

(19)



(11)

EP 4 110 992 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

08.05.2024 Bulletin 2024/19

(21) Application number: **21713470.9**

(22) Date of filing: **23.02.2021**

(51) International Patent Classification (IPC):
E01C 13/08^(2006.01)

(52) Cooperative Patent Classification (CPC):
E01C 13/08

(86) International application number:
PCT/IB2021/051510

(87) International publication number:
WO 2021/171172 (02.09.2021 Gazette 2021/35)

(54) **TURF SYSTEM FOR SPORTS OR DECORATIVE USE AND METHOD FOR POSITIONING SUCH SYSTEM**

RASENSYSTEM FÜR SPORT- ODER DEKORATIONSZWECKE UND VERFAHREN ZUR
POSITIONIERUNG SOLCH EINES SYSTEMS

SYSTÈME DE GAZON POUR USAGE SPORTIF OU DÉCORATIF ET PROCÉDÉ DE
POSITIONNEMENT D'UN TEL SYSTÈME

(84) Designated Contracting States:

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

Designated Extension States:

BA ME

Designated Validation States:

MA TN

(30) Priority: **24.02.2020 IT 202000003790**

(43) Date of publication of application:
04.01.2023 Bulletin 2023/01

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EP-A2- 1 900 874

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Description

Field of the invention

[0001] The present invention relates to a turf system for sports or decorative use both for professional and amateur levels, with artificial, or mixed artificial and natural grass.

[0002] The invention, furthermore, relates to a method for positioning such turf system.

Background of the invention

[0003] As well known, an artificial turf is essentially constituted by a mat made of a plastic material to which blades, also called "bristles", having a length comprised between 3 and 10 cm, and that are made of synthetic material, normally polyester, are fixed, in order to form a turf of synthetic grass. The blades made of synthetic material are knitted to the mat by known processes which allow to obtain a warp of blades, which are close to each other according to the needs.

[0004] Normally, between the blades made of synthetic material an infill material, also simply said "infill" is distributed. This is, normally, granular-shaped, and is chosen both on the basis of the type of sport to which the synthetic grass is for, for example soccer, hockey, cricket, rugby, but also on the basis of the most common weather conditions where it is placed.

[0005] As it is known, the infill material essentially provides a drainage action, because it adjusts the flow of the rain or irrigation water, protecting the mat in such a way to provide to the artificial turf a high duration over time, but, above all, it provides to the turf mechanical, physical and technological properties similar to those of the natural turfs, and sometimes even better.

[0006] The most important properties of an infill material are, in particular, the elasticity of the ground for the user, the rebound of the ball, the capacity of shock absorption when falling down, tensile and torque resistance to the force caused by the shoe, the resistance against compression, and penetration of external bodies, as well as the capacity of absorption and drainage of water in case of meteorological and environmental events

[0007] The drainage action of the synthetic turf is, normally, carried out by a base portion, or "stabilizing infill" that is normally constituted by sand. Instead, the elasticity of the turf is, normally, assured by the presence of granules of rubber, which are concentrated in the upper portion of the turf, or "performance infill". An example of a similar infill material is described in US2002/081399.

[0008] The artificial turf is normally placed upon a base member that is able to carry out a drainage action. An example of a similar base member provides a first and a second sheet made of a synthetic material normally constituted by two layers made of perforated nonwoven fabric, commonly polyester, between which a material having a granular, or reticular, shape, or in the form of woven

blades, for example made of nylon, is arranged.

[0009] However, the base members of prior art have many drawbacks.

[0010] The prior art products, in particular, over time, especially if during a year significant temperature variations exist, and due to the use of the turf, tend to lose their properties, in particular their elasticity, and to harden, also, and above all, for their content in synthetic substances, in particular synthetic rubber.

[0011] Another drawback of the prior art products both for the aforementioned reasons and the risk of obstructing the base member for materials such as sand, granules of rubber, as well as other materials transported by the flow of irrigation or rain water flowing out from the infill of the turf, is that, over time, also the drainage action of the base members is lost, and is, therefore, high the risk of flooding with the need to remove the turf and to replace the base member with considerable time and energy consumption.

[0012] A further drawback of the prior art base members is that since, as described above, they have made of synthetic materials, when they have to be removed, for example to be replaced with new base members, these kinds of material have to be sent to sanitary landfills, with high costs, in addition to the not insignificant high environmental impact that these materials have on the environment.

[0013] Another example of a drainable panel with synthetic grass is described in EP1900874. More in detail, the drainable panel comprises an element provided with synthetic grass having an upper surface from which blades made of synthetic grass protrude, and a lower surface, opposite to the upper surface, to which an elastically deformable layer provided with transversal drainage holes is non removably fixed. The element provided with synthetic grass is fixed to the elastically deformable layer by a thermos-adhesive glue. The drainable panel can also comprise a reinforcement sheet made of a material formed from fibres which are interlaced but not woven. The reinforcement sheet can be positioned between the element provided with synthetic grass and the elastically deformable layer, and can be fixed only to this latter. The fibres of the reinforcement sheet can be fibres of glass, carbon, or fibres of a polyester, or fibres of rock wool, or made of cotton.

[0014] However, also the drainable panel described in EP1900874 has to be sent to landfills and has a high environmental impact because it provides to use a thermo-adhesive glue to fix the member provided with synthetic grass to the elastically deformable layer.

Summary of the invention

[0015] It is therefore an object of the present invention to provide a turf system which has high performance and that is able to solve the aforementioned drawbacks of the prior art turf systems.

[0016] It is in particular an object of the present inven-

tion to provide a turf system that is able to maintain substantially unchanged over time the structure and the drainage effectiveness that it had at the moment of its positioning.

[0017] It is also an object of the present invention to provide a turf system that is able to control the temperature of the turf, in particular due to the capacity of the base member to absorb a determined amount of moisture.

[0018] It is, furthermore, an object of the present invention to provide a turf system made of synthetic grass, or mixed synthetic and natural, which is able to considerably reduce with respect to the prior art turf systems the amount of material to be sent to the sanitary landfills.

[0019] It is a particular object of the present invention to provide a turf system with synthetic grass, or mixed synthetic and artificial, which is able to dampen shocks against the turf surface, in particular of people, for example athletes, after an accidental fall.

[0020] These and other objects are achieved by a turf system, according to the invention, comprising:

- a base member having a predetermined thickness (s) and constituted by natural fibres of vegetable origin of determined length (1);
- an artificial turf arranged to be positioned upon said base member, said artificial turf comprising:
 - a mat provided with a first face and a second face opposite to the first face, said mat being configured to be water-permeable in such a way to allow rain or irrigation water to flow from said second face to said first face in order to reach said base member;
 - a plurality of blades made of synthetic material that are fixed to said mat, said plurality of blades made of synthetic material protruding from said second face in such a way to form said turf;

whose main characteristic is that the aforementioned base member is, furthermore, constituted by an adhesive based on natural latex arranged to keep the natural fibres of vegetable origin together, and that the aforementioned thickness (s) is greater than 5 mm.

[0021] Other features of the present invention and related embodiments are set out in the dependent claims.

[0022] In particular, the aforementioned natural fibres of vegetable origin are selected from the group consisting of:

- fibres of coconut;
- fibres of linen;
- fibres of canvas;
- fibres of jute;
- fibres of ramie;
- fibres of sisal;
- fibres of cotton;
- fibres of Genisteae;

- fibres of Manila hemp;
- fibres of bamboo;
- fibres of Ceiba pentandra;
- fibres of straw;
- fibres of Hibiscus;
- fibres of banana plant;
- fibres of Agave;
- fibres of Aloe;
- fibres obtained from arboreous plants, in particular Eucalyptus;

or a combination thereof.

[0023] Advantageously, the aforementioned base member comprises at least a substantially planar member constituted by the aforementioned natural fibres of vegetable origin pressed and kept together by the aforementioned adhesive based on natural latex.

[0024] According to a possible embodiment of the invention, the aforementioned base member, furthermore, comprises a predetermined amount of a natural antibacterial material selected from the group consisting of: rachis of cereal ear which is not coated by a film, or layer, of a coating material, and cork, or a combination thereof, in such a way to exert an antibacterial action and, therefore, to slow down the degradation of the natural fibres of vegetable origin.

[0025] In particular, the aforementioned base member can be formed by a plurality of planar members adjacent to each other. More in particular, the planar members adjacent to each other can be mutually engaged by the aforementioned adhesive based on natural latex, advantageously by a connection line of the aforementioned adhesive based on natural latex.

[0026] According to a preferred embodiment, the aforementioned artificial turf can, furthermore, comprise an infill material distributed on the aforementioned second face of the mat.

[0027] Advantageously, the aforementioned infill material can be constituted by a loose material of vegetable origin.

[0028] In particular, the loose material of vegetable origin can be selected from the group consisting of:

- rachis of cereal ear, in particular maize cob, i.e. rachis of maize;
- cereal husks, in particular rice husks;
- a loose product obtained from a raw material based on cork;
- a loose product obtained from a raw material based on ground coconut;

or a combination thereof.

