) for defining a lower aperture part 15' with a height sufficient for fully receiving a locking member 16 and an

upper aperture part 15" with a smaller height such that a locking member positioned therein extends above the box body 1 (but than could extend into a cover coupling aperture 17 of a box cover positioned on top of the box body -see figure 3D-, or in the lower aperture part 15' of a next box body positioned on top of the box body).

[0036] Such box and cover coupling apertures 15,17 and locking members 16 will have corresponding cross sections and may be used to connect adjacent box bodies 1 (or box covers), as illustrated in figure 4. The pattern of the coupling apertures may be chosen such, that adjacent box bodies or box covers also may be connected in a staggered manner.

[0037] Referring to figure 1, the box body 1 on its base wall 3 is provided with a succession of curved guide ribs 19 defining an inspection channel. The two opposite short box side walls 5 are provided with weakened break-away parts 20 which can be removed for gaining access to said inspection channel.

[0038] Finally it is noted, that the body columns 6,7 and cover columns may be provided with openings 21 for the passage of water. These openings 21 may be located between and/or at the ends of the columns, for example at the base wall 3 and top wall 11, respectively.

[0039] The invention is not limited to the embodiments described before, which may be varied widely within the scope of the invention as defined by the appending claims.

Claims

1. Irrigation and/or drainage assembly, comprising a box body with a base wall provided with perforations and body side walls provided with perforations extending perpendicularly and integrally connected to said base wall, **characterized by** a separate box cover comprising a top wall provided with perforations and cover side walls extending perpendicularly and integrally connected to said top wall, wherein the box body is provided with a number of body columns extending upwardly from its base wall and having a top end extending above the body side walls and forming coupling members, wherein the base wall at its lower side is provided with a number of body recesses which are positioned such that, when two box bodies are positioned one on top of the other, the coupling members of the lower of those two box bodies are receivable within the body recesses of the upper of those two box bodies, and wherein the box cover is provided with a number of cover columns extending downwardly from its top wall and having a lower end defining cover recesses which are positioned such that, when a box body and a box cover are positioned one on top of the other, the coupling members of the box body are receivable within the cover recesses of the box cover.

2. Assembly according to claim 1, wherein the body columns are hollow and wherein the body recesses are defined by the lower end of said body columns.
3. Assembly according to claim 1 or 2, wherein the height of the box body is larger than the height of the box cover.
4. Assembly according to any of the previous claims, wherein the patterns of the coupling members of the box body, body recesses and cover recesses are such, that two box bodies or a box body and a box cover are positionable one on top of the other in a staggered manner.
5. Assembly according to claim 4, wherein the box body and box cover have a rectangular shape with two long sides twice as large as two short sides thereof and wherein said patterns are such that on top of two lower box bodies positioned alongside each other with corresponding long sides, two box bodies or box covers, which are likewise positioned alongside each other with corresponding long sides, are positionable orthogonally with respect to the two lower box bodies such, that a fully square structure is obtained.
6. Assembly according to any of the previous claims, wherein the cover columns have an upper end extending through the top wall defining additional cover recesses which are positioned such that, when a box cover in an upside down position is positioned on top of a box body, the coupling members of the box body are receivable within said additional cover recesses of the box cover.
7. Assembly according to any of the previous claims, wherein the body side walls are provided with body coupling apertures for receiving locking members for locking together adjacently positioned box bodies.
8. Assembly according to claim 7, wherein the body coupling apertures extend perpendicularly to the base wall over the entire height of the body side walls, the locking members have a height which is smaller than the height of the body side walls and wherein the body coupling apertures are provided with division members for defining a lower aperture part with a height sufficient for fully receiving a locking member and an upper aperture part with a smaller height such that a locking member positioned therein extends above the box body.
9. Assembly according to claim 7 or 8, wherein the cover side walls are provided with correspondingly positioned cover coupling apertures.
10. Assembly according to any of the previous claims, wherein some of the top ends of the body columns extend further above the box body than other top ends.
11. Assembly according to any of the previous claims, wherein the box body on its base wall is provided with a succession of curved guide ribs defining an inspection channel and wherein two opposite box side walls are provided with weakened break-away parts which can be removed for gaining access to said inspection channel.
12. Assembly according to claim 11, wherein the box body has a rectangular shape with two long sides and two short sides and wherein the curved guide ribs are positioned such that an inspection channel is defined extending between the opposite short sides.
13. Assembly according to any of the previous claims, wherein the body columns and/or cover columns are provided with openings for the passage of water.

