(19) DANMARK

(10) DK/EP 2807312 T3

Patent- og Varemærkestyrelsen

(12) Oversættelse af europæisk patentskrift

(51) Int.Cl.: *E 03 F 1/00 (2006.01)* *E 02 B 11/00 (2006.01)*

(45) Oversættelsen bekendtgjort den: **2019-03-18**

(80) Dato for Den Europæiske Patentmyndigheds bekendtgørelse om meddelelse af patentet: **2018-11-28**

(86) Europæisk ansøgning nr.: **13701970.9**

(86) Europæisk indleveringsdag: **2013-01-23**

(87) Den europæiske ansøgnings publiceringsdag: **2014-12-03**

(86) International ansøgning nr.: **EP2013051183**

(87) Internationalt publikationsnr.: **WO2013110629**

(30) Prioritet: **2012-01-24 DE 102012100560**

(84) Designerede stater: **AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**

(73) Patenthaver: **ACO Severin Ahlmann GmbH & Co. KG, Am Ahlmannkai, 24782 Büdelsdorf, Tyskland**

(72) Opfinder: **Wandkowski, Marco, Volbehrstraße 47, 24119 Kronshagen, Tyskland**
WICHMANN, Thorsten, Bramhorst 44, 24217 Schönberg, Tyskland
MIEZE, Jan, Rendsburger Landstrasse 387 b, 24111 Kiel, Tyskland

(74) Fuldmægtig i Danmark: **Patrade A/S, Ceresbyen 75, 8000 Århus C, Danmark**

(54) Benævnelse: **SAMLING AF TO DRÆNLEGEMER**

(56) Fremdragne publikationer:
WO-A1-2011/089690
DE-A1-102009 044 412
GB-A- 2 417 733

ASSEMBLY OF TWO DRAINAGE BODIES

Description

[0001] The invention relates to an assembly of two drainage bodies, thus of hollow or mesh bodies which can be installed in the ground and which are intended to receive accumulating surface water and to slowly discharge it into the ground or to store the water.

Surface water which often arises in larger volume flows is generally diverted into the public sewer system. Fees have to be paid for this type of water flow. In order to allow this surface water to seep into the ground, so-called infiltration ditches, thus constructions, are known which are installed in the ground and can often take up very large volumes of surface water which then runs into the ground. Infiltration ditches of this kind are made up of individual bodies which are connected to one another. These structures have to be very stable since it is often necessary to drive over the surface underneath which the infiltration ditch is installed. Therefore, not only must the individual bodies which make up the infiltration ditches be stable, but the connections between the individual bodies also have to be stable in order to provide the overall structure with the required stability. It is furthermore necessary here that the drainage body connecting elements not only have the required strength, but that they also have to be easily and cost-effectively manufactured and easily assembled.

A drainage body is known from GB 2 417 733 A having connecting elements according to the preamble of patent claim 1. The connecting elements are suitable for connecting together the base plates of the drainage bodies which lie next to one another.

[0002] The object of the invention is to provide an assembly of two drainage bodies which guarantees a high strength for the connection between the drainage bodies and a precise alignment between the drainage bodies and which can nevertheless be assembled cost-effectively and easily.

[0003] This is achieved with respect to the assembly by the subject of claim 1.

[0004] In particular this is achieved by an assembly comprising two drainage bodies connected via drainage body connecting elements, wherein the drainage body connecting elements each have two pegs which are connected via a web and which can each be inserted into a receiving orifice of a drainage body, so that two drainage bodies are connected to one another via the web and have first locking devices via which a first drainage body connecting element can be connected to a second drainage body connecting element in such a way that the first drainage body connecting element can be mounted in a first drainage body flush or countersunk to the surface thereof and the second drainage body connecting element can be mounted on the first drainage body connecting element to protrude beyond the surface, wherein the pegs of the drainage body connecting elements are insertable into one another.

[0005] By means of this assembly it is now possible on the one hand, when connecting two drainage bodies mounted next to one another, to produce smooth surfaces, thus surfaces without protruding drainage body connecting elements. On the other hand, when drainage bodies are stacked on one another the upper drainage bodies can be fixed in the horizontal direction on the lower drainage bodies via the protruding drainage body connecting elements (fixing in the vertical direction is not at all necessary). It is of particular advantage here if the first and the second drainage body connecting elements are of identical design so that only one type of drainage body connecting element has to be produced.

[0006] The pegs are preferably lockable in the receiving orifices. It can thereby be ensured that even with loads perpendicular to the peripheral surfaces of the pegs, these pegs are not squeezed out from the receiving orifices.

[0007] The pegs preferably comprise outer surfaces tapering conically towards a lower end and preferably comprise at an opposite upper end, a projecting upper edge which is in particular insertable in a form-fit manner into a receiving orifice. In particular, during manufacture using an injection mould the conical shape is particularly well suited for removing the drainage body connecting elements out from the mould.

[0008] In a first embodiment of the invention, the pegs are interlockable in their interfitting position. A very stable construction is thereby easily achieved.

[0009] In another embodiment of the invention, the pegs are interlockable at their ends. This not only produces a simple construction, but also longer connecting elements can be produced to connect drainage bodies which are stacked up one on the other.

[0010] With the first embodiment, the first locking devices are preferably formed such that both the pegs can be locked to one another and also the pegs can be locked to the drainage bodies via these first locking devices. This construction is particularly simple.

[0011] With the second embodiment, it is advantageous if the first locking devices are designed to connect the pegs to one another, and the second locking devices are provided to connect the pegs to the drainage bodies. The said extended construction is thereby easily achieved.

[0012] The pegs are preferably designed so that they are deployable with first ends either countersunk into the receiving orifice or flush to a surface of the drainage body, or with a second end into the receiving orifice to be projecting from the surface of the drainage body. This enables greater variability in the way in which the drainage body connecting elements can be used to assemble the drainage bodies.