[0029] According to an alternative embodiment, the aforementioned loose material of vegetable origin can be subject to a mixing step with a predetermined amount of a predetermined compound based on at least a drying, or semi-drying oil, in such a way to improve the properties of the loose material of vegetable origin. For example,

the aforementioned drying, or semi-drying oil can be a stand-oil obtained by subjecting the, or each drying, or semi-drying oil, to a thermal treatment which provides to heat the, or each, drying, or semi-drying oil, up to reach a predetermined temperature T^* . In particular, the aforementioned thermal treatment can be carried out in the absence of air, in such a way to cause a polymerization of the, or each, drying, or semi-drying oil to increase its stability. For example, the aforementioned temperature T^* can be higher than 200 °C, advantageously higher than 250 °C.

[0030] Advantageously, the drying oil can be selected from the group consisting of linseed oil, walnut oil, poppy oil, or sunflower oil, or a combination thereof.

[0031] In particular, the aforementioned natural fibres of vegetable origin can have a length greater than 5 mm. Preferably, the aforementioned natural fibres of vegetable origin can have a length comprised between 5 mm and 100 cm, advantageously between 5 mm and 60 cm, preferably between 5 mm and 40 cm.

[0032] According to another aspect of the invention, a method for positioning a turf system comprises the steps of:

- positioning a support surface of a base member constituted by a natural fibres of vegetable origin having a determined length (1), said base member having a predetermined thickness (s);
- positioning a turf upon said base member, said turf comprising:
 - a mat provided with a first face and a second face opposite to the first face, said mat being configured to allow rain or irrigation water to flow from said second face to said first face in such a way to reach said base member;
 - a plurality of blades made of synthetic material fixed to said mat, said plurality of blades made of synthetic material configured to protrude from said second face in such a way to form said turf;

whose main characteristic is that the base member is, furthermore, constituted by an adhesive based on natural latex arranged to keep the aforementioned natural fibres of vegetable origin together and that the aforementioned thickness (s) is greater than 5 mm.

Brief description of the drawings

[0033] The invention will be now illustrated with the following description of an exemplary embodiment thereof, exemplifying but not limitative, with reference to the attached drawings wherein:

- Fig. 1 diagrammatically shows a side elevational perspective view of a first embodiment of a turf system according to the invention arranged in a disassembled configuration;

- Fig. 2 diagrammatically shows an enlargement of the base member of the system of figure 1 to highlight some technical characteristics of the same;
- Fig. 3 diagrammatically shows a side elevational perspective view of the turf system of figure 1 arranged in an assembled configuration;
- Fig. 4 diagrammatically shows a side elevation view of the system of figure 3;
- Fig. 5 diagrammatically shows a side elevational perspective view of a first alternative embodiment of the turf system of figure 1 arranged in a disassembled configuration;
- Fig. 6 diagrammatically shows a side elevational perspective view of a possible embodiment of the base member of the system according to the invention;
- Fig. 7 diagrammatically shows a side elevational perspective view of another alternative embodiment of the turf system of figure 3 in an assembled configuration;
- Fig. 8 diagrammatically shows a side elevation view the turf system of figure 7;
- Fig. 9 diagrammatically shows a side elevational perspective view of another alternative embodiment of the turf system of figure 3 arranged in an assembled configuration;
- Fig. 10 diagrammatically shows a side elevation view of the system of figure 9;
- Fig. 11 diagrammatically shows a side elevation view of a still another alternative embodiment of the system of figure 3 according to the invention.

Detailed description of some exemplary embodiments of the invention

[0034] With reference to the figures from 1 to 4, a turf system 1, according to the invention, comprises a base member 10 having a predetermined thickness (s) and a turf 20 arranged to be positioned upon the base member 10.

[0035] In particular, the turf 20 comprises a mat 21 provided with a first face 22 and a second face 23 opposite to the first face 22. More in particular, the base member 10 is provided with an upper surface 11 and a lower surface 12 opposite to the aforementioned upper surface 11. Once that the turf 20 has been positioned upon the base member 10, the first face 22 of the turf 20 is arranged adjacent to the upper surface 11 of the base member 10. The lower surface 12 of the base member 10, instead, is positioned in contact with a support surface 100 (figure 4).

[0036] The mat 21 is configured to be water-permeable in such a way that rain or irrigation water can flow from the second face 23 to the first face 22 and, therefore, to reach the base member 10. More precisely, the mat 21 can be provided with through holes 24, which are shown, for example, in figure 4, or can be made of a water-permeable material, for example nonwoven fabric, advantageously made of polyester.

[0037] The turf 20 is, furthermore, provided with a plurality of blades 25 made of synthetic material, for example polypropylene, that are fixed to the mat 21 and configured to protrude a predetermined length from the second face 23, in such a way to form an artificial turf. In particular, the blades 25 in synthetic material can have a length comprised between 20 mm and 150 mm, preferably a length comprised between 30 mm and 100 mm.

[0038] According to the present invention, the base member 10 is constituted by natural fibres of vegetable origin 15 (see figure 2) that are kept together by an adhesive based on natural latex. For example the adhesive based on natural latex can be a natural latex, preferably latex of natural rubber.

[0039] The base member 10 can comprise at least a substantially planar member 13, or "tile", constituted by at least a layer of the aforementioned natural fibres of vegetable origin 15. These are, advantageously, pressed and kept together by the aforementioned adhesive based on natural latex, in such a way to obtain slabs, or "blocks", or "bricks", of a product of predetermined size. For example, the pressing step to which the aforementioned natural fibres of vegetable origin 15 can be subject is such to achieve at least a reduction of 30% of the starting height of the same. Advantageously, the pressing step to which the aforementioned natural fibres of vegetable origin 15 can be subject is such to achieve at least a reduction of 50% of the starting height of the natural fibres of vegetable origin 15.

[0040] The natural latex, in addition to keep the natural fibres of vegetable origin 15 together allows to provide a high elasticity to the base member 10, and, therefore, to all the turf system 1, thus, avoiding to use the synthetic materials such as rubber, or similar materials commonly used in the prior art base members. In particular, the aforementioned base member 10 can comprise a predetermined amount by weight of the aforementioned natural fibres of vegetable origin 15 and a predetermined amount by weight of the aforementioned adhesive based on natural latex. More in particular, the aforementioned base member 10 is constituted by a percentage by weight comprised between 30% and 70% of the aforementioned natural fibres of vegetable origin 15 and between 70% and 30% by weight of the aforementioned natural latex. Advantageously, between 40% and 60% by weight of the base member 10 can be constituted by the aforementioned natural fibres of vegetable origin 15 and between 60% and 40% by weight by the aforementioned natural latex.

[0041] Preferably, the natural latex is latex of natural rubber, i.e. an aqueous emulsion of natural rubber. In particular, the aforementioned adhesive based on natural latex is constituted for at least 70% of natural latex, preferably latex of natural rubber. Advantageously, the aforementioned adhesive based on natural latex is constituted for at least 90% of natural latex, preferably latex of natural rubber. For example, the natural latex used for keeping the aforementioned natural fibres of vegetable

origin 15 together can be extracted from *Hevea Brasiliensis*, or from *Hevea Guianensis*, or from *Hevea Benthamiana*, or can be a combination thereof.

[0042] The aforementioned predetermined thickness (s) of the base member 10 is greater than 5 mm, advantageously greater than 8 mm. More in particular, the aforementioned thickness can be comprised between 5 mm and 80 mm, advantageously comprised between 6 mm and 70 mm, preferably comprised between 8 mm and 60 mm. According to a possible embodiment, the aforementioned thickness s of the base member 10 can be comprised between 5 mm and 60 mm, advantageously between 6 mm and 50 mm, preferably between 8 mm and 50 mm.

[0043] In particular, the aforementioned natural fibres of vegetable origin can be selected from the group consisting of: fibres of coconut, fibres of linen, fibres of canvas, fibres of jute, fibres of ramie, fibres of sisal, fibres of cotton, fibres of Genisteae, fibres of Manila hemp, fibres of bamboo, Ceiba pentandra fibres, fibres of straw, Hibiscus fibres, fibres banana plants, Agave fibres, aloe fibres, or any combination of these. According to an alternative embodiment of the invention, the natural fibres of vegetable origin are natural fibres of vegetable origin obtained from arboreal plants, for example Eucalyptus. According to a preferred embodiment of the invention, the natural fibres of vegetable origin are fibres of coconut.

[0044] In particular, the aforementioned natural fibres of vegetable origin 15 can have a length greater than 5 mm. More in particular, the aforementioned natural fibres of vegetable origin 15 can have a length (l) comprised between 5 mm and 150 mm, advantageously a length (l) comprised between 10 mm and 150 mm, preferably a length comprised between 30 mm and 100 mm. Furthermore, the aforementioned natural fibres of vegetable origin 15 of the base member 10 can be single superimposed fibres (as diagrammatically shown in figure 2), or more fibres woven to each other, or, also, can comprise a combination of fibres woven to each other and single fibres.

[0045] The turf 20 can be simply placed upon the base member 10 to form the turf system 1 shown in figure 3. The possibility is, anyway, also provided that the aforementioned turf 20 can be engaged, or fixed, to the base member 10, for example by gluing, preferably by a natural adhesive, in particular an adhesive based on natural latex, or by knitting points, for example by needling, preferably by using a natural fibre, such as cotton, or by other fixing systems.

[0046] In the alternative embodiment that is diagrammatically shown in figure 5, the base member 10 is constituted by a plurality of planar members 13 of predetermined size adjacent to each other. Even though in figures 5 and 6 the planar members 13 are diagrammatically shown as slabs, or "blocks", as substantially parallelepiped-shaped with rectangular, or square, base, according to the invention, this can also have a different shape, for example a triangular, or hexagonal, shape etc.