Fig. 1

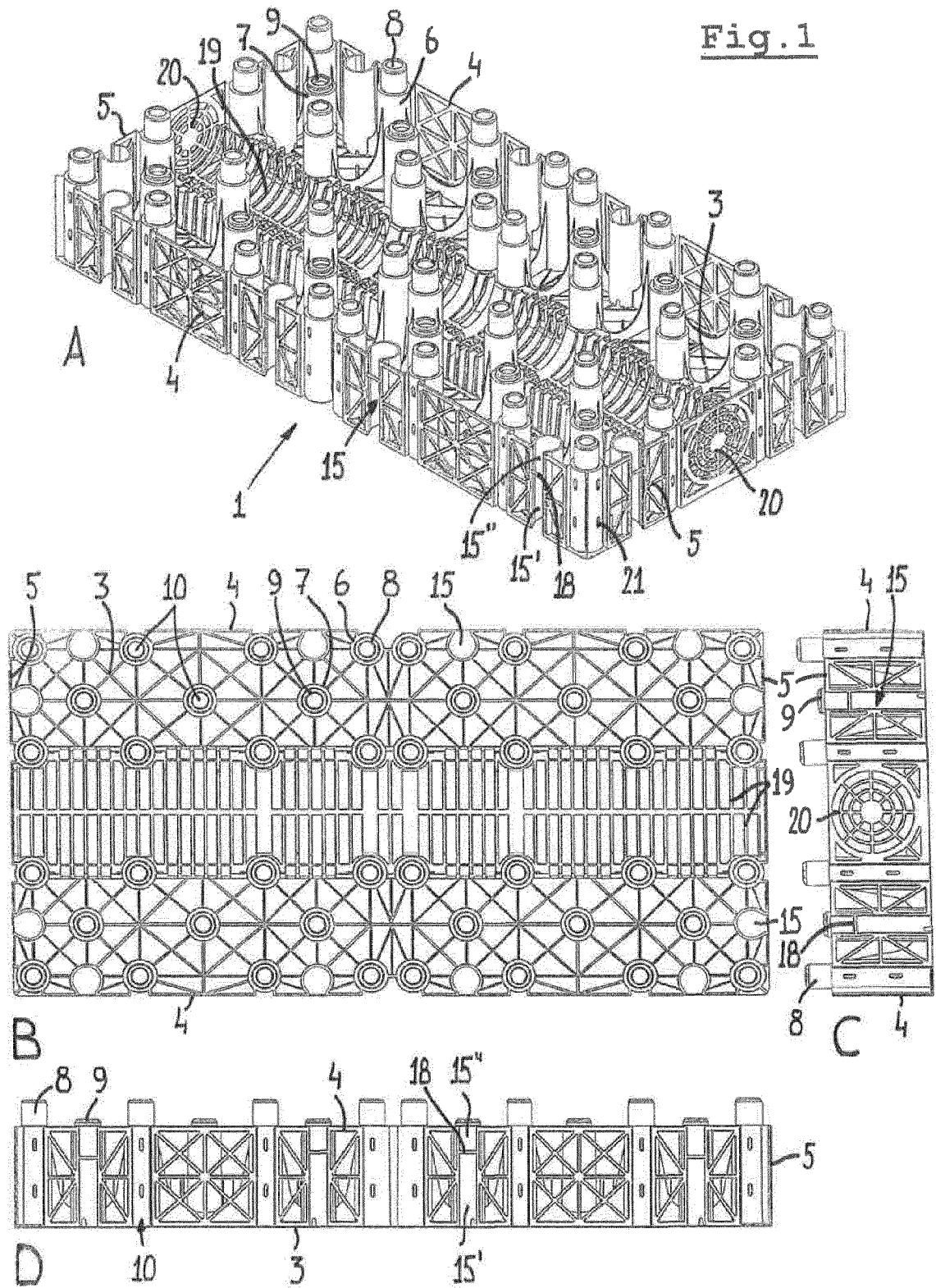


Fig. 2

