(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 123 091 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
**25.01.2023 Bulletin 2023/04**

(21) Application number: **22185726.1**

(22) Date of filing: **19.07.2022**

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

(52) Cooperative Patent Classification (CPC):
**E01C 13/08;** E01C 2013/086

(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:
**KH MA MD TN**

(30) Priority: **19.07.2021 GB 202110356**

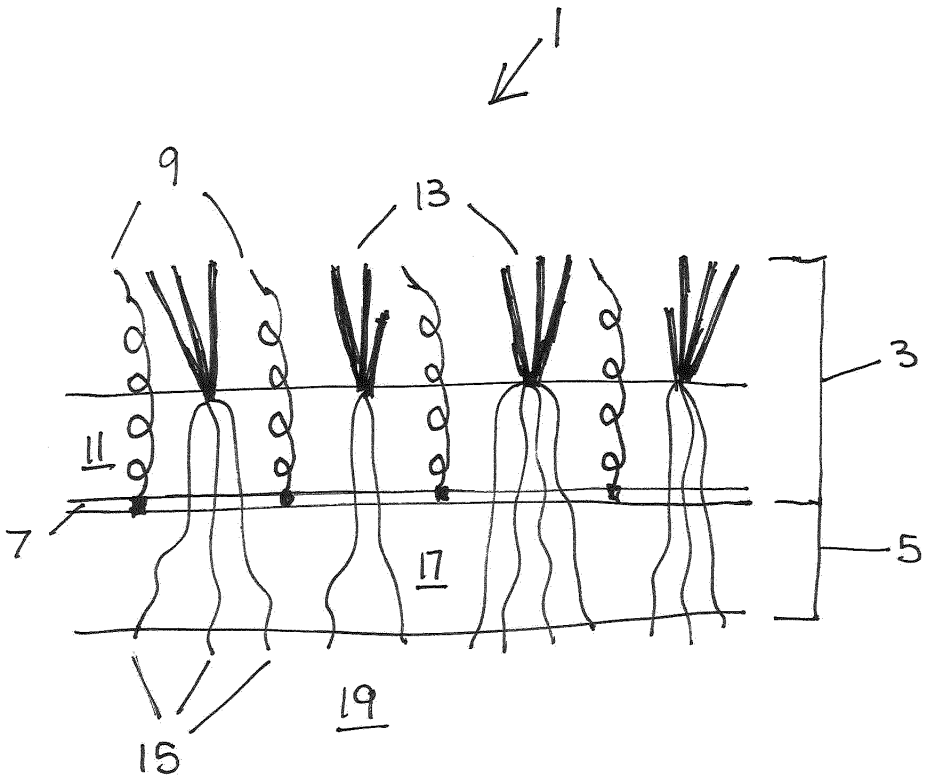
(71) Applicant: **Hawthorn Heights Limited**
**Eglinton BT47 3BE (GB)**

(72) Inventor: **McGuinness, Steven**
**Eglinton, BT47 3BE (GB)**

(74) Representative: **HGF**
**HGF Limited**
**1 City Walk**
**Leeds LS11 9DX (GB)**

(54) **GROUND SURFACING PRODUCT**

(57) A ground surfacing product comprising a first section (3) comprising an artificial, root-permeable backing layer (7), artificial grass having blades (9) attached to and extending upwardly from the backing layer, a growth media layer (11) positioned over the backing layer (7) to at least partially cover the backing layer and the artificial grass blades, natural grass sown in the growth media layer and having blades (13) extending upwardly from the growth media layer and roots (15) extending downwardly through the growth media layer and the backing layer, and a second section (5) comprising a layer of cork (17) positioned beneath the backing layer of the first section and roots of the natural grass extending at least through the cork.




EP 4 123 091 A1

## Description

**[0001]** The invention relates to a ground surfacing product particularly for use in public play areas and other areas where falls may occur.

**[0002]** Various products exist for use in areas where falls may occur. In playgrounds, where apparatus is provided for play and from which it is possible to fall, it is important that ground surfacing product provided around and beneath the playground apparatus is able to provide some protection from falls. Industry standards, such as BS EN 1176 and BS EN 1177, set out impact attenuation requirements at different fall heights for ground surfacing products used in playgrounds and other such areas. In addition to these requirements, ground surfacing products used in public play areas have to be durable, maintainable and, preferably, aesthetically pleasing. The invention aims to provide a ground surfacing product that addresses these requirements.