[0047] According to an embodiment, two planar members adjacent to each other 13 can be firmly fixed to each other by one, or more glue points of a natural glue, advantageously an adhesive based on natural latex, preferably latex of natural rubber. For example, as diagrammatically shown in figure 6, two planar members 13a and 13b of the base member 10 adjacent to each other can be firmly fixed to each other by a connection line 16, in particular by using a natural adhesive, advantageously an adhesive base on the aforementioned natural latex, in such a way to provide a high stability to the system 1 during the use of the turf 20, in particular during sports competition.

[0048] The base member 10, according to the invention, ensures a life considerably longer with respect to the products that are on the market. In fact, the base member 10 according to the invention, allows to keep the elastic properties, and above all the effectiveness of the drainage action, substantially unchanged, due to the fact that the natural fibres of vegetable origin 15 cannot easily be attacked by microorganisms and bacteria.

[0049] The products currently on the market, instead, as time passes, especially in the presence of temperature variations during the year, and with the use of the turf, tend to lose their properties, in particular their elasticity and to harden, also and above all due to their content in synthetic substances, in particular synthetic rubber. Another drawback of the prior art products both for the aforementioned reasons and for the risk of obstructing the base member due to materials such as sand, granules of rubber, and other materials that are transported by the flow of irrigation or rain water from the infill of the turf, is that, over time, also the drainage action of the base members fails, and, therefore, the risk of flooding is high with the need to remove the turf and to replace the base member.

[0050] Another advantage of the present invention is that the base member 10 is able to adjust, within some limits, the temperature of the turf 20 positioned upon the same thus avoiding excessive temperature variation of the turf 20 in particular due to the change in the climatic conditions. In fact, the natural fibres of vegetable origin 15, and in particular the fibres of coconut, are able to absorb a determined amount of moisture, i.e. the rain or irrigation water, coming from turf 20. Therefore, during the hottest seasons, the aforementioned amount of water retained by the base member 10 tends to evaporate and, therefore, to make the turf 20 cooler. In this way, on the one hand the turf 20 same is preserved, because excessive temperature variations are avoided, and on the other hand a cooling action on the athletes, or anyway people, which use the turf 20 during sports or recreational activities.

[0051] Instead, this does not occur in the turf system of prior art, where the base members are quickly crossed by the rain or irrigation water coming from the upper turf, and is, almost immediately, discharged from the system through the discharge network. Also for this reason the

prior art turfs have an average life very short and cannot be used with high temperatures without causing inconveniences to the people using the same.

[0052] According to an embodiment of the invention the possibility is however provided that the base member 10 can also comprise a predetermined amount of a natural antibacterial material selected from the group consisting of: rachis of cereal ear, which is not coated by a film, or layer, of a coating material, and cork, or a combination thereof, in such a way to exert an antibacterial action for the natural fibres of vegetable origin 15 of the base member 10 and, therefore, to further reduce any possible degradation.

[0053] According to what is foreseen by the invention, in general, the turf 20 positioned upon the base member 10 can be substantially of any kind. In particular, the turf 20 can be of the type not provided with infill as diagrammatically shown in the figures 1, 3 and 5.

[0054] Alternatively, as diagrammatically shown in the figures from 7 to 11, the turf 20 comprises, furthermore, an infill material 30 distributed on the aforementioned second face 23 of the mat 21 arranged between the synthetic blades 25.

[0055] As diagrammatically shown in the figures 7 and 8, the infill material 30 can provide only a layer 31 made of a single synthetic, or natural, material, or a mix of different synthetic and natural materials. For example, the infill material can be constituted by synthetic material, such as granules of rubber, in particular a styrene-butadiene rubber, or "SBR", or a thermoplastic material, an ethylene-propylene-diene monomer, or "EPDM" rubber, a polyvinyl chloride, or "PVC", a synthetic organic material, or a combination thereof. According to a possible embodiment, the aforementioned synthetic materials can be mixed with a determined amount of a mineral material, such as sand, for example siliceous sand. In addition, or alternatively to the aforementioned materials, the infill material 30 can comprise at least a loose material of vegetable origin. For example, the aforementioned loose material of vegetable origin can be selected from the group consisting of: rachis of cereal ear, in particular maize cob, i.e. rachis of maize, cereal husks, in particular rice husks, a loose product obtained from a raw material based on cork, a loose product obtained from a raw material based on ground coconut, or a combination thereof.

[0056] According to a preferred embodiment, the infill material 30 is constituted by one, or more, of the aforementioned loose materials of vegetable origin in such a way that the turf system 1 altogether has a very low environmental impact, in such a way that the synthetic blades 25 are substantially the only part of the product that has to be sent to the sanitary landfills.

[0057] In the alternative embodiments that are diagrammatically shown in the figures from 9 to 11, the infill material, or infill, 30 comprises a plurality of layers superimposed one upon the other, for example two layers 31 and 32. Also in this case each layer can be made of single synthetic or natural materials, for example the syn-

thetic and natural materials described above with reference to the figures 7 and 8, or a mix of the same. According to a possible embodiment, the lower layer, i.e. the stabilization layer 32 can be a layer of sand, or a layer of maize cob, or a mix of the same. The upper layer 31, also called performance layer, can be constituted by one of the aforementioned synthetic or natural materials, or a mix of the same, or of some of them. In particular, the performance layer 32 can be a mix of rachis of cereal ear, in particular maize cob, with cereal husks and/or a loose product obtained from a raw material based on cork, for example in the form of granules, and/or a loose product obtained from a raw material based on coconut, and/or other vegetable material.

[0058] According to an alternative embodiment of the invention, the aforementioned loose material of vegetable origin can be obtained by a step of mixing a predetermined amount of the aforementioned loose material of vegetable origin with a predetermined amount of a predetermined compound based on at least a drying, or semi-drying oil, in such a way to improve the properties of the loose material of vegetable origin based on at least a drying, or semi-drying oil.

[0059] For example, the aforementioned drying, or semi-drying oil can be a stand-oil obtained by subjecting the, or each drying, or semi-drying oil, to a thermal treatment which provides to heat the, or each, drying, or semi-drying oil, up to reach a predetermined temperature T^* . In particular, the aforementioned thermal treatment can be carried out in the absence of air, in such a way to cause a polymerization of said, or each, drying, or semi-drying oil to increase its stability. For example, the aforementioned temperature T^* can be higher than 200 °C, advantageously higher than 250 °C.

[0060] Advantageously, the drying oil can be selected from the group consisting of linseed oil, walnut oil, poppy oil, or sunflower oil, or a combination thereof.

[0061] As diagrammatically shown in figure 11, furthermore, according to another alternative embodiment of the system 1 of the invention, the aforementioned turf 20 can, furthermore, comprise blades of natural grass 26 obtained from at least a vegetable species forming a natural grass turf. In this case, therefore, the turf 20 is a natural and synthetic mixed turf.

Claims

1. A turf system (1) comprising:

- a base member (10) having a predetermined thickness (s) and constituted by natural fibres of vegetable origin (15) having a determined length (l);
- a turf (20) arranged to be positioned upon said base member (10), said turf (20) comprising:

- a mat (21) provided with a first face (22)

and a second face (23) opposite to the first face, said mat (21) being configured to be water-permeable in such a way to allow rain or irrigation water to flow from said second face (23) to said first face (22) and to reach said base member (10);

- a plurality of blades (25) made of synthetic material fixed to said mat (21), said plurality of blades made of synthetic material (25) being configured to protrude from said second face (23) in such a way to form an artificial turf;

said turf system (1) being **characterized in that** said base member (10) is, furthermore, constituted by an adhesive based on natural latex arranged to keep said natural fibres of vegetable origin together (15) **and in that** said predetermined thickness (s) is greater than 5 mm.

2. Turf system according to claim 1, wherein said predetermined thickness (s) of said base member (10) is comprised between 5 mm and 80 mm.

3. Turf system according to claim 1, wherein said predetermined thickness (s) of said base member (10) is comprised between 8 mm and 50 mm.

4. Turf system according to claim 1, wherein said length (l) of said natural fibres of vegetable origin is greater than 5 mm.

5. Turf system according to any of the previous claims wherein said natural fibres of vegetable origin are selected from the group consisting of: _

- fibres of coconut;
- fibres of linen;
- fibres of canvas;
- fibres of jute;
- fibres of ramie.
- fibres of sisal;
- fibres of cotton;
- fibres of Genisteae;
- fibres of Manila hemp;
- fibres of bamboo;
- fibres of Ceiba pentandra;
- fibres of straw;
- fibres of Hibiscus;
- fibres of banana plant;
- fibres of Agave;
- fibres of Aloe;
- fibres obtained from arboreous plants;
- fibres of Eucalyptus;

or a combination thereof.

6. Turf system according to any of the previous claims,

wherein said natural fibres of vegetable origin comprise at least two different types of natural fibres of vegetable origin selected from the group consisting of fibres of coconut, fibres of linen, fibres of canvas, fibres of jute, fibres of ramie, fibres of sisal, fibres of cotton, fibres of Genisteae, fibres of Manila hemp, fibres of bamboo, fibres of Ceiba pentandra, fibres of straw, fibres of Hibiscus, fibres of banana plant, fibres of Agave, fibres of Aloe, fibres obtained from arboreous plants.

