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(54) A SUPPORT LAYER FOR SUPPORTING AN ARTIFICIAL TURF ASSEMBLY, AND AN ARTIFICIAL TURF SYSTEM

(57) A support layer for supporting a playing field assembly, said support layer having a first side and a second side, and having a longitudinal direction, a width direction, and a height direction, said support layer having a layer thickness in the height direction, and is formed of a polymeric foam,
wherein the first side of the support layer is provided with a plurality of first channels, extending parallel in a first longitudinal direction, and wherein the second side of the support layer is provided with a plurality of second channels, extending parallel in a second longitudinal direction, wherein each of said plurality of first channels has a first depth in the height direction and each of said plurality of second channels has a second depth in the height direction, wherein the first depth and the second depth are smaller than the layer thickness,
wherein each of said plurality of first channels comprises a first base side extending parallel to the first side and first sidewalls extending from the first base side towards the first side, and wherein each of said plurality of second channels comprises a second base side extending parallel to the second side and second sidewalls extending from the second base side towards the second side,
wherein the support layer comprises a plurality of through drainage holes, wherein each of said plurality of drainage holes is positioned at a cross section of a first channel of said plurality of first channels and a second channel of said plurality of second channels, wherein each of said plurality of drainage holes opens at a first end in a first channel of said plurality of first channels and at a second end in a second channel of said plurality of second channels .

An artificial turf system, comprising a base layer, the support layer, and a playing field assembly.

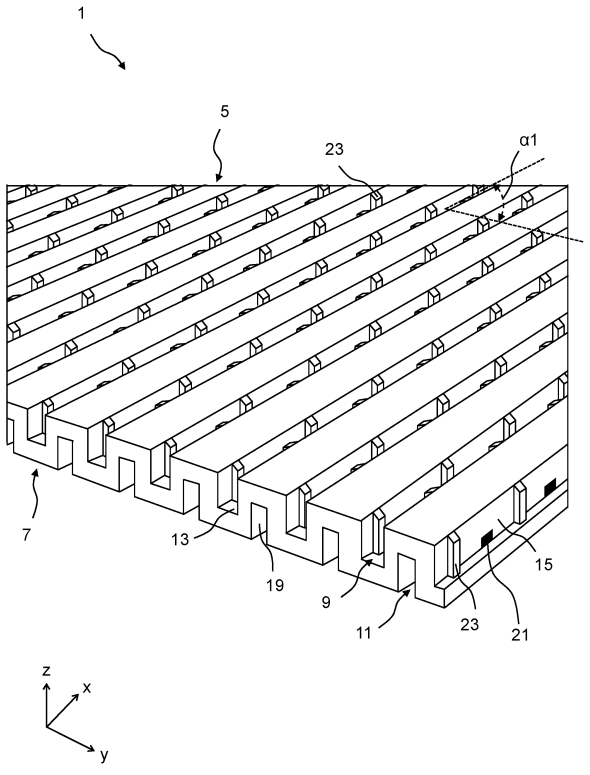

Fig. 1

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a support layer for supporting an artificial turf assembly, and to an artificial turf system. The support layer of the present invention may be used as supporting layer for artificial turf systems, for example for use in athletic fields (e.g., football fields), for equestrian applications, in ornamental lawns and gardens, and in children's playgrounds.

BACKGROUND OF THE INVENTION

[0002] Artificial turf is widely used for athletic fields/-courses for playing sports such as football, field hockey, rugby, golf, etc., and for playgrounds as well as for equestrian use. An artificial turf system is known and is typically build-up of a base layer or foundation layer (e.g., compacted sand or dirt, concrete, asphalt, gravel, or other compacted particulate or granulate material; said foundation layer being graded so that water will not form pools on the field), a support layer and the artificial turf. The artificial turf often comprises a porous turf backing to which a plurality of plastic grass-like filaments/strands are attached, preferably comprising an infill material between approx. the lower half to two-third of the vertically arrange filaments.

[0003] To prevent water pools on the field, the artificial turf field should be designed in such a manner that the rainwater is drained off fast enough. This requires that the support layer also needs to have a water drainage system through which the water can be drained off fast and efficient, while its supporting function to the artificial turf lying on top of the support layer is maintained.

[0004] A problem of conventional support layers having excellent drainage properties is that the plate elements that form the support layer have a relatively complex design which makes them more difficult to manufacture and/or results in relatively thick and/or heavy plate elements. With "complex design" is meant that the support layer comprises channels and drainage holes in all kinds of shapes and directions and possibly multiple layers to provide sufficient drainage, rigidity, and support. Using materials with a lower density and/or using a thinner support layer could resolve the issues of the thickness and weight of the support layer, but these negatively affect the support and impact characteristics of the support layer. By reducing the amount of drainage holes and/or channels, the support layer provides more support and has improved impact properties, but this strongly reduces the drainage properties of the support layer.

[0005] There is therefore a need for a support layer that resolves the above-mentioned issues while maintaining the excellent drainage properties.

OBJECT OF THE INVENTION

[0006] It is therefore an object of the invention to provide for a support layer having a less complex design with reduced weight and improved flexibility and having excellent shock absorption and drainage properties.

SUMMARY OF THE INVENTION

[0007] The foregoing object is achieved according to a first aspect of the invention that relates to a support layer for supporting a playing field assembly, such as an artificial turf assembly, said support layer having a first side and a second side, and having a longitudinal direction, a width direction, and a height direction, said support layer having a layer thickness in the height direction, and is formed of a polymeric foam, wherein the first side of the support layer is provided with a plurality of first channels, extending parallel in a first longitudinal direction for allowing liquid to flow through the plurality of first channels along the first side, and wherein the second side of the support layer is provided with a plurality of second channels, extending parallel in a second longitudinal direction for allowing liquid to flow through the plurality of second channels along the second side,

wherein each of said plurality of first channels has a first depth in the height direction and each of said plurality of second channels has a second depth in the height direction, wherein the first depth and the second depth are smaller than the layer thickness,
wherein each of said plurality of first channels comprises a first base side extending parallel to the first side and first sidewalls extending from the first base side towards the first side, and wherein each of said plurality of second channels comprises a second base side extending parallel to the second side and second sidewalls extending from the second base side towards the second side,
wherein the support layer comprises a plurality of through drainage holes, wherein each of said plurality of drainage holes is positioned at a cross section of a first channel of said plurality of first channels and a second channel of said plurality of second channels, wherein each of said plurality of drainage holes opens at a first end in a first channel of said plurality of first channels and at a second end in a second channel of said plurality of second channels for allowing liquid to flow via the plurality of drainage holes between the plurality of first channels and the plurality of second channels of the support layer.

[0008] An advantage of the support layer according to the first aspect of the invention is that its design provides a more flexible and softer support layer, while the vertical deformation, i.e., the shock or impact absorption, properties and drainage properties are comparable or improved compared to conventional support layers. A softer sup-

port layer follows more narrowly the contours of the base layer's surface while still providing sufficient support and impact absorption. Thus, safety and user-friendliness of users of the playing field assembly that is supported by the support layer according to the present invention are improved.

[0009] The increased flexibility of the support layer allows that the support layer can follow the contours of the surface of the underlying base layer more narrowly while still providing sufficient support and impact absorption. In case the support layer is formed as a plate element, the increased flexibility improves securing of the plate element to adjacent plate elements, thereby preventing moving of plate elements underneath a playing field assembly. A "playing field assembly" as used in the present disclosure includes sport fields, such as a football field or a rugby field, and playing field, such as a children's playing field.

[0010] The drainage properties of the support layer strongly reduce the risk of the formation of pools on top of the playing field assembly.

[0011] Furthermore, another advantage of the design of the support layer according to the present invention is that less material (i.e., polymeric foam) is required to prepare a support layer having properties that are equal to or better than conventional support layers.

[0012] A further benefit of the support layer according to the first aspect of the present invention is that the recyclability of the material(s) used is much better compared to conventional support layers that are based on expanded polyethylene (EPE) and expanded polypropylene (EPP).

[0013] The design of the support layer allows that not only the first side of the support layer can function as a top side and the second side of the support layer as a bottom side, but also that the second side can function as the top side and the first side as the bottom side. Each orientation of the support layer has its own advantage.

[0014] In the first orientation of the support layer, i.e., the first side being the top side and the second side being the bottom side, focus lies on cooling of the playing field assembly. This orientation may be beneficial in warmer regions where it is desirable for the support layer to retain a portion of water for a longer time in the channels of the support layer. The retained water has a cooling effect on the playing field assembly laying on top of the support layer.

[0015] In the second orientation of the support layer, i.e., the second side being the top side and the first side being the top side, focus lies on water drainage. This orientation may be beneficial in wetter regions where it is desirable to drain water from the playing field assembly as quickly as possible.

[0016] In a second aspect, the present invention relates to an artificial turf system, comprising from bottom to top:

- a base layer,
- a support layer according to the first aspect of the present invention, and
- a playing field assembly.

[0017] Corresponding embodiments disclosed below for the first aspect are also applicable for the artificial turf system (second aspect) according to the present invention, unless stated otherwise.

DETAILED DESCRIPTION OF EMBODIMENTS

[0018] The present invention is elucidated below with a detailed description.

[0019] In an embodiment, the first longitudinal direction of the plurality of first channels and the second longitudinal direction of the plurality of second channels are oriented in the same direction as the longitudinal direction of the support layer.

[0020] In an embodiment of the present invention, the first sidewalls and the second sidewalls extend substantially parallel to the height direction z. However, it is also possible that the first sidewalls extend inwardly or outwardly from the first base side towards the first side and that the second sidewalls extend inwardly or outwardly from the second base side towards to second side. In this way, a support layer with increased or reduced flexibility/softness (compared to a support layer according to the first aspect of the invention that has sidewalls that extend substantially parallel to the height direction can be provided to the user, depending on the user's wishes.

[0021] The first base side and the second base side may also be referred to as the first horizontal side and the second horizontal side, especially in case the support later is positioned on a horizontal (flat) surface.

[0022] The expressions "first side" and "second side" are used for reference in a nonlimiting manner, e.g., depending on the spatial orientation of an embodiment of the support layer. Such terms may be synonymous with "left side" and "right side", "top side" and "bottom side" and similar terminology.

[0023] In an embodiment, the first base side of the plurality of first channels and/or the second base side of the plurality of second channels are curved. This reduces the amount of water that remains in the channels if complete drainage of water is required/desired. The risk of pool formation on top of the playing field assembly is also further reduced.

[0024] In an embodiment of the support layer according to the first aspect of the invention, the support layer further comprises a plurality of pillars, wherein the plurality of pillars are of the same polymeric foam as the support layer and extend from the first base side of the plurality of first channels towards the first side of the support layer and/or extend from the second base side of the plurality of second channels towards the second side of the support layer and/or extend from the third base side of the plurality of third channels, if any, towards the first side of the support layer, wherein each pillar of the

pillars is connected to a first sidewall of the first sidewalls or to a second sidewall of the plurality of second sidewalls and/or to a third sidewall of the third sidewalls (33), if any.

[0025] Adding pillars to the support layer increases the stiffness, or rigidity, of the support layer. By changing the number of pillars, a stiffer or a more flexible, or softer, support layer can be obtained. A softer support layer follows more narrowly the contours of the base layer's surface while still providing sufficient support and impact absorption. Furthermore, the flexibility improves securing the plate element to neighbouring plate elements of the support layer, thereby preventing moving of the plate elements underneath the playing field assembly during use.

[0026] In an embodiment, the first side is a top side (i.e., the first side is facing towards the playing field assembly that placed on top of the support layer) and the second side is a bottom side (i.e., the second side is facing towards the base layer on which the support layer is placed), wherein the support layer comprises a plurality of first water impediments extending from the first base side and/or from the third base side, if any, towards the first side and extending between two adjacent first sidewalls and/or extending between two adjacent third sidewalls, if any, wherein the plurality of first water impediments are of the same polymeric foam as the support layer, wherein the first water impediments have a first height that is in the range of from 25 to 65 percent, preferably 40 to 50 percent, of the first depth of the plurality of first channels,. The first water impediments have the same width as the width of the first channels and/or of the third depth of the plurality of third channels, such that water can only flow over the impediments and not underneath or around the impediments.

[0027] In another embodiment, second water impediments may also be present on the second side of the support layer in a similar manner, and possibly with similar dimensions, as the first water impediments, such that the same effects can be established if the support layer is used in the second orientation, i.e., wherein the first side is facing downwards, thus towards to the base layer, and the second side is facing upwards, thus facing towards to the playing field assembly.

[0028] The first and/or second water impediments prevent that the channels can completely drain. In other words, a layer of water is retained in the channels between the impediments. In sunny and/or warm/hot conditions, the retaining water has a cooling effect on the playing field assembly that is supported by the support layer.

