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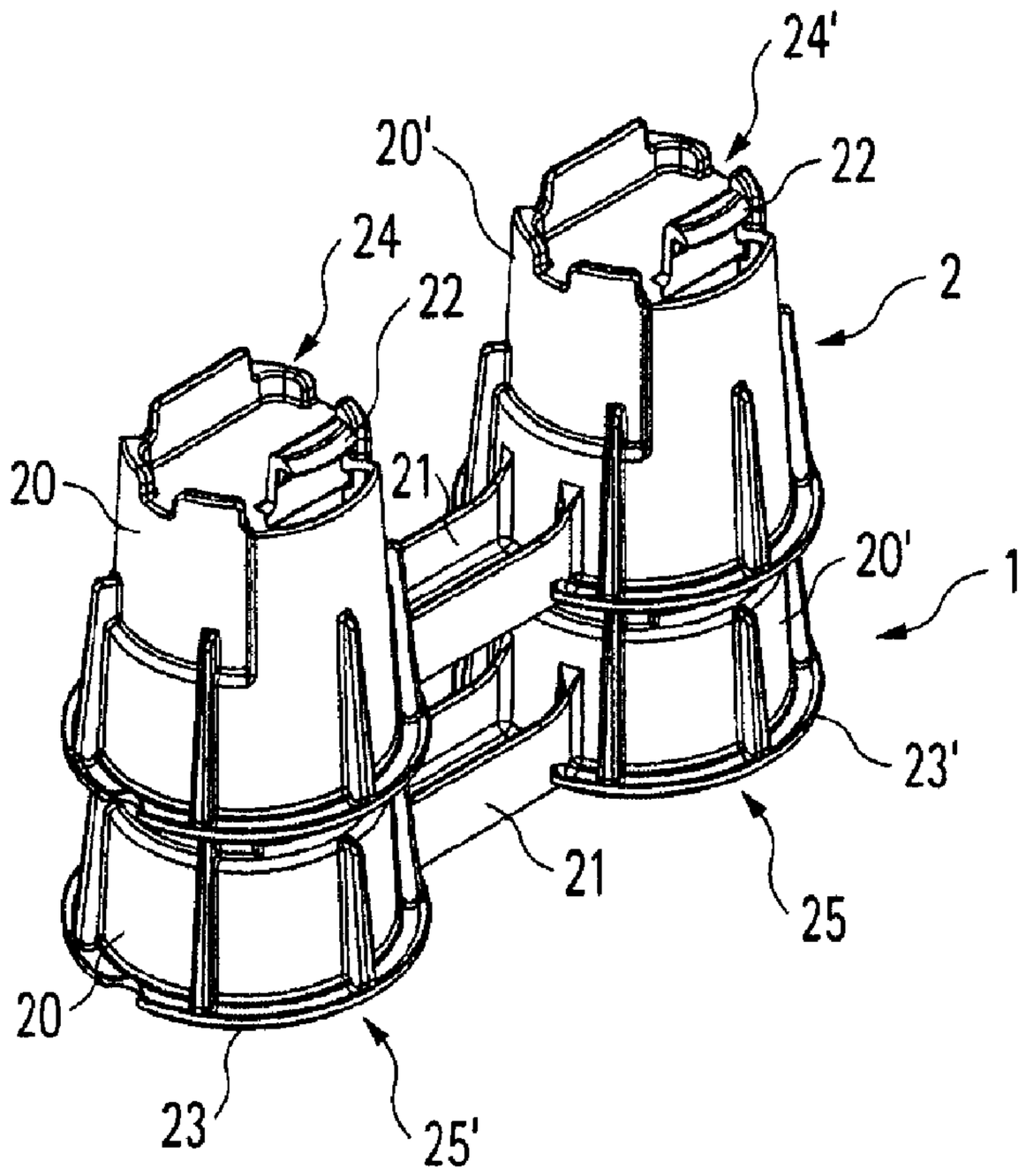
(54) **Titre : ELEMENT D'ASSEMBLAGE DE CORPS DE TRANCHEE DRAINANTE**
(54) **Title: DRAINAGE BODY CONNECTING ELEMENT**



(57) **Abrégé/Abstract:**
Trench drains are hollow or grid-like bodies which can be installed in the ground and are intended to receive precipitated surface water and slowly dissipate it into the ground or to store the water. These hollow or grid-like bodies are constructed from individual drainage bodies which must be firmly connected together. Drainage body connecting elements (1, 2) are proposed for connecting drainage bodies, which comprise two pegs (20, 20') which are connected via a web (21) and can each be inserted in a receiving orifice of a drainage body so the two drainage bodies can be connected together via the web (21).

Abstract

Trench drains are hollow or grid-like bodies which can be installed in the ground and are intended to receive precipitated surface water and slowly dissipate it into the ground or to store the water. These hollow or grid-like bodies are constructed from individual drainage bodies which must be firmly connected together. Drainage body connecting elements (1, 2) are proposed for connecting drainage bodies, which comprise two pegs (20, 20') which are connected via a web (21) and can each be inserted in a receiving orifice of a drainage body so the two drainage bodies can be connected together via the web (21).

Drainage Body Connecting Element

Description

The invention concerns a drainage body connecting element for connecting drainage bodies, i.e. hollow or grid-like bodies which can be installed in the ground and are intended to receive precipitated surface water and slowly dissipate it into the ground or to store the water.

Surface water, which often occurs in large volume flows, is generally discharged into the public drainage network. Charges are levied for such water drainage. To enable this surface water to seep into the ground, trench drains are known, i.e. constructions which are installed in the ground and can often receive very large volumes of surface water which then dissipates into the ground. Such trench drains are constructed from individual bodies which are connected together. These constructions must be very stable since often, vehicles must drive over the surface below which the drain is installed. For this, not only must the individual bodies from which the drain is constructed be stable, but the connections between the individual bodies must also be stable in order to give the entire construction the necessary stability. Furthermore here it is necessary for the drainage body connecting elements not only to have the necessary strength, but they must also be simple and economic to produce and easy to install.

The invention is based on the object of producing a drainage body connecting element which guarantees a high connection strength and a precise alignment between drainage bodies, but nonetheless is economic and simple to install.
This object is achieved by a drainage body connecting element for connecting drainage bodies, comprising: two pegs which are connected via a web and can each be inserted in a receiving orifice of a drainage body so that the two drainage bodies

are connected together via the web; first locking devices via which a first drainage body connecting element can be connected with a second drainage body connecting element, such that the first drainage body connecting element can be mounted in a first drainage body flush or countersunk to its surface, and the second drainage body connecting element can be mounted on the first drainage body connecting element protruding above the surface.

A drainage body connecting element for connecting drainage bodies, comprises two pegs connected via a web, each of which can be placed in a receiving orifice of a drainage body so that two drainage

bodies are connected together via the web. Such a construction is easy to produce, easy to install and also durable.

Preferably the pegs can be locked in the receiving orifices. This ensures that when loads are applied perpendicular to the casing surfaces of the pegs, these cannot be squeezed out of the receiving orifices.

Preferably the pegs are formed tapering towards a lower end on their outer faces, and preferably have a protruding upper edge at an opposing upper end, which edge can in particular be inserted by form fit in the receiving orifice. In particular when made by injection moulding, the conical form is particularly suitable for removal of the drainage body connecting elements from the mould.

Preferably the drainage body connecting elements have first locking devices via which a first drainage body connecting element can be connected to a second, such that the first drainage body connecting element can be mounted in a first drainage body either flush or countersunk in relation to its surface, and the second drainage body connecting element can be mounted on the first drainage body connecting element protruding above the surface of the drainage body. By means of this arrangement, firstly on connection of two adjacent drainage bodies, smooth surfaces can be produced i.e. surfaces without protruding drainage body connecting elements. Secondly, when drainage bodies are stacked on top of each other, the upper drainage bodies can be fixed to the lower drainage bodies in the horizontal direction via the protruding drainage body connecting elements (no fixing in the vertical direction is required). Here it is of particular advantage that the first and second drainage body connecting elements are formed identically, so that only a single type of drainage body connecting element need be produced.

In a first embodiment of the invention, the pegs can be pushed into each other and locked together in this position. This gives a very stable construction in a simple manner.

In a second embodiment of the invention, the pegs can be locked together at their ends. This gives not only a simple construction but rather, even longer

connecting elements can be produced for connecting drainage bodies which are stacked on top of each other.

In the first embodiment, the first locking devices are preferably configured such that the pegs can be connected both to each other and to the drainage bodies via these first locking devices. This construction is particularly simple.

In the second embodiment, it is advantageous if the first locking devices are configured to connect the pegs together and the second locking devices are provided for connecting the pegs to the drainage bodies. This achieves said extended construction in a simple manner.

The pegs are preferably configured so that they can be inserted either with lower ends in the receiving orifices countersunk into or flush with a surface of the drainage body, or with a second end in the receiving orifice protruding from the surface of the drainage body. This achieves an increased variability of usage of the drainage body connecting elements.

In order to connect together at their edges drainage bodies which are stacked on top of each other, for each drainage body connecting element only two pegs pushed into each other or two pegs attached to each other are required. In order not to have to create separate drainage body connecting elements for this application, it is advantageous if the web can be separated from the pegs or in particular can be separated in the middle. Thus uniform drainage body connecting elements produced with pegs can be converted into edge connecting elements.

Advantageously, because of the variability of the drainage body connecting element according to the invention, three different connection types can be achieved with this component, namely connection of adjacent drainage bodies, connection of drainage bodies stacked on top of each other, and connection of two adjacent drainage bodies and two drainage bodies stacked on top of each other.

Preferably the drainage body connecting element is produced as an injection moulding, in particular made of plastic, wherein the pegs (in some cases, also the webs) are formed as hollow bodies. This achieves a considerable material saving without substantially reducing the strength of the drainage body connecting element.