7. Turf system according to any of the previous claims, wherein said base member (10), furthermore, comprises a predetermined amount of a natural antibacterial material selected from the group consisting of:

- rachis of cereal ear, which is not coated by a film, or layer of a coating material;
- cork;

or a combination thereof.

8. Turf system according to any of the previous claims, wherein said base member (10) comprises at least a substantially planar member (13) constituted by at least a layer of said natural fibres of vegetable origin pressed and kept together by said adhesive based on natural latex.

9. Turf system according to any of the previous claims, wherein said base member (10) comprises a plurality of planar members (13) adjacent to each other, said planar members (13) adjacent to each other being mutually engaged by said adhesive based on natural latex.

10. Turf system according to any of the previous claims, wherein said artificial turf comprises, furthermore, an infill material (30) arranged to be distributed on said second face (23) of said mat (21), said infill material (30) being constituted by loose material of vegetable origin selected from the group consisting of:

- rachis of cereal ear, in particular maize cob, i. e. rachis of maize;
- cereal husks, in particular rice husks;
- a loose product obtained from raw material based on cork;
- a loose product obtained from raw material based on ground coconut;

or a combination thereof.

11. Turf system according to claim 10, wherein said loose material of vegetable origin is obtained by a step of mixing a predetermined amount of the aforementioned loose material of vegetable origin with a predetermined amount of a predetermined com-

pound based on at least a drying, or semi-drying oil, in such a way to improve the properties of the loose material of vegetable origin.

12. Turf system according to any of the previous claims, wherein said turf (20) comprises, furthermore, blades of natural grass (26) obtained by at least a vegetable species that form a natural grass turf, in such a way to obtain a mixed turf (20) synthetic and natural.

13. Turf system according to any claim from 10 to 12, wherein said infill material comprises synthetic material selected from the group consisting of: granules of rubber, granules of a styrene-butadiene rubber, granules of a thermoplastic material, granules of an ethylene-propylene-diene monomer, granules of polyvinyl chloride, granules of a synthetic organic material, or a combination thereof; and/or a predetermined amount of sand.

14. Turf system according to any claim from 10 to 13, wherein said infill material comprises a lower layer (32) and at least an upper layer (31) positioned upon said lower layer (32), in particular said lower layer (32) being a layer of sand, or a layer of maize cob, or a mix of sand and maize cob and said upper layer (31) being constituted by a material selected from the group consisting of:

- rachis of cereal ear, in particular maize cob, i. e. rachis of maize;
- cereal husks, in particular rice husks;
- a loose product obtained from raw material based on cork;
- a loose product obtained from raw material based on ground coconut;
- a synthetic material selected from the group consisting of: granules of rubber, granules of a styrene-butadiene rubber, granules of a thermoplastic material, granules of an ethylene-propylene-diene monomer, granules of polyvinylchloride, granules of a synthetic organic material;

or a combination thereof.

15. Method for positioning a turf system comprising the steps of:

- positioning a base member (10) having a predetermined thickness (s) upon a support surface (100), said base member (10) being constituted by natural fibres of vegetable origin (15) having a determined length (l);
- positioning a turf (20) upon said base member (10), said turf (20) comprising:

- a mat (21) provided with a first face (22) and a second face opposite to the first face (23), said mat (21) being configured to allow rain or irrigation water to flow from said second face (23) to said first face (22) in such a way to reach said base member (10);
- a plurality of blades (25) in synthetic material fixed to said mat (21), said plurality of blades in synthetic material (25) configured to protrude from said second face (23) in such a way to form said turf;

said method being **characterized in that** said predetermined thickness (s) is greater than 5 mm and **in that** said base member (10) is, furthermore, constituted by an adhesive based on natural latex arranged to keep said natural fibres of vegetable origin (15) together.

Patentansprüche

1. Rasensystem (1), umfassend:

- ein Basiselement (10), das eine vorbestimmte Dicke (s) aufweist und aus Naturfasern pflanzlichen Ursprungs (15) gebildet ist, die eine vorbestimmte Länge (l) aufweisen;
- einen Rasen (20), der so angeordnet ist, dass er auf dem Basiselement (10) positioniert ist, wobei der Rasen (20) Folgendes umfasst:
- eine Matte (21), die mit einer ersten Seite (22) und einer zweiten Seite (23) gegenüber der ersten Seite versehen ist, wobei die Matte (21) dazu konfiguriert ist, derart wasserdurchlässig zu sein, so dass es Regen- oder Bewässerungswasser ermöglicht wird, von der zweiten Seite (23) zu der ersten Seite (22) zu fließen und das Basiselement (10) zu erreichen;
- eine Vielzahl von Halmen (25), die aus synthetischem Material hergestellt sind, die an der Matte (21) befestigt sind, wobei die Vielzahl von Halmen, die aus synthetischem Material (25) hergestellt sind, dazu konfiguriert sind, von der zweiten Seite (23) derart vorzustehen, so dass sie einen künstlichen Rasen ausbilden;

wobei das Rasensystem (1) **dadurch gekennzeichnet ist, dass** das Basiselement (10) außerdem aus einem Klebstoff auf Naturlatexbasis gebildet ist, der so angeordnet ist, dass er die Naturfasern pflanzlichen Ursprungs zusammenhält (15), **und dadurch, dass** die vorbestimmte Dicke (s) größer als 5 mm ist.

2. Rasensystem nach Anspruch 1, wobei die vorbestimmte Dicke (s) des Basiselements (10) zwischen 5 mm und 80 mm umfasst ist.

3. Rasensystem nach Anspruch 1, wobei die vorbestimmte Dicke (s) des Basiselements (10) zwischen 8 mm und 50 mm umfasst ist.

4. Rasensystem nach Anspruch 1, wobei die Länge (l) der Naturfasern pflanzlichen Ursprungs größer als 5 mm ist.

5. Rasensystem nach einem der vorhergehenden Ansprüche, wobei die Naturfasern pflanzlichen Ursprungs aus der Gruppe ausgewählt sind, die aus Folgendem besteht:

- Kokosnusssfasern;
- Leinenfasern;
- Fasern aus Segeltuch;
- Jutefasern;
- Ramiefasern
- Sisalfasern;
- Baumwollfasern;
- Fasern aus Genisteae;
- Fasern aus Manilahanf;
- Bambusfasern;
- Fasern aus Ceiba pentandra,
- Strohfasern;
- Hibiskusfasern;
- Fasern aus Bananenpflanzen,
- Agavenfasern;
- Aloefasern;
- Fasern, die von baumartigen Pflanzen gewonnen werden;
- Eukalyptusfasern;

oder einer Kombination davon.

6. Rasensystem nach einem der vorhergehenden Ansprüche, wobei die Naturfasern pflanzlichen Ursprungs mindestens zwei verschiedene Arten von Naturfasern pflanzlichen Ursprungs umfassen, die aus der Gruppe ausgewählt sind, die aus Kokosnusssfasern, Leinenfasern, Fasern aus Segeltuch, Jutefasern, Ramiefasern, Sisalfasern, Baumwollfasern, Fasern aus Genisteae, Fasern aus Manilahanf, Bambusfasern, Fasern aus Ceiba pentandra, Strohfasern, Hibiskusfasern, Fasern aus Bananenpflanzen, Agavenfasern, Aloefasern, Fasern, die von baumartigen Pflanzen gewonnen werden, besteht.

7. Rasensystem nach einem der vorhergehenden Ansprüche, wobei das Basiselement (10) außerdem eine vorbestimmte Menge eines natürlichen antibakteriellen Materials umfasst, das aus der Gruppe ausgewählt ist, die aus Folgendem besteht:

- Rhachis von Getreideähren, die nicht durch einen Film oder eine Schicht eines Beschichtungsmaterials beschichtet ist;
- Kork;

oder einer Kombination davon.

8. Rasensystem nach einem der vorhergehenden Ansprüche, wobei das Basiselement (10) mindestens ein im Wesentlichen planares Element (13) umfasst, das aus mindestens einer Schicht der Naturfasern pflanzlichen Ursprungs gebildet ist, die zusammengepresst und durch den Klebstoff auf Naturlatexbasis zusammengehalten werden. 5
9. Rasensystem nach einem der vorhergehenden Ansprüche, wobei das Basiselement (10) eine Vielzahl von planaren Elementen (13), die aneinander angrenzen, umfasst, wobei die planaren Elemente (13), die aneinander angrenzen, durch den Klebstoff auf Naturlatexbasis miteinander in Eingriff gebracht werden. 10
10. Rasensystem nach einem der vorhergehenden Ansprüche, wobei der Kunstrasen außerdem ein Füllmaterial (30) umfasst, das so angeordnet ist, dass es auf der zweiten Seite (23) der Matte (21) verteilt wird, wobei das Füllmaterial (30) aus losem Material pflanzlichen Ursprungs gebildet ist, das aus der Gruppe ausgewählt ist, die aus Folgendem besteht: 15
 - Rhachis von Getreideähren, insbesondere Maiskolben, d. h. Rhachis von Mais;
 - Getreideschalen, insbesondere Reisschalen;
 - ein loses Produkt, das aus Rohmaterial auf Korkbasis gewonnen wird;
 - ein loses Produkt, das aus Rohmaterial auf Basis gemahlener Kokosnuss gewonnen wird; oder einer Kombination davon. 20
11. Rasensystem nach Anspruch 10, wobei das lose Material pflanzlichen Ursprungs durch einen Schritt eines Mischens einer vorbestimmten Menge des oben genannten losen Materials pflanzlichen Ursprungs mit einer vorbestimmten Menge einer vorbestimmten Verbindung auf der Basis von mindestens einem trocknenden oder halbtrocknenden Öl derart gewonnen wird, so dass die Eigenschaften des losen Materials pflanzlichen Ursprungs verbessert werden. 25
12. Rasensystem nach einem der vorhergehenden Ansprüche, wobei der Rasen (20) außerdem Halme aus natürlichem Gras (26) umfasst, die von mindestens einer Pflanzenart gewonnen werden und die einen natürlichen Grasrasen ausbilden, so dass ein Mischrasen (20) synthetisch und natürlich gewonnen wird. 30
13. Rasensystem nach einem der Ansprüche 10 bis 12, wobei das Füllmaterial synthetisches Material umfasst, das aus der Gruppe ausgewählt ist, die aus Folgendem besteht: Granulat aus Gummi, Granulat 35