[0029] In an embodiment, the thickness of the support layer is in the range of from 10 to 50 mm, preferably 15 to 30 mm, such as 20 mm or 25 mm. The support layer having such a thickness has an optimal balance between material strength and rigidity and impact absorption.

[0030] In an embodiment, a first wall thickness, defined as the difference between the support layer thickness and the first depth of the plurality of first channels, and /or a second wall thickness, defined as the difference between the support layer thickness and the second depth of the plurality of second channels, and/or a third wall thickness, defined as the distance between a first sidewall of the plurality of first sidewalls and an adjacent second sidewall of the plurality of second sidewalls, have a substantially constant thickness in the range of from 2 to 30 mm, such as 2 to 10 mm, preferably 5 to 20 mm, more preferably 10 to 15 mm. Such a thickness provides a substantially constant material strength, rigidity, and impact absorption across the complete support layer.

[0031] In an embodiment, the first depth of each of the plurality of first channels and/or the second depth of each of the plurality of second channels and/or the third depth of each of the plurality of third channels, if any, are in the range of from 50 to 85 percent of the thickness of the support layer, preferably wherein the plurality of first channels and/or the plurality of second channels and/or the plurality of third channels, if any, have the same depth. Such a depth provides a substantially constant material strength, rigidity, and impact absorption across the complete support layer.

[0032] In an embodiment, the support layer has a mass per unit area in the range of from 200 to 700 g/m^2, preferably 300 to 550 g/m^2, more preferably 350 to 450 g/m^2, measured according to ISO 9863-1 :2016. A support layer having such a mass per unit area has a much lower weight compared to conventional support layers while strength/rigidity and impact absorption properties of the support layer are maintained. A lower mass per unit area of the support layer means that the plate elements are also lighter, making them easier to manage and transport.

[0033] The polymeric foam may have a density in the range of from 20 to 70 g/L, preferably 30 to 55 g/L, more preferably 35 to 45 g/L. Such a support layer has a much lower weight compared to conventional support layers while strength/rigidity and impact absorption properties of the support layer are maintained. Furthermore, a lower weight means that less polymeric foam is needed to manufacture a support layer with the same performance as conventional support layers.

[0034] Furthermore, the polymeric foam may be a polyolefin foam, such as polyethylene foam, for example expanded polyethylene (EPE), and polypropylene foam, for example expanded polypropylene (EPP), a polyurethane foam, for example expanded thermoplastic urethane (ETPU), a biobased foam, such as polylactic acid foam, for example expanded polylactic acid (EPLA), a polystyrene foam, for example expanded polystyrene (EPS), a co-polymer foam comprising at least two monomers, preferably ethylene monomers and propylene monomers, or one or more mixtures of these polymeric foams.

[0035] In an embodiment, the plurality of first channels have a first width in the width direction and the plurality of second channels have a second width in the width direction, wherein the first width and the second width are in

the range of from 3 to 50 mm, preferably 5 to 30 mm, more preferably 10 to 15 mm, preferably wherein the plurality of first channels and the plurality of second channels have the same width.

[0036] The plurality of first channels may have a first width in the longitudinal direction and the plurality of second channels may have a second width in the width direction, wherein the first width and the second width are in the range of from 3 to 50 mm, preferably 5 to 30 mm, more preferably 10 to 15 mm, preferably wherein the plurality of first channels and the plurality of second channels have the same width.

[0037] Channels with such a width reduce the weight of the support layer and increase the flexibility of the support layer while the strength and rigidity (or: flexibility) are maintained. Furthermore, wider channels allow faster drainage of water.

[0038] In an embodiment, the plurality of drainage holes have a hole width in the longitudinal direction in the range of from 1 to 50 mm, preferably 3 to 50 mm, more preferably 5 to 30 mm, more preferably 10 to 15 mm, and a hole height in the height direction in the range of from 1 to 20 mm, preferably 5 to 10 mm. The width of the plurality of drainage holes may be equal to or smaller than the first width of the plurality of first channels and/or the second width of the plurality of second channels.

[0039] The drainage holes may have a hole width in the width direction in the range of from 1 to 50 mm, preferably 3 to 50 mm, more preferably 5 to 30 mm, more preferably 10 to 15 mm, and a hole length in the longitudinal direction that equals the second width of the second channels.

[0040] The further drainage holes may have a hole width in the longitudinal direction in the range of from 1 to 50 mm, preferably 3 to 50 mm, more preferably 5 to 30 mm, more preferably 10 to 15 mm, and a hole height in the height direction in the range of from 1 to 20 mm, preferably 5 to 10 mm.

[0041] The skilled person will appreciate that the plurality of drainage holes preferably has a rectangular opening, and, thus, do not have a circular or oval opening. Furthermore, the drainage holes may comprise an end that partially or completely opens into the second sidewalls of the plurality of second channels.

[0042] Drainage holes with such dimensions reduce the weight of the support layer and increase the flexibility of the support layer while the strength and rigidity (or: flexibility) are maintained. Furthermore, wider drainage holes allow faster drainage of water.

[0043] An additional advantage of drainage holes having the dimensions as disclosed above is that a softer support layer can be obtained. A softer support layer follows more narrowly the contours of the base layer's surface while still providing sufficient support and impact absorption.

[0044] The plurality of drainage holes may be provided in first parallel rows extending in the longitudinal direction, wherein drainage holes in a parallel row of said first parallel rows are spaced apart at a constant first pitch. Furthermore, the plurality of drainage holes may be provided in second parallel rows extending in the width direction, wherein drainage holes in a parallel row of said second parallel rows are spaced apart at a constant second pitch.

[0045] Such a distribution of the pillars provides a substantially constant water drainage across the whole support layer.

[0046] In an embodiment, the plurality of pillars has a pillar height in the height direction that is at most equal to the first depth of each of the plurality of first channels and/or to the second depth of each of the plurality of second channels and/or to the third depth of each of the plurality of third channels, if any. This has the effect that the strength and rigidity of the support layer are increased with minimal addition of polymeric foam and thus, minimal increase of the support layer's weight.

[0047] In an embodiment, the plurality of pillars has a pillar width in the longitudinal direction and a pillar depth in the width direction, wherein the pillar width and the pillar depth are in the range of from 1 to 10 mm, preferably wherein the pillar width equals the pillar depth. This improves the strength and rigidity of the support layer while drainage properties are maintained.

[0048] The plurality of pillars may be provided in third parallel rows extending in the longitudinal direction, wherein pillars in a parallel row of said third rows are spaced apart at a constant third pitch. Furthermore, the plurality of pillars may be provided in fourth parallel rows extending in the width direction, wherein pillars in a parallel row of said fourth parallel rows are spaced apart at a constant fourth pitch.

[0049] Such a distribution of the pillars provides a substantially constant strength and rigidity (or: flexibility) across the whole support layer.

[0050] The support layer may also comprise a plurality of fourth channels along the second side for allowing lateral flow of liquid, wherein the plurality of fourth channels are oriented at a second angle with respect to the longitudinal direction of the support layer, wherein the second angle is in the range of 30 to 90°, preferably 60 to 90°, more preferably approximately 90°. Each of said plurality of fourth channels has a fourth depth in the height direction of the support layer, wherein the fourth depth is in the range of from 10 to 50 percent of the second depth the plurality of second channels.

[0051] The lateral water flow through the third and fourth channels makes sure that the level of water drainage of the support layer is maintained in case one or more first and/or second channels and/or one or more drainage holes are blocked, for example due to infill/dirt blocking the channels/drainage holes.

[0052] In an embodiment, the support layer is formed as a plate element, which comprises connecting elements at a circumferential edge thereof for connecting the plate element to further plate elements such that the plate elements are flush with respect to each other, preferably wherein the connecting elements are ar-

ranged for connecting the plate element to further plate elements in a form-closed manner such as a dovetail joint. The connecting elements enable connecting adjacent plate elements to each other such that uncontrolled sliding or moving of a plate element relative to adjacent plate elements, which may result in splits in the support layer, is prevented.

[0053] In an embodiment, the surface area in plan view of the plate element is in the range of from 0.5 to 4 m^2, preferably wherein the plate element is rectangular having a plate length in the range of from 0.5 to 4 m and a plate width in the range of from 0.5 to 4 m, the length more preferably in the range of from 1 to 2 m, even more preferably about 1.6 m, and the width more preferably in the range of from 1 to 1.5 m, even more preferably about 1.15 m. Plate elements of such dimensions are more manageable and enable easier application of the support layer on the base layer.

[0054] In an embodiment, the plurality of first channels and the plurality of second channels extend continuously in the longitudinal direction in interconnected plate elements. This enables water to flow from one end to the other end of the support layer in the longitudinal direction through the plurality of first channels and through the plurality of second channels.

[0055] In an embodiment, the first longitudinal direction of the plurality of first channels extends substantially parallel, preferably parallel, in the longitudinal direction of the support layer and the second longitudinal direction of the plurality of second channels extends substantially parallel, preferably parallel, in the longitudinal direction of the support layer, wherein in the width direction the plurality of first channels and the plurality of second channels are alternating so that in cross-sectional view in the width direction the support layer has an undulated shape, such as a wave-shape, zig-zag-shape, or a corrugated shape, wherein the first end of each of the plurality of drainage holes opens in one of the first sidewalls of the first channel of said plurality of first channels at a position directly adjacent the first base side of the first channel of said plurality of first channels, and the second end of each of the plurality of drainage holes opens in one of the second sidewalls of the second channel of said plurality of second channels adjacent to the respective first channel of said plurality of first channels, preferably wherein said second end opens completely in the one of the second sidewalls, such as at a position adjacent, preferably directly adjacent, to the second base side of the second channel of said plurality of second channels.

[0056] In another embodiment, the first longitudinal direction of the plurality of first channels extends at a first angle of from 70 to 110° or from 80 to 100 ° with respect to the longitudinal direction of the support layer, preferably substantially parallel, more preferably parallel, in the width direction of the support layer and the second longitudinal direction of the plurality of second channels extends substantially parallel, preferably parallel, in the longitudinal direction of the support layer, wherein the first end of each of the plurality of drainage holes opens in the first base side of the first channel of the plurality of first channels and the second end of each of the plurality of drainage holes opens in the second base side of the second channel of the plurality of second channels. Preferably, said embodiment further comprises a plurality of third channels along the first side arranged for allowing liquid to flow through the plurality of third channels along the first side, wherein said third channels have a third longitudinal direction extending substantially parallel, preferably parallel, in the longitudinal direction of the support layer, wherein each of the plurality of third channels has a third depth in the height direction that is smaller than the layer thickness, wherein in the width direction the plurality of second channels and the plurality of third channels are alternating so that in cross-sectional view in the width direction the support layer has an undulated shape, such as a wave-shape, zig-zag-shape, or a corrugated shape, wherein each of the plurality of third channels comprises a third base side extending parallel to the first side and third sidewalls extending from the third base side towards the first side,

[0057] Each of the plurality of third channels may be provided with a plurality of further through drainage holes, wherein each of said plurality of further drainage holes extends from said third base side towards an adjacent second channel of said plurality of second channels for allowing liquid to flow via the plurality of further drainage holes between the plurality of third channels and the plurality of second channels of the support layer, wherein each of said plurality of further drainage holes comprises a further first end that opens in one of the third sidewalls of the third channel of the plurality of third channels at a position directly adjacent to the third base side of the third channel of said plurality of third channels a third channel of said plurality of third channels, and a further second end that opens in one of the second sidewalls of the second channel adjacent to the respective third channel of said plurality of third channels, preferably wherein said further second end opens completely in the one of the second sidewalls, such as at a position adjacent, preferably directly adjacent, to the second base side of the second channel of said plurality of second channels.

BRIEF DESCRIPTION OF DRAWINGS

[0058] The present invention is described hereinafter with reference to the accompanying drawings in which embodiments of the present invention are shown and in which like reference numbers indicate the same or similar elements. The invention is in no manner whatsoever limited to the embodiments disclosed therein:

Fig. 1 shows, in a schematic and illustrative manner, a three-dimensional view of a part of a support layer according to the present invention;

Fig. 2 shows, in a schematic and illustrative manner, a three-dimensional view of a part of a support layer

according to the present invention;
Fig. 3A shows, in a schematic and illustrative manner, a three-dimensional cross-sectional view of a support layer according to the present invention;
Fig. 3B shows, in a schematic and illustrative manner, a three-dimensional cross-sectional view of a support layer according to the present invention;
Fig. 4 shows, in a schematic and illustrative manner, a top view of a support layer according to the present invention;
Fig. 5 shows, in a schematic and illustrative manner, a bottom view of a support layer according to the present invention;
Fig. 6 shows, in a schematic and illustrative manner, in plan view a support layer according to the present invention;
Fig. 7 shows, in a schematic and illustrative manner, in plan view multiple support layers according to the present invention connected to each other;
Fig. 8 shows, in a schematic and illustrative manner, a three-dimensional side view of a support layer according to the present invention;
Fig. 9 shows, in a schematic and illustrative manner, a cross-sectional view of an artificial turf system according to the present invention;
Fig. 10 shows, in a schematic and illustrative manner, a three-dimensional view of a support layer according to the present invention;
Fig. 11 shows, in a schematic and illustrative manner, a three-dimensional view of a part of a support layer according to the present invention;
Fig. 12 shows, in a schematic and illustrative manner, a three-dimensional view of a part of a support layer according to the present invention;
Fig. 13 shows, in a schematic and illustrative manner, in plan view a support layer according to the present invention;
Fig. 14A and B show, in a schematic and illustrative manner, respective close up views of selection parts A and B of the support layer of Fig. 13;
Fig. 15 shows, in a schematic and illustrative manner, a cross-sectional view along line C-C of the support layer of Fig. 13;
Fig. 16A and B show, in a schematic and illustrative manner, respective close up views E and F of parts of the support layer of Fig. 15;
Fig. 17 shows, in a schematic and illustrative manner, a cross-sectional view along line D-D of the support layer of Fig. 13;
Fig. 18A and B show, in a schematic and illustrative manner, respective close up views G and H of parts of the support layer of Fig. 17.