[0013] In order to connect stacked up drainage bodies to one another also along their edges, only two pegs, fitted in one another or fastened on one another, are required for each drainage body connecting element. In order not to have to produce separate drainage body connecting elements for this specific purpose, it is advantageous if the web can be separated from the pegs or in particular is splittable in the middle. Drainage body connecting elements made integrally with pegs can thereby be converted into edge connecting elements.

[0014] More advantageously, as a result of the variability of the drainage body connecting element according to the invention, three different types of connection with

this component can be achieved, namely the connection of drainage bodies which are set side by side, connection of drainage bodies which are set one another above the other, as well as the connection of two drainage bodies which are set side by side and two which are set one above the other.

[0015] The drainage body connecting element is preferably designed as an injection moulded part, in particular from plastic, wherein the pegs (and where applicable also the webs) are designed as hollow bodies. This produces a considerable material saving, without significantly reducing the strength of the drainage body connecting elements.

[0016] Embodiments of the invention will now be explained in further detail with reference to illustrations. In the drawings:

Fig. 1 shows a perspective view of a first embodiment of the drainage body connecting elements according to the invention;

Fig. 2 shows two interfitted drainage body connecting elements according to Fig. 1, from a viewing angle inclined from the bottom;

Fig. 3 shows a side view of two interfitted drainage body connecting elements according to Figs. 1 and 2;

Fig. 4 shows a front view of two interfitted drainage body connecting elements according to Figs. 1 to 3;

Fig. 5 shows a view from below of two interfitted drainage body connecting elements according to Fig. 3;

Fig. 6 shows a section along the line VI-VI of Fig. 5;

Fig. 7 shows a perspective view of an assembly of drainage bodies;

Fig. 8 shows a perspective detailed view of a portion of the drainage body according to Fig. 7 with a drainage body connecting element in the Y-direction (X-Z plane);

Fig. 9 shows a sectional view in the Y-Z plane through a drainage body with a drainage body connecting element according to Fig. 8;

Fig.10 shows a section in the X-Y plane through the assembly with a drainage body connecting element according to Fig. 8;

Fig. 11 shows a perspective view of an assembly of drainage bodies with two elements stacked one on the other;

Fig. 12 shows a section in the Y-Z direction through the assembly with two interfitted drainage body connecting elements which are arranged inside the drainage body according to Fig. 11;

Fig. 13 shows a section through the assembly with two interfitted drainage body connecting elements according to Fig. 12 in the X-Y plane;

Fig. 14 shows a perspective detailed view in the Z-direction (X-Y) plane of the drainage body according to Fig. 11;

Fig. 15 shows a section in the Y-Z plane through the assembly with two interfitted drainage body connecting elements according to Fig. 14;

Fig. 16 shows a section in the X-Y plane through the assembly with two interfitted drainage body connecting elements according to Fig. 14;

Fig. 17 shows a perspective view of two drainage bodies in series against one another with a second embodiment of the drainage body connecting elements according to the invention;

Fig. 18 shows a perspective detailed view in the Y-direction (X-Z) plane of a central detail with a drainage body connecting element according to Fig. 17;

Fig. 19 shows a section in the Y-Z plane through a drainage body with a drainage body connecting element according to Fig. 18;

Fig 20 shows a section in the X-Y plane through the two drainage bodies in series against one another with a drainage body connecting element according to Fig. 18;

Fig. 21 shows a perspective view of two drainage bodies stacked one on the other, according to the embodiment according to Figs. 17 to 20;

Fig. 22 shows a section through two drainage body connecting elements which are arranged in the middle in Fig. 21 and connect two drainage bodies to one another;

Fig. 23 shows a section through two drainage body connecting elements which are arranged in a peripheral region of the assembly according to Fig. 21 in the X-Y plane;

Fig. 24 shows a perspective detailed view in the Z-direction (X-Y) plane of the peripheral region of the drainage bodies with two drainage body connecting elements according to Fig. 23;

Fig. 25 shows a section in the X-Y plane through two drainage body connecting elements which are arranged in a central region of the assembly of two drainage bodies according to Fig. 21, and

Fig. 26 shows a section through two drainage body connecting elements according to Fig. 21 in the Y-Z plane.

[0017] In the following description the same reference numerals will be used for the same and similarly acting parts.

[0018] With the first preferred embodiment of the drainage body connecting element illustrated in detail in Figs. 1 to 6, two drainage body connecting elements 1 and 2 of this kind are fitted or stacked in each other. The two drainage body connecting elements 1, 2 are designed identically as injection moulded plastic parts and each have pegs 20, 20' which comprise a conical external shape which tapers conically towards the lower ends 24, 24'.

[0019] The upper ends 25, 25' comprise upper edges 23, 23' which protrude in flange-like manner towards the outside.

[0020] Each two of the pegs 20, 20' are connected to one another via a web 21.

[0021] Furthermore, first locking devices 22 are provided at the lower ends 24, 24' of the pegs 20, 20'. These locking devices 22 – as is apparent in particular from Fig. 6 – snap-fit with the lower ends 24, 24' of the respective upper pegs 20, 20'- when stacking or fitting in one another, as shown in Figs. 1 and 2 – so that the two drainage body connecting elements 1, 2 are connected in a stable manner to one another after the first locking devices 22 are fixedly inserted and snap-fitted in one another. These locks 22 can also be opened again when deformed accordingly by means of a tool.

[0022] In Fig. 7 two drainage bodies 10, 11 are placed with their small sides adjoining one another and are connected to each other via drainage body connecting elements. Figs. 9 and 10 show different sections and Fig. 8 shows a perspective detailed view of a drainage body connecting element which is fitted into the receiving orifices 12, 13 on the outside substantially flush to a surface 18 between the two drainage bodies 10, 11.

[0023] It is apparent from the illustrations 8 to 10 that the first locking devices 22 project through orifices in a bottom 14, 15 of the drainage bodies 10, 11 and engage with snap-fit connection there so that the drainage body connecting elements 1, 2 are fixedly locked in the drainage body 10, 11.