aus einem Styrol-Butadien-Kautschuk, Granulat aus einem thermoplastischen Material, Granulat aus einem Ethylen-Propylen-Dien-Monomer, Granulat aus Polyvinylchlorid, Granulat aus einem synthetischen organischen Material oder einer Kombination davon; und/oder eine vorbestimmte Menge Sand.

14. Rasensystem nach einem der Ansprüche 10 bis 13, wobei das Füllmaterial eine untere Schicht (32) und mindestens eine obere Schicht (31) umfasst, die auf der unteren Schicht (32) positioniert ist, wobei die untere Schicht (32) insbesondere eine Sandschicht oder eine Maiskolbensschicht ist, oder eine Mischung aus Sand und Maiskolben und die obere Schicht (31) aus einem Material gebildet ist, das aus der Gruppe ausgewählt ist, die aus Folgendem besteht: 40

- Rhachis von Getreideähren, insbesondere Maiskolben, d. h. Rhachis von Mais;
- Getreideschalen, insbesondere Reisschalen;
- einem losen Produkt, das aus Rohmaterial auf Korkbasis gewonnen wird;
- einem losen Produkt, das aus Rohmaterial auf Basis gemahlener Kokosnuss gewonnen wird;
- einem synthetischen Material, das aus der Gruppe ausgewählt ist, die aus Folgendem besteht: Granulat aus Gummi, Granulat aus einem Styrol-Butadien-Kautschuk, Granulat aus einem thermoplastischen Material, Granulat aus einem Ethylen-Propylen-Dien-Monomer, Granulat aus Polyvinylchlorid, Granulat aus einem synthetischen organischen Material oder einer Kombination davon. 45

15. Verfahren zum Positionieren eines Rasensystems, umfassend die folgenden Schritte: 50

- Positionieren eines Basiselements (10), das eine vorbestimmte Dicke (s) aufweist, auf einer Trägeroberfläche (100), wobei das Basiselement (10) aus Naturfasern pflanzlichen Ursprungs (15) gebildet ist, die eine vorbestimmte Länge (l) aufweisen;
- Positionieren eines Rasens (20) auf dem Basiselement (10), wobei der Rasen (20) Folgendes umfasst: 55
 - eine Matte (21), die mit einer ersten Seite (22) und einer zweiten Seite gegenüber der ersten Seite (23) versehen ist, wobei die Matte (21) dazu konfiguriert ist, es Regen- oder Bewässerungswasser zu ermöglichen, von der zweiten Seite (23) zu der ersten Seite (22) derart zu fließen, dass es das Basiselement (10) erreicht;
 - eine Vielzahl von Halmen (25) aus synthetischem Material, die an der Matte (21) befestigt sind, wobei die Vielzahl von Halmen aus synthetischem Material (25) dazu konfiguriert sind, von der zweiten Seite (23) derart vorzustehen,

so dass sie den Rasen ausbilden;

wobei das Verfahren **dadurch gekennzeichnet ist, dass** die vorbestimmte Dicke (s) größer als 5 mm ist, **und dadurch, dass** das Basiselement (10) außerdem aus einem Klebstoff auf Naturlatexbasis gebildet ist, der so angeordnet ist, dass er die Naturfasern pflanzlichen Ursprungs (15) zusammenhält.

Revendications

1. Système de gazon (1) comprenant :

- un élément de base (10) comportant une épaisseur prédéfinie (s) et constitué par de fibres naturelles d'origine végétale (15) comportant une longueur déterminée (l) ;
 - un gazon (20) agencé pour être positionné sur ledit élément de base (10), ledit gazon (20) comprenant :
 - un tapis (21) doté d'une première face (22) et d'une seconde face (23) opposée à la première face, ledit tapis (21) étant conçu pour être perméable à l'eau d'une façon telle qu'il permet à l'eau de pluie ou d'irrigation de s'écouler de ladite seconde face (23) vers ladite première face (22) et d'atteindre ledit élément de base (10) ;
 - une pluralité de lames (25) constituées d'une matière synthétique fixées audit tapis (21), ladite pluralité de lames (25) constituées d'une matière synthétique étant conçues pour faire saillie à partir de ladite seconde face (23) d'une façon telle qu'elles forment un gazon synthétique ;
- ledit système de gazon (1) étant **caractérisé en ce que** ledit élément de base (10) est, en outre, constitué d'un adhésif à base de latex naturel agencé pour maintenir ensemble lesdites fibres naturelles d'origine végétale (15) **et en ce que** ladite épaisseur prédéfinie (s) est supérieure à 5 mm.

2. Système de gazon selon la revendication 1, ladite épaisseur prédéfinie (s) dudit élément de base (10) étant comprises entre 5 mm et 80 mm.
3. Système de gazon selon la revendication 1, ladite épaisseur prédéfinie (s) dudit élément de base (10) étant comprises entre 8 mm et 50 mm.
4. Système de gazon selon la revendication 1, ladite longueur (l) desdites fibres naturelles d'origine végétale étant supérieure à 5 mm.
5. Système de gazon selon l'une quelconque des revendications précédentes, lesdites fibres naturelles d'origine végétale étant choisies dans le groupe

constitué de :

- fibres de noix de coco ;
- fibres de lin ;
- fibres de toile ;
- fibres de jute ;
- fibres de ramie ;
- fibres de sisal ;
- fibres de coton ;
- fibres de Genisteae ;
- fibres de chanvre de Manille ;
- fibres de bambou ;
- fibres de Ceiba pentandra ;
- fibres de paille ;
- fibres d'Hibiscus ;
- fibres de bananier ;
- fibres d'Agave ;
- fibres d'Aloès ;
- fibres obtenues à partir de plantes arborescentes ;
- fibres d'Eucalyptus ;

ou une combinaison de ceux-ci.

6. Système de gazon selon l'une quelconque des revendications précédentes, lesdites fibres naturelles d'origine végétale comprenant au moins deux types différents de fibres naturelles d'origine végétale choisies dans le groupe constitué par des fibres de noix de coco, des fibres de lin, des fibres de toile, des fibres de jute, des fibres de ramie, des fibres de sisal, des fibres de coton, des fibres de Genisteae, des fibres de chanvre de Manille, des fibres de bambou, des fibres de Ceiba pentandra, des fibres de paille, des fibres d'Hibiscus, des fibres de bananier, des fibres d'Agave, des fibres d'Aloès, des fibres obtenues à partir de plantes arborescentes.

7. Système de gazon selon l'une quelconque des revendications précédentes, ledit élément de base (10) comprenant en outre une quantité prédéfinie d'une matière antibactérienne naturelle choisi dans le groupe constitué de :

- rachis d'épi de céréale, qui n'est pas recouvert d'un film ou d'une couche d'une matière d'enrobage ;
- liège ;

ou une combinaison de ceux-ci.

8. Système de gazon selon l'une quelconque des revendications précédentes, ledit élément de base (10) comprenant au moins un élément sensiblement plan (13) constitué d'au moins une couche desdites fibres naturelles d'origine végétale pressées et maintenues ensemble par ledit adhésif à base de

latex naturel.

9. Système de gazon selon l'une quelconque des revendications précédentes, ledit élément de base (10) comprenant une pluralité d'éléments plans (13) adjacents les uns aux autres, lesdits éléments plans (13) adjacents les uns aux autres étant mutuellement en prise par ledit adhésif à base de latex naturel. 5

10. Système de gazon selon l'une quelconque des revendications précédentes, ledit gazon artificiel comprenant, en outre, une matière de remplissage (30) agencée pour être distribué sur ladite seconde face (23) dudit tapis (21), ladite matière de remplissage (30) étant constituée d'une matière en vrac d'origine végétale choisie dans le groupe constitué de : 10
 - rachis d'épi de céréale, notamment la rafle de maïs, c'est-à-dire le rachis de maïs ;
 - balles de céréales, notamment de balles de riz ; 20
 - un produit en vrac obtenu à partir d'une matière première à base de liège ;
 - un produit en vrac obtenu à partir d'une matière première à base de noix de coco broyée ; ou 25
 - une combinaison de ceux-ci.