Embodiments of the invention are explained below in more detail with reference to drawings. The drawings show:

Fig. 1 a perspective view of a first embodiment of the invention,

Fig. 2 the arrangement from Fig. 1 in an oblique view from below,

Fig. 3 a side view of the arrangement in Figs. 1 and 2,

Fig. 4 a front view of the arrangement in Figs. 1 to 3,

Fig. 5 a bottom view of the arrangement in Fig. 3,

Fig. 6 a section along line VI-VI from Fig. 5,

Fig. 7 a perspective view of a drainage body,

Fig. 8 a perspective detail view of a portion of the drainage body from Fig. 7 with a drainage body connecting element in the Y direction (X-Z plane),

Fig. 9 a section in the Y-Z plane through the arrangement in Fig. 8,

Fig. 10 a section in the X-Y plane through the arrangement in Fig. 8,

Fig. 11 a perspective view of a drainage body with two elements stacked on top of each other,

Fig. 12 a section in the Y-Z direction through a drainage body connecting element which is arranged inside the drainage body according to Fig. 11,

Fig. 13 a section through the drainage body connecting element in Fig. 12 in the X-Y plane,

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

Fig. 15 a section in the Y-Z plane through the arrangement in Fig. 14,

Fig. 16 a section in the X-Y plane through the arrangement in Fig. 14,

Fig. 17 a perspective view of two drainage bodies aligned next to each other according to a second embodiment of the invention,

Fig. 18 a perspective detail view in the Y direction (X-Z plane) of a middle detail in Fig. 17,

Fig. 19 a section in the Y-Z plane through the arrangement in Fig. 18,

Fig. 20 a section in the X-Y plane through the arrangement in Fig. 18,

Fig. 21 a perspective view of two drainage bodies stacked on top of each other according to the embodiment in Figs. 17 to 20,

Fig. 22 a section through a drainage body connecting element which is arranged in the middle in Fig. 21 and connects two drainage bodies together,

Fig. 23 a section through the drainage body connecting element which is arranged in an edge region of the arrangement in Fig. 21, in the X-Y plane,

Fig. 24 a perspective detail view in the Z direction (X-Y plane) of the element in Fig. 23,

Fig. 25 a section in the X-Y plane of a drainage body connecting element arranged in a middle region of the arrangement in Fig. 21, and

Fig. 26 a section through the element in Fig. 21 in the Y-Z plane.

In the description below, the same reference numerals are used for the same parts and those with the same effect.

In the first preferred embodiment of the drainage body connecting element shown in detail in Figs. 1 to 6, two such drainage body connecting elements 1 and 2 are pushed into each other or stacked together. The two drainage body connecting elements 1, 2 are formed identically as plastic injection mouldings and each have pegs 20, 20' of conical outer form, which run tapering towards lower ends 24, 24'.

Upper edges 23, 23' are provided at upper ends 25, 25' and protrude outward in the form of flanges.

Pegs 20, 20' are connected together in pairs via a web 21.

Furthermore, first locking devices 22 are provided at the lower ends 24, 24' of the pegs 20, 20'. When pushed or stacked in each other as shown in Figs. 1 and 2, these locking devices 22 - as shown in particular in Fig. 6 - are in snap engagement with the lower end 24, 24' of the respective upper peg 20, 20', so that the two drainage body connecting elements 1, 2 are stably connected together after the first locking devices 22 have been firmly pushed together and snap-locked. However these locks 22 can also be opened again on corresponding deformation with a tool.

Fig. 7 shows two adjacent drainage bodies 10, 11 with aligned short sides which are connected together via drainage body connecting elements. Figs. 9 and 10 show different cross sections and Fig. 8 shows a perspective detail view of a drainage body connecting element which on the outside is pushed into the receiving orifices 12, 13 between the two drainage bodies 10, 11 substantially flush with a surface 18.

Figs. 8 to 10 show that the first locking devices 22 protrude through openings in a base 14, 15 of the drainage body 10, 11 and snap-lock there, so that the drainage body connecting elements 1, 2 are firmly locked in the drainage bodies 10, 11.

Whereas the outer faces of the pegs 20, 20' sit freely in the receiving orifices 12, 13, the upper edges 23, 23' stand in form-fit connection with the walls of the recesses 12, 13 so that the two drainage bodies 10, 11 are connected together substantially play-free via the web 21.

Figs. 11 to 16 show how the drainage body connecting elements 1, 2 connect together two drainage bodies 10, 11 stacked on top of each other.

First, two drainage body connecting elements 1, 2 are stacked on top of each other. As shown in particular in Figs. 12, 13, 15 and 16, the "lower" drainage body connecting element engages with its pegs 20, 20' so deeply 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. Furthermore it is secured to the drainage body 10 by its first locking device 22.

The "upper" drainage body connecting element 2 sits in the first drainage body connecting element 1 and is firmly connected to this by its first locking devices 22. With its upper end 25, 25' or upper edge 23', this drainage body connecting element 2 protrudes far above the surface 18 of the drainage body 10 so that the upper drainage body 11 (in Fig. 11) can be placed on the lower drainage body 10 such that its receiving orifice 13 aligns with the receiving orifice 12 of the lower drainage body 10, and the "upper" drainage body connecting element 2 is

inserted into the receiving orifice 13 and stands with its upper wall 23' in form-fit engagement with the wall of the orifice 13. This reliably prevents any movement in the X-Z plane, i.e. in the horizontal. It is possible for the "upper" drainage body 11 to 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 here serves as an orientation aid for the upper drainage body 11. There is no need to fix the "upper" drainage body connecting element 2 in the upper drainage body 11 since this connection in the vertical direction cannot easily be separated because of gravity and the ground loading the overall arrangement.

A further preferred embodiment of the drainage body connecting element is now described below with reference to Figs. 17 to 26.

This embodiment of the drainage body connecting element differs from that described above firstly in that the two drainage body connecting elements 1 and 2 are connected 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 allow a snap engagement of two drainage body connecting elements 1 and 2.

Two locking devices 26 are provided at the lower ends 24, 24' and allow a snap engagement with the lower drainage body 10 (see Figs. 19, 22 and 25), so that the first drainage body connecting element 1 is firmly connected to the drainage body 10. The upper edges 23, 23' are again in form-fit engagement with the walls of the receiving orifices 12, 13 (see Fig. 25).

The pegs 20, 20' are of different lengths, as shown in particular in 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 together, as shown for example in Figs. 22 to 26, the upper edge 23' of the "upper" drainage body connecting element 2 engages both in the receiving orifice 12 of the lower drainage body 10 and in the receiving orifice 13 of the upper drainage body 11 (see Fig. 25) and is there in form-fit engagement

with the walls of the receiving orifices 12, 13. This guarantees a maximum strength of the drainage body connecting element against horizontal movement of drainage bodies 10, 11 stacked on top of each other.

Furthermore, in comparison with the previous embodiment, it is easier to place an upper drainage body 11 on a lower drainage body 10 since the thinner lower ends 24' of the "upper" drainage body connecting element 2 protrude over the surface 18 of the lower drainage body 10, and hence there is a relatively large play between the pegs and the walls of the receiving orifice 13. The form-fit engagement takes place only in the region of the upper edges 23, 23' (see in particular Fig. 25).

Figs. 24 and 26 show a further detail in relation to the web 21. This web 21 has a separating notch 27 (see Fig. 26) at which it can be separated, which occurs when (as shown in Figs. 23 and 24) drainage body connecting elements are installed at the edges and only connect together drainage bodies 10, 11 which are stacked vertically on top of each other. This separation of the web 21 is naturally also guaranteed in the preferred embodiment shown above of the drainage body connecting element.

Both embodiments of the invention described above are also distinguished in that only a single "type" of drainage body connecting element need be produced. By connecting two drainage body connecting elements together, both a flush surface (for edge mounting) or a protrusion of the one drainage body connecting element from the associated receiver orifice, for connecting drainage bodies which are stacked vertically on top of each other, can be guaranteed.

List of Reference Numerals

1	Drainage body connecting element
2	Drainage body connecting element
10	Drainage body
11	Drainage body
12	Receiving orifice
13	Receiving orifice
14	Base
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

CLAIMS:

1. Drainage body system comprising:

a plurality of drainage bodies, including a first and a second drainage body; and

a plurality of drainage body connecting elements, including a first and a second drainage body connecting element, each drainage body connecting element comprising:

two pegs which are connected via a web; and

first locking devices;

wherein inserting the pegs of the first drainage body connecting element in a receiving orifice of the first and the second drainage body connects the first and the second drainage bodies together via the web of the first drainage body connecting element, when the first and the second drainage bodies are arranged side by side; and

wherein the first drainage body connecting element can be connected with the second drainage body connecting element via the first locking devices, such that the first drainage body connecting element can be mounted in the first drainage body flush or countersunk to its surface, and the second drainage body connecting element can be mounted on the first drainage body connecting element protruding above the surface of the first drainage body, so that the first and the second drainage bodies are connected together, when the second drainage body is arranged above the first drainage body.

2. Drainage body system according to claim 1,
wherein
the pegs of the first drainage body connecting element can be locked in the receiving orifice of the first and the second drainage body, when the first and second drainage bodies are arranged side by side.

3. Drainage body system according to claim 1 or claim 2,
wherein
the pegs of the plurality of drainage body connecting elements have outer surfaces tapering towards a lower end.

4. Drainage body system according to claim 3, wherein the pegs of the plurality of drainage body connecting elements, at an upper end that is opposite the lower end, have a protruding upper edge which can be inserted in the receiving orifice.

5. Drainage body system according to claim 4, wherein the protruding upper edge can be inserted in the receiving orifice by form-fit.

6. Drainage body system according to claim 4, wherein
the first and second drainage body connecting elements are configured identically.

7. Drainage body system according to any one of claims 1 to 6,
wherein
the pegs of the second drainage body connecting element can be pushed into the pegs of the first drainage body connecting element and locked in this position.