**[0003]** According to a first aspect of the invention there is provided a ground surfacing product comprising :
a first section comprising :

an artificial, root-permeable backing layer,
artificial grass having blades attached to and extending upwardly from the backing layer, a growth media layer positioned over the backing layer to at least partially cover the backing layer and the artificial grass blades,
natural grass sown in the growth media layer and having blades extending upwardly from the growth media layer and roots extending downwardly through the growth media layer and the backing layer, and
a second section comprising a layer of cork positioned beneath the backing layer of the first section and roots of the natural grass extending at least through the cork.

**[0004]** The backing layer may comprise artificial yarn fibres. The artificial yarn fibres may be woven to provide openings in the backing layer for permeation of natural grass roots through the backing layer.

**[0005]** The artificial grass blades may comprise artificial yarn fibres. The artificial yarn fibres may comprise spiral-shaped yarn fibres.

**[0006]** The artificial yarn fibres may be made from polyethylene. The polyethylene may be ultra violet stabilised. The polyethylene may be 5000 hours ultra violet stabilised.

**[0007]** The artificial grass blades may have a length of approximately 62mm. The artificial grass blades may have a density of 2000 d-tex. The artificial grass blades may be attached to the backing layer using a latex glue by a lick process followed by a curing process.

**[0008]** The growth media layer may comprise a plurality of growth media granules. The growth media granules may comprise sand granules. The growth media granules may comprise soil granules. The growth media granules may initially comprise sand granules to which are added cuttings of the natural grass to form soil granules.

**[0009]** The growth media granules may be positioned over the backing layer to substantially cover the backing layer. The growth media granules may be positioned over the backing layer to partially cover the artificial grass blades. The growth media granules may be positioned over the backing layer to partially cover approximately 9% length of the artificial grass blades.

**[0010]** The growth media layer may have a thickness of approximately 15mm.

**[0011]** The natural grass may comprise one species of grass. The natural grass may comprise a mixture of two species of grass. The two species of grass may comprise a ratio of approximately 70:30. The natural grass may comprise a mixture of three or more species of grass. In one embodiment of the ground surfacing product, the natural grass comprises a mixture of dwarf perennial rye grass and strong creeping red fescue grass, in a ratio of approximately 70% rye grass and 30% red fescue grass.

**[0012]** The first section may comprise a ratio of approximately 50:50 of natural grass and artificial grass.

**[0013]** The layer of cork may comprise natural cork. The layer of cork may comprise untreated cork. The layer of cork may comprise a plurality of cork granules. The cork granules may have a size of approximately 1-3mm. The cork granules may have a size of approximately 2-4mm. The layer of cork may have a thickness of any of approximately 40mm, approximately 60mm, approximately 90mm.

**[0014]** The ground surfacing product may comprise an overall thickness of any of approximately 40mm, approximately 70mm, approximately 100mm, approximately 130mm. The various thicknesses of the product may provide impact attenuation and protection from serious injury at different critical fall heights. A thickness of approximately 40mm may provide protection for a critical fall height of up to 0.98m. A thickness of approximately 70mm may provide protection for a critical fall height of up to 2.09m. A thickness of approximately 100mm may provide protection for a critical fall height of up to 2.62m. A thickness of approximately 130mm may provide protection at a critical fall height of greater than 3m.

**[0015]** According to a second aspect of the invention there is provided a method of assembling a ground surfacing product on a ground surface comprising
forming a first section of the product by:

providing an artificial, root-permeable backing layer having artificial grass blades attached to and extending upwardly therefrom,
positioning a growth media layer over the backing layer to at least partially cover the backing layer and the artificial grass blades,
sowing natural grass in the growth media layer and growing blades extending upwardly from the growth media layer and roots extending downwardly

through the growth media layer and the backing layer,

forming a second section of the product by placing a layer of cork on the ground surface, and

placing the first section of the product on the second section of the product such that the layer of cork is positioned beneath the backing layer and growing roots of the natural grass through the layer of cork into the ground surface.

**[0016]** Positioning the growth media layer over the backing layer may comprise sprinkling a plurality of growth media granules over the backing layer. The growth media granules may comprise sand granules. The method may further comprise periodically cutting blades of the natural grass. Cuttings of the blades of natural grass may be deposited in the layer of growth media to, over time, form growth media granules comprising soil granules.

**[0017]** Placing the layer of cork on the ground surface may comprise sprinkling a plurality of cork particles on the ground surface.

**[0018]** An embodiment of the invention will now be described by way of example only, with reference to the accompanying drawing which is a cross sectional schematic view of the ground surfacing product according to the first aspect of the invention.