[0024] Whereas the outside surfaces of the pegs 20, 20' sit freely in the receiving orifices 12, 13, the upper edges 23, 23' are in form-fit connection with the walls of the recesses 12, 13 so that the two drainage bodies 10, 11 are connected to one another in a substantially play-free manner via the web 21.

[0025] It is apparent from Figs. 11 to 16 how the drainage body connecting elements 1, 2 connect together two drainage bodies 10, 11, stacked one above the other.

[0026] Firstly, two drainage body connecting elements 1, 2 are stacked one on the other. As is particularly apparent from Figs. 12, 13, 15 and 16, the "lower" drainage body connecting element fits with its peg 20, 20' so deep in the one drainage body 10 that it sits in the receiving orifice 12 with its upper edge 23 slightly below the surface 18 of the associated drainage body 10. It is furthermore fastened by its first locking device 22 in the drainage body 10.

[0027] The "upper" drainage body connecting element 2 sits in the first drainage body connecting element 1 and is fixedly connected thereto by its first locking devices 22. This drainage body connecting element 2 protrudes by its upper end 25, 25' or its upper edge 23', so far over the surface 18 of the drainage body 10 that the upper drainage body 11 (according to Fig. 11) can be set on the lower drainage body 10 in such a way that its receiving orifice 13 lies flush with the receiving orifice 12 of the lower drainage body 10, and the "upper" drainage body connecting element 2 fits in this receiving orifice 13 and engages in a form-fit manner by its upper edge 23' with the wall of the orifice 13. It is thereby ensured that any displacement in the X-Z plane, thus in the horizontal direction, is reliably prevented. It is possible that the "upper" drainage body 11 can be moved in the direction of an "upper" drainage body connecting element 2 in order to bring the "upper" drainage body 11 into connection with the "upper" drainage body connecting element 2. The "upper" drainage body connecting element 2 then serves as an alignment aid for the upper drainage body 11. Fixing the "upper" drainage body connecting element 2 in the upper drainage body 11 is not necessary since this connection cannot in any case be released in the vertical direction as a result of gravity and the bottom bearing on the overall assembly.

[0028] A further preferred embodiment of the drainage body connecting element will now be described with reference to Figs. 17 to 26.

[0029] This embodiment of the drainage body connecting element differs from that previously described initially in that the connection of two drainage body connecting elements 1 and 2 takes place at their upper ends 25, 25' (see Figs. 18 to 20). The first locking devices 22, 22' are provided at these upper ends 25, 25' and enable two drainage body connecting elements 1 and 2 to be snap-fitted together.

[0030] Second locking devices 26 are provided at the lower ends 24, 24' and enter into a snap-fitting engagement with the lower drainage body 10 (see Figs. 19, 22 and 25) so that the first drainage body connecting element 1 is fixedly connected to the drainage body 10. The upper edges 23, 23' are in turn in form-fitting engagement with the walls of the receiving orifices 12, 13 (see Fig. 25).

[0031] The pegs 20, 20' are of different length, as is apparent in particular from Figs. 18 and 20, so that the upper ends 25, 25' of the pegs 20, 20' sit at different depths in the receiving orifices 12, 13. If then two drainage body connecting elements 1, 2 are connected to one another, as is shown by way of example in Figs. 22 to 26, then the upper edge 23' of the "upper" drainage body connecting element 2 fits both in the receiving orifice 12 of the lower drainage body 10 and also in the receiving orifice 13 of the upper drainage body 11 (see Fig. 25), and is in form-fitting engagement there with the walls of the receiving orifices 12, 13. It is thereby ensured that maximum stability of the drainage body connecting element is guaranteed against horizontal displacement of drainage bodies 10, 11 which are stacked up on one another.

[0032] Furthermore it is easier to set an upper drainage body 11 on a lower drainage body 10 compared to the previously illustrated embodiment since the thinner lower ends 24' of the "upper" drainage body connecting element 2 protrude out above the surface 18 of the lower drainage body 10 and thus relatively ample play exists between the pegs and the walls of the receiving orifice 13. The form-fitting engagement is only in the region of the upper edges 23, 23' (see in particular Fig. 25).

[0033] A further detail in relation to the web 21 is apparent from Figs. 24 and 26. This web 21 has a separating notch 27 (see Fig. 26) where it can be separated, as then happens when (as shown in Figs. 23 and 24) drainage body connecting elements are installed along the edge and only drainage bodies 10, 11 which are stacked vertically one above the other have to be connected to one another. This separation of the web 21 is obviously also ensured in the case of the preferred embodiment previously described of the drainage body connecting element.

[0034] Both embodiments of the invention previously described are also characterised in that only a single "type" of drainage body connecting element has to be manufactured. By connecting two drainage body connecting elements to one another it is possible to ensure both a flush surface alignment (in the case of an edge assembly) or a protrusion of the one drainage body connecting element out from the associated receiving orifice for connecting drainage bodies stacked vertically one above the other.

REFERENCE NUMERAL LIST

[0035]

1	Drainage body connecting element
2	Drainage body connecting element
10	Drainage body
11	Drainage body
12	Receiving orifice
13	Receiving orifice
14	Bottom
18, 18'	Surface
20, 20'	Peg
21	Web
22	First locking device
23, 23'	Upper edge
24, 24'	Lower end
25, 25'	Upper end
26	Second locking device
27	Separating notch

PATENTKRAV

1. En samling omfattende to drænlegemer (10, 11) forbundet via drænlegemeforbindelseselementer (1, 2), der hver omfatter:

to dyvler (20, 20´), der er forbundet via en web, og som hver kan indsættes i en modtageåbning (12, 13) af et drænlegeme (10, 11), således at to drænlegemer (10, 11) er indbyrdes forbundet via webben (21),
første låseindretninger (22) via hvilke et første drænlegemeforbindelseselement (1) kan forbindes til et andet drænlegemeforbindelseselement (2), således at det første drænlegemeforbindelseselement (1) kan monteret i et første drænlegeme (10) til at flugte med eller til at være forsænket i overfladen (18) deraf, og det andet drænlegemeforbindelseselement (2) kan monteres på det første drænlegemeforbindelseselement (1) til at rage frem udenfor overfladen (18),
kendetegnet ved, at
dyvlerne (20, 20´) af drænlegemeforbindelseselementerne (1, 2) kan indsættes i hinanden.