DETAILED DESCRIPTION OF DRAWINGS

[0059] Fig. 1 shows, in a schematic and illustrative manner, a three-dimensional view of a part of a support layer 1 according to the present invention. The support layer 1, wherein the first side 5, or top side, is facing upwards, i.e., towards the playing field assembly 3 laying on top of the support layer 1, is viewed from above. Hence, the second side 7, or bottom side, is facing downwards, i.e., towards the base layer 203.

[0060] The support layer 1 comprises first water channels 9 on the top side 5 and second water channels 11 on the bottom side 7. The first and second water channels 9,11 extend in a respective first and second longitudinal direction , wherein both the first and second longitudinal direction are the same as the longitudinal direction x of the support layer 1. Each water channel 9 on the top side 5 comprises a first base side 13, a floor side in this orientation of the support layer 1, that extends parallel to the top side 5 and two first sidewalls 15 that extend from the first base side 13 towards to the top side 5. On the bottom side 7, each second water channel 11 comprises a second base side 17, a ceiling side in this orientation of the support layer 1, that extends parallel to the bottom side 5 and two second sidewalls 19 that extend from the second base side 17 towards to the bottom side 7.

[0061] Drainage holes 21 are present in the support layer 1, which extend from the sidewall 15 towards an adjacent sidewall 19 such that liquid, such as water, can flow via the drainage holes 21 between the first and second channels 9,11.

[0062] Fig. 1 further shows that the support layer 1 comprises pillars 23, each pillar is connected to the first sidewall 15. The pillars 23 extend from the floor side 13 to the top side 5.

[0063] In Fig. 2, another embodiment of the support layer 1 according to the present invention is shown in a schematic and illustrative manner. The support layer 1 is viewed on the second side 7. It is shown that each second water channel 11, having a second base side 17 and second sidewalls 19, comprises pillars 23 that are connected to a second sidewall 19 of the second water channel 11. The drainage holes 21 partially open into the second sidewalls 19 and partially open into the second side 7 of the support layer 1.

[0064] A three-dimensional cross-sectional view of part of a support layer 1 according to the present invention is shown in Fig. 3A. The drainage hole 21 having one opening at the bottom of the first channel 9 and one opening that partially opens into a second sidewall 19 of a second channel 11 and partially opens into a second side 7 of the support layer 1. The drainage hole 21 has a hole height H_2, extending in the height direction z. The black arrow illustrates how water flows through the drainage hole 21.

[0065] Fig. 3A further shows that the base side 13 of the first channel 9 is curved at the edges next to the first sidewalls 15. Furthermore, the support layer 1 comprises pillars 23 in both the first and second channels 9,11. The pillars 23 have a pillar height H_3, extending in the height direction z, a pillar width W_4, extending in the longitudinal direction x, and a pillar depth D_4, extending in the width direction y.

[0066] Fig. 3B shows a three-dimensional cross-sectional view of part of another embodiment of the support layer 1. Here, the drainage hole 21 opens completely into the sidewall 19 of the second channel 11.

[0067] A top view of the first side of a support layer 1 according to the present invention is shown in Fig. 4. It clearly shows the parallel orientation of the first channels 9 in the longitudinal direction x of the support layer 1. The plurality of pillars 23 is provided in third parallel rows extending in the longitudinal direction x, wherein pillars 23 in a parallel row of said third rows are spaced apart at a constant third pitch P_3. Furthermore, the pillars 23 are provided in fourth parallel rows extending in the width direction y of the support layer 1, wherein pillars 23 in a parallel row of said fourth parallel rows are spaced apart at a constant fourth pitch P_4.

[0068] Fig. 5 shows, a top view of the second side of a support layer 1 according to the present invention. The plurality of drainage holes 21, partially opening into the second sidewalls 19 and partially opening into the second side 7, are provided in first parallel rows extending in the longitudinal direction x, wherein drainage holes 21 in a parallel row of said first parallel rows are spaced apart at a constant first pitch P_1. The drainage holes 21 are provided in second parallel rows extending in the width direction y, wherein drainage holes 21 in a parallel row of said second parallel rows are spaced apart at a constant second pitch P_2.

[0069] The support layer 1 further comprises fourth channels 37 that are oriented at a second angle α_2 with respect to the longitudinal direction x of the support layer 1. Here, the second angle α_2 is approximately 90°. Each of said plurality of fourth channels 37 has a fourth depth D_5 in the height direction z of the support layer 1.

[0070] A support layer 1 according to the present invention is shown in plan view in Fig. 6. The support layer 1 is a plate element 101 that has a plate length L in the longitudinal direction x of the support layer 1 and a plate width W_5 in the width direction y of the support layer 1. The plate element 101 comprises connecting elements 27a,27b on its edges for connecting plate elements 101 having the same connecting elements 27a,27b in a simple and secure manner, as shown in Fig. 7.

[0071] In Fig. 7, it is shown that a plurality of plate elements 101 is connected to each other thereby forming a support layer 1 according to the present invention. It is further shown in Fig. 7 that the first channels 9 extend continuously in the interconnected plate elements 101.

[0072] Fig. 8 shows a three-dimensional side view of a support layer 1 according to the present invention. It shows that the support layer 1 comprises a plurality of third channels 29 along the first side 5 for allowing lateral flow of liquid. The third channels 29 are oriented at a first angle α_1 with respect to the longitudinal direction x. Here, the first angle α_1 is approximately 90°. The third channels 29 have a third depth D_3 in the height direction z, which is approximately 20 percent of the first depth D_1 of the plurality of first channels 9.

[0073] Fig. 9 shows a cross-sectional view of an artificial turf system 201 according to the present invention. The artificial turf system 201 comprises, from the bottom to the top, a base layer 203, a support layer 1 according to the present invention, and a playing field assembly 3, in this case an artificial turf assembly. Here, the support layer 1 is formed by a plurality of plate elements 101.

[0074] Fig. 10 shows embodiment, of the support layer 1 of the present disclosure. The support layer 1 comprises a plurality of first channels 9 having a first longitudinal direction that extends parallel to the width direction y of the support layer 1, and a plurality of second channels 11 and a plurality of third channels 29 having respectively a second longitudinal direction and a third longitudinal direction that extend parallel to the longitudinal direction x of the support layer 1. The first channels 9 and the third channels 29 are provided at the first side 5 of the support layer 1. The second channels 11 are provided at the second side 7 of the support layer 1.

[0075] A detailed part of the support layer 1 of Fig. 10 is shown in Fig. 11. It shows that the third channels 29 are provided with first water embodiments 25 extending from the third base side 31 of the third channels 29 towards the first side 5 and extending between two adjacent third sidewalls 33.

[0076] Another detailed part of the support layer 1 of Fig. 10 is shown in Fig. 12. It shows that the first channels 9 are provided with drainage holes 21 in the first base side 13 and that the third channels 29 are provided with further drainage holes 35 in the side walls 33. The drainage holes 21 extend from the first base side 13 towards the second base side 17 of the second channels 11 and the further drainage holes 35 extend from the third base side 31 towards a adjacent second channel 11.

[0077] A top view of the support layer 1 of Fig. 10 is shown in Fig. 13. The first channels 9 and third channels 29 are oriented in the respective width direction y and longitudinal direction x of the support layer 1.

[0078] Fig. 14A shows a close-up view of selection part A in which it is shown that a drainage hole is provided in the first channel 9. Fig. 14B shows a close-up view of selection part B in which it is shown that a water impediment 25 is provided in the third channel 29.

[0079] A cross-sectional view along the line C-C of Fig. 13 is shown in Fig. 15. The left part of Fig. 15 shows the cross-sectional view along the part of the line C-C that runs through the first channel 9 in the first longitudinal direction, and the right part shows the cross-sectional view along the part of the line C-C that runs between two adjacent first channels 9 through a position at which the first water impediments 25 are provided. Close-up views of parts E and F are shown in Figs. 16A and 16B. Fig. 16A shows that the first water impediments 25 are provided in the third channels 29 and one of the sidewalls 15 of the first channels 9 is visible. In Fig. 16B, the third channels 29 are shown. The horizontal solid lines in the third channels 29 correspond to the top surface of the first water impediments 25 and the dashed lines correspond

to the bottom part of the third channels 29.

[0080] A cross-sectional view along the line D-D of Fig. 13 is shown in Fig. 17. The left part of Fig. 17 shows the cross-sectional view along the part of the line D-D that runs between two adjacent third channels 29, and the right part of Fig. 17 shows the cross-sectional view along the part of the line D-D that runs through the third channel 29 in the third longitudinal direction. Close-up views of parts G and H are shown in Figs. 18A and 18B. Fig. 18A shows a first channel 9 and Fig. 18B shows a first channel 9, that the first water impediment 25 is provided in the third channel 29, and further one of the sidewalls 33 of the third channel 29.

[0081] Modifications and additions to the embodiments disclosed above are obvious to those skilled in the art and covered by the scope of the appended claims. Embodiments and examples of the first aspect of the present invention are also applicable to the second aspect of the present invention.

[0082] Other variations to the disclosed embodiments can be understood and effected by those skilled in the art in practicing the claimed invention, from a study of the drawings, the disclosure, and the appended claims. In the claims, the word "comprising" does not exclude other elements or steps, and the indefinite article "a" or "an" does not exclude a plurality. The mere fact that certain measures are recited in mutually different dependent claims does not indicate that a combination of these measured cannot be used to advantage. Any reference signs in the claims should not be construed as limiting the scope thereof. One or more of the objects of the invention are achieved by the appended claims.

CLAUSES

[0083]

1. A support layer for supporting a playing field assembly, such as an artificial turf assembly, said support layer having a first side and a second side, and having a longitudinal direction, a width direction and a height direction, said support layer having a layer thickness in the height direction, and is formed of a polymeric foam,

wherein the first side of the support layer is provided with a plurality of first channels, extending parallel in the longitudinal direction for allowing liquid to flow through the plurality of first channels along the first side, and wherein the second side of the support layer is provided with a plurality of second channels, extending parallel in the longitudinal direction for allowing liquid to flow through the plurality of second channels along the second side,

wherein each of said plurality of first channels has a first depth in the height direction and each of said plurality of second channels has a second depth in the height direction, wherein the first depth and the second depth are smaller than the layer thickness,

wherein in the width direction the plurality of first channels and the plurality of second channels are alternating so that in cross-sectional view in the width direction the support layer has an undulated shape, such as a wave-shape, zig-zag-shape, or a corrugated shape,

wherein each of said plurality of first channels comprises a first horizontal side extending parallel to the first side and first sidewalls extending from the first horizontal side towards the first side, and wherein each of said plurality of second channels comprises a second horizontal side extending parallel to the second side and second sidewalls extending from the second horizontal side towards the second side,

wherein the support layer comprises a plurality of through drainage holes, wherein each of said plurality of drainage holes extends from each of said first sidewalls towards an adjacent second sidewall of said second sidewalls for allowing liquid to flow via the plurality of drainage holes between the plurality of first channels and the plurality of second channels of the support layer.

2. The support layer according to clause 1, wherein the support layer further comprises a plurality of pillars, wherein the plurality of pillars are of the same polymeric foam as the support layer and extend from the first horizontal side of the plurality of first channels towards the first side of the support layer and/or extend from the second horizontal side of the plurality of second channels towards the second side of the support layer, wherein each pillar of the plurality of pillars is connected to a first sidewall of the plurality of first sidewalls or to a second sidewall of the plurality of second sidewalls.

3. The support layer according to clause 1 or 2, wherein the first side is a top side and the second side is a bottom side, wherein the support layer comprises a plurality of first water impediments extending from the first horizontal side towards the first side and extending between two adjacent first sidewalls, wherein the plurality of first water impediments are of the same polymeric foam as the support layer, wherein the first water impediments have a first height that is in the range of from 25 to 65 percent of the first depth of the plurality of first channels, preferably 40 to 50 percent.