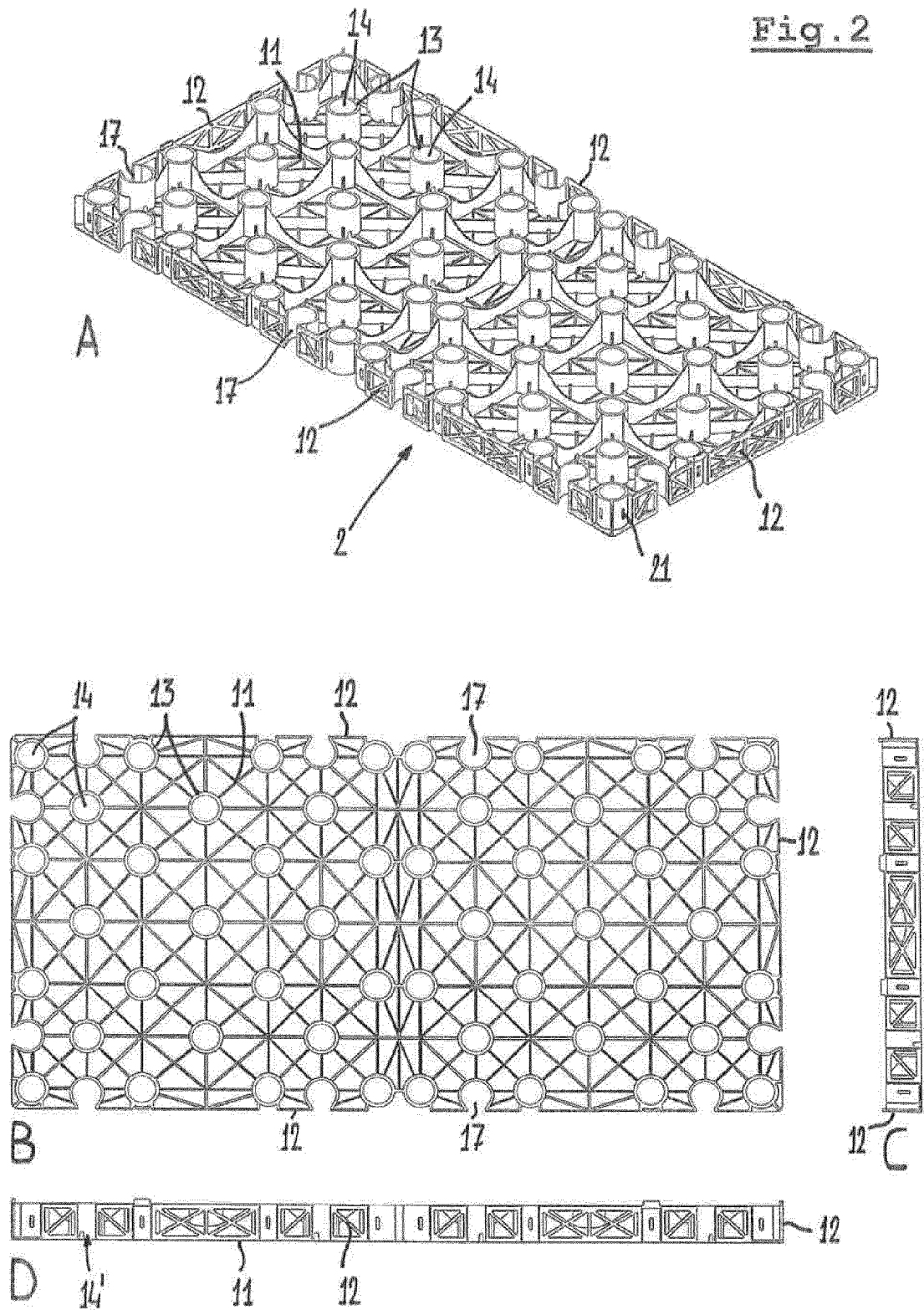
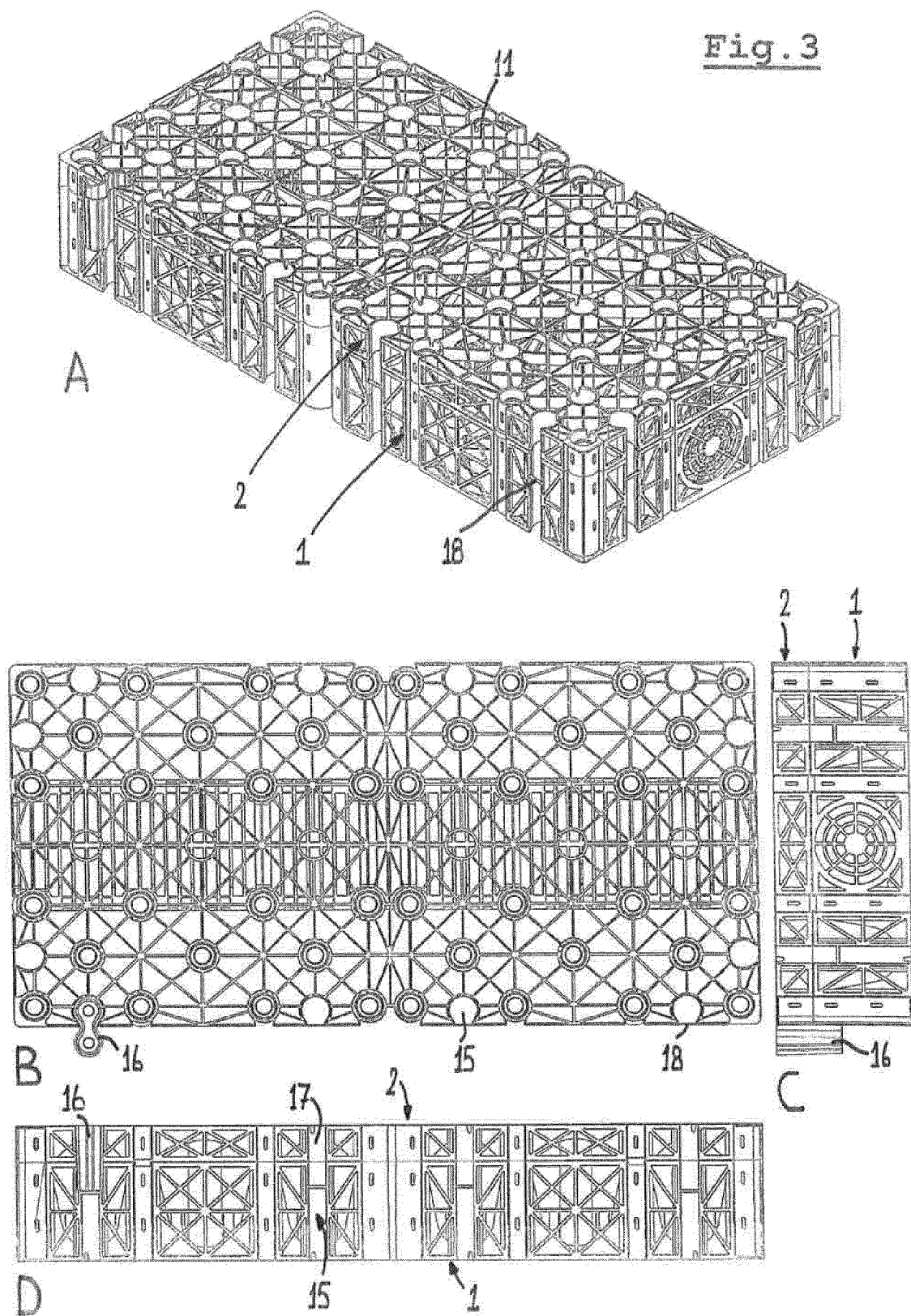