2. Samlingen ifølge krav 1, **kendetegnet ved**, at dyvlerne (20, 20´) kan låses i modtageåbningerne (12, 13).

3. Samlingen ifølge ethvert af de foregående krav, **kendetegnet ved**, at dyvlerne (20, 20´) omfatter ydre overflader, der indsnævres imod en nedre ende (24, 24´), og fortrinsvis omfatter ved en modsat øvre ende (25, 25´) en fremadragende øvre kant (23, 23´), som især kan indsættes på formpassende måde i en modtageåbning (16, 17).

4. Samlingen ifølge ethvert af de foregående krav, **kendetegnet ved**, at det første drænlegemeforbindelseselement (1) og det andet drænlegemeforbindelseselement (2) er identisk udformede.

5. Samlingen ifølge ethvert af de foregående krav, **kendetegnet ved**, at dyvlerne (20, 20´) kan sammenlåses i positionen indført i hinanden.

6. Samlingen ifølge ethvert af de foregående krav, **kendetegnet ved**, at dyvlerne (20, 20´) kan sammenlåses ved enderne.

7. Samlingen ifølge ethvert af de foregående krav, **kendetegnet ved**, at de første låseindretninger (22, 22´) er udformet således, at dyvlerne (20, 20´) kan sammenlåses og dyvlerne (20, 20´) kan låses med drænlegemerne (10, 11) via den første låseindretning (22, 22´).

8. Samlingen ifølge ethvert af de foregående krav, **kendetegnet ved**, at de første låseindretninger (22, 22´) er udformet til indbyrdes forbindelse af dyvlerne (20, 20´), og sekundære låseindretninger (26) er tilvejebragt for at forbinde dyvlerne (20, 20´) til drænlegemerne (10, 11).

9. Samlingen ifølge ethvert af de foregående krav, **kendetegnet ved**, at dyvlerne (20, 20´) er således udformet, at de er klar til at forbindes med første ender (24, 24´) enter forsænket i modtageåbningen (12, 13) eller flugte med en overflade (18) af drænlegemet (10, 11) eller med en anden ende (25, 25´) i modtageåbningen (12, 13) og rage ud fra overfladen (18) af drænlegemet (10, 11).

10. Samlingen ifølge ethvert af de foregående krav, **kendetegnet ved**, at webben (21) kan separeres fra dyvlerne (20, 20´) eller især kan spaltes på midten.

11. Samlingen ifølge ethvert af de foregående krav, **kendetegnet ved**, at drænlegemeforbindelseselementet (1, 2) er udformet som en sprøjtestøbt del især af plastic, og dyvlerne (20, 20´) og/eller webben (21) er udformet som hule legemer.