4. The support layer according to any of the preceding clauses, wherein the thickness of the support layer is in the range of from 10 to 50 mm, preferably 15 to 30 mm.

5. The support layer according to any of the preceding clauses, wherein a first wall thickness, defined as the difference between the support layer thickness and the first depth of the plurality of first channels, and/or a second wall thickness, defined as the difference between the support layer thickness and the second depth of the plurality of second channels, and/or a third wall thickness, defined as the distance between a first sidewall of the plurality of first sidewalls and an adjacent second sidewall of the plurality of second sidewalls, have a substantially constant thickness in the range of from 2 to 30 mm, preferably 5 to 20 mm, more preferably 10 to 15 mm.

6. The support layer according to any of the preceding clauses, wherein the first depth of each of the plurality of first channels and the second depth of each of the plurality of second channels are in the range of from 50 to 85 percent of the thickness of the support layer, preferably wherein the plurality of first channels and the plurality of second channels have the same depth.

7. The support layer according to any of the preceding clauses, wherein the support layer has a mass per unit area in the range of from 200 to 700 g/m^2, preferably 300 to 550 g/m^2, more preferably 350 to 450 g/m^2, measured according to ISO 9863-1:2016.

8. The support layer according to any of the preceding clauses, wherein the polymeric foam has a density in the range of from 20 to 70 g/L, preferably 30 to 55 g/L, more preferably 35 to 45 g/L.

9. The support layer according to any of the preceding clauses, wherein the polymeric foam is a polyolefin foam, such as polyethylene foam, for example expanded polyethylene (EPE), and polypropylene foam, for example expanded polypropylene (EPP), a polyurethane foam, for example expanded thermoplastic urethane (ETPU), a biobased foam, such as polylactic acid foam, for example expanded polylactic acid (EPLA), a polystyrene foam, for example expanded polystyrene (EPS), a co-polymer foam comprising at least two monomers, preferably ethylene monomers and propylene monomers, or one or more mixtures of these polymeric foams.

10. The support layer according to any of the preceding clauses, wherein the plurality of first channels have a first width in the width direction and the plurality of second channels have a second width in the width direction, wherein the first width and the second width are in the range of from 3 to 50 mm, preferably 5 to 30 mm, more preferably 10 to 15 mm, preferably wherein the plurality of first channels and the plurality of second channels have the same width.

11. The support layer according to any of the preceding clauses, wherein the plurality of drainage holes have a hole width in the longitudinal direction in the range of from 1 to 50 mm, preferably 3 to 50 mm, more preferably 5 to 30 mm, more preferably 10 to 15 mm, and a hole height in the height direction in the range of from 1 to 20 mm, preferably 5 to 10 mm.

12. The support layer according to clause 2 or any clause dependent thereof, wherein the plurality of pillars have a pillar height in the height direction that is at most equal to the first depth of each of the plurality of first channels and/or to the second depth of each of the plurality of second channels.

13. The support layer according to clause 2 or any clause dependent thereof, wherein the plurality of pillars have a pillar width in the longitudinal direction and a pillar depth in the width direction, wherein the pillar width and the pillar depth are in the range of from 1 to 10 mm, preferably wherein the pillar width equals the pillar depth.

14. The support layer according to any of the preceding clauses, wherein the support layer is formed as a plate element, which comprises connecting elements at a circumferential edge thereof for connecting the plate element to further plate elements such that the plate elements are flush with respect to each other, preferably wherein the connecting elements are arranged for connecting the plate element to further plate elements in a form-closed manner such as a dovetail joint.

15. An artificial turf system, comprising from bottom to top:

- a base layer,
- a support layer according to any of the clauses 1-14, and
- a playing field assembly, such as an artificial turf assembly.

Claims

1. A support layer (1) for supporting a playing field assembly (3), such as an artificial turf assembly, said support layer (1) having a first side (5) and a second side (7), and having a longitudinal direction (x), a width direction (y) and a height direction (z), said support layer (1) having a layer thickness (T_1) in the height direction (z), and is formed of a polymeric foam,

wherein the first side (5) of the support layer (1) is provided with a plurality of first channels (9), extending parallel in a first longitudinal direction

for allowing liquid to flow through the plurality of first channels (9) along the first side (5), and wherein the second side (7) of the support layer (1) is provided with a plurality of second channels (11), extending parallel in a second longitudinal direction for allowing liquid to flow through the plurality of second channels (11) along the second side (7),
wherein each of said plurality of first channels (9) has a first depth (D_1) in the height direction (z) and each of said plurality of second channels (11) has a second depth (D_2) in the height direction (z), wherein the first depth (D_1) and the second depth (D_2) are smaller than the layer thickness (T_1),
wherein each of said plurality of first channels (9) comprises a first base side (13) extending parallel to the first side (5) and first sidewalls (15) extending from the first base side (13) towards the first side (5), and wherein each of said plurality of second channels (11) comprises a second base side (17) extending parallel to the second side (7) and second sidewalls (19) extending from the second base side (17) towards the second side (7),
characterized in that,
the support layer (1) comprises a plurality of through drainage holes (21), wherein each of said plurality of drainage holes (21) is positioned at a cross section of a first channel of said plurality of first channels (9) and a second channel of said plurality of second channels (11), wherein each of said plurality of drainage holes (21) opens at a first end (21a) in a first channel of said plurality of first channels (9) and at a second end (21b) in a second channel of said plurality of second channels (11) for allowing liquid to flow via the plurality of drainage holes (21) between the plurality of first channels (9) and the plurality of second channels (11) of the support layer (1).

2. The support layer (1) according to claim 1, wherein the first longitudinal direction of the plurality of first channels (9) extends substantially parallel, preferably parallel, in the longitudinal direction (x) of the support layer (1) and the second longitudinal direction of the plurality of second channels (11) extends substantially parallel, preferably parallel, in the longitudinal direction (x) of the support layer (1),

wherein in the width direction (y) the plurality of first channels (9) and the plurality of second channels (11) are alternating so that in cross-sectional view in the width direction (y) the support layer (1) has an undulated shape, such as a wave-shape, zig-zag-shape, or a corrugated shape,
wherein the first end (21a) of each of the plurality of drainage holes (21) opens in one of the first sidewalls (15) of the first channel of said plurality of first channels (9) at a position directly adjacent the first base side (13) of the first channel of said plurality of first channels (9), and the second end (21b) of each of the plurality of drainage holes (21) opens in one of the second sidewalls (15) of the second channel of said plurality of second channels (11) adjacent to the respective first channel of said plurality of first channels (9), preferably wherein said second end (21b) opens completely in the one of the second sidewalls (19), such as at a position adjacent, preferably directly adjacent, to the second base side (17) of the second channel of said plurality of second channels (11).

3. The support layer (1) according to claim 1, wherein the first longitudinal direction of the plurality of first channels (9) extends at a first angle ($\alpha 1$) of from 70 to 110° or from 80 to 100° with respect to the longitudinal direction (x) of the support layer, preferably substantially parallel, more preferably parallel, in the width direction (y) of the support layer (1) and the second longitudinal direction of the plurality of second channels (11) extends substantially parallel, preferably parallel, in the longitudinal direction (x) of the support layer (1),
wherein the first end (21a) of each of the plurality of drainage holes (21) opens in the first base side (13) of the first channel of the plurality of first channels (9) and the second end (21b) of each of the plurality of drainage holes (21) opens in the second base side (17) of the second channel of the plurality of second channels (11).

4. The support layer (1) according to claim 3, wherein the support layer (1) further comprises a plurality of third channels (29) along the first side (5) arranged for allowing liquid to flow through the plurality of third channels (29) along the first side (5),

wherein said third channels (29) have a third longitudinal direction extending substantially parallel, preferably parallel, in the longitudinal direction (x) of the support layer (1), wherein each of the plurality of third channels (29) has a third depth (D_3) in the height direction (z) that is smaller than the layer thickness (T_1), wherein in the width direction (y) the plurality of second channels (11) and the plurality of third channels (29) are alternating so that in cross-sectional view in the width direction (y) the support layer (1) has an undulated shape, such as a wave-shape, zig-zag-shape, or a corrugated shape,
wherein each of the plurality of third channels (29) comprises a third base side (31) extending parallel to the first side (5) and third sidewalls

(33) extending from the third base side (31) towards the first side (5),

5. The support layer (1) according to claim 4, wherein each of the plurality of third channels (29) is provided with a plurality of further through drainage holes (35), wherein each of said plurality of further drainage holes (35) extends from said third base side (31) towards an adjacent second channel of said plurality of second channels (11) for allowing liquid to flow via the plurality of further drainage holes (35) between the plurality of third channels (29) and the plurality of second channels (11) of the support layer (1),
wherein each of said plurality of further drainage holes (35) comprises a further first end (35a) that opens in one of the third sidewalls (33) of the third channel of the plurality of third channels (29) at a position directly adjacent to the third base side (31) of the third channel of said plurality of third channels (29), and a further second end (35b) that opens in one of the second sidewalls (19) of a second channel of said plurality of second channels (11) adjacent to the respective third channel of said plurality of third channels (29), preferably wherein said further second end (35b) opens completely in the one of the second sidewalls (19), such as at a position adjacent, preferably directly adjacent, to the second base side (17) of the second channel of said plurality of second channels (11).

6. The support layer (1) according to any of the preceding claims, wherein the support layer (1) further comprises a plurality of pillars (23), wherein the plurality of pillars (23) are of the same polymeric foam as the support layer (1) and extend from the first base side (13) of the plurality of first channels (9) towards the first side (5) of the support layer (1) and/or extend from the second base side (17) of the plurality of second channels (11) towards the second side (7) of the support layer (1) and/or extend from the third base side (33) of the plurality of third channels (29), if any, towards the first side (5) of the support layer (1), wherein each pillar of the plurality of pillars (23) is connected to a first sidewall of the first sidewalls (15) and/or to a second sidewall of the second sidewalls (19) and/or to a third sidewall of the third sidewalls (33), if any.

7. The support layer (1) according to any of the preceding claims, wherein the first side (5) is a top side and the second side (7) is a bottom side, wherein the support layer (1) comprises a plurality of first water impediments (25) extending from the first base side (13) and/or from the third base side (31), if any, towards the first side (5) and extending between two adjacent first sidewalls (15) and/or extending between two adjacent third sidewalls (33), if any, wherein the plurality of first water impediments (25) are of the same polymeric foam as the support layer (1), wherein the first water impediments (25) have a first height (H_1) that is in the range of from 25 to 65 percent, preferably 40 to 50 percent, of the first depth (D_1) of the plurality of first channels (9) and/or of the third depth (D_3) of the plurality of third channels (29).

8. The support layer (1) according to any of the preceding claims, wherein a first wall thickness (T_2), defined as the difference between the support layer thickness (T_1) and the first depth (D_1) of the plurality of first channels (9), and/or a second wall thickness (T_3), defined as the difference between the support layer thickness (T_1) and the second depth (D_2) of the plurality of second channels (11), and/or a third wall thickness (T_4), defined as the distance between a first sidewall of the plurality of first sidewalls (15) and an adjacent second sidewall of the plurality of second sidewalls (19), have a substantially constant thickness in the range of from 2 to 30 mm, preferably 5 to 20 mm, more preferably 10 to 15 mm.

9. The support layer (1) according to any of the preceding claims, wherein the first depth (D_1) of each of the plurality of first channels (9) and/or the second depth (D_2) of each of the plurality of second channels (11) and/or the third depth (D_3) of each of the plurality of third channels (29), if any, are in the range of from 50 to 85 percent of the thickness (T_1) of the support layer (1), preferably wherein the plurality of first channels (9) and/or the plurality of second channels (11) and/or the plurality of third channels (29), if any, have the same depth.

10. The support layer (1) according to any of the preceding claims, wherein the plurality of first channels (9) have a first width (W_1) in the width direction (y) and the plurality of second channels (11) have a second width (W_2) in the width direction (y), wherein the first width (W_1) and the second width (W_2) are in the range of from 3 to 50 mm, preferably 5 to 30 mm, more preferably 10 to 15 mm, preferably wherein the plurality of first channels (9) and the plurality of second channels (11) have the same width.

11. The support layer (1) according to any of the preceding claims, wherein the plurality of drainage holes (21) have a hole width (W_3) in the longitudinal direction (x) in the range of from 1 to 50 mm, preferably 3 to 50 mm, more preferably 5 to 30 mm, more preferably 10 to 15 mm, and a hole height (H_2) in the height direction (z) in the range of from 1 to 20 mm, preferably 5 to 10 mm.

12. The support layer (1) according to claim 6 or any claim dependent thereof, wherein the plurality of pillars (23) have a pillar height (H_3) in the height

direction (z) that is at most equal to the first depth (D_1) of each of the plurality of first channels (9) and/or to the second depth (D_2) of each of the plurality of second channels (11) and/or to the third depth (D_3) of each of the plurality of third channels (29), if any.