8. Drainage body system according to claim 3,
wherein
the pegs of the first drainage body connecting element can be locked to the pegs of the second drainage body connecting element, at the lower ends.

9. Drainage body system according to claim 7,
wherein
the first locking devices are configured such that the pegs of the first drainage body connecting element can be locked to the pegs of the second drainage body connecting element and to the plurality of drainage bodies via the first locking devices.

10. Drainage body system according to any one of claims 1 to 6,
wherein
the first locking devices are configured to connect the pegs of the first drainage body connecting element to the pegs of the second drainage body connecting element together and
second locking devices are configured to connect the pegs of the plurality of drainage body connecting element to the plurality of drainage bodies.

11. Drainage body system according to any one of claims 1 to 10, wherein
the pegs are configured so that they can be inserted either with a first end in the receiving orifice flush or countersunk in relation to a surface of the drainage body, or with a second end in the receiving orifice protruding from the surface of the drainage body.

12. Drainage body system according to any one of claims 1 to 11, wherein
the web can be separated from the pegs.

13. Drainage body system according to any one of claims 1 to 11, wherein the web can be separated in the middle.

14. Drainage body system according to any one of claims 1 to 13, wherein the drainage body connecting element is formed as an injection moulding, and one or both of the pegs and the web are formed as hollow bodies.

15. Drainage body system according to claim 14, wherein the plurality of drainage body connecting elements are formed of plastic.