11. Système de gazon selon la revendication 10, ladite matière en vrac d'origine végétale étant obtenue par une étape de mélange d'une quantité prédéfinie de ladite matière en vrac d'origine végétale susmentionnée avec une quantité prédéfinie d'un composé prédéfini à base d'au moins une huile siccatrice, ou semi-siccative, d'une telle façon qu'elle améliore les propriétés de la matière en vrac d'origine végétale. 30 35

12. Système de gazon selon l'une quelconque des revendications précédentes, ledit gazon (20) comprenant, en outre, des lames d'herbe naturelle (26) obtenues par au moins une espèce végétale qui forment un gazon en plaques naturel, de manière à obtenir un gazon mixte (20) synthétique et naturel. 40

13. Système de gazon selon l'une quelconque des revendications 10 à 12, ledit matériau de remplissage comprenant une matière synthétique choisie dans le groupe constitué de : granulés de caoutchouc, granulés de caoutchouc styrène-butadiène, granulés d'une matière thermoplastique, granulés d'un monomère éthylène-propylène-diène, granulés de chlorure de polyvinyle, granulés d'une matière organique synthétique, ou une combinaison de ceux-ci ; et/ou une quantité prédéfinie de sable. 45 50 55

14. Système de gazon selon l'une quelconque des revendications 10 à 13,

ladite matière de remplissage comprenant une couche inférieure (32) et au moins une couche supérieure (31) positionnée sur ladite couche inférieure (32), notamment ladite couche inférieure (32) étant une couche de sable, ou une couche de rafle de maïs, ou un mélange de sable et de rafle de maïs et ladite couche supérieure (31) étant constituée d'une matière choisie dans le groupe constitué de :

- rachis d'épi de céréale, notamment une rafle de maïs, c'est-à-dire un rachis de maïs ;
- balles de céréales, notamment de balles de riz ;
- un produit en vrac obtenu à partir d'une matière première à base de liège ;
- un produit en vrac obtenu à partir d'une matière première à base de noix de coco broyée ;
- une matière synthétique choisie dans le groupe constitué de : granulés de caoutchouc, granulés d'un caoutchouc styrène-butadiène, granulés d'une matière thermoplastique, granulés d'un monomère éthylène-propylène-diène, granulés de polychlorure de vinyle, granulés d'une matière organique synthétique ;

ou une combinaison de ceux-ci.

15. Procédé permettant le positionnement d'un système de gazon comprenant les étapes de :
 - positionnement d'un élément de base (10) comportant une épaisseur prédéfinie (s) sur une surface de support (100), ledit élément de base (10) étant constitué de fibres naturelles d'origine végétale (15) comportant une longueur déterminée (l) ;
 - positionnement d'un gazon (20) sur ledit élément de base (10), ledit gazon (20) comprenant :
 - un tapis (21) doté d'une première face (22) et d'une seconde face opposée à la première face (23), ledit tapis (21) étant conçu pour permettre à l'eau de pluie ou d'irrigation de s'écouler de ladite seconde face (23) un ladite première face (22) d'une façon telle qu'elle atteigne ledit élément de base (10) ;
 - une pluralité de lames (25) en matière synthétique fixées audit tapis (21), ladite pluralité de lames en matière synthétique (25) conçues pour faire saillie à partir de ladite seconde face (23) d'une façon telle qu'elles forment ledit gazon ;

ledit procédé étant **caractérisé en ce que** ladite épaisseur prédéfinie (s) est supérieure à 5 mm et **en ce que** ledit élément de base (10) est, en outre, constitué d'un adhésif à base de latex naturel agencé pour maintenir lesdites fibres naturelles d'origine végétale (15) ensemble.