**[0019]** Referring to the figure, the ground surfacing product 1 comprises a first section 3 and a second section 5. The first section 3 comprises an artificial, root-permeable backing layer 7, artificial grass having blades 9 attached to and extending upwardly from the backing layer 7, a growth media layer 11 positioned over the backing layer 7 to partially cover the backing layer 7 and the artificial grass blades 9, and natural grass sown in the growth media layer 11 and having blades 13 extending upwardly from the growth media layer 11 and roots 15 extending downwardly through the growth media layer 11 and the backing layer 7. The second section 5 comprises a layer of cork 17 positioned beneath the backing layer 7 of the first section 3 and roots 15 of the natural grass extending at least through the layer of cork 17.

**[0020]** The backing layer 7 comprises artificial yarn fibres, which are woven to provide openings (not shown) in the backing layer 7 for permeation of natural grass roots 15 through the backing layer 7. The artificial grass blades 9 comprise artificial spiral-shaped yarn fibres. The artificial yarn fibres are made from 5000 hours ultra violet stabilised polyethylene. The artificial grass blades have a length of approximately 62mm and a density of approximately 2000 d-tex.

**[0021]** The growth media layer 11 comprises a plurality of growth media granules (not shown). In this embodiment of the invention, the growth media granules initially comprise sand granules to which are added cuttings of the natural grass to form soil granules. It will be appreciated that the growth media may comprise other materials.

**[0022]** The growth media granules are positioned over the backing layer to substantially cover the backing layer and to partially cover the artificial grass blades. The growth media layer has a thickness of approximately 15mm. It will be appreciated that the growth media may comprise other thicknesses.

**[0023]** In this embodiment, the natural grass comprises a mixture of two species of grass, dwarf perennial rye grass and strong creeping red fescue grass, in a ratio of approximately 70:30. It will be appreciated that other species of natural grass may be used in other ratios.

**[0024]** In this embodiment of the ground surfacing product, the first section 3 comprises a ratio of approximately 50:50 of natural grass and artificial grass. It will be appreciated that other ratios can be used.

**[0025]** The layer of cork 17 comprise natural cork, which is untreated. The layer of cork 17 comprises a plurality of cork granules (not shown), having a size of approximately 1-3mm or approximately 2-4mm, and the layer has a thickness of any of approximately 40mm, approximately 60mm, approximately 90mm. Other sized cork granules and layer thicknesses may be used.

**[0026]** The ground surfacing product 1 is assembled on a ground surface 19 as follows.

**[0027]** The first section 3 of the product 1 is formed by providing the artificial, root-permeable backing layer 7 having artificial grass blades 9 attached to and extending upwardly therefrom, positioning the growth media layer 11 over the backing layer 7 to at least partially cover the backing layer 7 and the artificial grass blades 9, sowing natural grass in the growth media layer 11 and growing blades 13 extending upwardly from the growth media layer 11 and roots 15 extending downwardly through the growth media layer 11 and the backing layer 7.

**[0028]** Positioning the growth media layer 11 over the backing layer 7 comprises sprinkling a plurality of growth media granules over the backing layer 7 to a thickness of approximately 15mm. In this embodiment, the growth media granules comprise sand granules. Forming the first section 3 of the product 1 further comprises periodically cutting blades 15 of the natural grass. Cuttings of the blades 15 of natural grass are deposited in the layer of growth media 11 to mix with the sand granules and, over time, form growth media granules comprising soil granules. In this embodiment of the invention, the thickness of the layer of soil granules is approximately 40mm. The thickness of the layer of soil granules will depend on the length of time over which the natural grass is grown and cut.

**[0029]** The first section 3 of the ground surfacing product 1 will generally be formed 'off-site', i.e. not in the location where the product is to be used. The first section 3 may be formed, for example, in a nursery and then moved to the location where it is to be used.

**[0030]** The second section 5 of the ground surfacing product 1 is formed by placing a layer of cork on the ground surface 19. This comprises sprinkling a plurality of cork particles on the ground surface to form a substantially even layer of cork granules. The thickness of the

layer of cork granules can be, for example, 40mm, 60mm or 90mm. The chosen thickness of the layer of cork granules depends on the required impact attenuation of the product, which, in turn, depends on the anticipated fall height onto the product 1.

**[0031]** The first section 3 of the ground surfacing product 1 is then placed on the second section 5 of the product 1, such that the layer of cork 17 is positioned beneath the backing layer 7. Over time, roots 15 of the natural grass grow out of the layer of cork 17 into the ground surface 19. This acts to attach the ground surfacing product 1 into the soil surface 19.