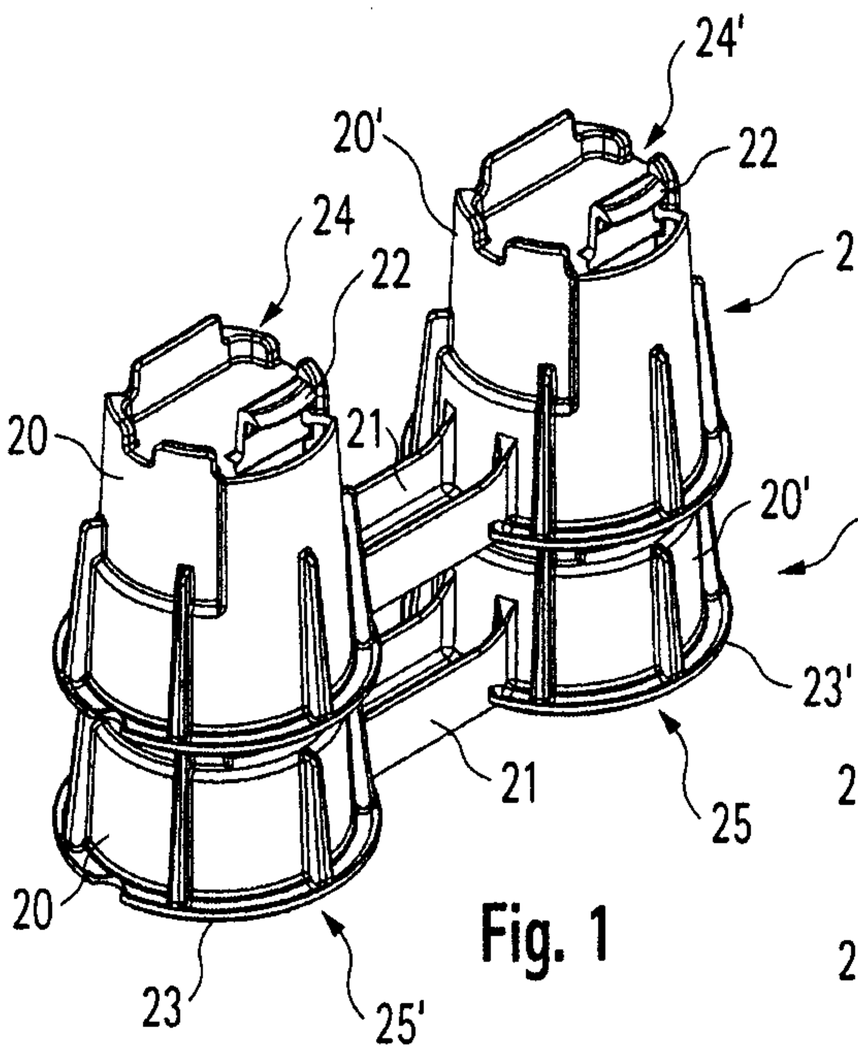


Fig. 1

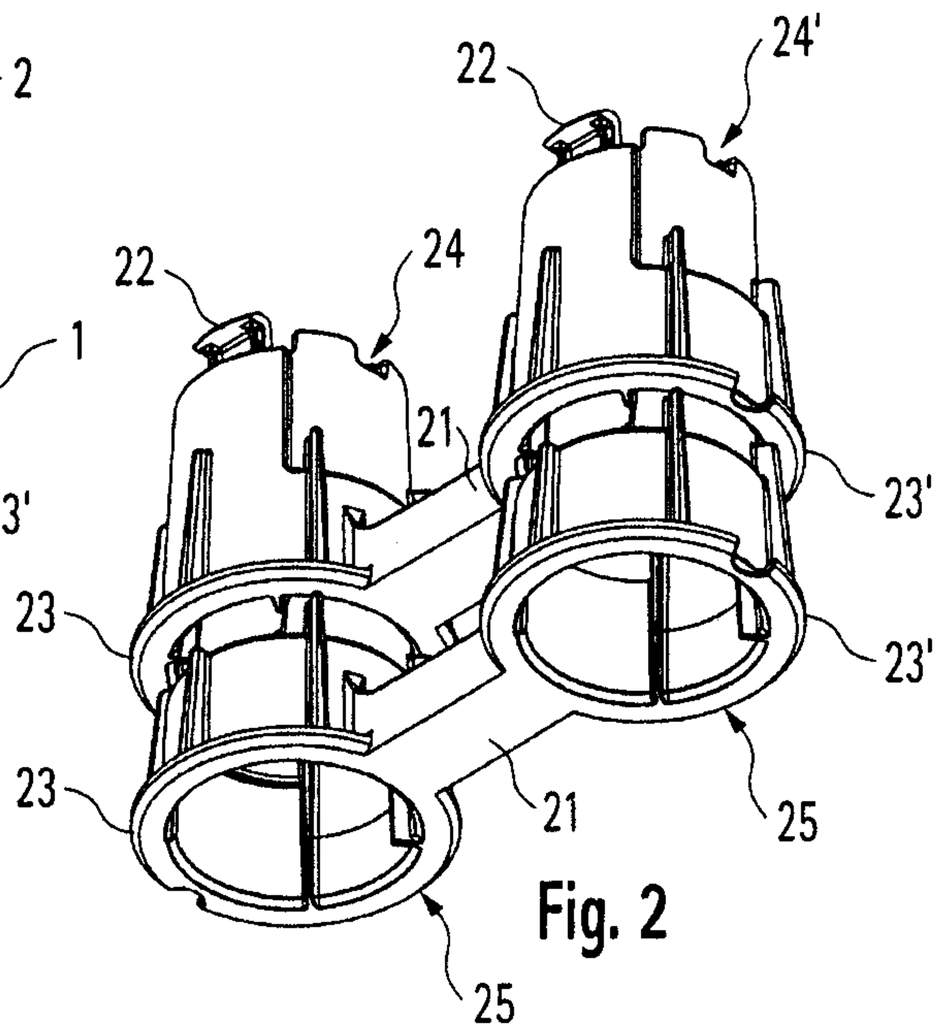


Fig. 2

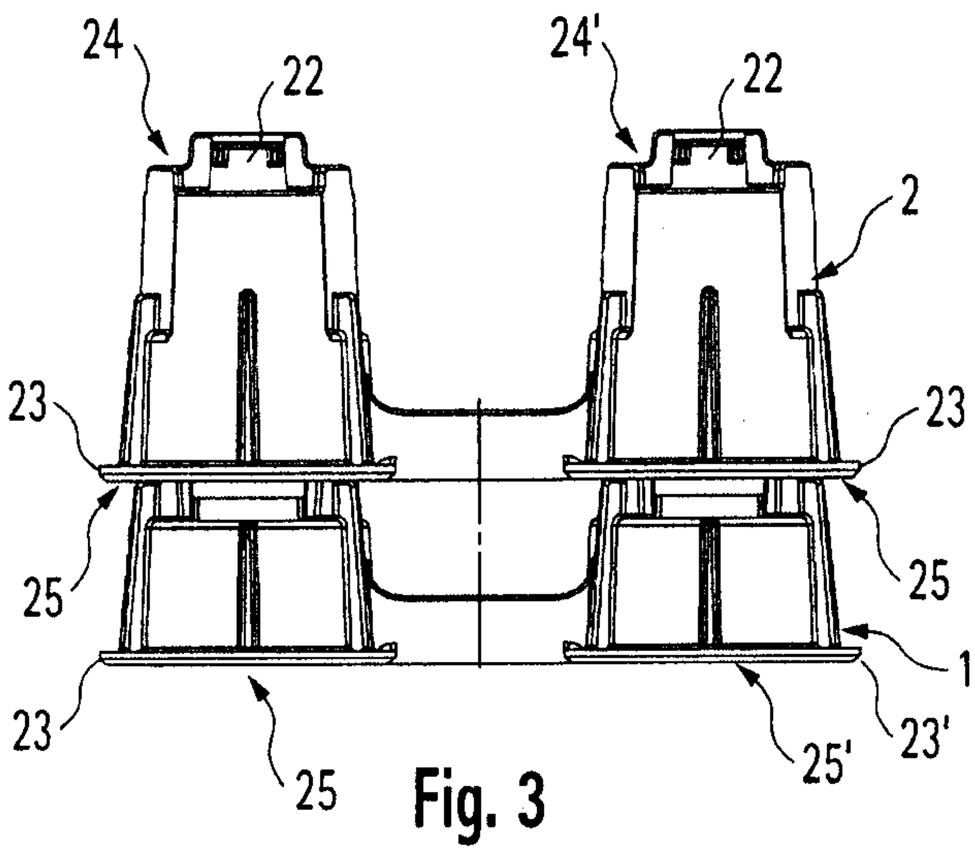


Fig. 3

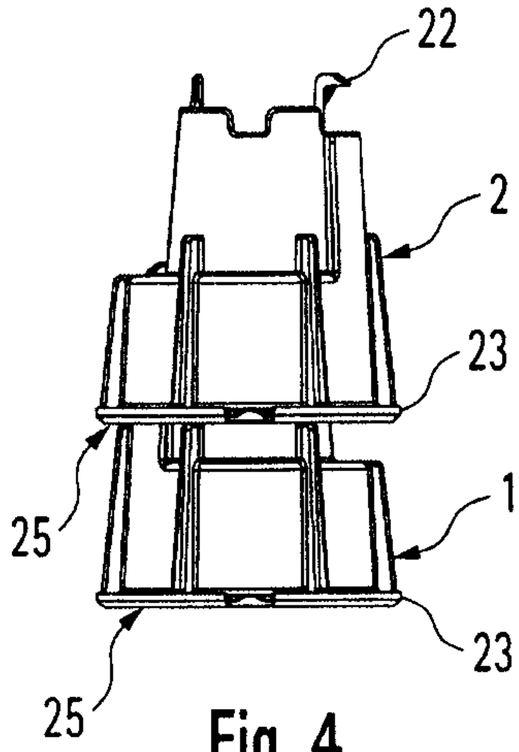


Fig. 4

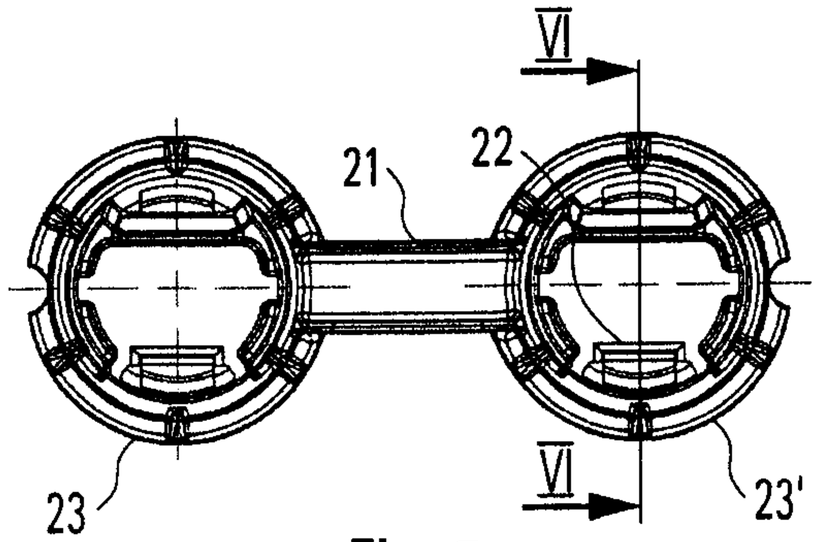


Fig. 5

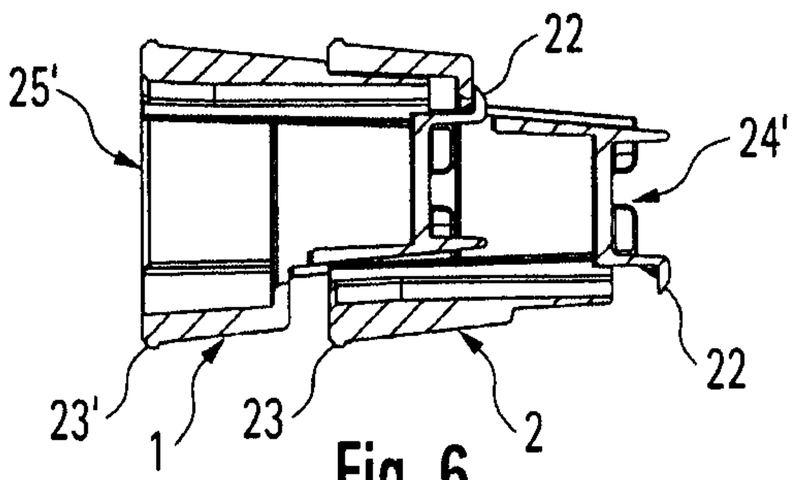