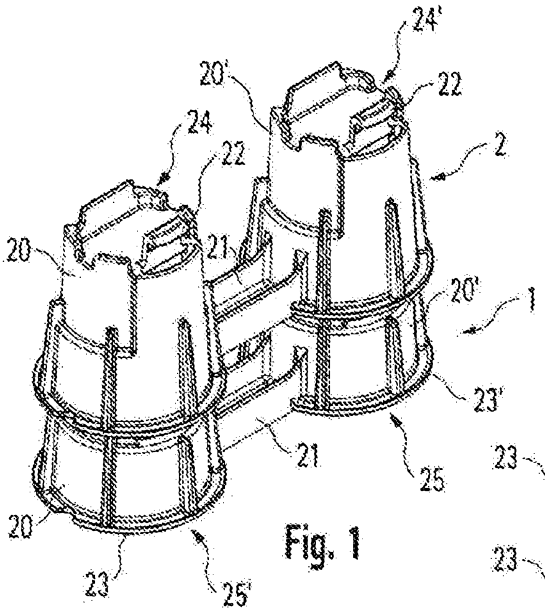

Fig. 1

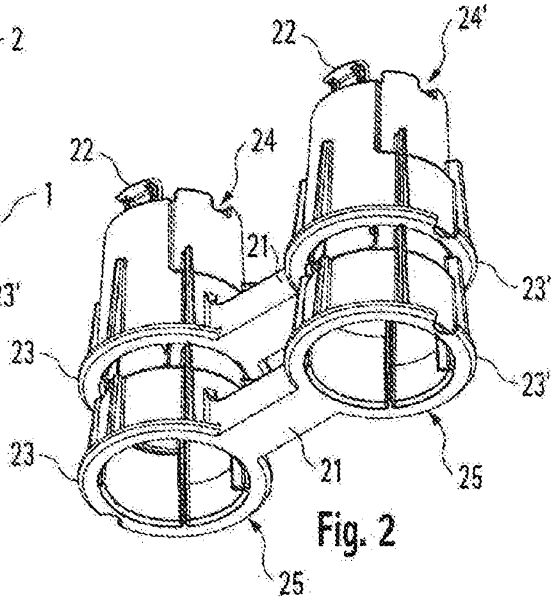

Fig. 2

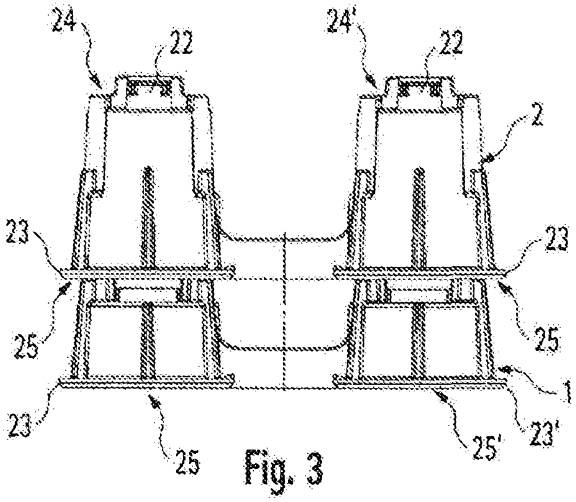

Fig. 3

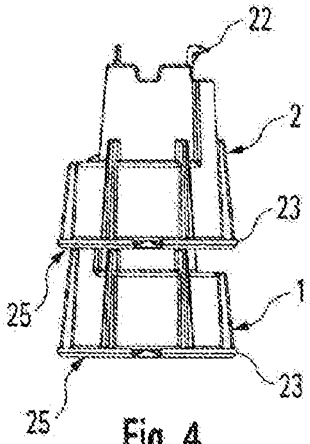

Fig. 4

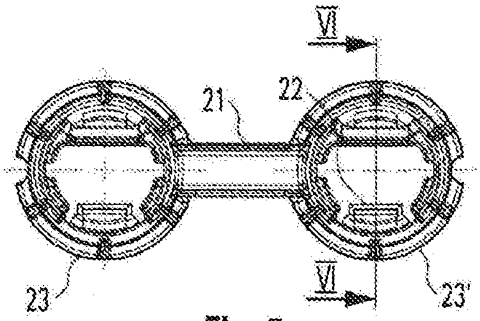

Fig. 5

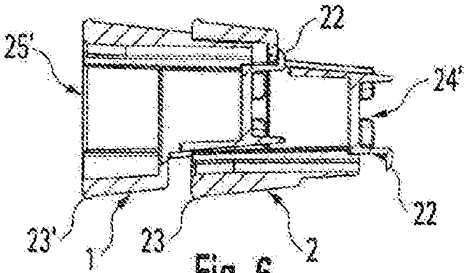

Fig. 6