**[0032]** The ground surfacing product 1 comprises an overall thickness of any of approximately 40mm, approximately 70mm, approximately 100mm, approximately 130mm. The various thicknesses of the product 1 provide impact attenuation and protection from serious injury at different critical fall heights onto the product 1. A thickness of approximately 40mm may provide protection for a critical fall height of up to 0.98m. A thickness of approximately 70mm may provide protection for a critical fall height of up to 2.09m. A thickness of approximately 100mm may provide protection for a critical fall height of up to 2.62m. A thickness of approximately 130mm may provide protection at a critical fall height of greater than 3m.

## Claims

1. A ground surfacing product comprising :
   a first section comprising :

   an artificial, root-permeable backing layer,
   artificial grass having blades attached to and extending upwardly from the backing layer, a growth media layer positioned over the backing layer to at least partially cover the backing layer and the artificial grass blades,
   natural grass sown in the growth media layer and having blades extending upwardly from the growth media layer and roots extending downwardly through the growth media layer and the backing layer, and
   a second section comprising a layer of cork positioned beneath the backing layer of the first section and roots of the natural grass extending at least through the cork.

2. A ground surfacing product according to claim 1 in which the backing layer comprise artificial yarn fibres.

3. A ground surfacing product according to claim 2 in which the artificial yarn fibres are woven to provide openings in the backing layer for permeation of natural grass roots through the backing layer.

4. A ground surfacing product according to any preceding claim in which the artificial grass blades comprise spiral-shaped yarn fibres.

5. A ground surfacing product according to any of claims 2 to 4 in which the artificial yarn fibres are made from polyethylene.

6. A ground surfacing product according to any preceding claim in which the growth media layer comprises a plurality of growth media granules comprising sand granules to which are added cuttings of the natural grass to form soil granules.

7. A ground surfacing product according to claim 6 in which the growth media granules are positioned over the backing layer to substantially cover the backing layer and to partially cover the artificial grass blades.

8. A ground surfacing product according to any preceding claim in which the natural grass comprises a mixture of two species of grass in a ratio of approximately 70:30.

9. A ground surfacing product according to any preceding claim in which the first section comprises a ratio of approximately 50:50 of natural grass and artificial grass.

10. A ground surfacing product according to any preceding claim in which the layer of cork comprises a plurality of cork granules having a size of any of approximately 1-3mm, approximately 2-4mm.

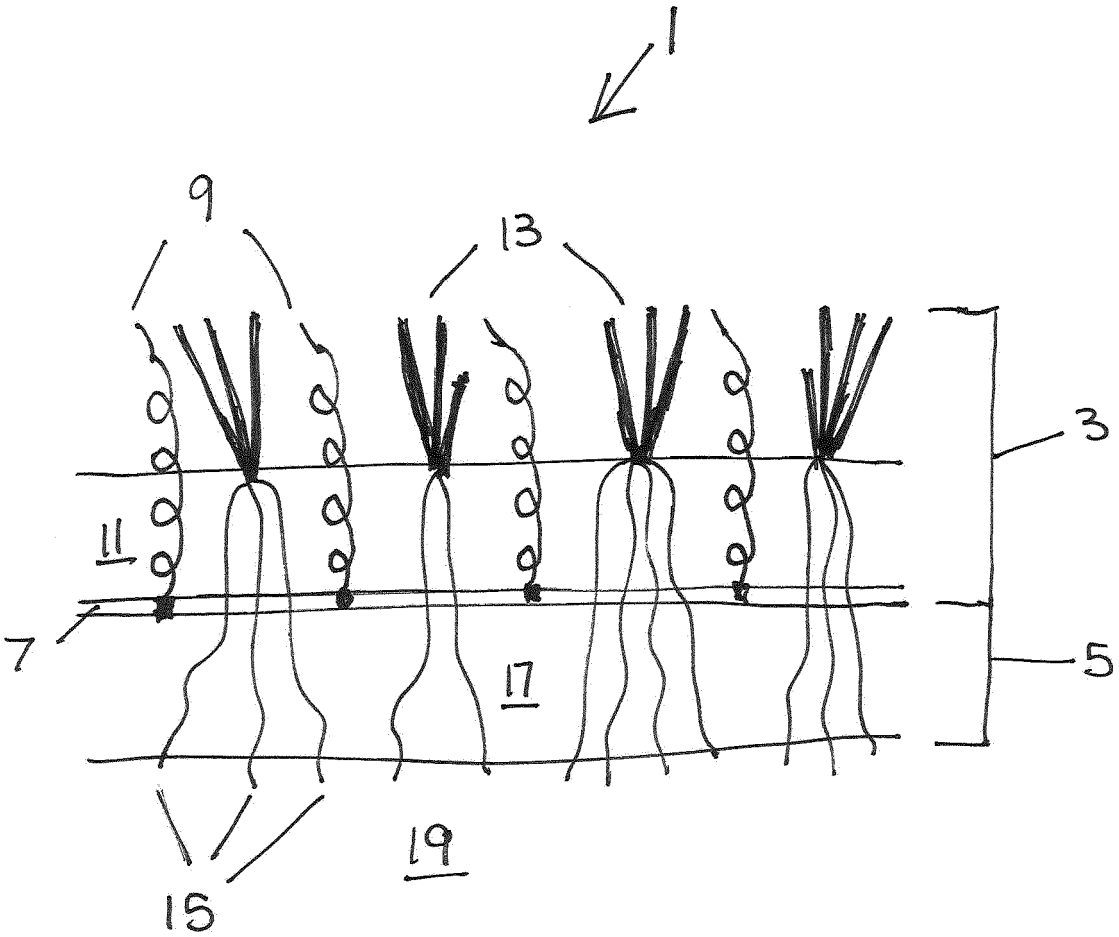
11. A ground surfacing product according to any preceding claim in which the layer of cork has a thickness of any of approximately 40mm, approximately 60mm, approximately 90mm.