Fig. 6

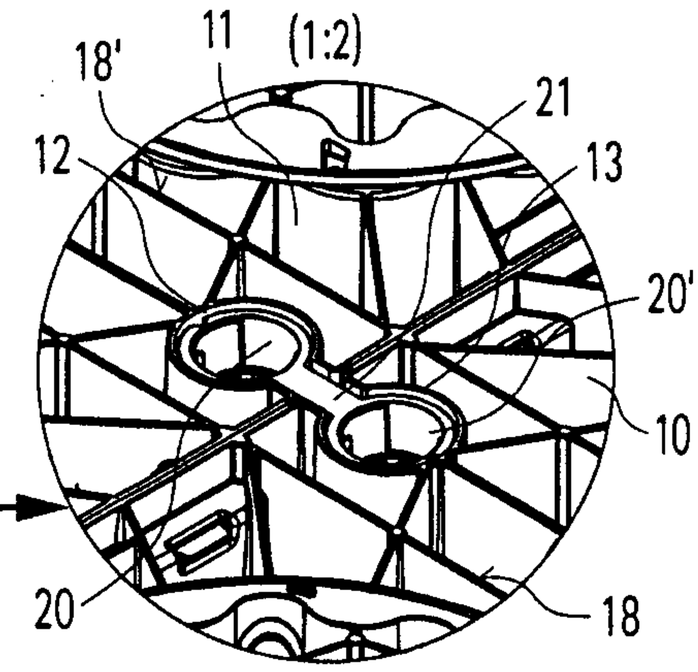


Fig. 8

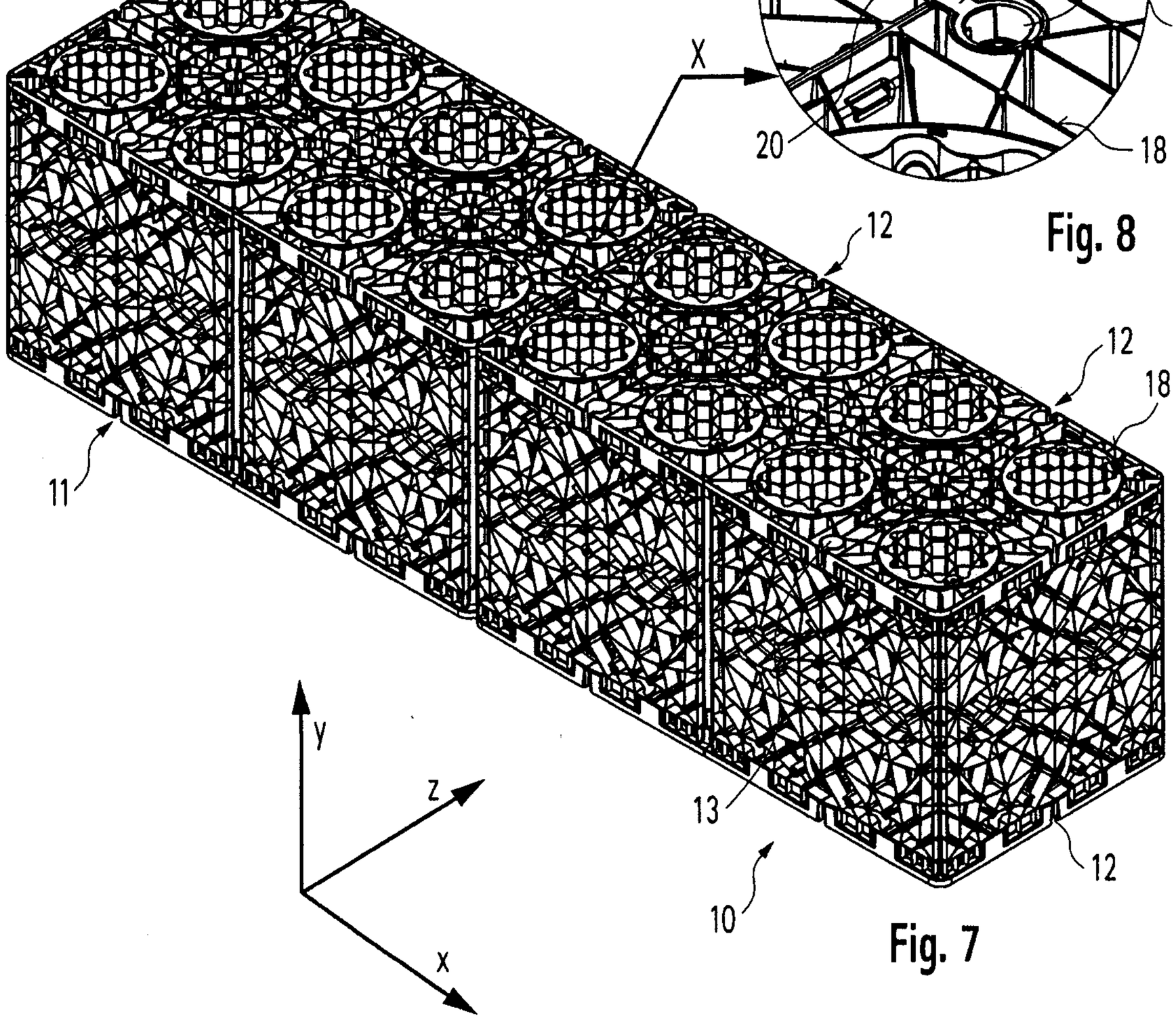


Fig. 7

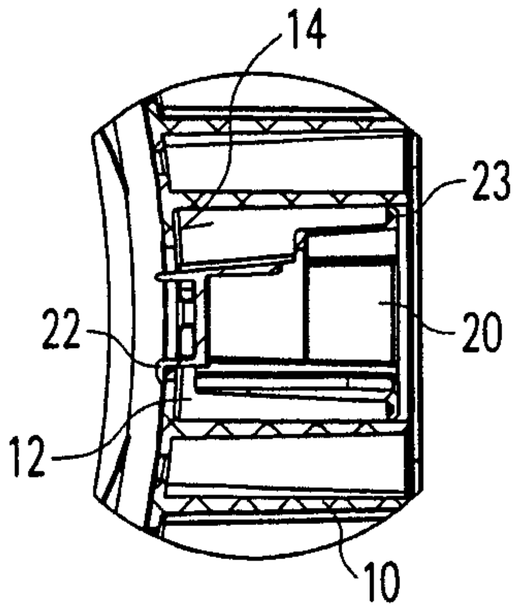


Fig. 9

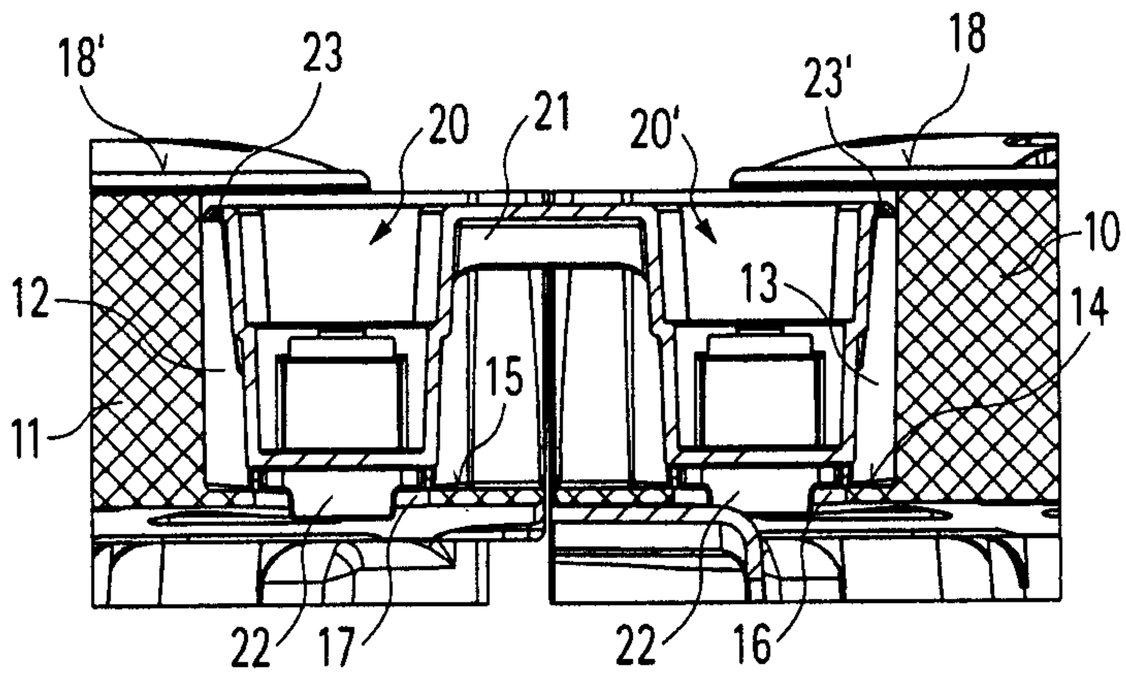


Fig. 10

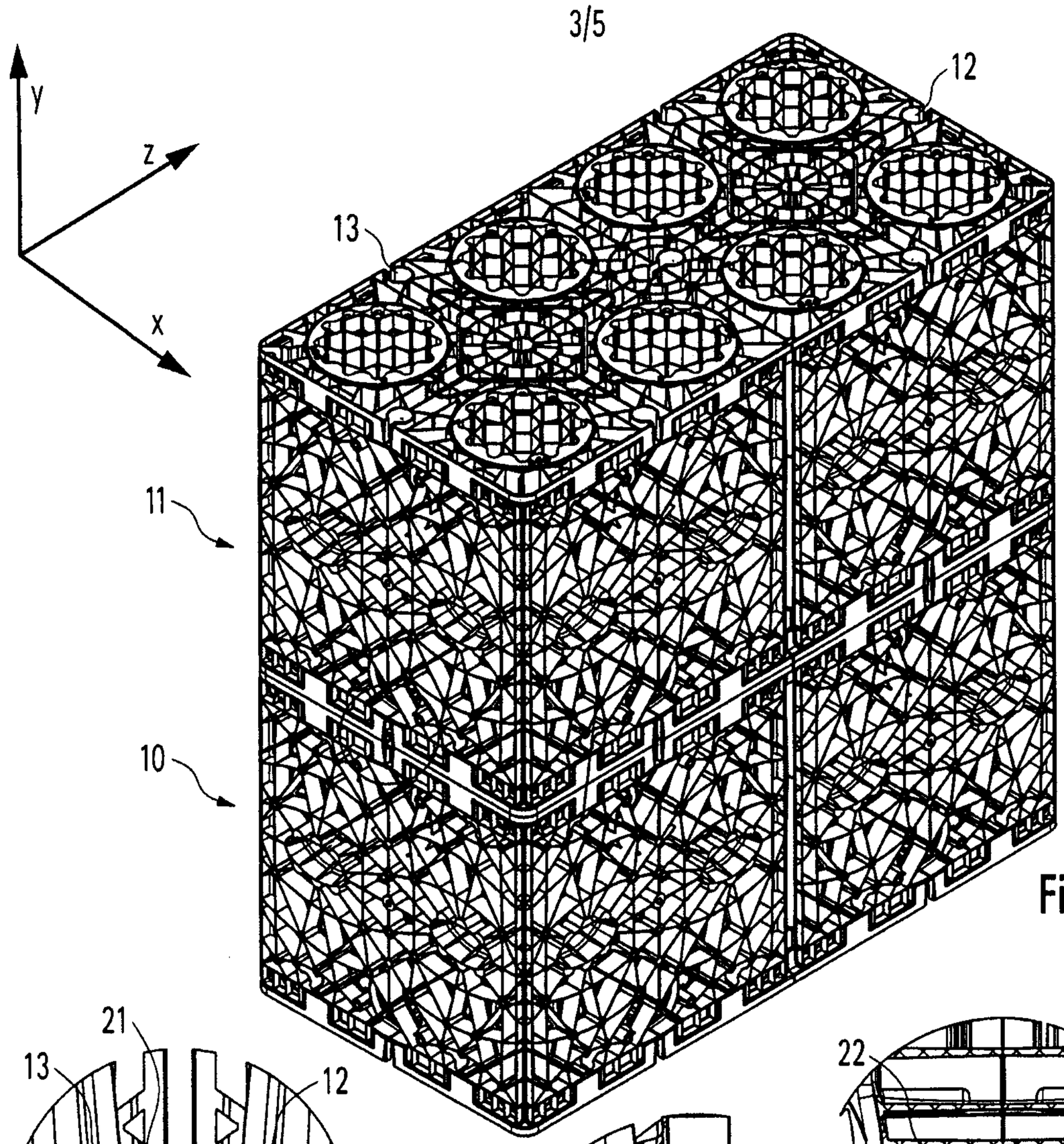