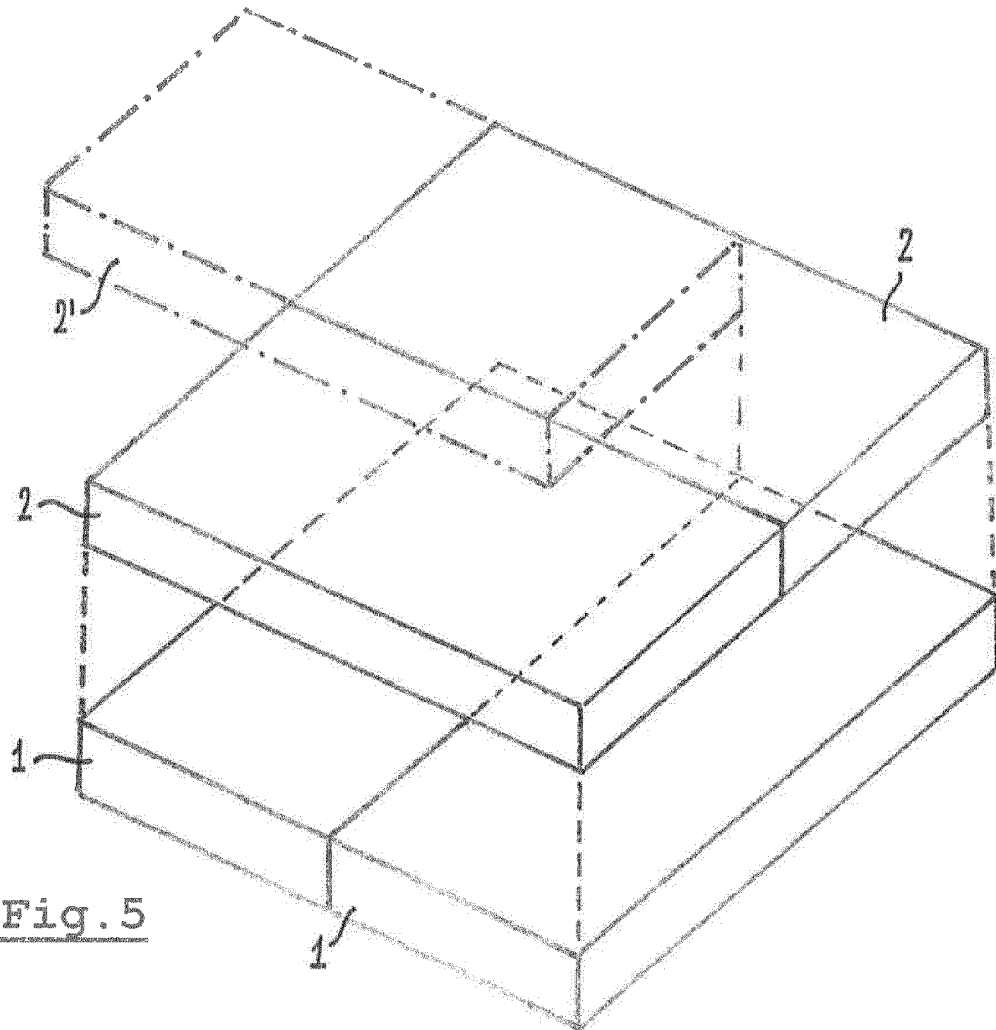
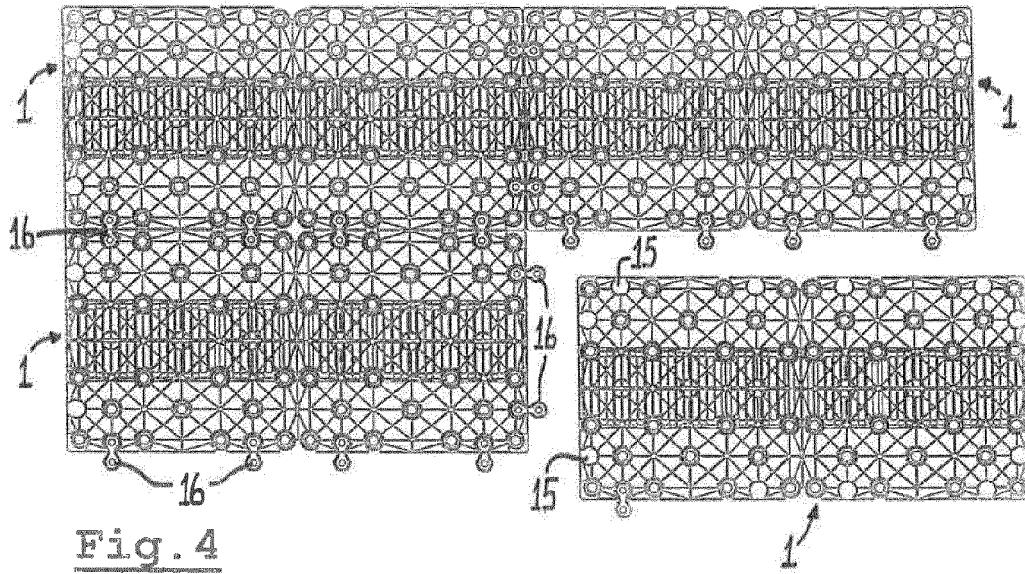


Fig. 3







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