12. A ground surfacing product according to any preceding claim comprising an overall thickness of any of approximately 40mm, approximately 70mm, approximately 100mm, approximately 130mm.

13. A ground surfacing product according to claim 12 having any of a thickness of approximately 40mm providing protection for a critical fall height of up to 0.98m, a thickness of approximately 70mm providing protection for a critical fall height of up to 2.09m, a thickness of approximately 100mm providing protection for a critical fall height of up to 2.62m, a thickness of approximately 130mm providing protection at a critical fall height of greater than 3m.

14. A method of assembling a ground surfacing product on a ground surface comprising
    forming a first section of the product by:

providing an artificial, root-permeable backing layer having artificial grass blades attached to and extending upwardly therefrom,
positioning a growth media layer over the backing layer to at least partially cover the backing layer and the artificial grass blades,
sowing natural grass in the growth media layer and growing blades extending upwardly from the growth media layer and roots extending downwardly through the growth media layer and the backing layer,
forming a second section of the product by placing a layer of cork on the ground surface, and
placing the first section of the product on the second section of the product such that the layer of cork is positioned beneath the backing layer and growing roots of the natural grass through the layer of cork into the ground surface.


1
9
13
3
11
7
17
5
19
15

Europäisches Patentamt
European Patent Office
Office européen des brevets

# EUROPEAN SEARCH REPORT

Application Number
EP 22 18 5726

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
|---|---|---|---|
| X | WO 2015/128730 A1 (SARRIS NIKOLAOS [IT]) 3 September 2015 (2015-09-03) | 1-3,6-14 | INV. E01C13/08 |
| Y | * the whole document * | 4,5 | |
| Y | WO 90/15193 A1 (OTSUKA KAGAKU KK [JP]) 13 December 1990 (1990-12-13) * the whole document * | 4,5 | |
| X | WO 2006/008579 A1 (NUSCA ROBERTO [IT]; VOLTERRANI MARCO [IT]) 26 January 2006 (2006-01-26) * the whole document * | 1 | |

TECHNICAL FIELDS SEARCHED (IPC)

E01C

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| Munich | 24 November 2022 | Beucher, Stefan |

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

# ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 22 18 5726

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

24-11-2022

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| WO 2015128730 A1 | 03-09-2015 | DK 3114282 T3 | 16-07-2018 |
| | | EP 3114282 A1 | 11-01-2017 |
| | | ES 2673932 T3 | 26-06-2018 |
| | | HR P20180920 T1 | 27-07-2018 |
| | | HU E037848 T2 | 28-09-2018 |
| | | PL 3114282 T3 | 28-09-2018 |
| | | PT 3114282 T | 04-07-2018 |
| | | SI 3114282 T1 | 31-08-2018 |
| | | TR 201808880 T4 | 23-07-2018 |
| | | US 2017067213 A1 | 09-03-2017 |
| | | WO 2015128730 A1 | 03-09-2015 |
| WO 9015193 A1 | 13-12-1990 | CA 2034003 A1 | 10-12-1990 |
| | | DE 69019120 T2 | 26-10-1995 |
| | | EP 0432272 A1 | 19-06-1991 |
| | | US 5462778 A | 31-10-1995 |
| | | WO 9015193 A1 | 13-12-1990 |
| WO 2006008579 A1 | 26-01-2006 | EP 1781859 A1 | 09-05-2007 |
| | | PL 212454 B1 | 31-10-2012 |
| | | US 2007248773 A1 | 25-10-2007 |
| | | WO 2006008579 A1 | 26-01-2006 |

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82