Fig. 11

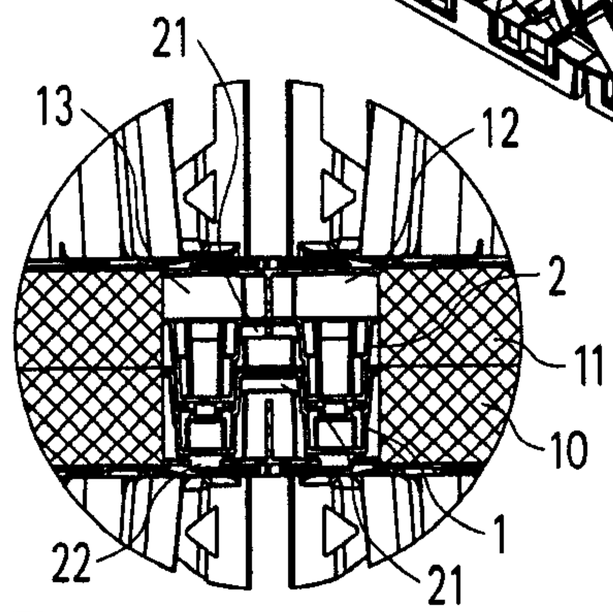


Fig. 12

Fig. 15

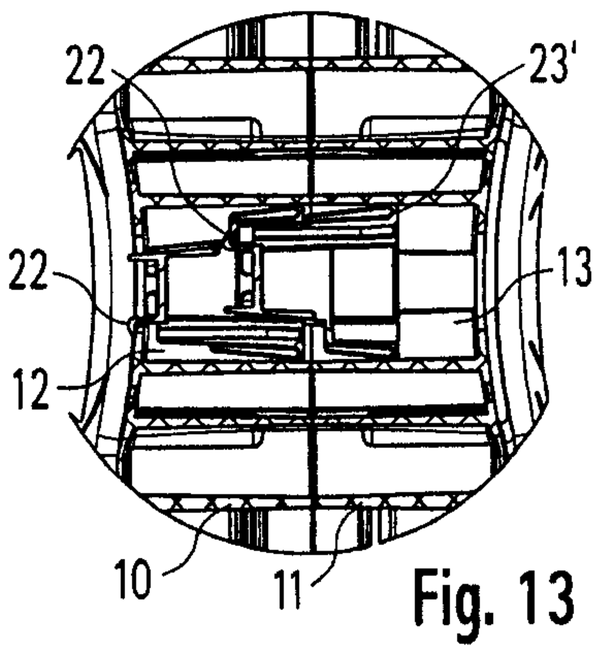


Fig. 13

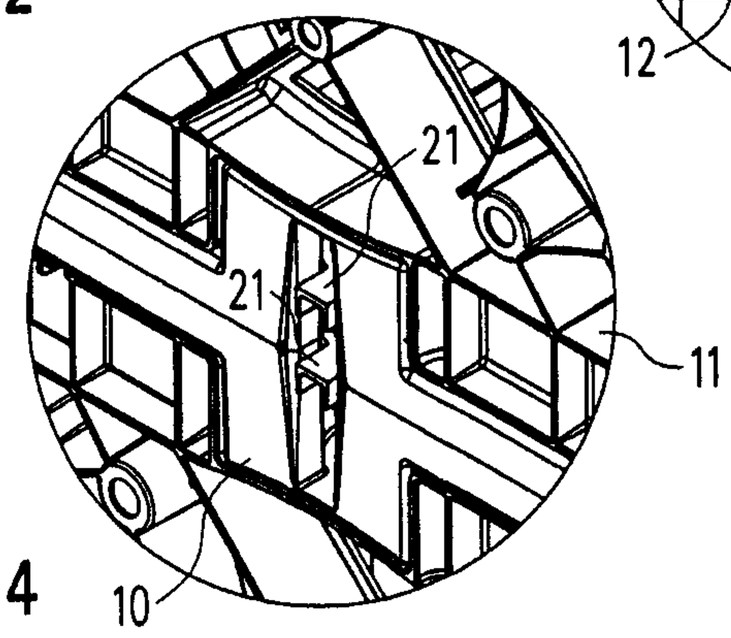


Fig. 14

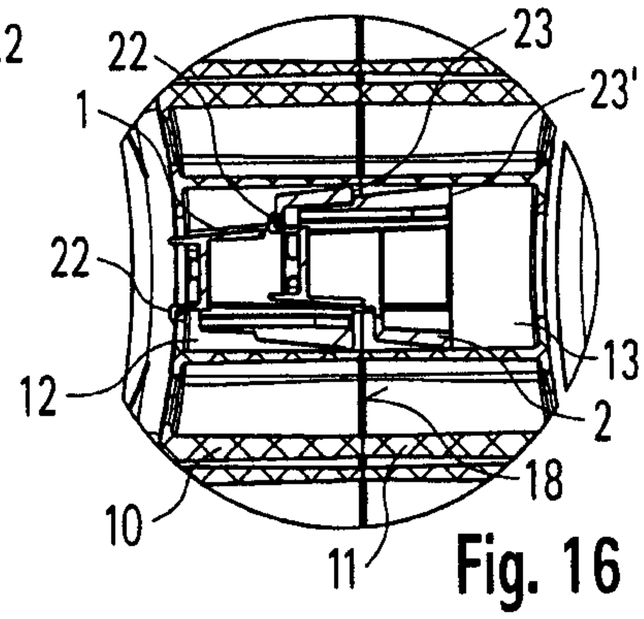


Fig. 16

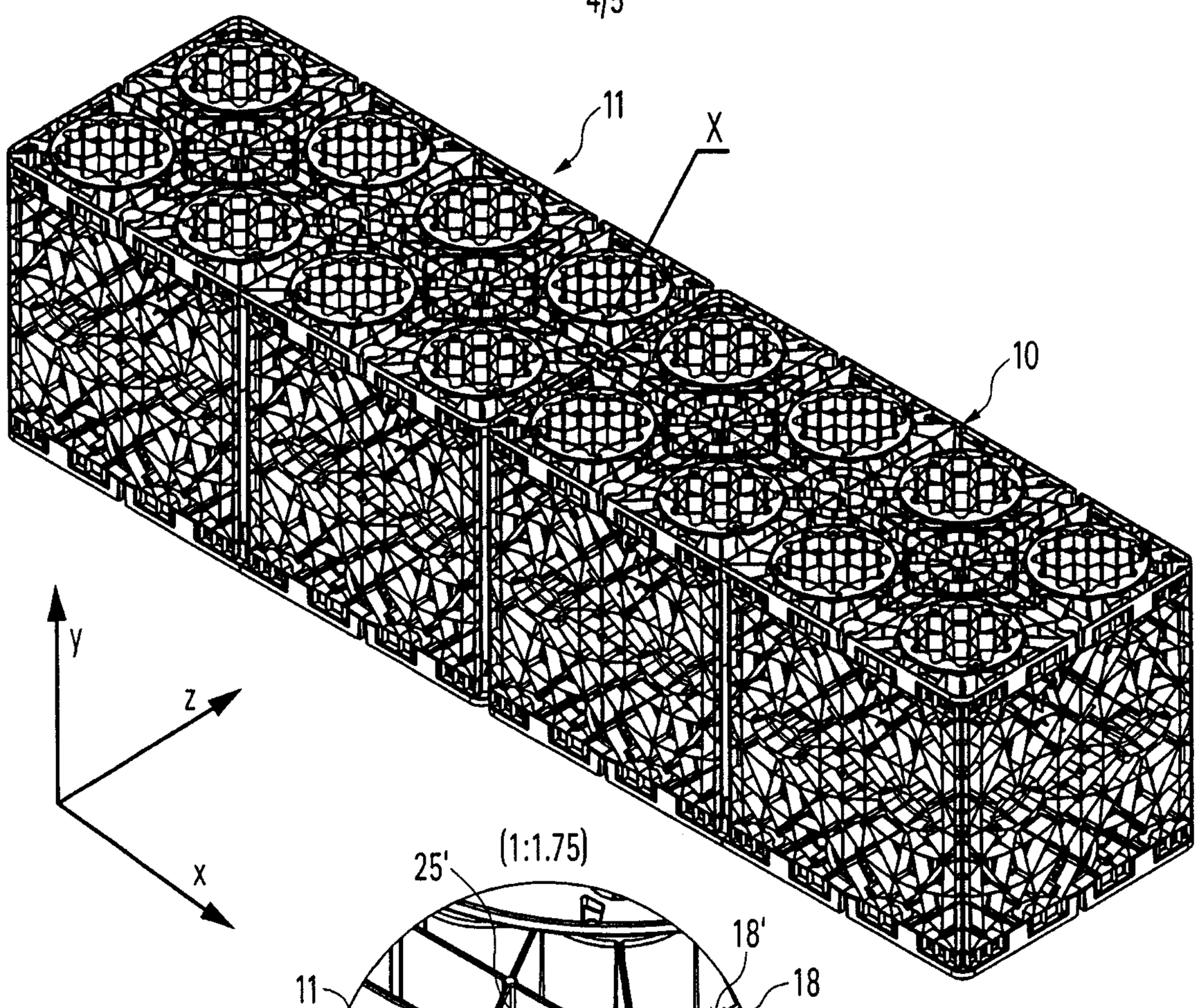


Fig. 17