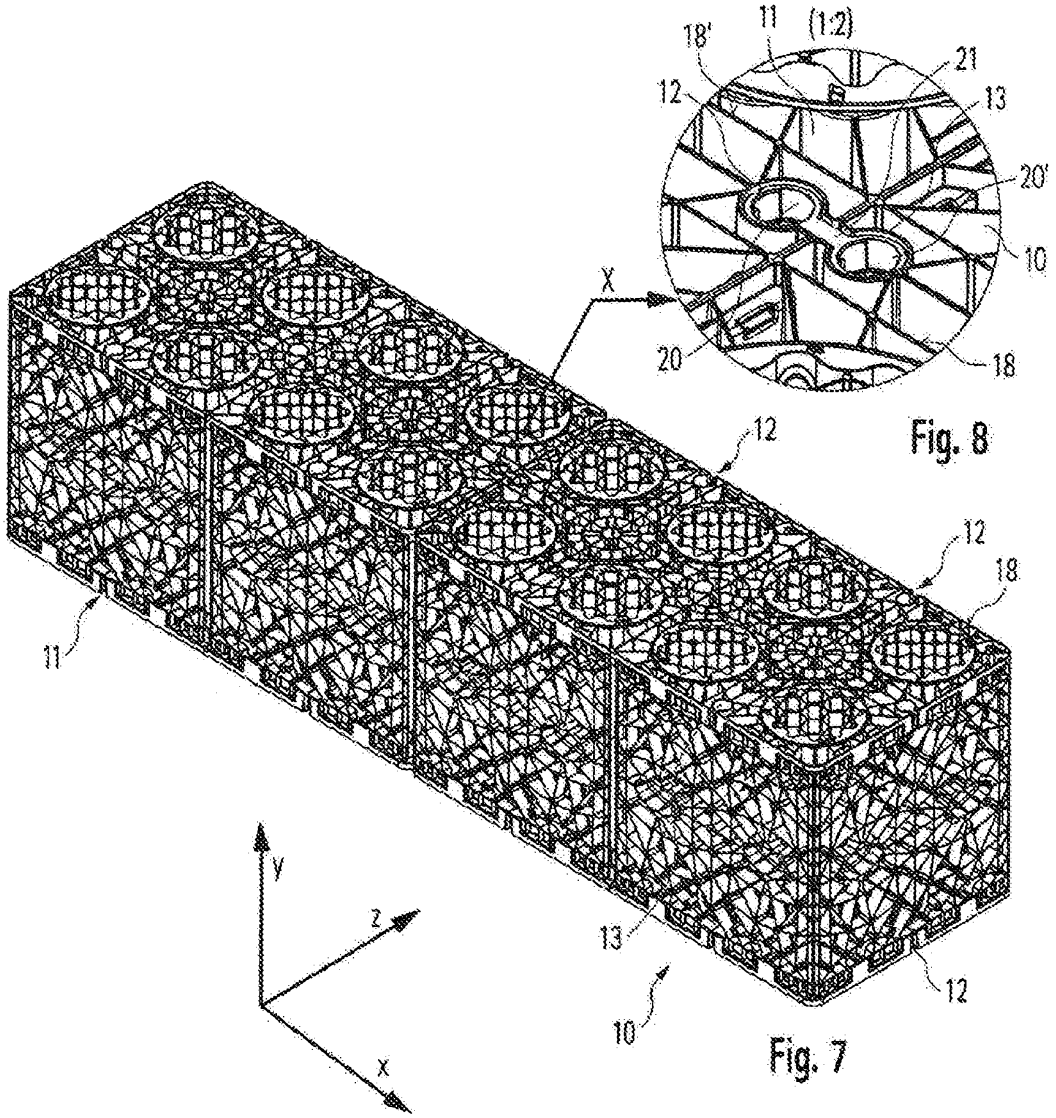

Fig. 8

Fig. 7

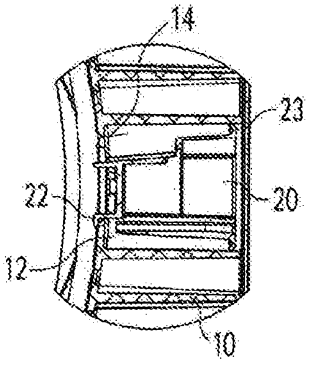

Fig. 9

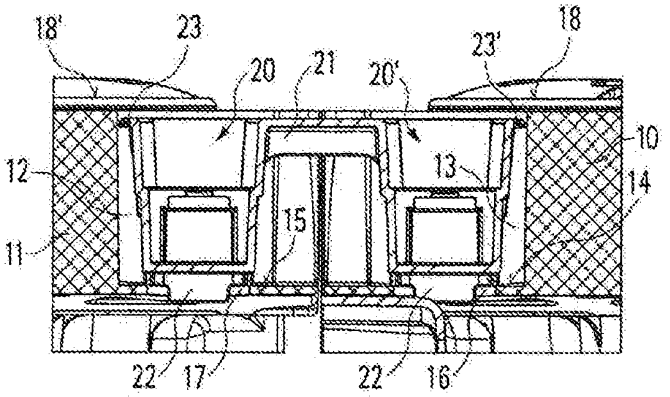

Fig. 10

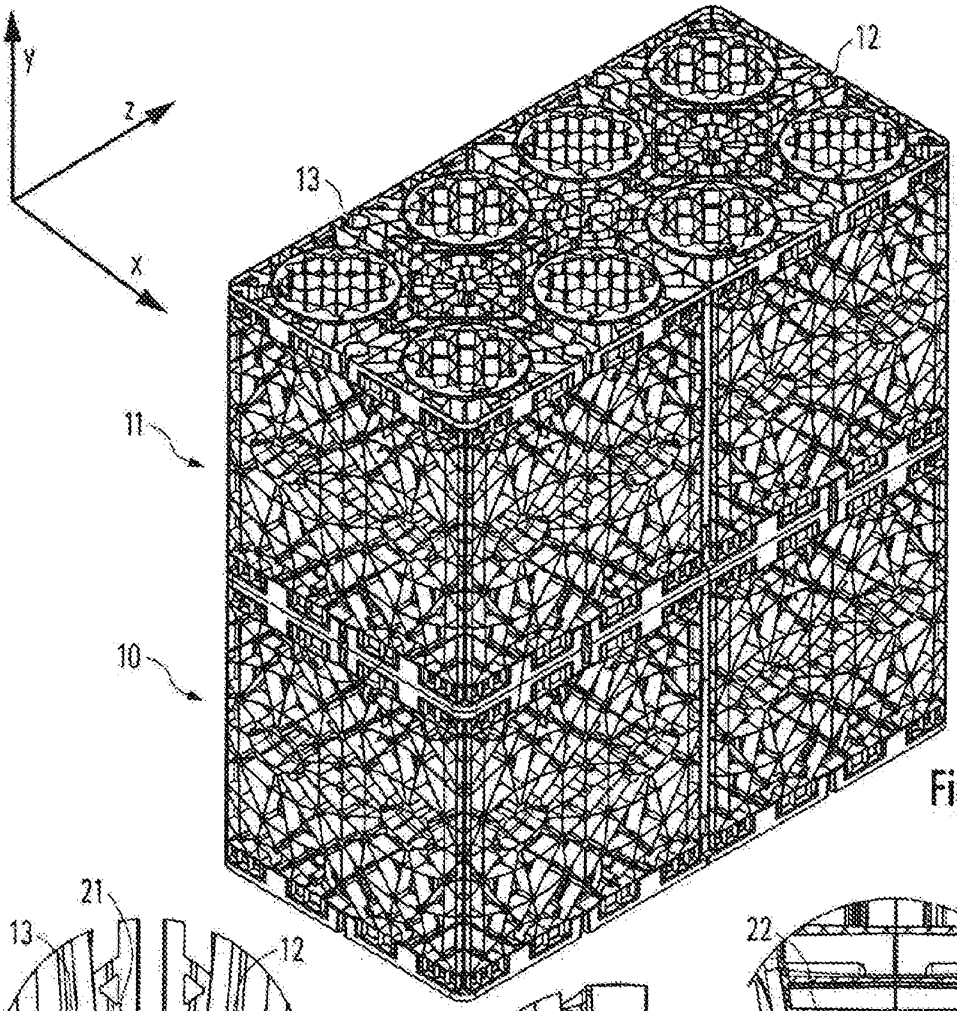

Fig. 11

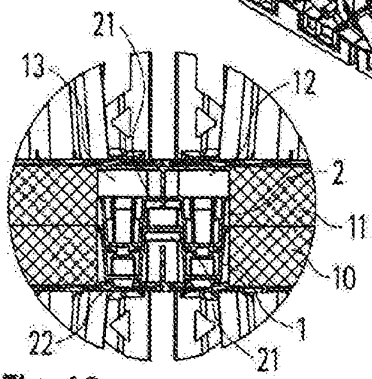

Fig. 12

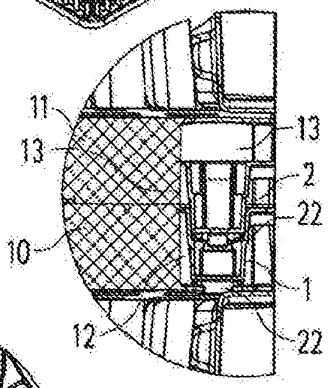

Fig. 15

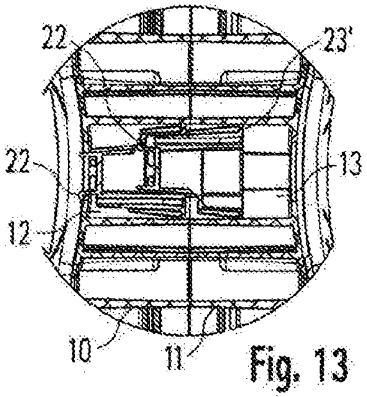