13. The support layer (1) according to claim 6 or any claim dependent thereof, wherein the plurality of pillars (23) have a pillar width (W_4) in the longitudinal direction (x) and a pillar depth (D_4) in the width direction (y), wherein the pillar width (W_4) and the pillar depth (D_4) are in the range of from 1 to 10 mm, preferably wherein the pillar width (W_4) equals the pillar depth (D_4).

14. The support layer (1) according to any of the preceding claims, wherein the support layer (1) is formed as a plate element (101), which comprises connecting elements (27a,27b) at a circumferential edge thereof for connecting the plate element (101) to further plate elements (101) such that the plate elements (101) are flush with respect to each other, preferably wherein the connecting elements (27a,27b) are arranged for connecting the plate element (101) to further plate elements (101) in a form-closed manner such as a dovetail joint.

15. An artificial turf system (201), comprising from bottom to top:

- a base layer (203),
- a support layer (1) according to any of the claims 1-14, and
- a playing field assembly (3), such as an artificial turf assembly.

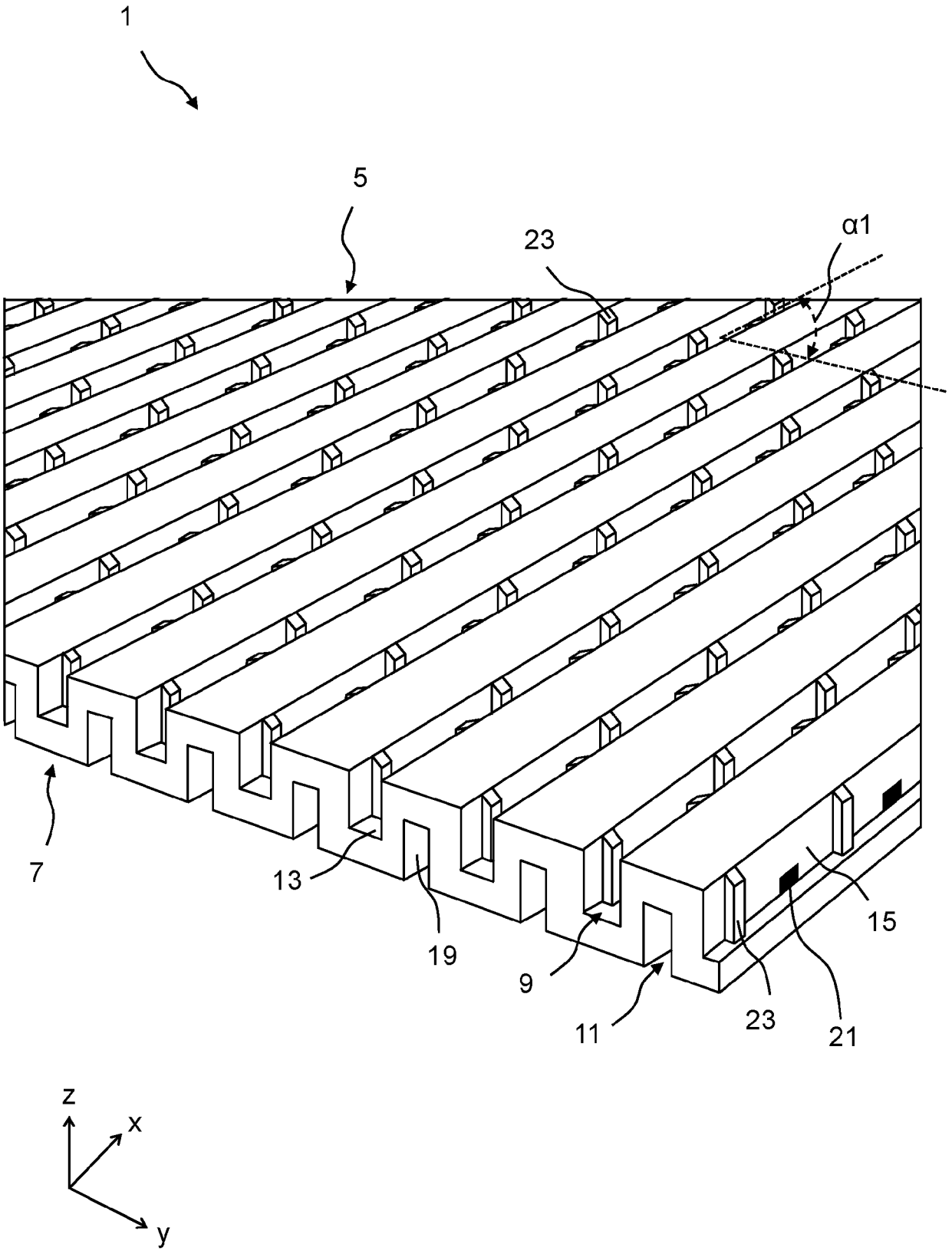

Fig. 1

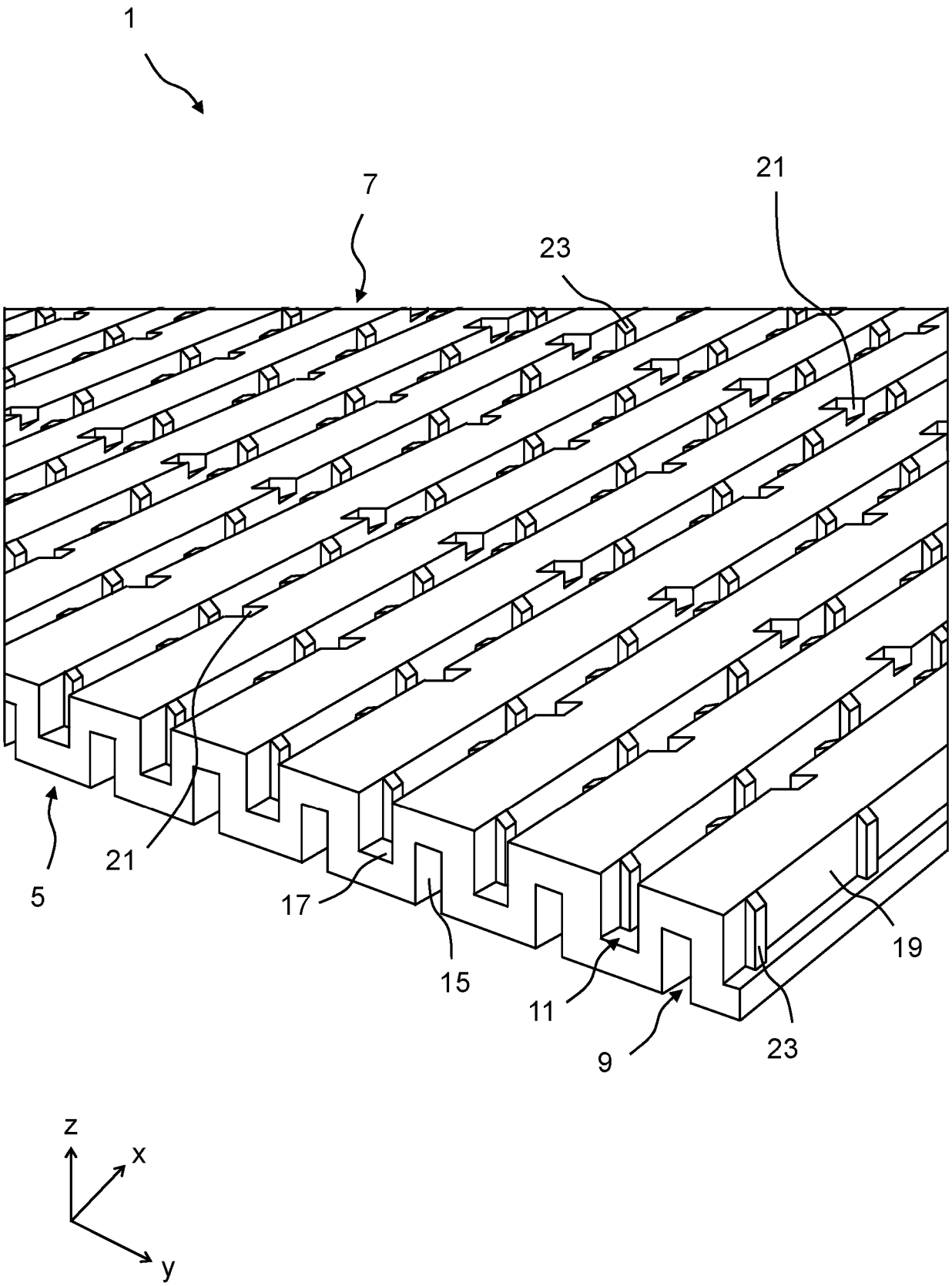

Fig. 2

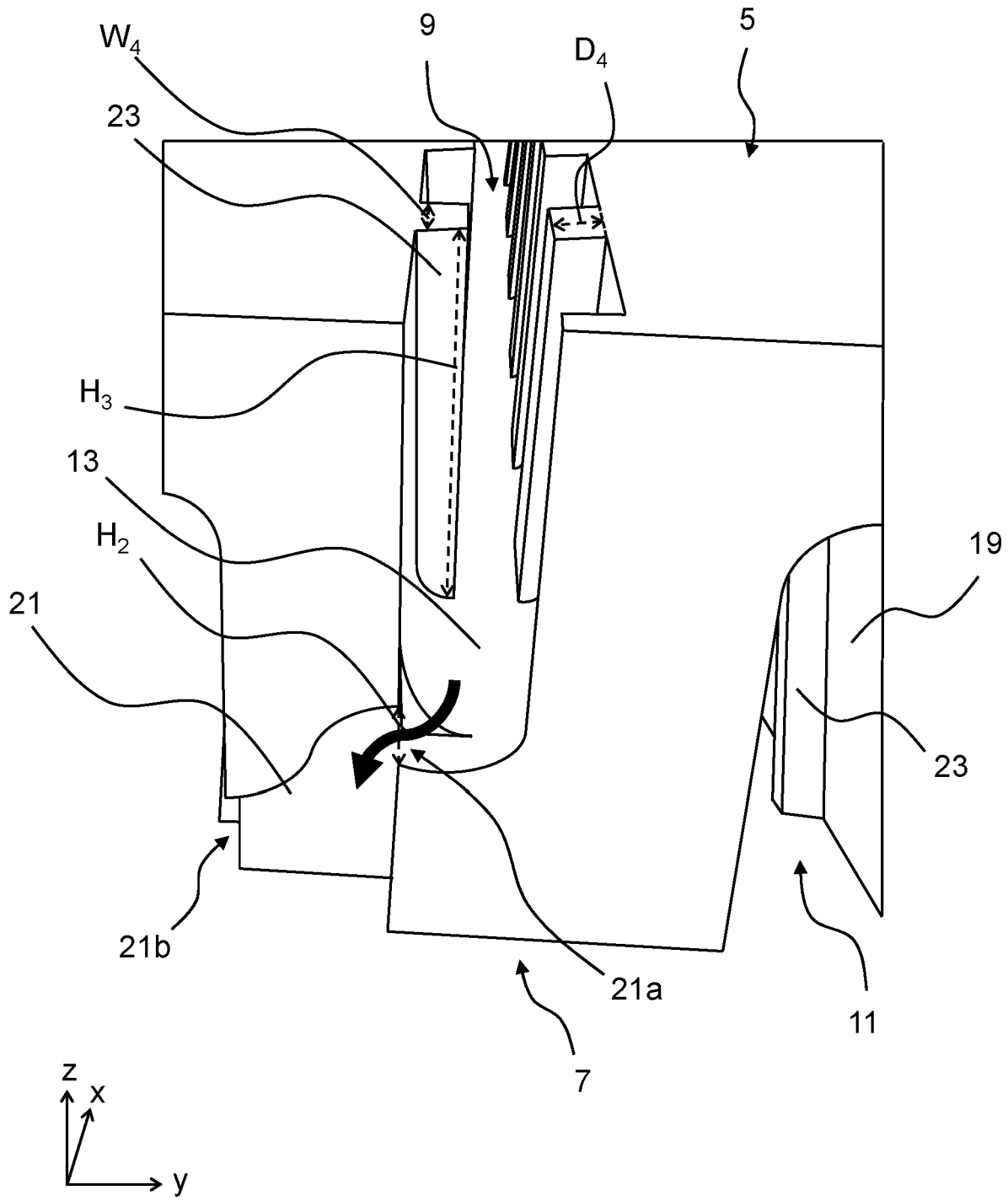

Fig. 3A

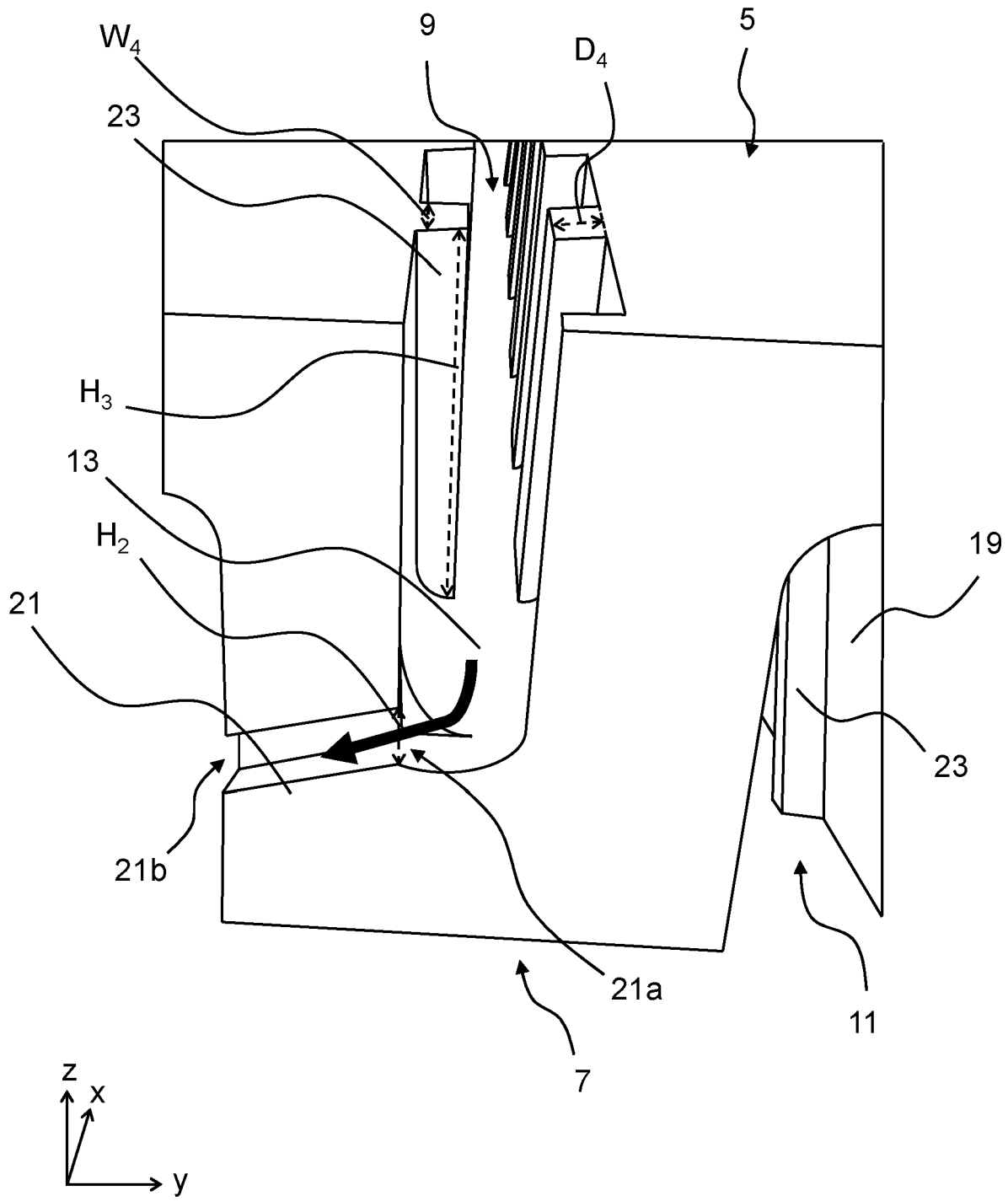

Fig. 3B

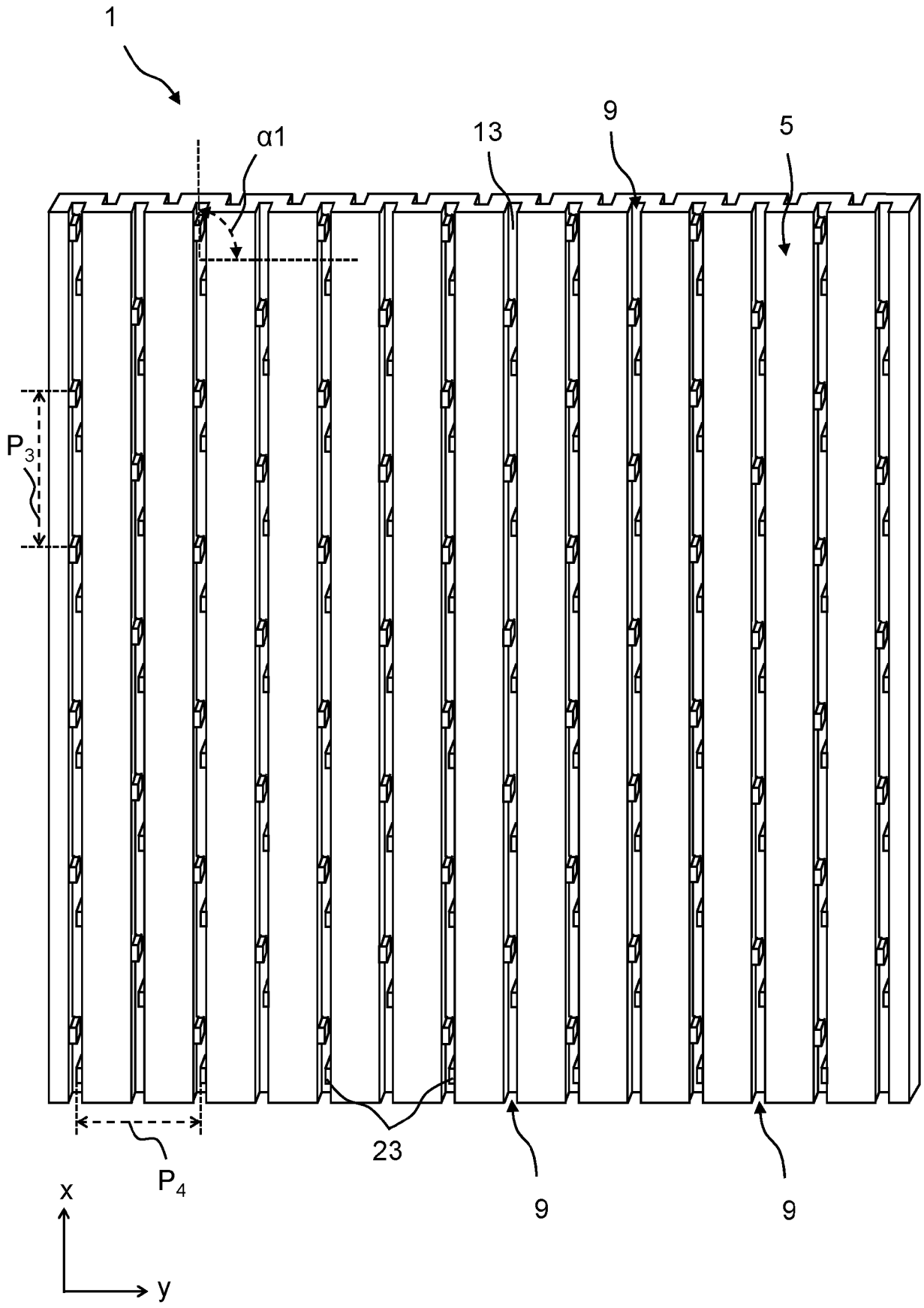

Fig. 4

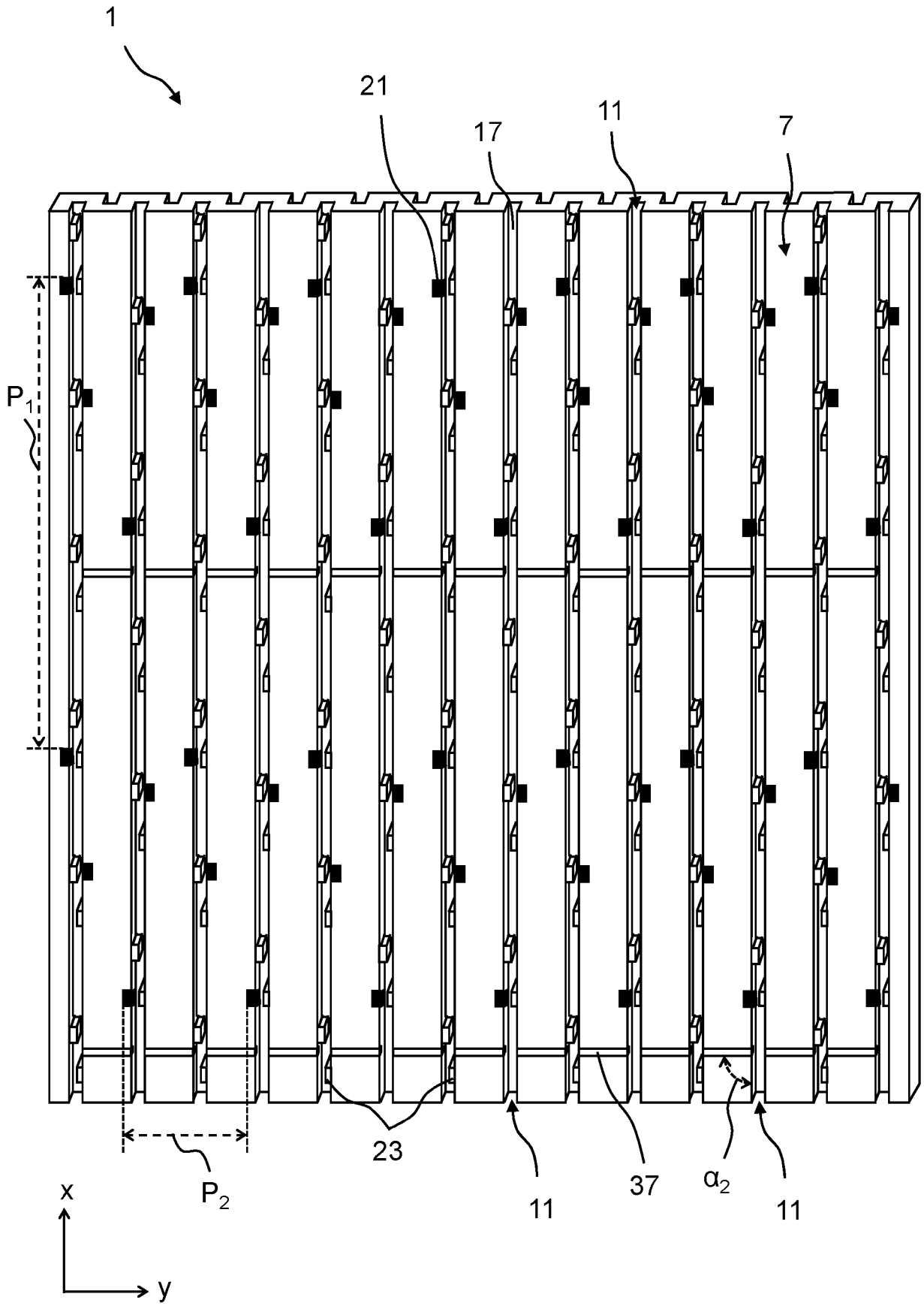

Fig. 5

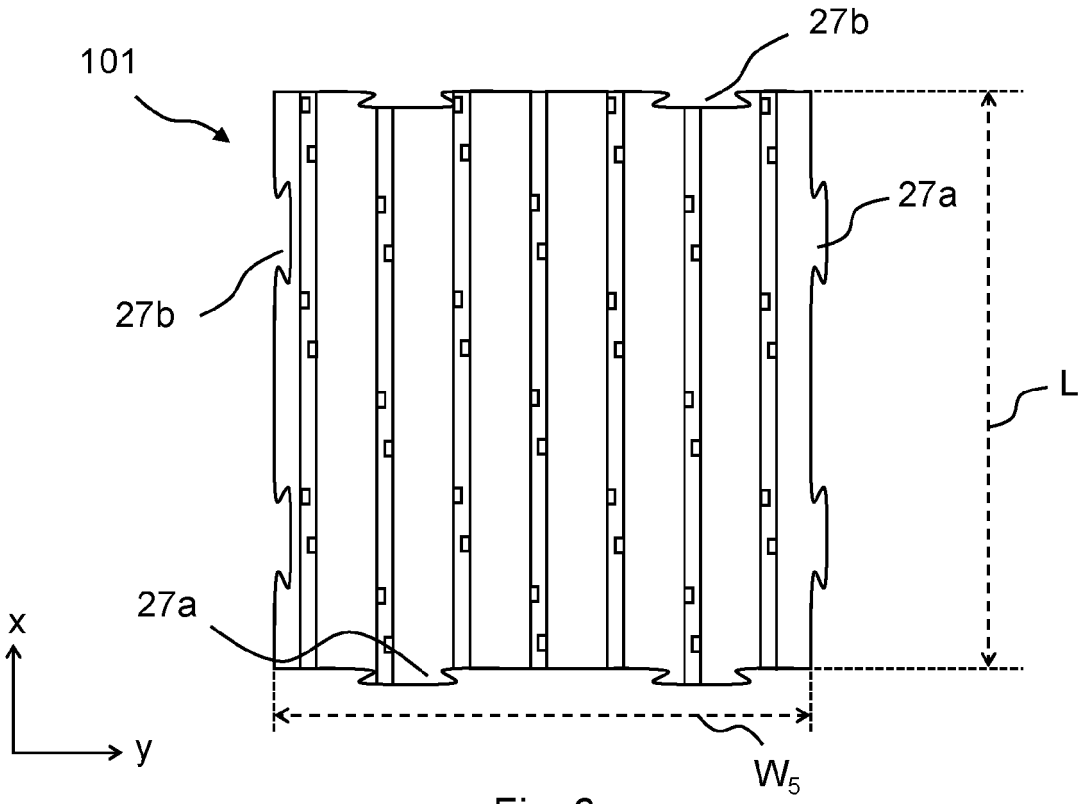

Fig. 6

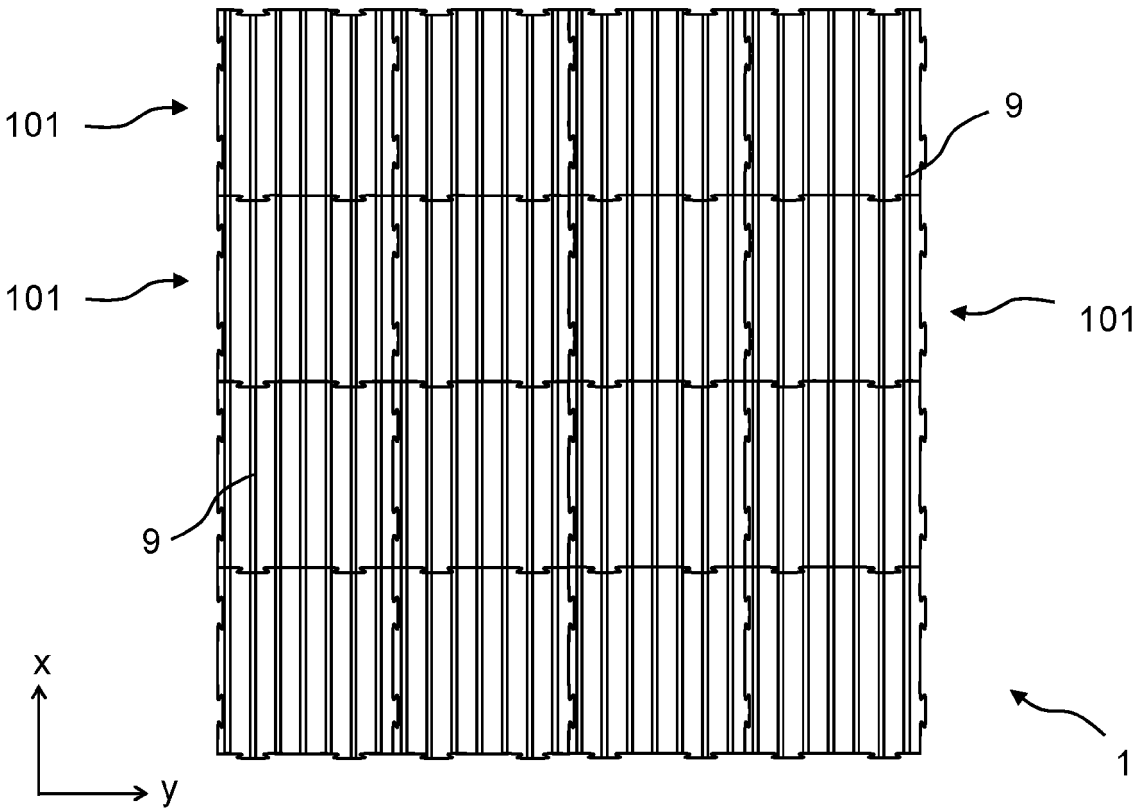

Fig. 7

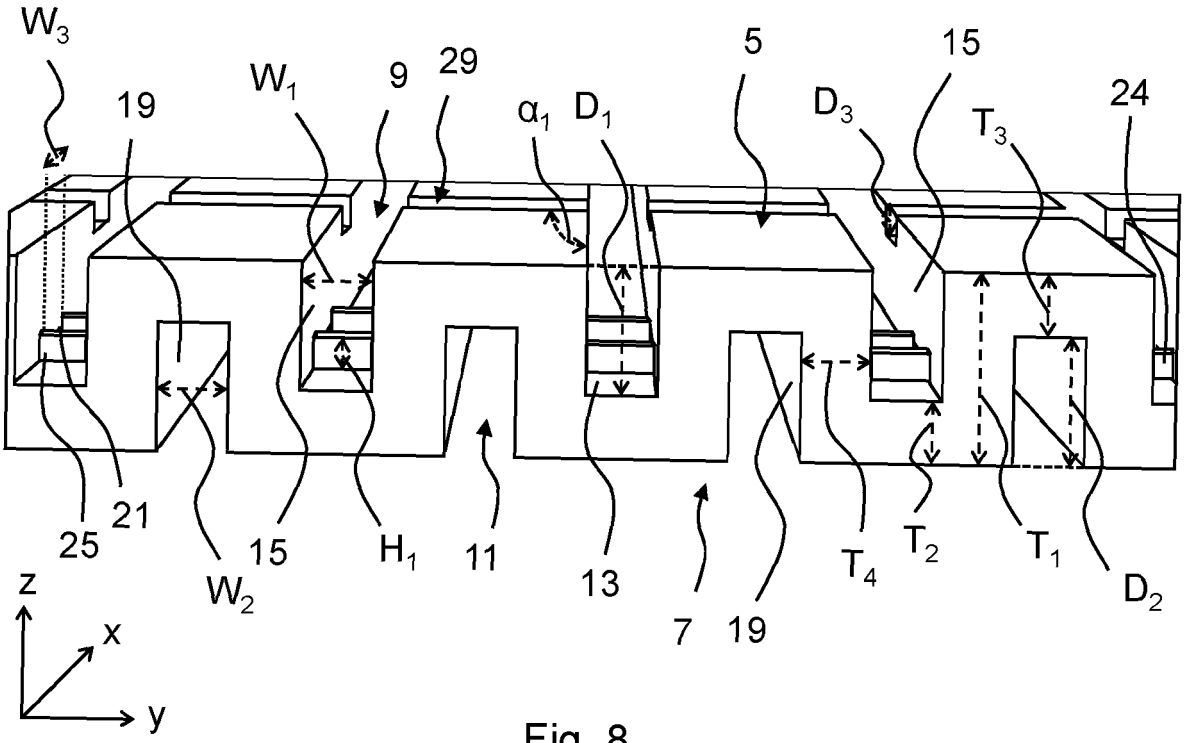
W3
19
W1
9
29
α1
D1
5
D3
15
T3
24
25
21
15
W2
H1
11
13
7
19
T4
T2
T1
D2
z
x
y