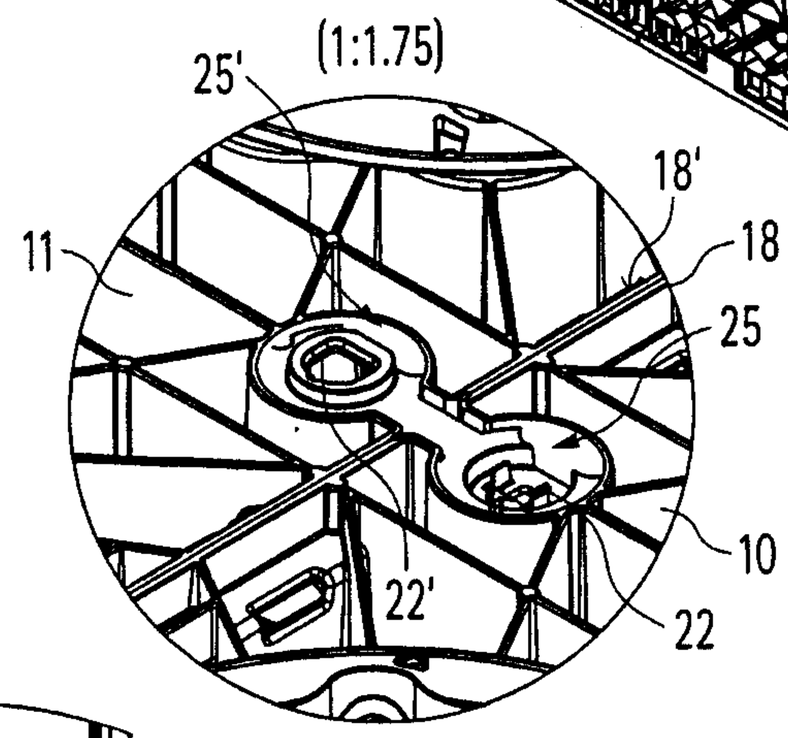


Fig. 18

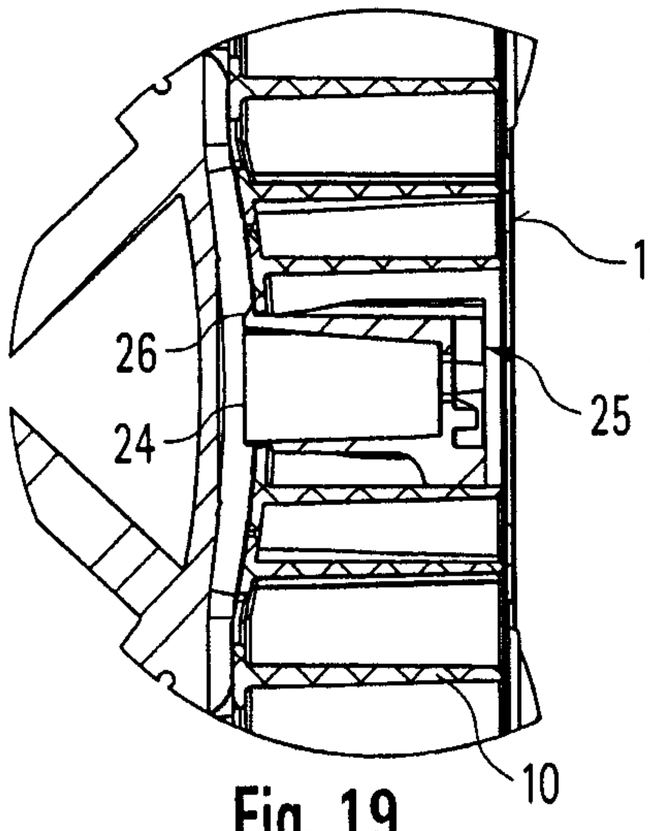


Fig. 19

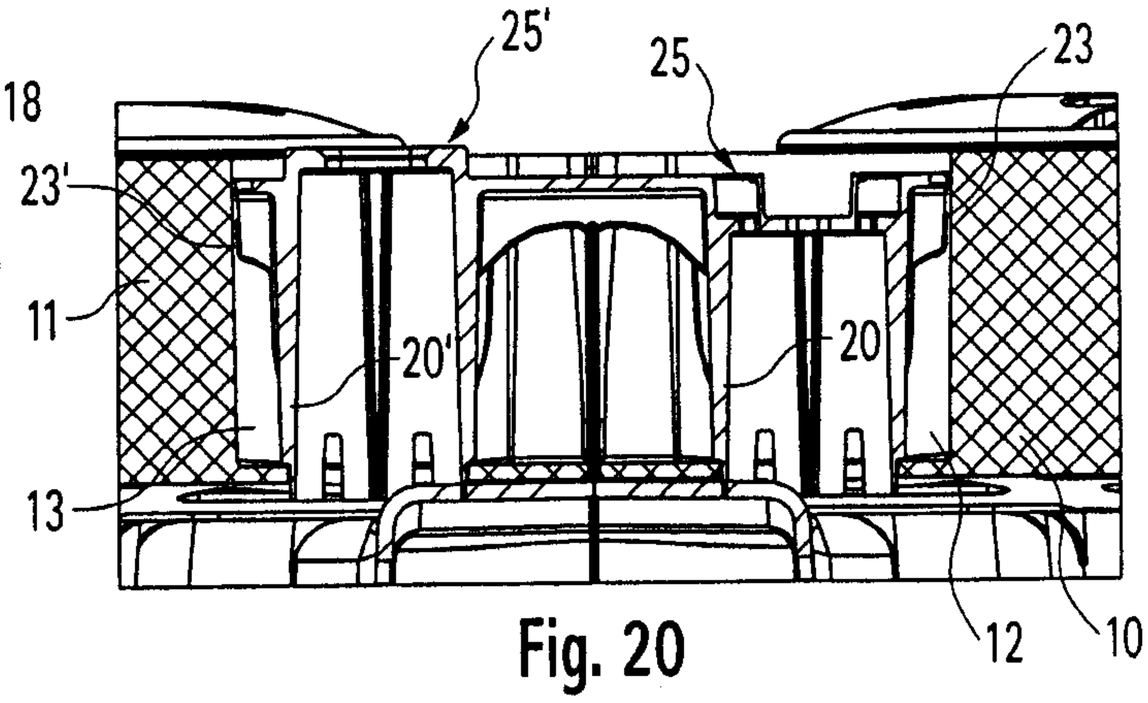


Fig. 20

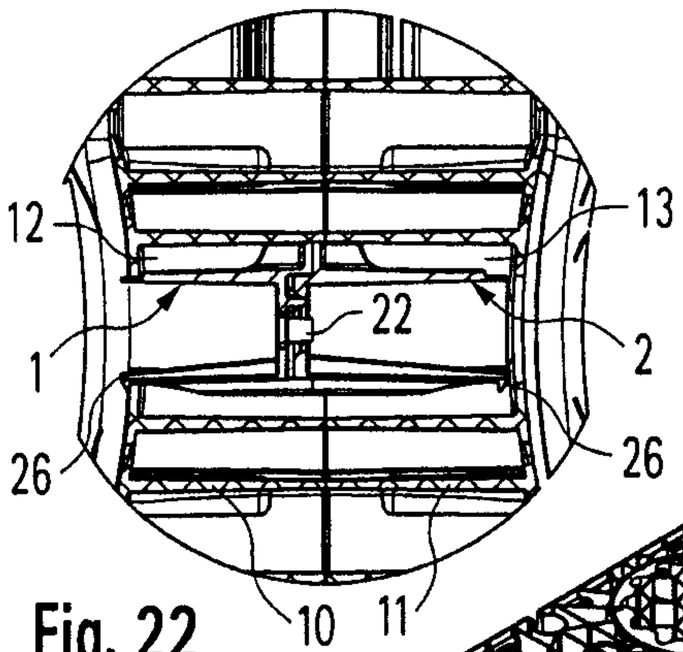


Fig. 22

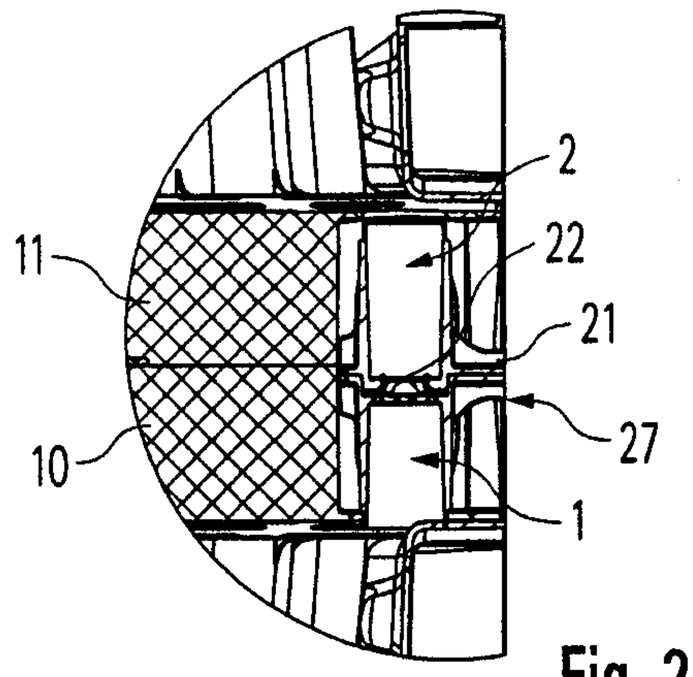


Fig. 23

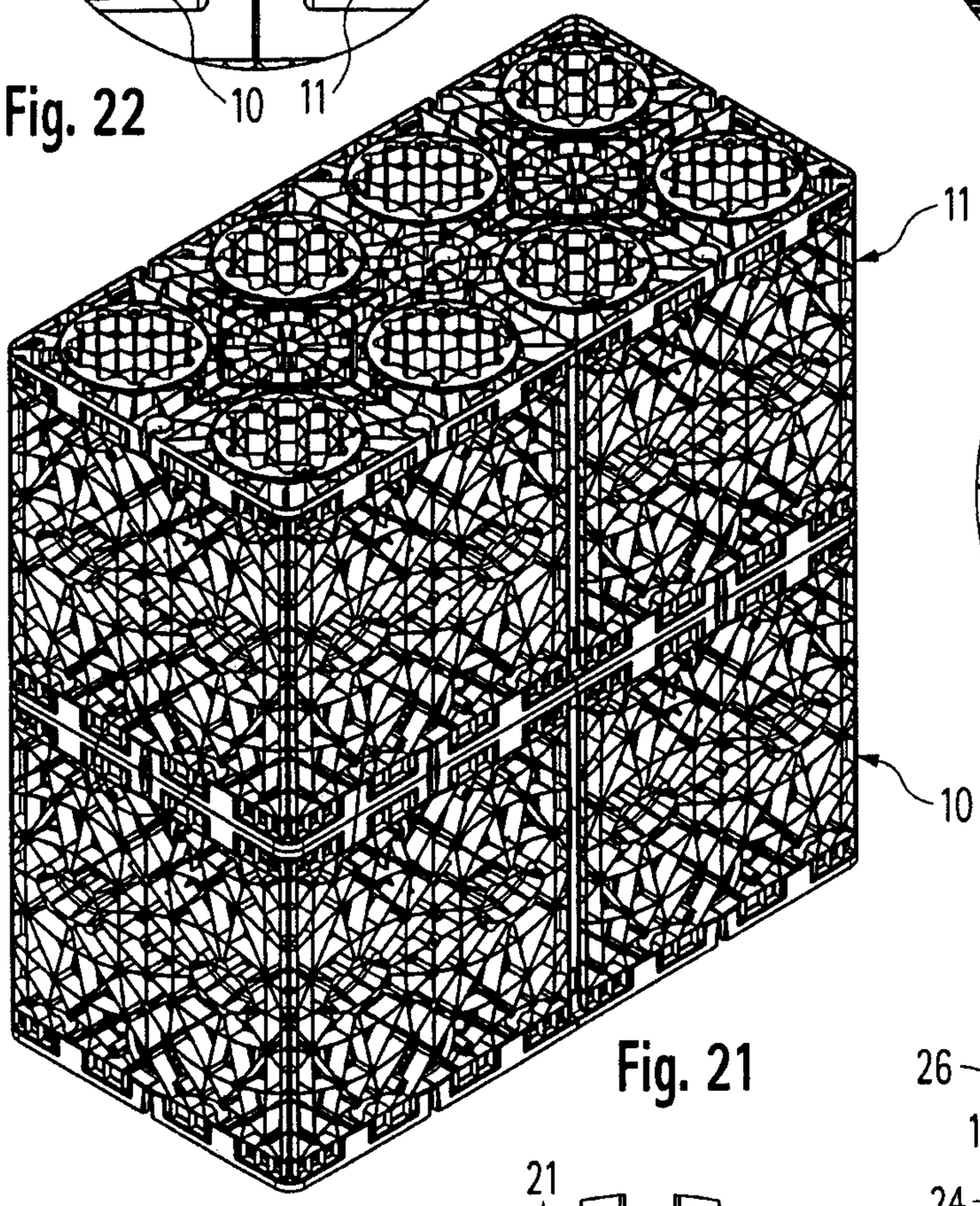