Fig. 13

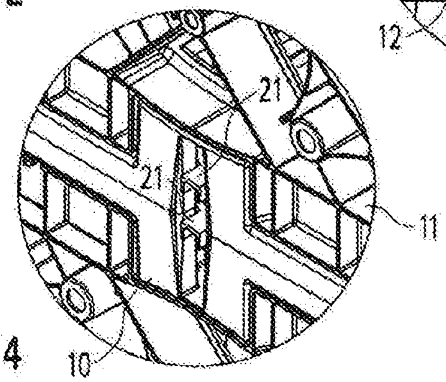

Fig. 14

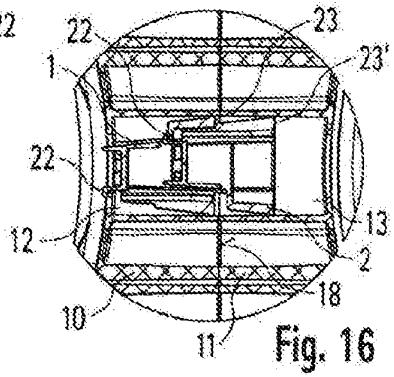

Fig. 16

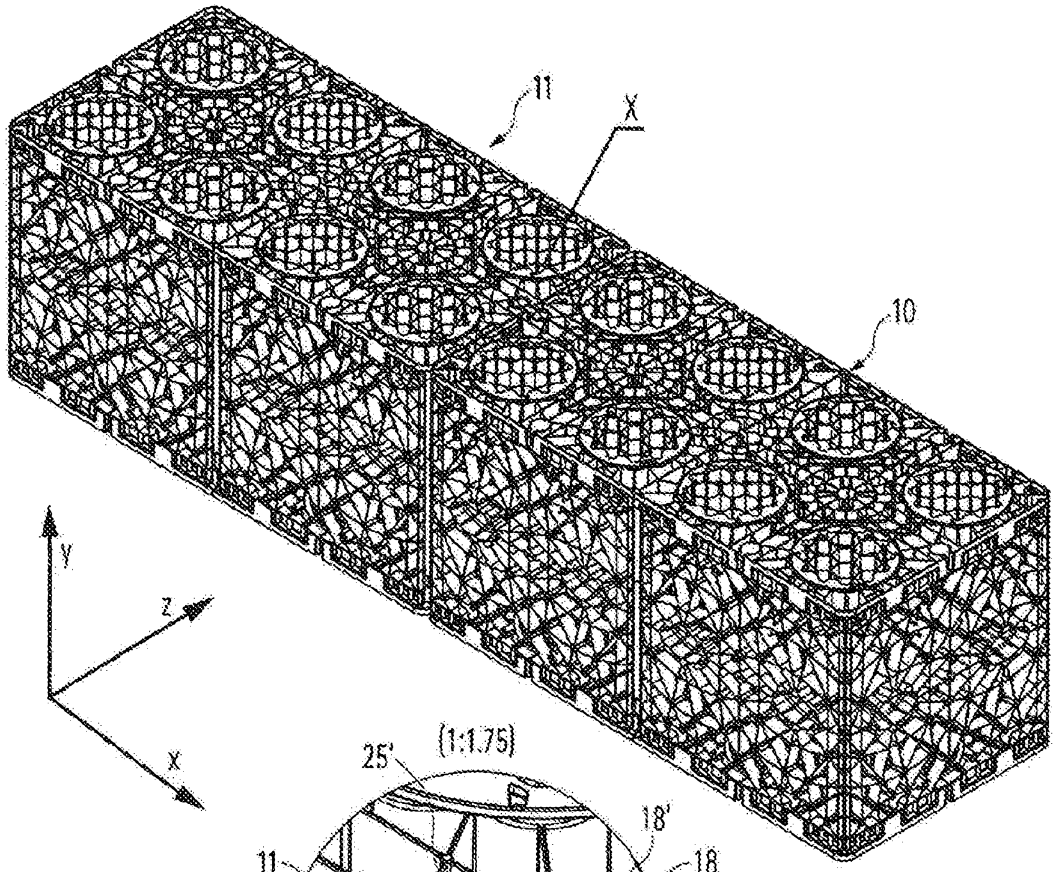

Fig. 17

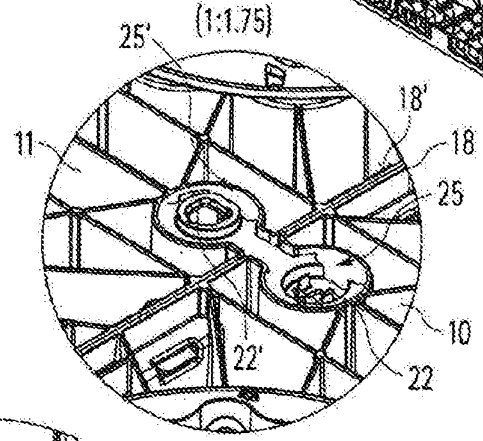

Fig. 18

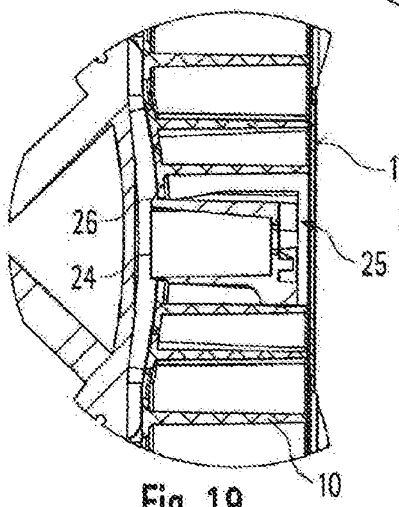

Fig. 19

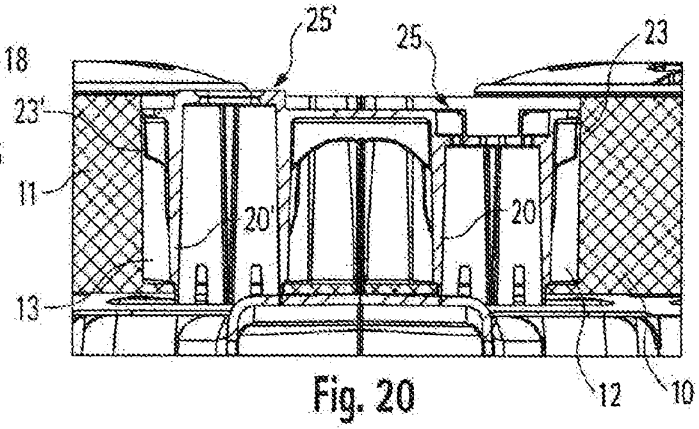