Fig. 1

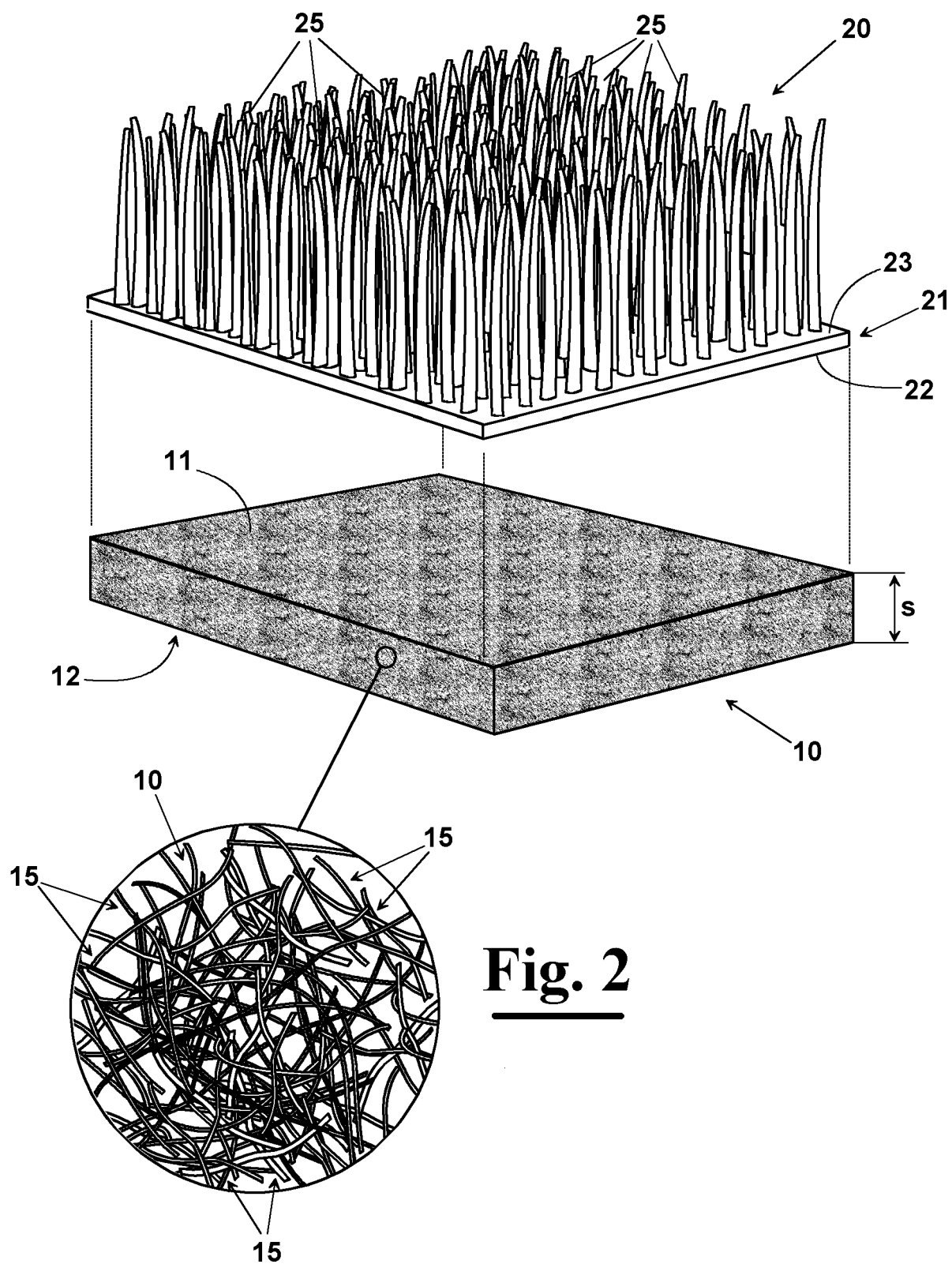


Fig. 2

Fig. 3

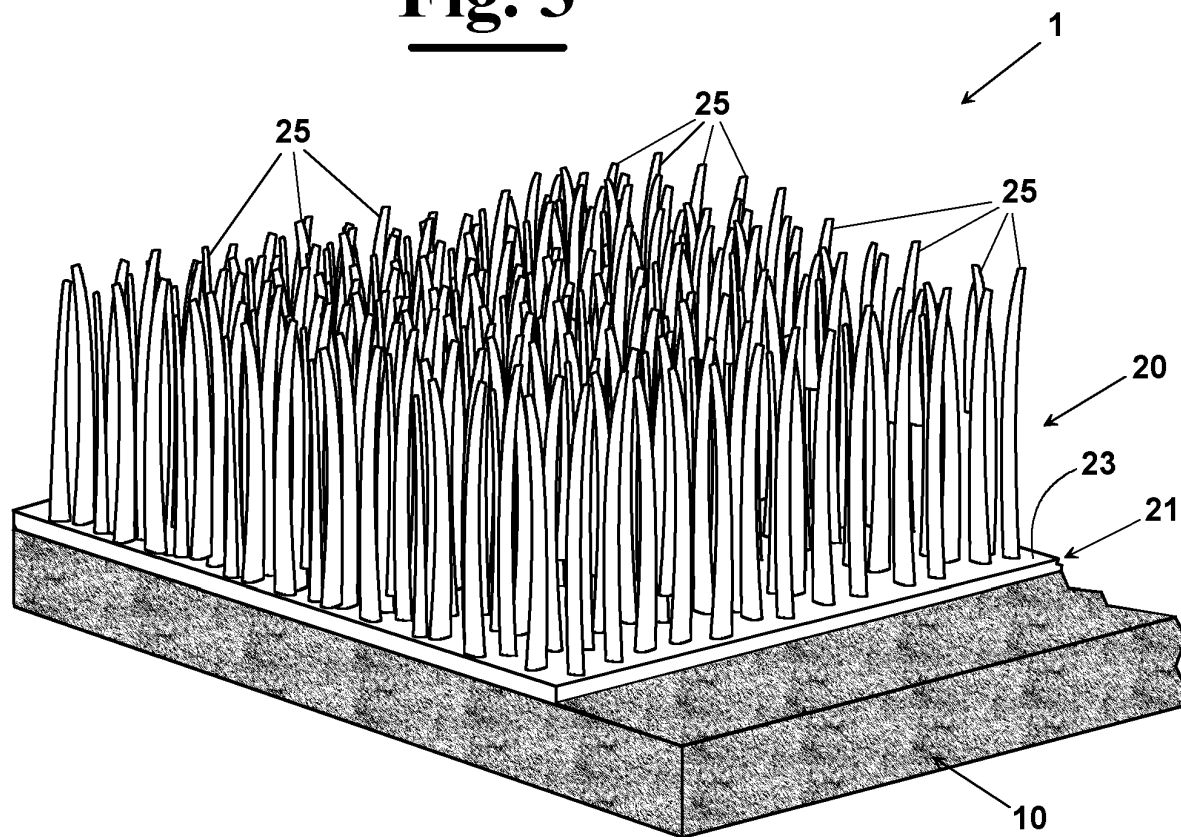


Fig. 4

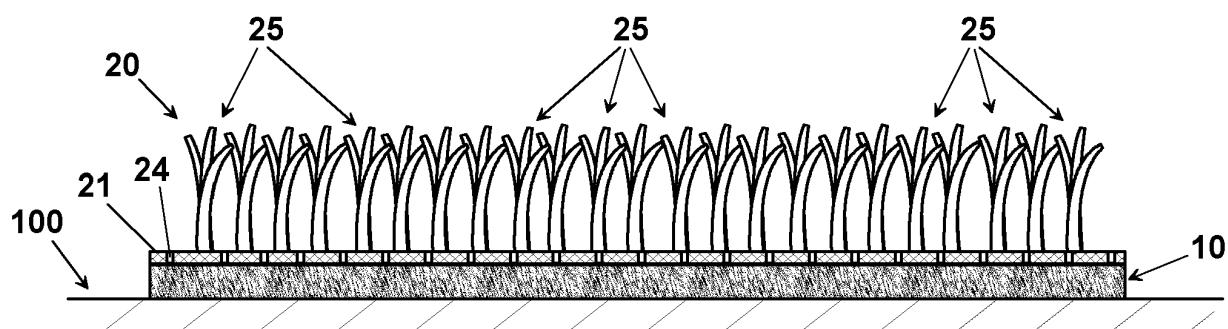


Fig. 5

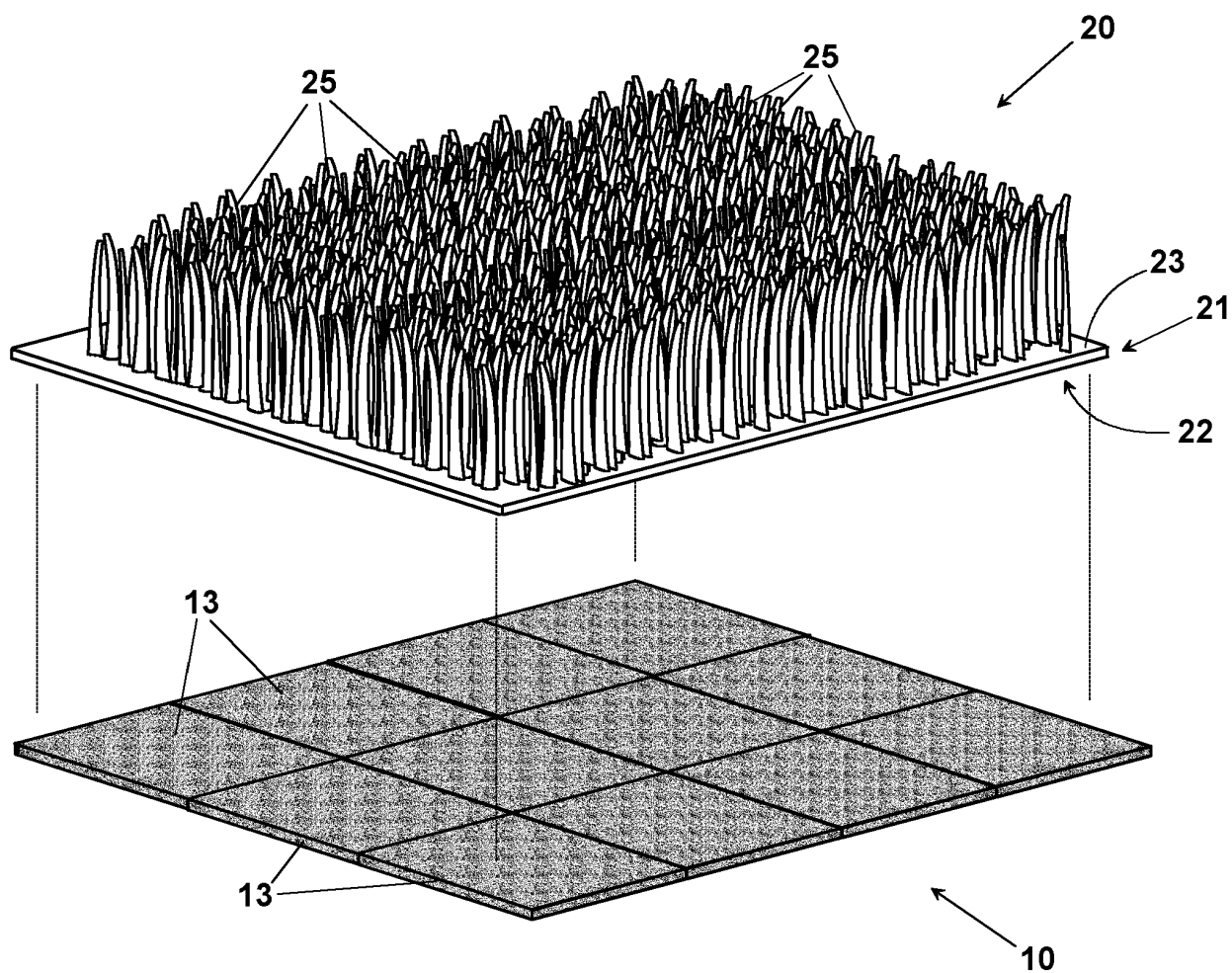


Fig. 6

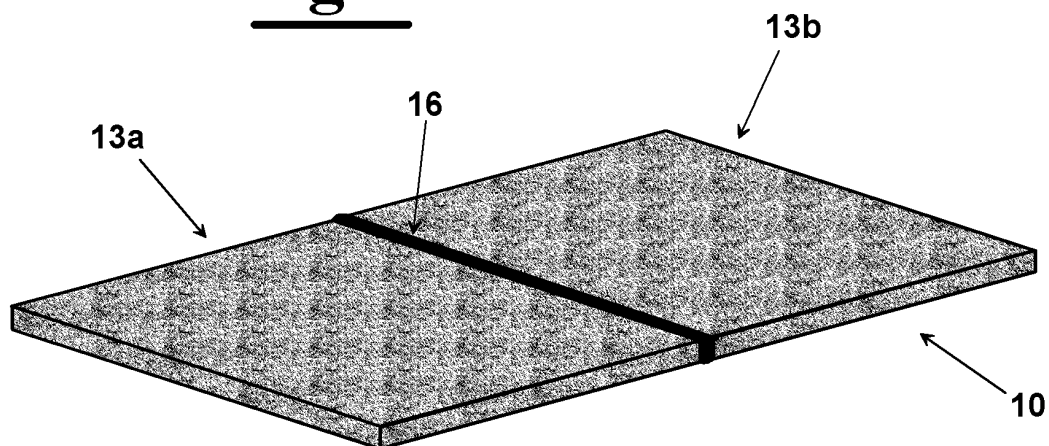


Fig. 7

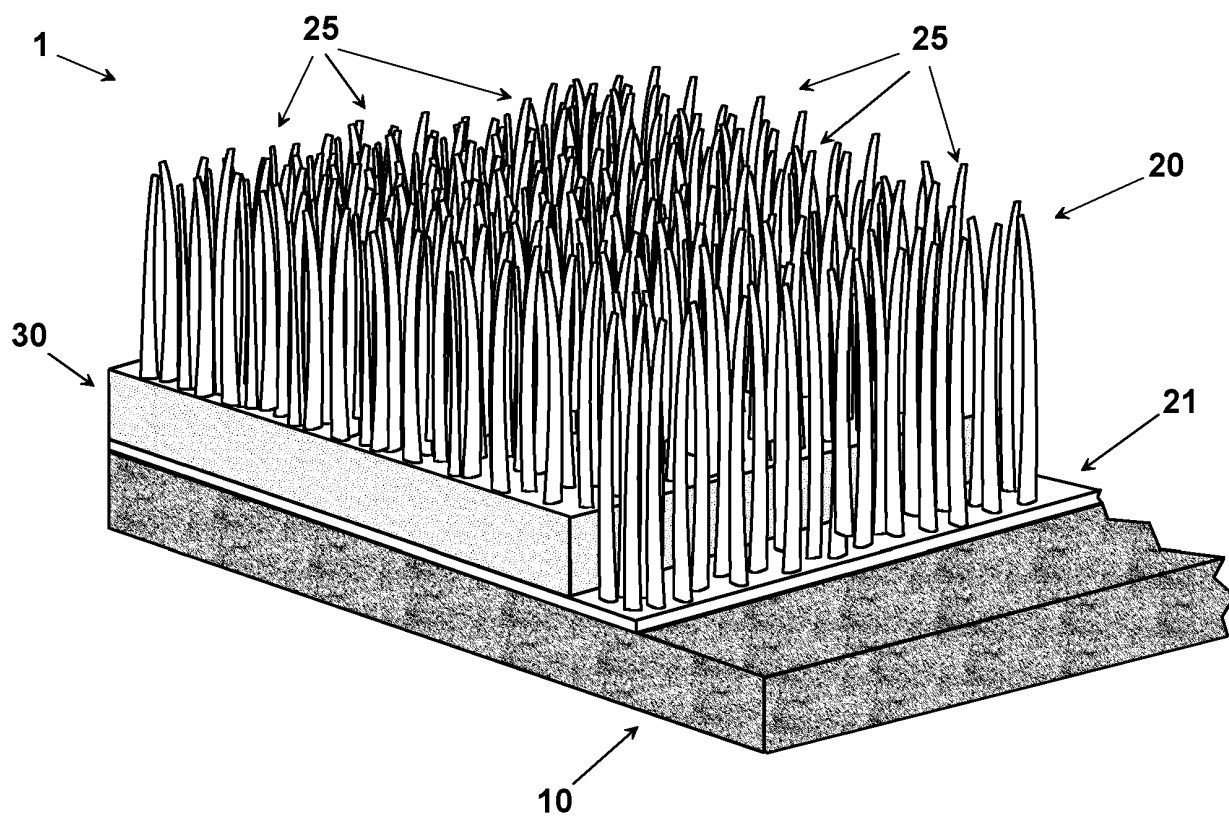