Fig. 8

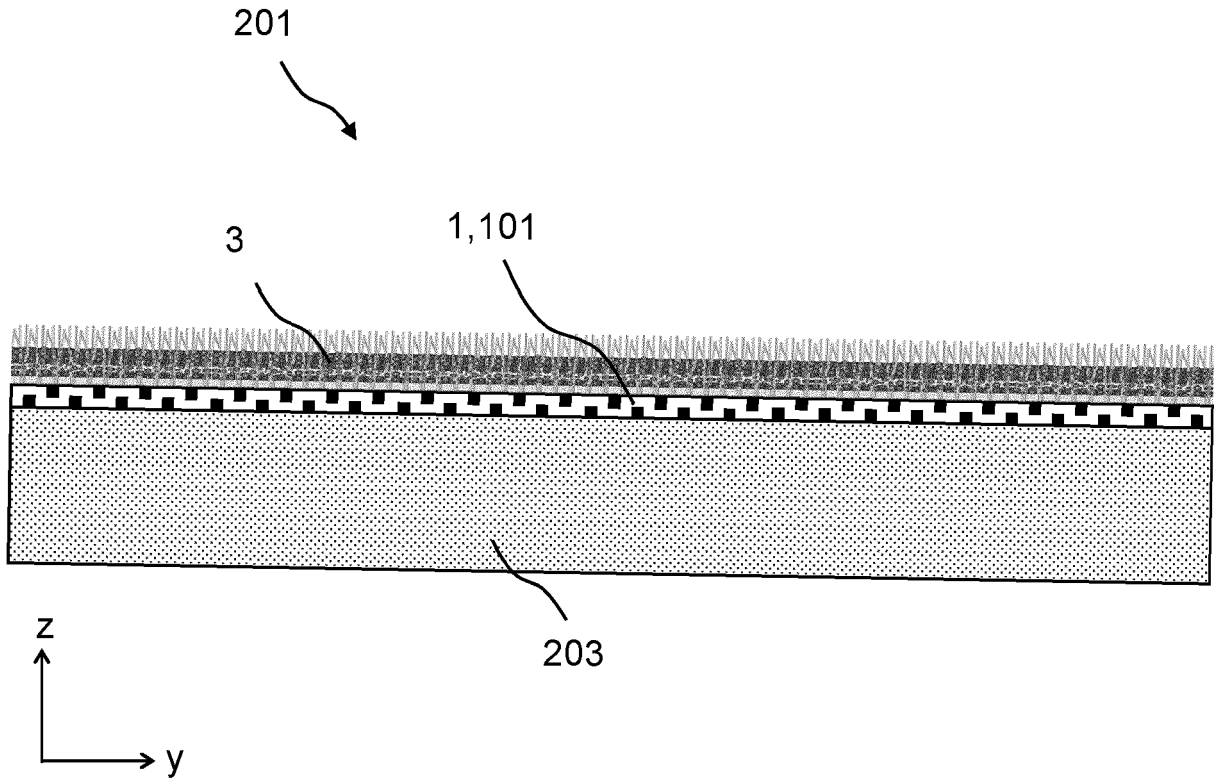
201
3
1,101
203
z
y

Fig. 9

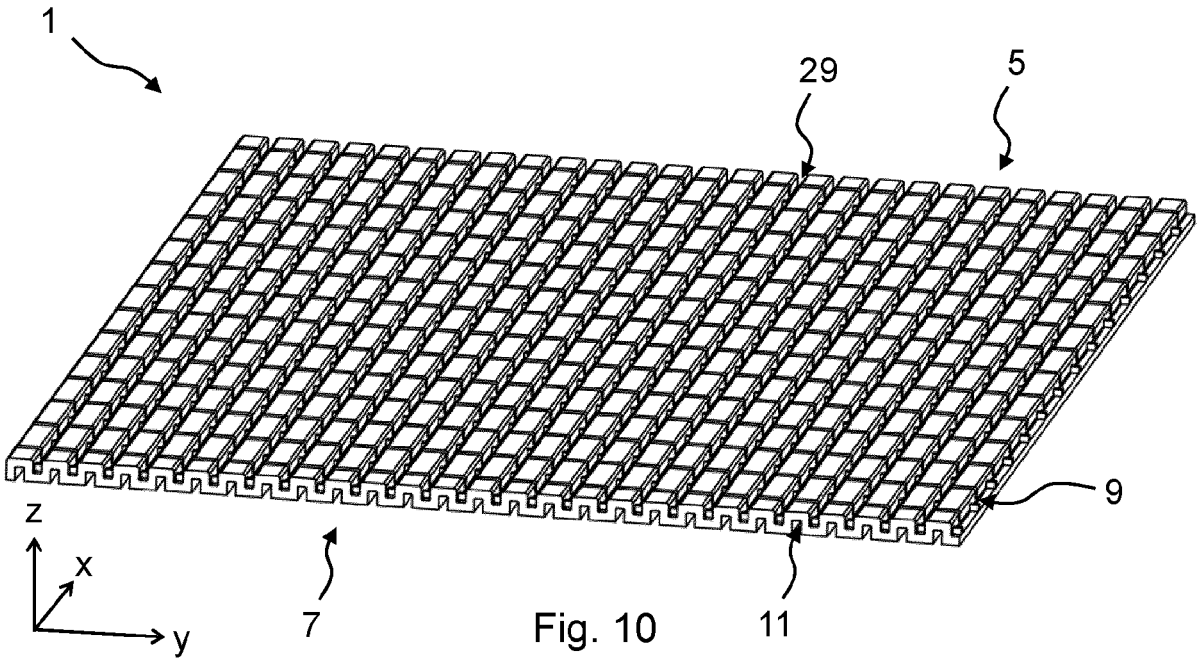

Fig. 10

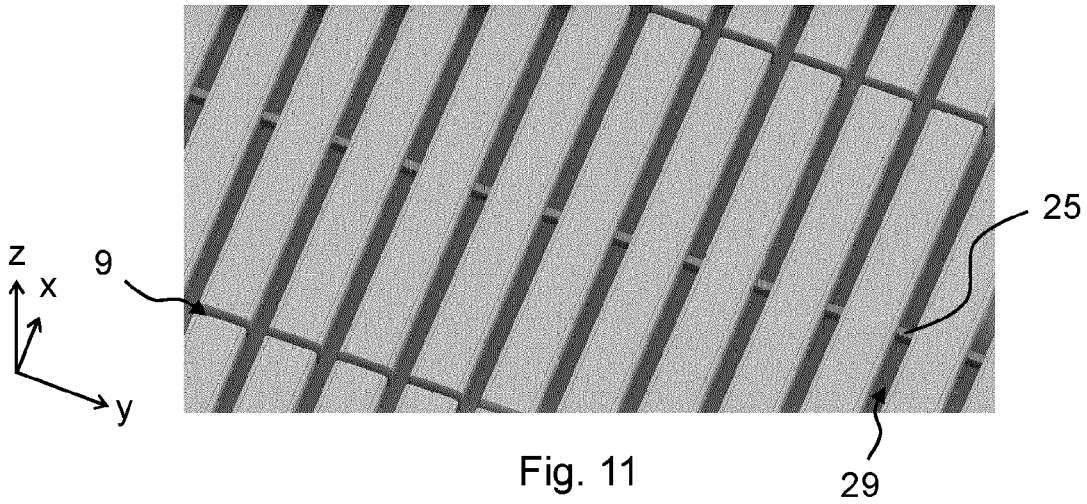

Fig. 11

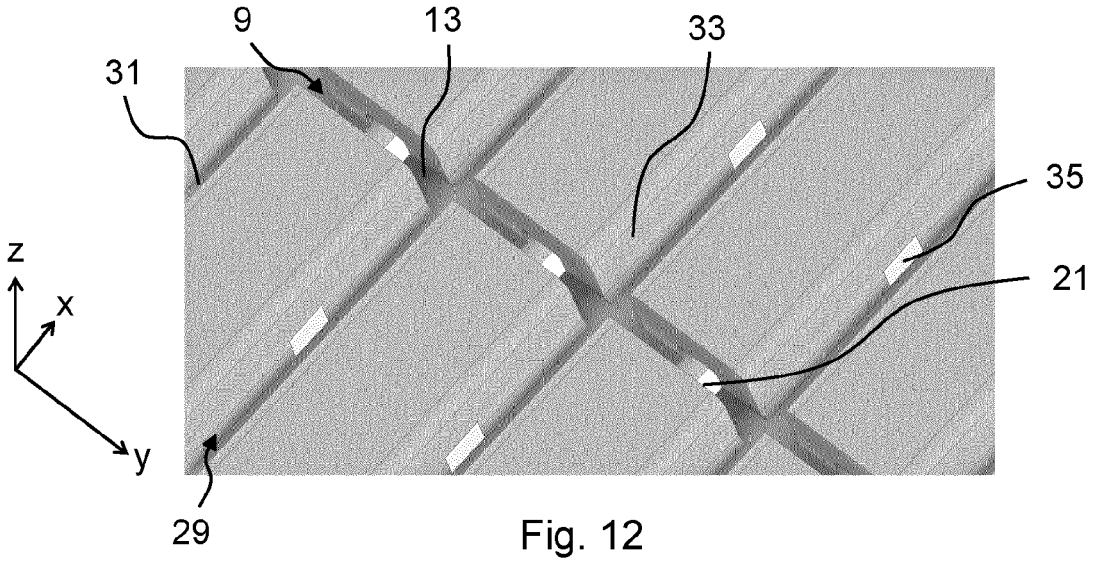

Fig. 12

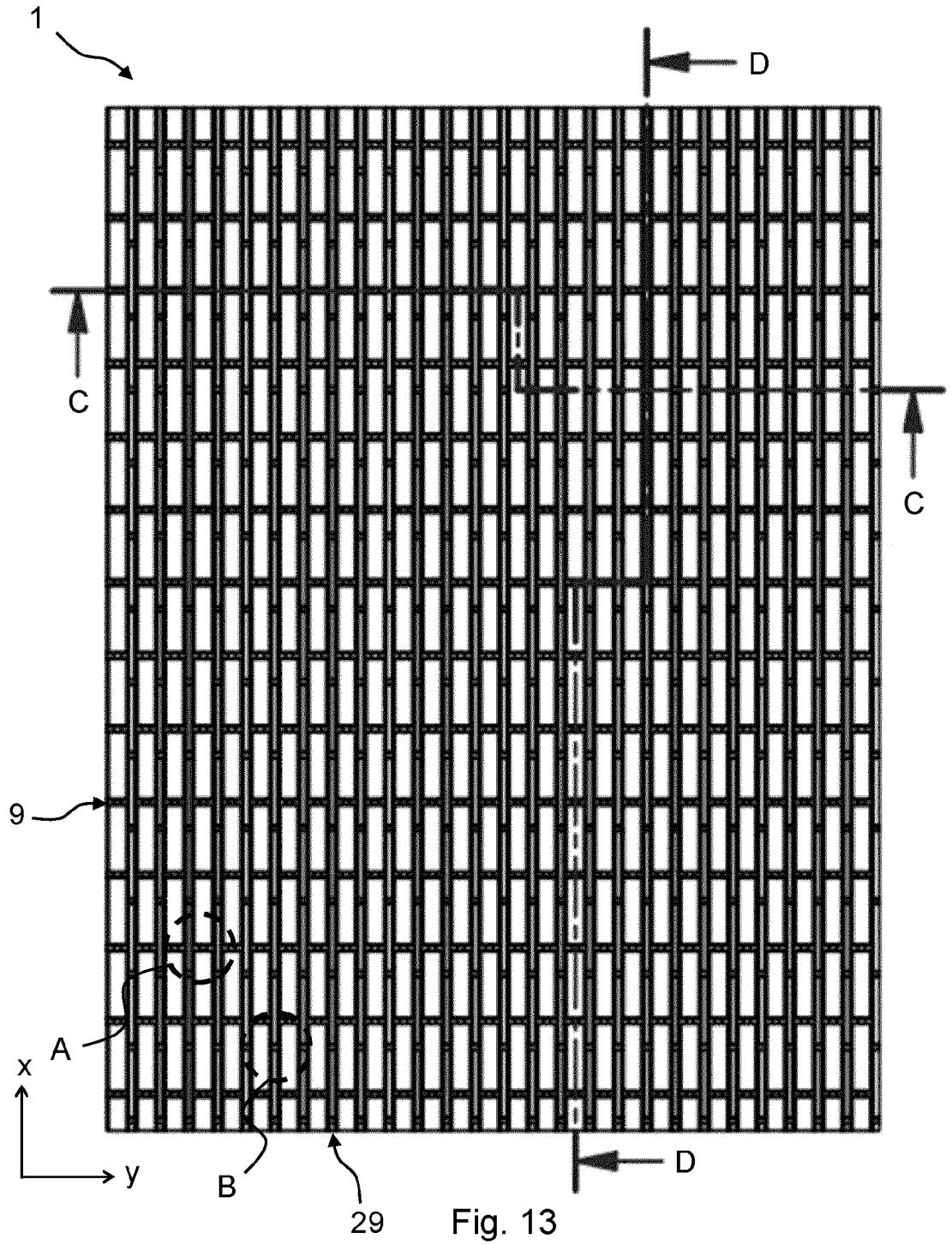

Fig. 13

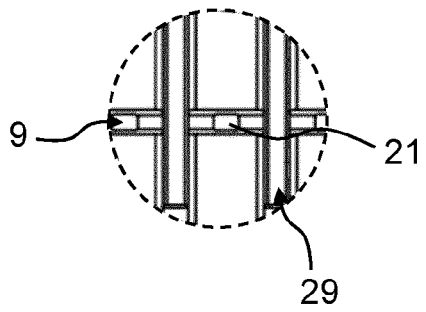

Fig. 14A

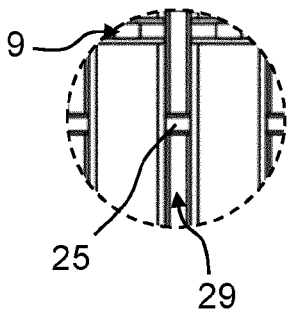

Fig. 14B

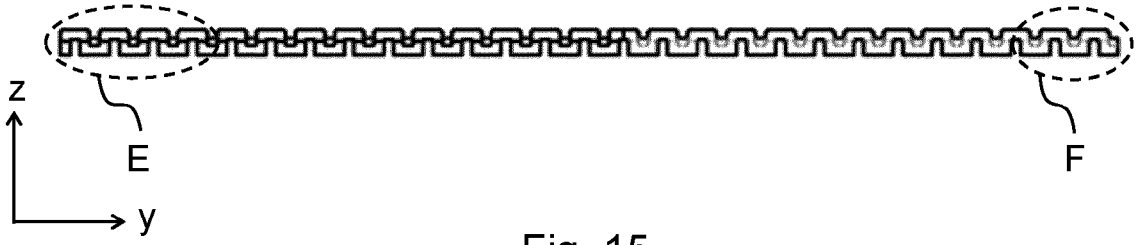

Fig. 15

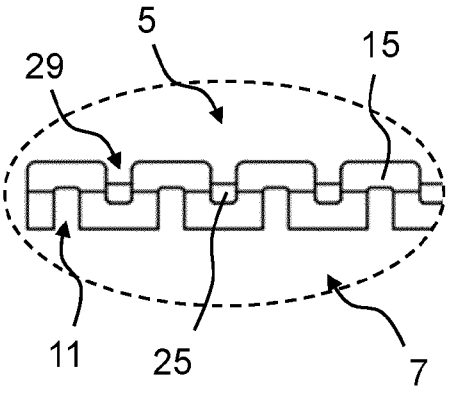

Fig. 16A

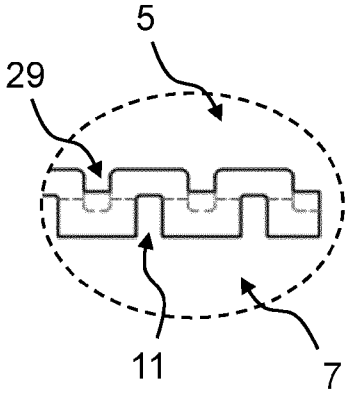

Fig. 16B

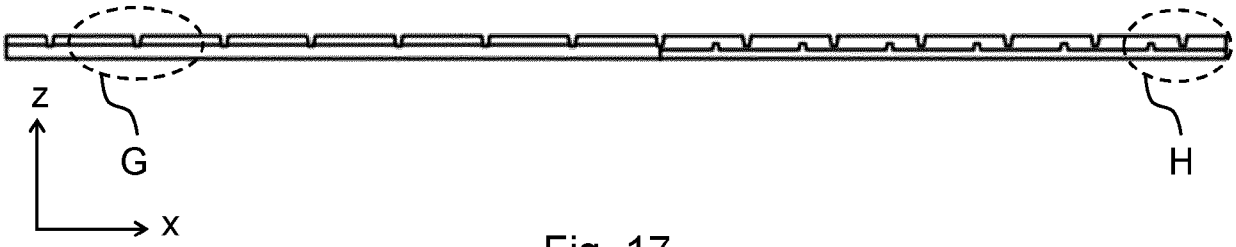

Fig. 17

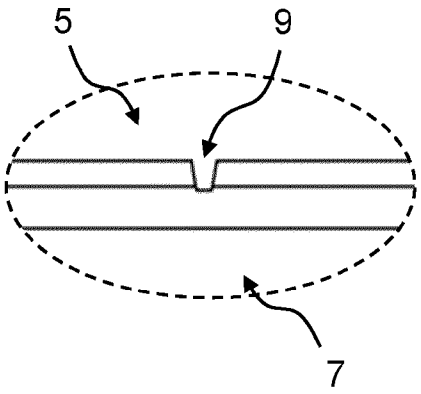

Fig. 18A

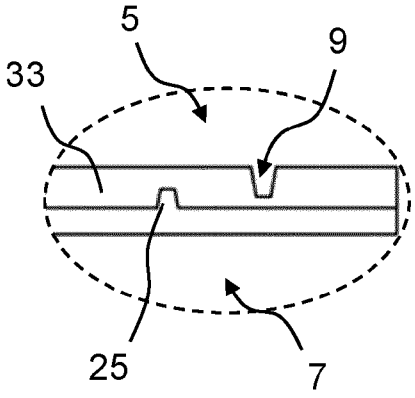

Fig. 18B

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EUROPEAN SEARCH REPORT

Application Number
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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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E01C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	24 April 2025	Beucher, Stefan

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