Fig. 20

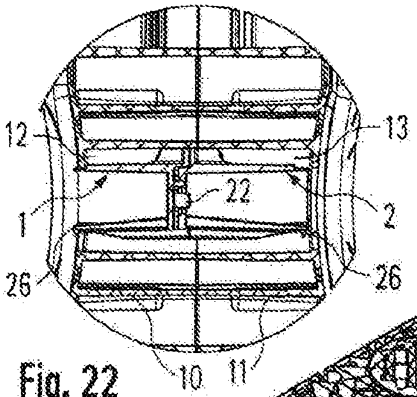

Fig. 22

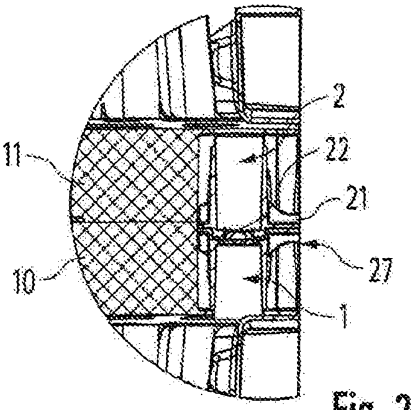

Fig. 23

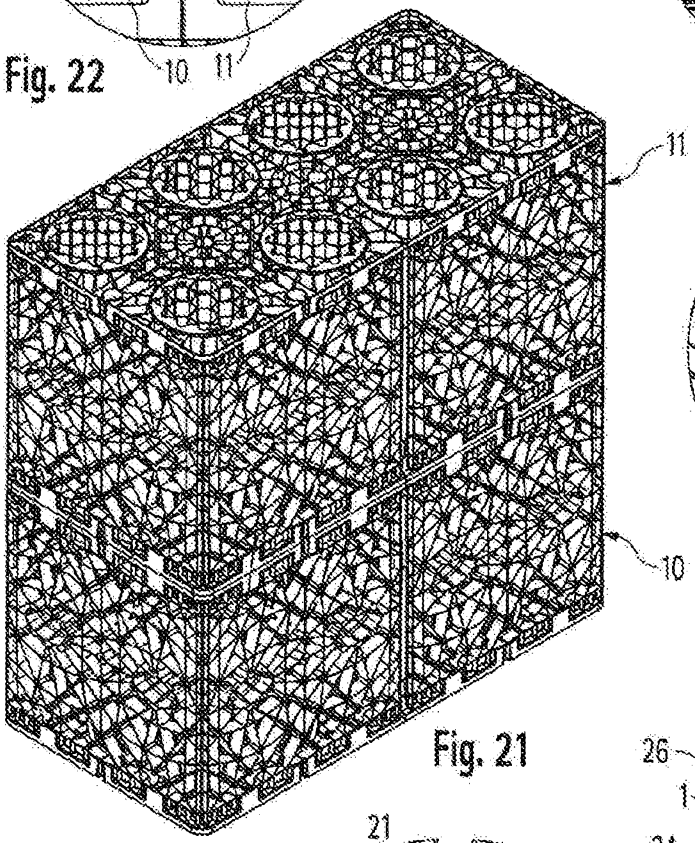

Fig. 21

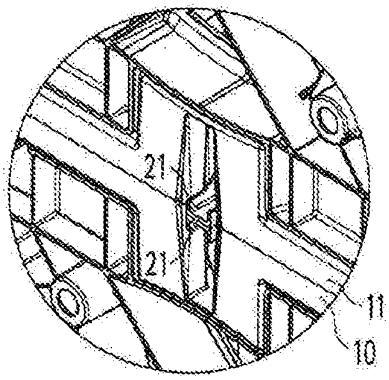

Fig. 24

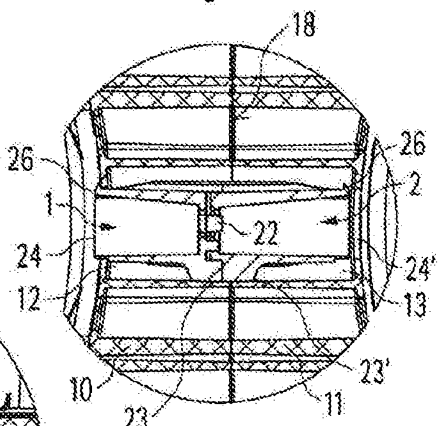

Fig. 25

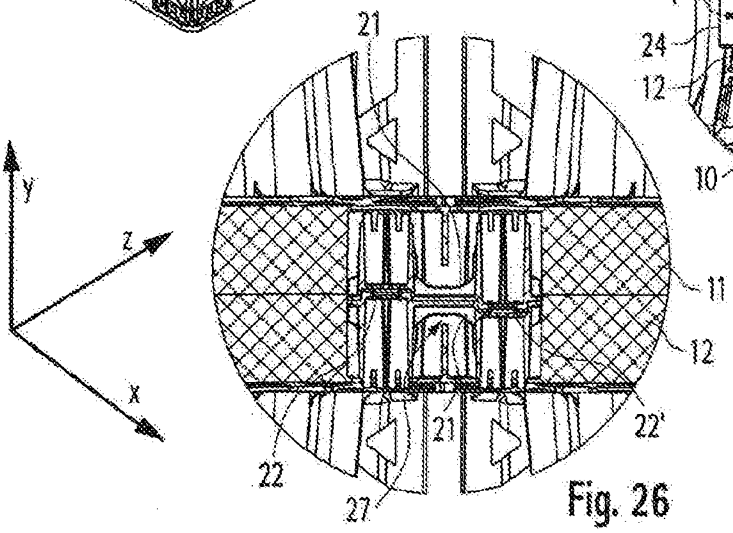

Fig. 26