Fig. 8

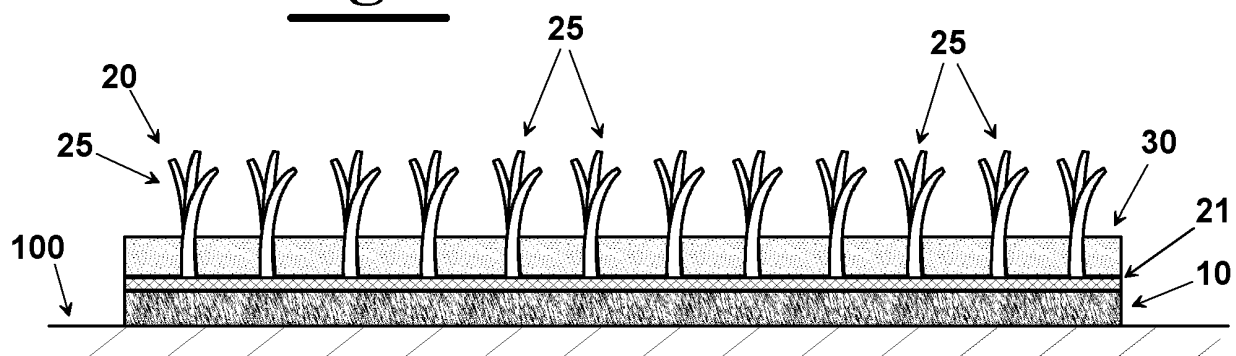


Fig. 9

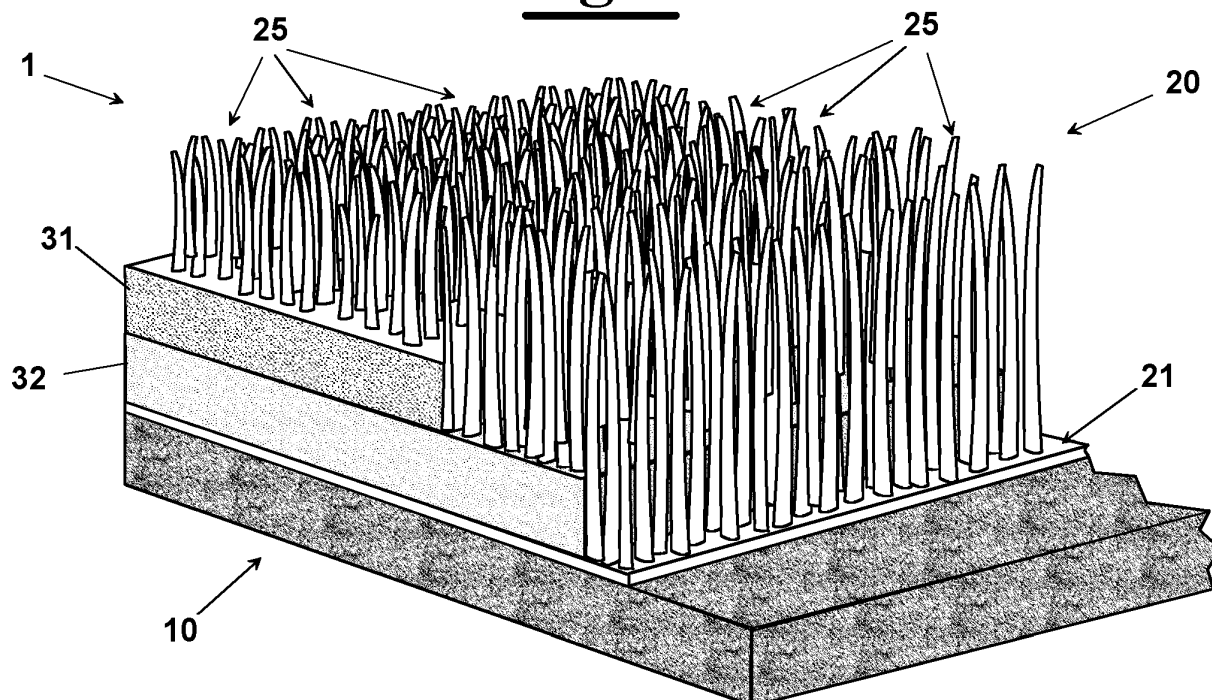


Fig. 10

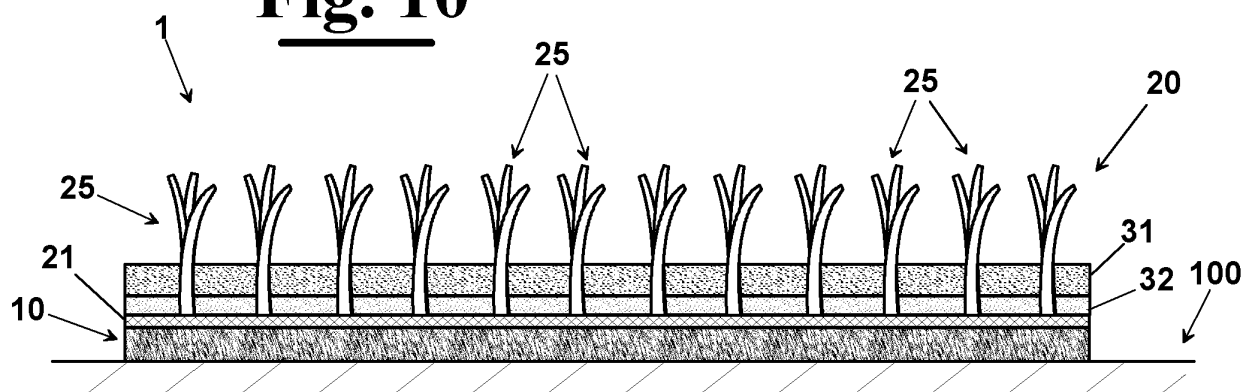
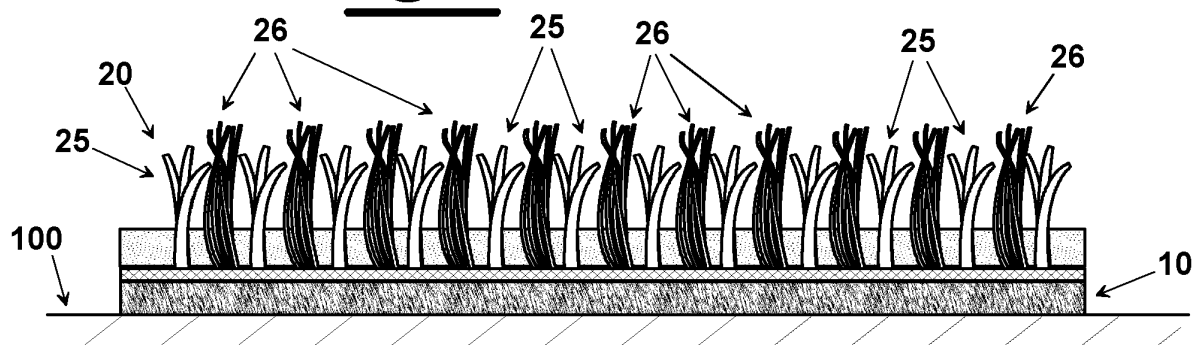


Fig. 11



REFERENCES CITED IN THE DESCRIPTION

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