Fig. 21

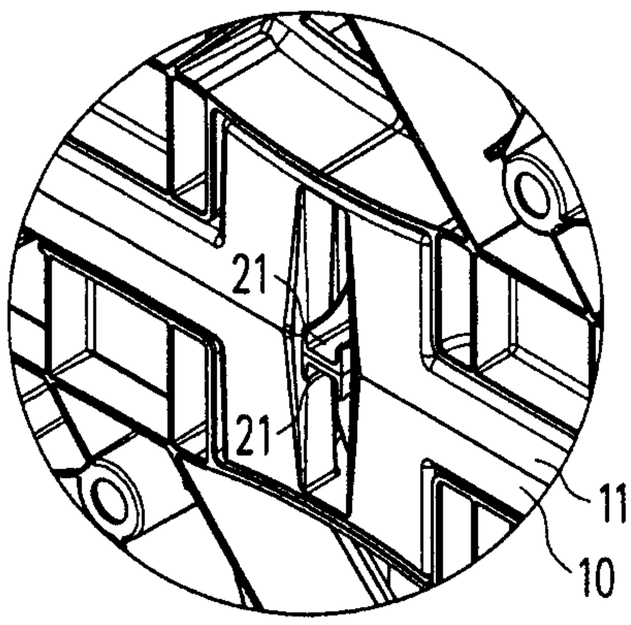


Fig. 24

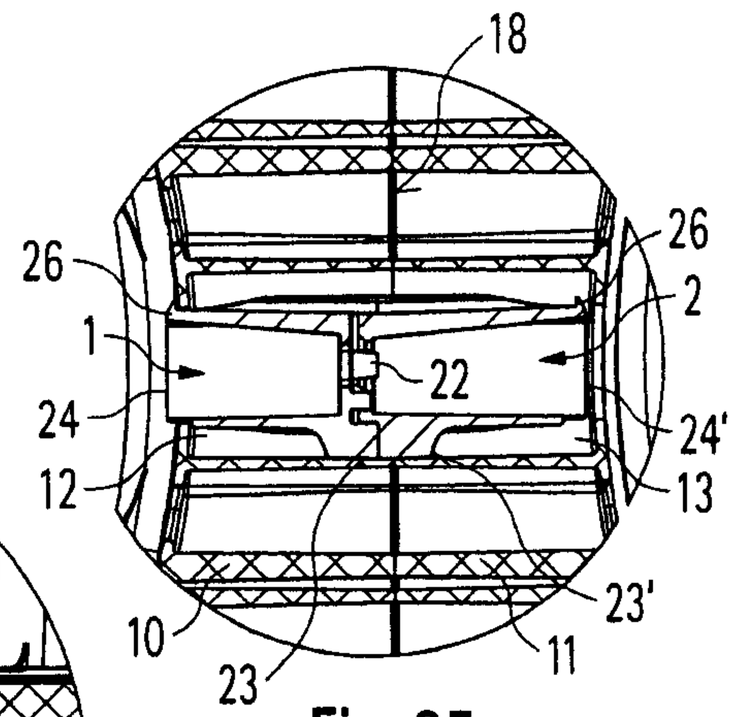


Fig. 25

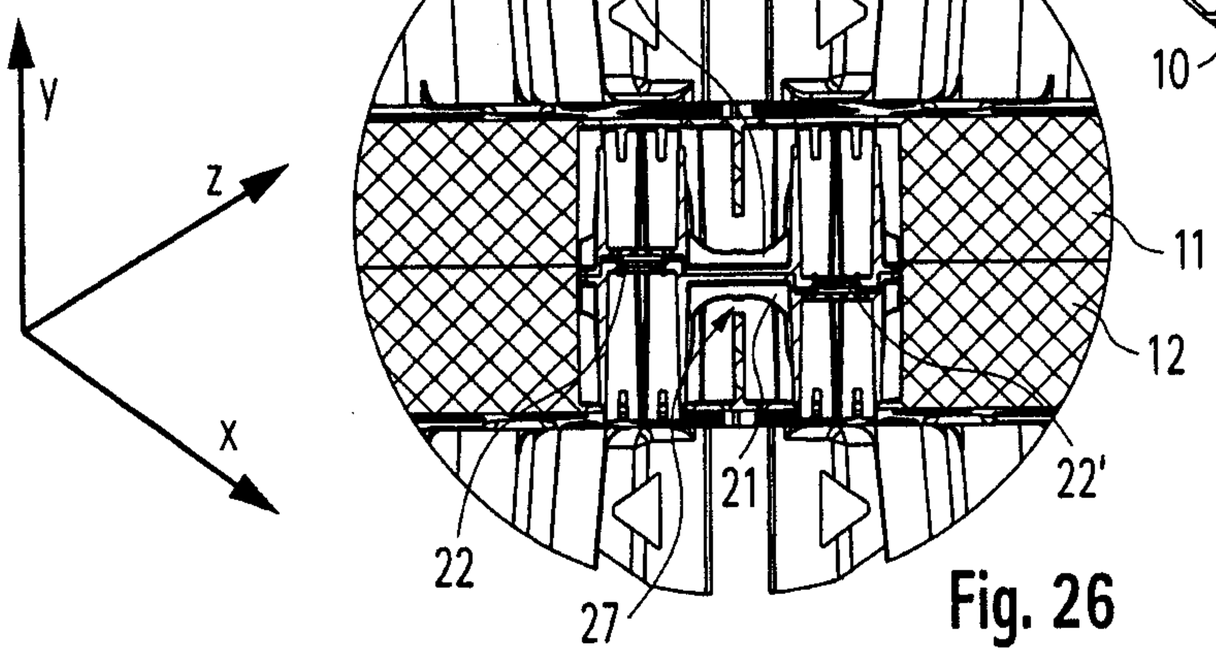
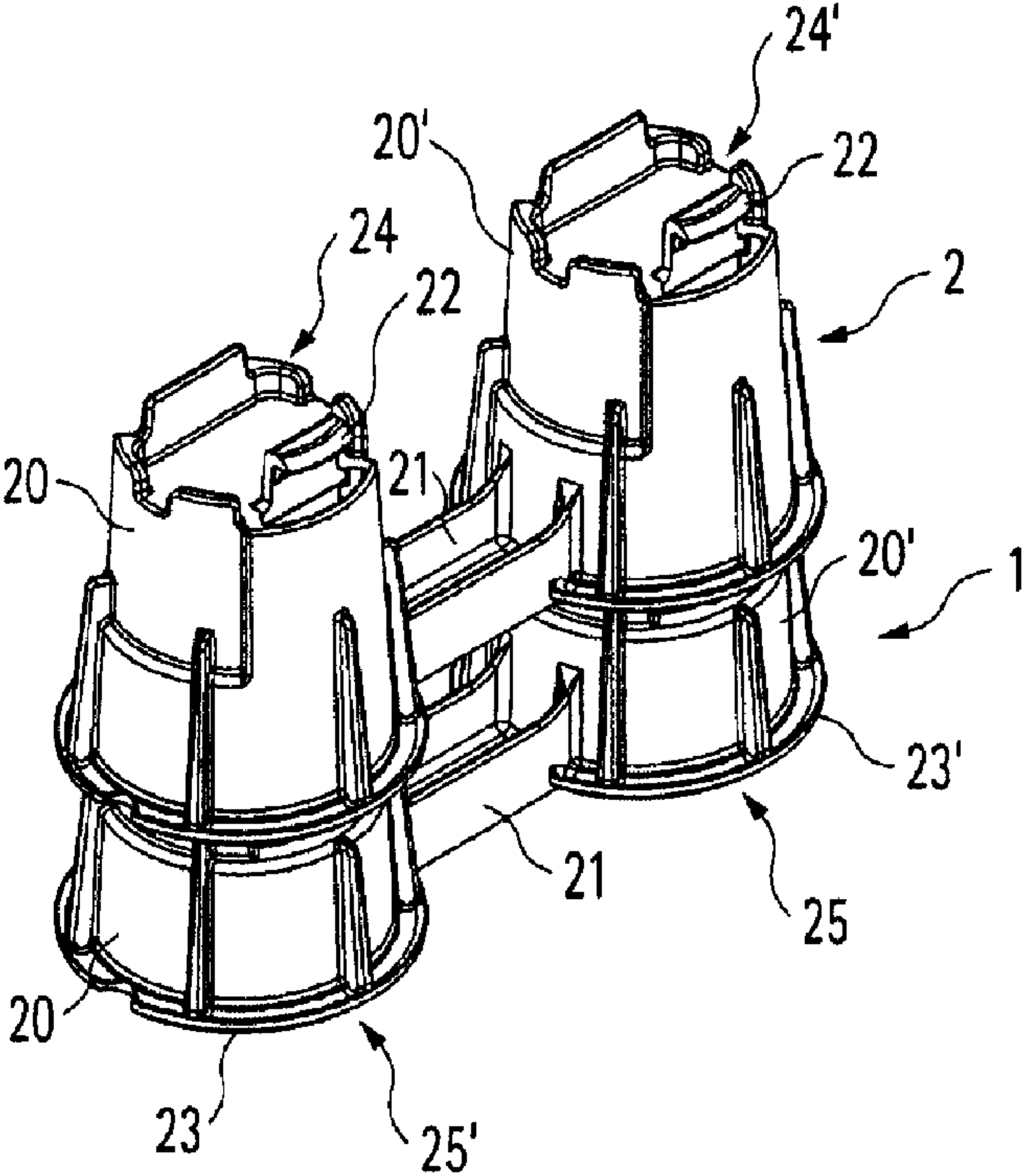


Fig. 26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